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DELINEATION OF FUNCTIONAL URBAN AREAS AND EVIDENCE OF AGGLOMERATION ECONOMIES IN INDONESIA

A Doctoral Thesis
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Abstract

This study presents the delineation of urban areas and estimates the magnitudes of agglomeration economies in Indonesia. It starts from offering a new definition of an urban area in Indonesia based on a functional approach. There are 83 urban areas identified from this process. These urban areas play an important role in Indonesia's economy as their economic share is substantial at 61 percent in 2010. They represent only 4.7 percent of the land area of Indonesia, but these urban areas are home of 52 percent of the country's population. The concentration of manufacturing workers is significant in those urban areas at 75 percentage level. This condition reflects a transformation of this country to become an industrialized economy that driven by the productivity in urban areas.

The second part of this study examines agglomeration economies in urban areas in Indonesia from the productivity perspective. The empirical estimation addresses the endogeneity in workers' quantity and workers' quality. The agglomeration externalities in Java urban areas are statistically significant and range between 2 and 3 percent. The market potential is also a significant determinant of wages in Java urban areas. The elasticity of wages with respect to market potential ranges between 24 percent and 25 percent. However, the effect of employment density and market potential are not significant to the productivity on urban areas outside Java.

The last part of this study focuses on the consumption side of agglomeration economies in Java metropolitan areas. The main feature of this empirical study is the application of micro-level estimation at household level. This micro-level assessment enables us to control for the house characteristics in estimating the net agglomeration values. The results suggest that the elasticity for agglomeration ranges from 12 to 14 percent in Java metropolitan areas. The local infrastructure is also statistically significant to the consumption values with an elasticity that ranges between 5.3 percent and 6 percent. Among local infrastructures, the road network has the highest consumption values in Java metropolitan areas.

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1. INTRODUCTION

This study delineates a functional urban area by using the recent statistical and geospatial data for Indonesia. This delineation process is discussed in Chapter 2. We start the delineation from sub-regency level to identify the potential core area. We construct a commuting matrix to identify the connectivity between regencies in all regions. The matrix is based on actual workers' commuting pattern available from the labour force surveys. We also examine the characteristics and the trend of development in urban areas during a period of 1996 to 2010. We describe the trend for urban population and the economic role of urban areas in Indonesia.

The next two chapters estimate the benefits from agglomeration in Indonesia's urban areas. We estimate the productivity-side and the consumption-side agglomeration economies using micro-level datasets. Chapter 3 focuses on the productivity side of agglomeration economies in Indonesia. Our study is based on the wage approach that enables us to address the endogenous quantity of workers by using the instruments. We address the endogeneity of workers' quality by constructing the panel data at regency level. We include the worker's characteristics as explanatory variables to separate their effect on wage disparity from the net agglomeration externality. Moreover, we estimate the effect of market potential to the wages as suggested by the new economic geography. Considering a variation of urban areas among the regions in Indonesia, we conduct a specific estimation on Java and compare the result with that in other islands.

Chapter 4 estimates the consumption side of agglomeration economies for metropolitan areas in Java only. Residents tolerate a higher cost of living in metropolitan areas if they benefit from the agglomeration economies and services from the local infrastructures. We estimate the bid rent functions at the household level. The micro-level data allows us to include house characteristics as explanatory variables of the house rent. By using this strategy, we can separate the effect of house characteristics on the house rent in estimating the consumption-side benefit of agglomeration.

The last chapter presents the overall conclusions from this paper and highlights some policy implications from our findings to the development of urban areas in Indonesia. We include the map of urban areas in Indonesia and the commuting matrices among the regencies in the Appendix as additional information to support further research.

2. DELINEATION OF URBAN AREAS IN INDONESIA

2.1. Introduction

Study in urban economics typically starts with a delineation of an urban boundary, a spatial unit where economic activities take place. This study delineates urban areas to provide groundwork for conducting studies on urban economics in Indonesia. We apply a delineation method that is based on the functional approach. This study utilizes available information from recent surveys in Indonesia to construct a delineation procedure that is comparable to those in other countries. This definition is expected to provide a necessary basis for further studies and policy formulation for urban areas in Indonesia.

This chapter focuses on three main tasks. We begin with a review of the existing definitions of urban areas in Indonesia and in other countries. In the next section, we propose a delineation method that relies on a functional approach. The last section of this chapter discusses the distribution of urban areas across the regions and the role of urban areas to economic development. We use the delineation to explain the development of urban areas in Indonesia. We focus on some important indicators such as the trend of population, the distribution of workers, and economic output.

This chapter is organized as follows. After a short introduction in this section, the second section discusses a current definition and our justification to define urban areas in Indonesia. The third section describes the method to delineate urban areas. The fourth section discusses some characteristics of urban areas and their role to the economy. The fifth section concludes our main findings.

2.2. Previous definitions of urban areas in Indonesia

The current definitions of urban areas in Indonesia are established for statistical and spatial planning purposes. For statistical purposes, an urban area is defined at village level. The classification of a village as an urban area or rural area is started in 1961 and is regularly reviewed in ten years. The earliest definition utilizes a simple procedure in which villages that located in a city or in a center of the regency, or the villages that have at least 80 percent of non-agriculture workers are defined as urban areas. This definition is subsequently improved by introducing other criteria such as the population density and access to public facilities.

The latest definition in 2010 outlines an urban area by using a scoring method. The method utilizes some criteria on the population density, the share of agricultural households, and access to urban facilities. The population density is set in a range between 500 and 8500 inhabitants per square kilometer. A lower population density corresponds to a lower score. The share of agricultural workers is set between 5 percent and 70 percent. A lower percentage agricultural worker corresponds to a higher score in the measurement. Access to urban facilities is measured by the existing facility in the village or by access to the facility in another village. Schools, the marketplace, shopping mall, cinemas, hospital, hotels, and entertainment spot are defined as urban facilities in that identification process. Access to local infrastructure is also measured in defining an urban village. For instance, the minimum share of a household with access to electricity is set at 90 percent. The share of a household with access to the cable phone is set at 8 percent. By using those criteria, a village with a total score of 10 or higher is defined as an urban area. There are 13330 villages that enlisted as urban areas in 2011, or about 17 percent from a total of 77961 villages in Indonesia (BPS, 2011a). Based on this definition, there are 118 million populations or 49.8 percent from Indonesia's population that inhabit in urban areas in 2010 (BPS, 2010a).

Another definition of urban areas is established in the spatial planning regulation, e.g. Government Regulation No. 26 Year 2008 on Spatial Plan. That regulation defines an urban region based on some criteria. The criteria are: the share of non-agricultural workers, the share of settlement areas in land use, and the existing facilities for government affairs, social services, and business. An urban region is defined as a Metropolitan area if it has a total population of at least one million. Two or more metropolitan areas with a functional connectivity, measured by the transportation network, are integrated as a Megapolitan area if the total population reaches above 2.5 million.

That regulation also defines a *national urban system*, a list of metropolitan areas and cities that designated as national and regional priorities for economic development. There are 238 regencies that established as the economic center, as listed in Table 2-1. Most of the province capitals are established as the national priority for economic development, except for three: Bengkulu and Pangkalpinang in Sumatera and Majene in Sulawesi. Moreover, the national priority cities are dominant in Java. There are 10 cities in Java, 6 province capitals and 4 big cities, assigned as the national priorities.

Table 2-1 National urban system by island groups in Indonesia

No	Island	National Priority	Regional Priority	National Strategic
1	SUMATERA	9	58	3
2	JAVA	10	32	0
3	BALI & NUSA	3	13	3
4	KALIMANTAN	5	25	10
5	SULAWESI	5	27	2
6	MALUKU & PAPUA	5	22	6
	TOTAL	**37**	**177**	**24**

Source: Government Regulation No. 26 Year 2008 on National Spatial Plan

There are 177 cities defined as a center for regional activities. These regional priority areas play as the midpoint of economic activities in a province. These regional centers are also dominant in Java. Among the cities that enlisted as national and regional priorities, there are 31 cities that have total populations of more than one million. Moreover, there are 7 cities that meet the criteria as Megapolitan. These Megapolitan areas are located in Java, except for two cities, Medan and Makassar.

Lastly, the list includes 24 regencies defined as national strategic areas. These areas are enlisted based on their strategic location in a border area between Indonesia and its neighbouring country. Most of these strategic areas are located in Kalimantan where Indonesia shared a border with Malaysia in the northern part of the island.

The urban regions enlisted in the national urban system are varied in their number of jurisdictions; from a Megapolitan area that consists of multiple regencies to a small city that only represents a particular area in one regency. Jakarta as the largest Megapolitan consists of 13 regencies and Surabaya as the second largest Megapolitan consists of 8 regencies. On the other hand, Cikampek – Cikopo district is defined as a city although it is only a fraction of Karawang regency. A similar condition holds for other cities such as Pangandaran district in Ciamis regency and Kadipaten district in Majalengka regency.

The two definitions of urban regions explained above are not suitable for conducting empirical study on urban areas in Indonesia. The definition of an urban area at village-level is not suitable for regency-level estimation. The scoring method applied for this delineation process does not only based on the functional term of urban areas such as the population density and the percentage of agricultural household, but also on physical facilities such as schools, marketplaces, and telephones. A village with adequate access to public facilities may be defined as an urban area even if the agricultural workers are still dominant in that area. Moreover, the definition of an urban area at the village level does not consider the regional connectivity that represents an integration of economic activities among the jurisdictions.

The definition of an urban area from spatial planning policy can be considered as the counterpart of the definition of a functional urban area in this paper. However, that definition includes some indicators that do not directly relate to economic condition. For instance, the national strategic region is defined from its location in a border with neighbouring country. The procedure to define megapolitan and metropolitan regions in spatial planning regulation utilizes the connectivity threshold among regencies to define the integration of two or more regencies. However, the inter-region connectivity is estimated from the availability of transportation network such as road and railway. We consider this measurement can overestimate the inter-regency union since the connectivity level is not derived from the actual commuting pattern of employment. The difference in a jurisdictional level in defining an urban region in this spatial planning regulation also raises a problem on the data computation since most of the statistical data are only available at regency level.

The method to define an urban area is varied among countries and subject of studies. There are three common approaches to define an urban area for different purposes: administrative, morphological, and functional definitions (see Freeman, 2004 and Eurostat, 2013). The administrative definition is usually established by the government based on the formal boundary jurisdictions. This administrative approach exists in the governmental system in all countries. There are 79 regions defined as a city (kota) in Indonesia in 2010 based on this administrative definition. This definition is important for policy formulation related to the public administration and governance.

The second definition of urban area is based on a morphological approach that defines a boundary of urban areas based on a sprawl of built-up areas or a concentration of settlement areas. This approach defines a city boundary based on the land use pattern and distribution of settlement areas. A region of urban areas can exist in one region or expand beyond one administrational jurisdiction. A delineation method based on the morphological approach is useful for conducting research related to the land use and environment.

The functional approach defines an urban area based on the economic connectivity among the regions. The boundary of an urban area is defined based on the existence of a core and sub-urban areas. The functional connectivity is defined by commuting ties or by the travel time between two regencies. This functional approach is suitable for empirical studies in urban economics.

There are two models to define an urban area based on the functional approach: a two-component model and a partitioning model. The two-component model defines a core area in first iteration, based on some criteria such as the total population and population density. The core area is defined based on administrative boundary at municipality or county level. The two-component method is more popular because of simplicity in its delineation process. Since this delineation method is based on an existing administrative boundary, it is also easier to integrate the urban area with the statistical data at municipality or county level. The identification of a potential core region in the first stage is also useful to investigate the relationship between a core area and its periphery. The partitioning model, on the other hand, starts with an identification of the settlement or the built-up area in a spatial grid and defines a core area in the last stage of its iteration process. The partitioning model is more convenient to deal with a condition where the size of administrative units varied across regions, such as in the case of European countries. It can yield a more precise boundary definition given the detail in its delineation process. However, partitioning model requires detail data at spatial grid level to support its aggregation process.

Table 2-2 summarizes the definition of urban areas that based on the functional approach in several countries. There are two main indicators to define a core area; population density and the total population. The population density is commonly applied in the previous delineation method since it represents a concentration of population and workers in one area. However, this indicator is no longer practical to distinguish a core and a sub-urban area. The current structure of the settlements may not be concentrated in the core area given an improvement in the transportation network and an increasing trend of the commuting pattern (Kanemoto & Kurima, 2004). Therefore, the recent definition methods use a combined indicator of the density and the total population. By using this indicator, a core area is identified by the existence of a densely populated area and a threshold on the total population.

Table 2-2 Delineation of urban areas in selected countries

Country	Source	Method	Core Area	Functional Connectivity
United States	US Office of Management and Budget (2010).	Two Component	Urbanized area of at least 50,000 population or urban cluster of at least 10,000 population	Commuting ties at least 25 percent
Japan	Kanemoto, Y. and Kurima, R. (2004).	Two Component	Collection of municipalities with DID populations of at least 10,000 that do not constitute as suburbs of any other core	Commuting ties at least 10 percent
European Union	Dijkstra, L., and Poelman, H. (2012).	Iterative aggregation	Urban center with a grid of minimum density 1,500 per sq. km and total population of 50,000	Commuting ties at least 15 percent
Columbia	Duranton, G. (2013).	Iterative aggregation	Total population of at least 10,000 for small cities and 50,000 for metropolitan	Commuting ties at least 10 percent
Various countries	Uchida, H., & Nelson, A. (2010).	Two Component	Density of 150 to 500 per sq. km and total population of at least 50,000	Travel time maximum 60 minutes
Canada	Statistics Canada (2013).	Two Component	Total population of at least 10,000 for small cities and 50,000 for metropolitan	Commuting ties at least 25 percent

There are two common types of urban areas based on the population size. The first type is the Metropolitan area with a minimum threshold of 50000 core populations. The second type is Micropolitan area with a total core population that ranged between 10000 and 50000. To define the functional connectivity, a conventional indicator is the commuting ties between jurisdictions. The threshold for commuting ties is based on a typical pattern of urban areas in a country. The commuting ties for cities in US and Canada are set at 25 percent. This commuting threshold is based on a condition that workers in those countries tend to reside in sub-urban areas and commute to their working place on a daily basis (US Office of Management and Budget 2010). On the other hand, the threshold for commuting ties in Japan is set at a lower level of 10 percent, given a typical settlement structure in that country that still concentrated in the core area. Another indicator for inter-regency's connectivity is based on a maximum travel time from the sub-urban area to the core, as suggested by Uchida and Nelson (2010).

2.3. Delineation method of functional urban areas in Indonesia

This paper utilizes the two-component method in delineating a functional urban area in Indonesia. This method is suitable for Indonesia, considering the availability of statistical data in the country. The effectiveness of this delineation process depends on the selection of jurisdictional level and the availability of data on that level. Some statistical data in Indonesia are available at village and sub-regency level. The village potential survey is conducted for each three years to record basic information such as the total population and the availability of local infrastructures. However, most of the statistical data on economic sector is only available up to regency level. Important indicators such as the composition of sectoral workers and the commuting pattern are only available at regency level. Based on this condition, we decide to apply the delineation procedure at sub-regency level and regency level. The identification of densely-populated areas is conducted at sub-regency level, but the other criteria in the delineation procedure are based on the statistical data at regency level.

This delineation method is not aiming at defining whole regions in Indonesia under an urban and rural classification. We focus on defining a functional urban area to identify some regions where urban activities are dominant. An urban area may include regency that still dominant in agriculture activities but meet the criteria as a periphery of one core regency. As a comparable definition, urban areas defined in this paper are referred to *the urban zones* in European countries. EU Commission establishes two definitions, namely the urban zones and the urban-rural typology. The latter definition distinguishes the urban and rural areas by using different criteria from a delineation of the urban zones.

2.3.1. Criteria to define urban areas

This delineation process starts with an explanation of the main criteria to identify a functional urban area in Indonesia. We set the requirement for the core area based on a combination of population density and the total population to anticipate the variation in the settlement structure. Some regency may have a large population, but their settlement structure can be dispersed in a wide area. This various pattern of settlement can become a constraint in using the population density as a single indicator to define the core. On the other hand, a single threshold on the total population density at regency level can be inaccurate since the land size is varied across regencies.

We conduct estimation at sub-regency (kecamatan) level to identify the potential core area. Sub-regency with a population density of at least 2,000 per square km is selected as a potential core area. This density threshold is set by considering a typical settlement structure in Indonesia. A constraint on transportation network influences the behaviour of city residents that prefer to live near the core area. This condition can be observed in small cities where the settlement is concentrated in particular sub-regencies. As a comparison to other countries, the density threshold for a core area in European countries is set at a lower level of 700 inhabitants per square km. The threshold in US cities is set at 1000 inhabitants per mile square (or about 2590 inhabitants per square km). The delineation criteria in Japan set a substantial level at 4000 inhabitants per square km.

We define a potential core-regency by using three criteria. First, the regency has at least one densely-populated sub-regency as previously defined. Second, the regency has a population of at least 50000 and has a population density of at least 200 inhabitants per square km. Third, the regency has at least 50 percent of non-agricultural workers.

The category for a total population of at least 50,000 is comparable to a standard for the metropolitan population of a county in the United States or that of a municipality in Japan. The population density at regency level is set at moderate level at 200 residents per square km. A previous study by the World Bank (2012) set a different threshold in defining an urban region in Java (700 per square km) and that outside Java (200 per square km). We argue that this different standard for Java and other regions can become a constraint for having a comparable definition among the regions. Instead, we decide to use a modest level of population density at 200 per square km, and to include an additional indicator on the share of non-agricultural workers. We set the share of the agricultural workers at a moderate level of 50 percent. This is based on a consideration that the agricultural workers are still dominant in Indonesia. As a comparison, the share of non-agricultural workers for urban areas in the delineation of Standard Metropolitan Employment Area (SMEA) in Japan is set at 75 percent (Yamada and Tokuoka, 1983).

We define a functional connectivity based on a threshold of 5 percent on commuting ties between two regencies. We set this moderate threshold that lower to common practices in other countries. There are two reasons for this. First, the distribution of the settlement is varied across regions in Indonesia. We observe that the population in smaller cities tend to be concentrated in the core regency and the sprawl of settlement to neighbouring regency is limited given the availability of inter-regency road network. This moderate level of commuting ties can represent the functional connection between two regencies in a small urban area. Second, the data only represents the commuting pattern of urban workers. This data may underestimate the actual commuting ties between two regencies. Actual daily commuters can be substantially higher than the commuting configuration of workers. Therefore, we consider that a threshold at 5 percent is adequate to represent the commuting ties between two regencies to form a functional urban area.

The commuting ties between regencies are estimated from the labour survey data in 2010. Information from the dataset allows us to identify the fraction of workers who commute into the core area as well as those who commute out from the core (reverse commuters). We use two preconditions in constructing the commuting matrix to simplify the process. First, we exclude agriculture workers in calculating the commuting workers. The dataset shows that less than 2 percent of the agriculture workers who commute to another regency. The agriculture workers with this commuting behaviour are only dominant in the eastern region of Indonesia such as in Nusa Tenggara and Papua. Second, we split the commuting matrix for each island group. Indonesia is a large archipelagic country that consists of more than 17 thousand islands. We define five island groups: Sumatera, Java, Bali – Nusa Tenggara, Kalimantan, Sulawesi, and Maluku – Papua. These island groups have not been connected by transportation system such as inter-island bridge or highway network. It is unlikely to have a substantial level of the commuting ties between two regencies in a different island. Based on this condition, it is adequate to assume that an inter-island commuting behaviour is not significant.

We set the criteria for core regency and sub-urban regency based on the following conditions. The core area as is defined as regency that satisfies the requirement as an urbanized area and does not qualify a condition as sub-urban to another core area. The sub-urban area is defined as regency that has at least 5 percent of workers that commute to the core area. Another condition for the sub-urban area is the regency that does not meet criteria as an urban area, but there are at least 5 percent of workers from core regency commute to that non-urban regency. We include this additional condition to anticipate a reverse commuting pattern in which the workers choose to reside in the core area and to work in the sub-urban area.

2.3.2. Procedure to delineate an urban area

The delineation procedure in this section refers to the criteria discussed in the previous section. The procedure consists of two iteration steps as follows:

1. *The first iteration: identification for potential core regencies.*
    a. Identify a kecamatan (sub-regency) with a population density of at least 2,000 per square kilometer as a potential core area.
    b. Identify the regency that has at least one sub-regency satisfies the criteria in point 1.a and has a total population of at least 50,000 and the population density of at least 200 per square kilometer.
    c. Estimate the share of non-agricultural workers for regencies that satisfy the criteria in point 1.b. Regency with more than 50 percent of workers on non-agriculture sectors become a candidate for the regency core area.
2. *The second iteration: delineation of functional urban areas based on commuting ties between regencies.*
    a. Identify connectivity between a candidate core-regency and its neighbouring areas based on the commuting matrix. Regency with at least 5 percent of commuting ties to the core-regency is marked as a potential first-order periphery.
    b. Two inter-connected regencies that satisfy the condition of being a core and also satisfy the commuting-ratio requirement of being a periphery of another core, the one with the lowest commuting ratio is defined as a core-regency.
    c. Identify the potential second-order and third-order peripheries from neighbouring regencies in point 2.b that satisfy the commuting ratio of at least 5 percent to the core-regency and/or its first order peripheries.
    d. If the regency satisfies a condition in point 2.c for more than one of the core regencies, it is considered as a periphery of the core-regency that has a higher commuting ratio.

The first iteration starts with the identification of a densely-populated sub regency of 2000 inhabitants per square km. We use population data from the Village Potential Survey in 2008 for this identification process. From the total 497 regencies in Indonesia, there are 166 regencies that have at least one densely-inhabited sub-regency. The next screening procedure is an identification of the potential core-regency by using a threshold of population density of 200 per square kilometer, a total population of 50000, and a share of non-agricultural workers of more than 50 percent. This identification step identifies 127 regencies that meet criteria as the potential core-regency.

The second iteration procedure analyses the functional connectivity between potential core and its neighbouring areas. We identify the connectivity based on the commuting matrix explained in the previous section. This iteration identifies a total of 83 urban areas. There are three types of urban area based on the relationship between the core and sub-urban areas. The first type is an urban area that consists of a core-regency and sub-urban regencies that also meet the requirements as urban regency. There are 22 urban areas that meet the criteria for the first type. As a special case for this type is Jakarta metropolitan in which the core area consists of five regencies from Jakarta administrative regions. The second type is an urban area that consists of one core-area and the sub-urban areas that do not meet the criteria as urban regency. There are 18 urban areas that meet the condition for this second type. The third type is an urban area that consists of one core-area without commuting ties to another regency. There are 43 urban areas that meet this third type.

The list of urban areas in Indonesia is presented in Table 2-3. The table is sorted based on location of the urban area from the west to the east region of Indonesia. The list starts from the Banda Aceh city that located in the northern-west part and ends in the Sorong city that located in the northern-east part of Indonesia.

We include an identification number for each city that consists of five-digit numbers as shown in the first column of the table. The first two-digits represent the island group and the last three-digits represent order of the urban areas. The identification number for an island group starts from code 10 for Sumatera; 30 for Java; 50 for Bali and Nusa Tenggara; 60 for Kalimantan; 70 for Sulawesi; 80 for Maluku; and 90 for Papua. This code refers to the classification standard from BPS Statistics Indonesia.

The nomenclature of the urban areas, shown in the second column of the table, corresponds to name of the core-regency. The core regencies are listed in the third column. The list includes an identification number that refers to the classification number from BPS Statistics Indonesia. The table includes 32 regencies that defined as sub-urban areas although they do not meet the criteria as urban areas. These regencies are written in *italics* fonts in Table 2-3.

Table 2-3 Urban areas in Indonesia 2010

IDCITY	URBAN AREA NAME	CORE REGENCIES		SUB-URBAN REGENCIES		TOTAL POPULATION (2010)
		ID	NAME	ID	NAME	
10001	BANDA ACEH	1171	BANDA ACEH	*1108*	*ACEH BESAR*	223,446
10002	LHOKSEUMAWE	1174	LHOKSEUMAWE			171,163
10003	SIBOLGA	1271	SIBOLGA	*1204*	*TAPANULI TENGAH*	84,481
10004	PEMATANG SIANTAR	1273	PEMATANG SIANTAR	*1209*	*SIMALUNGUN*	234,698
10005	MEDAN	1275	MEDAN	1212 1276	DELI SERDANG BINJAI	4,134,195
10006	TEBING TINGGI	1274	TEBING TINGGI	*1218*	*SERDANG BEDAGAI*	145,248
10007	TANJUNG BALAI	1272	TANJUNG BALAI			154,445
10008	PADANGSIDIMPUAN	1277	PADANGSIDIMPUAN			191,531
10009	BUKITTINGGI	1375	BUKITTINGGI	*1307*	*AGAM*	111,312
10010	PADANG	1371	PADANG			833,562
10011	PEKANBARU	1471	PEKANBARU	*1406*	*KAMPAR*	897,767
10012	JAMBI	1571	JAMBI	*1505*	*MUARO JAMBI*	531,857
10013	PALEMBANG	1671	PALEMBANG	*1607*	*BANYU ASIN*	1,455,284
10014	LUBUKLINGGAU	1674	LUBUKLINGGAU	*1605*	*MUSI RAWAS*	201,308
10015	BENGKULU	1771	BENGKULU			308,544
10016	BANDAR LAMPUNG	1871	BANDAR LAMPUNG	*1803*	*LAMPUNG SELATAN*	881,801
10017	METRO	1872	METRO	*1804*	*LAMPUNG TIMUR*	145,471
10018	PANGKAL PINANG	1971	PANGKAL PINANG	*1904*	*BANGKA TENGAH*	174,758
10019	B A T A M	2171	B A T A M			944,285
30020	JAKARTA	3171 3172 3173 3174 3175	JAKARTA SELATAN JAKARTA TIMUR JAKARTA PUSAT JAKARTA BARAT JAKARTA UTARA	3201 3216 3271 3275 3276 3603 3671 3674	BOGOR BEKASI BOGOR BEKASI DEPOK TANGERANG TANGERANG TANGERANG SELATAN	27,936,112
30021	SUKABUMI	3272	SUKABUMI	3202	SUKABUMI	2,640,090
30022	CIANJUR	3203	CIANJUR			2,171,281
30023	BANDUNG	3273	BANDUNG	3204 3217 3277	BANDUNG BANDUNG BARAT CIMAHI	7,624,877
30024	GARUT	3205	GARUT			2,404,121
30025	TASIKMALAYA	3206	TASIKMALAYA			1,675,675
30026	CIAMIS	3207	CIAMIS			1,532,504
30027	KUNINGAN	3208	KUNINGAN			1,035,589
30028	CIREBON	3274	CIREBON	3209	CIREBON	2,363,585
30029	MAJALENGKA	3210	MAJALENGKA			1,166,473
30030	SUMEDANG	3211	SUMEDANG			1,093,602
30031	SUBANG	3213	SUBANG			1,465,157
30032	PURWAKARTA	3214	PURWAKARTA			852,521
30033	KARAWANG	3215	KARAWANG			2,127,791
30034	KOTA TASIKMALAYA	3278	TASIKMALAYA			635,464
30035	BANJAR	3279	BANJAR			175,157
30036	CILACAP	3301	CILACAP			1,642,107
30037	BANYUMAS	3302	BANYUMAS			1,554,527
30038	PURBALINGGA	3303	PURBALINGGA			848,952
30039	KEBUMEN	3305	KEBUMEN			1,159,926
30040	MAGELANG	3371	MAGELANG	3308	MAGELANG	1,299,950
30041	SURAKARTA	3372	SURAKARTA	3309 3310 3311 3313 3314	BOYOLALI KLATEN SUKOHARJO KARANGANYAR SRAGEN	5,055,615
30042	PATI	3318	PATI			1,190,993
30043	KUDUS	3319	KUDUS			777,437
30044	JEPARA	3320	JEPARA			1,097,280
30045	SEMARANG	3374	SEMARANG	*3321* 3322	*DEMAK* SEMARANG	3,557,356

IDCITY	URBAN AREA NAME	CORE REGENCIES		SUB-URBAN REGENCIES		TOTAL POPULATION (2010)
		ID	NAME	ID	NAME	
				3324	KENDAL	
				3373	SALATIGA	
30046	BATANG	3325	BATANG			706,764
30047	PEKALONGAN	3326	PEKALONGAN			838,621
30048	PEMALANG	3327	PEMALANG			1,261,353
30049	KOTA PEKALONGAN	3375	PEKALONGAN			281,434
30050	TEGAL	3376	TEGAL	3328	TEGAL	1,634,438
30051	YOGYAKARTA	3471	YOGYAKARTA	*3401*	*KULON PROGO*	2,393,240
				3402	BANTUL	
				3403	*GUNUNG KIDUL*	
				3404	SLEMAN	
30052	TULUNGAGUNG	3504	TULUNGAGUNG			990,158
30053	KEDIRI	3571	KEDIRI	3506	KEDIRI	1,768,275
30054	MALANG	3573	MALANG	3507	MALANG	3,456,645
				3579	BATU	
30055	PASURUAN	3575	PASURUAN	3514	PASURUAN	1,698,730
30056	SURABAYA	3578	SURABAYA	3515	SIDOARJO	7,029,665
				3516	MOJOKERTO	
				3525	GRESIK	
				3576	MOJOKERTO	
30057	JOMBANG	3517	JOMBANG			1,202,407
30058	BLITAR	3572	BLITAR	*3505*	*BLITAR*	131,968
30059	PROBOLINGGO	3574	PROBOLINGGO	*3513*	*PROBOLINGGO*	1,313,306
30060	MADIUN	3577	MADIUN	*3519*	*MADIUN*	170,964
30061	CILEGON	3672	CILEGON	*3604*	*SERANG*	952,344
				3673	SERANG	
50062	DENPASAR	5171	DENPASAR	*5102*	*TABANAN*	1,331,921
				5103	BADUNG	
				5104	*GIANYAR*	
				5105	*KLUNGKUNG*	
50063	MATARAM	5271	MATARAM	5201	LOMBOK BARAT	1,002,829
50064	BIMA	5272	BIMA			142,579
50065	KUPANG	5371	KUPANG			336,239
50066	BULELENG	5108	BULELENG			624,125
60067	PONTIANAK	6171	PONTIANAK	*6104*	*PONTIANAK*	554,764
60068	SINGKAWANG	6172	SINGKAWANG			186,462
60069	BANJARMASIN	6371	BANJARMASIN	*6303*	*BANJAR*	825,108
				6304	*BARITO KUALA*	
				6372	BANJAR BARU	
60070	BALIKPAPAN	6471	BALIKPAPAN			557,579
60071	SAMARINDA	6472	SAMARINDA			727,500
60072	TARAKAN	6473	TARAKAN			193,370
70073	MANADO	7171	MANADO	*7102*	*MINAHASA*	410,481
				7106	*MINAHASA UTARA*	
				7173	*TOMOHON*	
70074	BITUNG	7172	BITUNG			187,652
70075	KOTAMOBAGU	7174	KOTAMOBAGU	*7101*	*BOLAANG MONGONDOW*	107,459
70076	MAKASSAR	7371	MAKASSAR	*7305*	*TAKALAR*	2,310,606
				7306	GOWA	
				7308	*MAROS*	
70077	PARE-PARE	7372	PARE-PARE			129,262
70078	PALOPO	7373	PALOPO			147,932
70079	KENDARI	7471	KENDARI	*7405*	*KONAWE SELATAN*	289,966
70080	BAU-BAU	7472	BAU-BAU			136,991
70081	GORONTALO	7571	GORONTALO	*7504*	*BONE BOLANGO*	180,127
80082	TERNATE	8271	TERNATE			185,705
90083	SORONG	9171	SORONG			190,625
					TOTAL URBAN POPULATION	**123,498,892**

Note: Regencies in *italics* are sub-urban areas that do not satisfy criteria as urban regency.
Total population is based on Population Census 2010 (BPS, 2010)

The total population of the urban area is presented in the last column. The largest urban area is Jakarta that consists of 13 regencies with the population of almost 28 million in 2010. The Sibolga city in north Sumatera is the smallest city with a total population of 84 thousand in 2010. We define two types of urban areas based on the total population. The first type is a Metropolitan city with a population of at least one million. The second type is a Micropolitan city with a population less than one million. Different with the classification methods from previous studies, we define Metropolitan and Micropolitan areas based on the total population rather than the core area's population. Our classification method corresponds to the spatial planning regulation in Indonesia. We use this classification on Metropolitan and Micropolitan area in describing the characteristics of Indonesia urban areas in the next section.

Urban areas defined in this paper have some differences with urban areas defined by the spatial planning regulation. There are 21 urban regions from that regulation do not meet the criteria as urban areas in our definition. Among those cities are six province capitals e.g. Tanjung Pinang, Palangkaraya, Palu, Majene, Ambon, and Jayapura. Moreover, our definition includes 23 urban areas that are not stated as a city (kota) in an administrative division by the government. All of these 23 regencies, except for one, are located in Java.

2.4. Characteristics of urban areas in Indonesia

2.4.1. Distribution of the urban area's population

The total population in urban areas is more than 123 million or about 52 percent from Indonesia's population in 2010. This substantial share of the population inhabits in 89 thousand square km or only about 4.7 percent from the total land areas in Indonesia. The population in Indonesia is become more concentrated in urban areas in recent years, and this trend is reflected in the economic performance of the country. This condition represents a transformation of Indonesia's economy from a resource-based economy to an industry-based economy that driven by concentration of the population in urban areas. We support the government's claim that about half of Indonesia's population lives in urban areas (BPS, 2010a), although our calculation is based on a different definition of urban areas.

We also analyse a temporal change of population in urban areas from 1996 to 2010 and discuss the trend of urbanization in Indonesia. We assume that an urban area defined from this process already meet the criteria as an urban area in 1996. This assumption may not be applicable in some urban areas, since our delineation process relies on the data in 2010. It is likely that some small cities have just started their development pace to become urban areas. Moreover, the recent connectivity among regencies may not exist in 1996 since it depends on the pattern of settlement areas and the transportation network in that period. However, we conduct this review to offer an insight on a transformation process of urban areas in Indonesia. Moreover, we only use the observation period of 15 years from 1996 to 2010 by assuming that most of the urban areas have met the criteria since 1996.

The share of an urban population increases from 48 percent in 1996 to 52 percent in 2010. The share of an urban population in Java is dominant at 69 percent in 1996 and is consistently increasing to 74 percent in 2010. The trend reflects an uneven urbanization rate between Java and other regions in

Indonesia. Java is the most developed island and has become a center for Indonesia's economy. The population in this island has reached 136.6 million or about 57 percent of the total Indonesian population in 2010. With an area of only about seven percent from total Indonesia land, Java is also the most densely-populated island in Indonesia. On the contrary, the Micropolitan areas in Java have a lower trend in population growth. A similar trend is observed for metropolitan areas outside Java where the population share is only increased from 9.1 percent in 1996 to become 10 percent in 2010. This trend may indicate the stagnation on city development in Indonesia, particularly in the regions outside Java.

Table 2-4 depicts the trend of urban population from 1996 to 2010. The population living in metropolitan cities dominates the urban population in Indonesia. The population in Java's metropolitan areas contributes to the largest share of the urban population in which more than 68 percent of the population in this island resides in the metropolitan area. A contrasting trend is observed in other islands where the share of the metropolitan population is lower than that in the Micropolitan area. This condition may be influenced by a significant quantity of Metropolitan areas in Java (32 out of 42 areas) compare to the metropolitan in other islands (11 out of 41 areas).

The share of an urban population in Java metropolitan increases from 63 percent in 1996 to 68 percent in 2010, whereas the population share in Micropolitan declines from 5.8 percent to 5.4 percent in the same period. The population growth in Java metropolitan areas is significant at 1.8 percent. On the other hand, the population growth of a typical Micropolitan area in Java is small at 0.5 percent. An opposite trend is shown in urban areas outside Java. Metropolitan areas outside Java have an average population growth of 2.6 percent, lower than that of the Micropolitan areas at 3.8 percent.

Table 2-4 Population in urban areas 1996 – 2010

VARIABLE	2010		2003		1996	
Pop. National	**237,641,326**		**208,122,141**		**200,748,801**	
Metropolitan (43)	103,787,505	43.7%	87,634,455	42.1%	82,427,945	41.1%
Micropolitan (40)	19,711,387	8.3%	16,789,984	8.1%	14,993,811	7.5%
Total Urban	***123,498,892***	***52.0%***	***104,424,439***	***50.2%***	***97,421,756***	***48.5%***
Pop. Java	**136,610,590**		**121,192,402**		**118,488,525**	
Metropolitan (32)	93,552,670	68.5%	79,421,457	65.5%	74,935,780	63.2%
Micropolitan (10)	7,361,784	5.4%	6,780,553	5.6%	6,899,056	5.8%
Total Urban	***100,914,454***	***73.9%***	***86,202,010***	***71.1%***	***81,834,836***	***69.1%***
Pop. Other Island	**101,030,736**		**86,929,739**		**82,260,276**	
Metropolitan (11)	10,234,835	10.1%	8,212,998	9.4%	7,492,165	9.1%
Micropolitan (30)	12,349,603	12.2%	10,009,431	11.5%	8,094,755	9.8%
Total Urban	***22,584,438***	***22.4%***	***18,222,429***	***21.0%***	***15,586,920***	***18.9%***

Note: Number of urban areas defined as Metropolitan or Micropolitan is stated in parenthesis
Source: National Statistical Agency, various years

The city rank-size indicates a stable distribution among urban areas in Indonesia in the last decade, except for three largest metropolitan areas. The rank size distribution in Figure 2-1 shows that the population of Jakarta, Bandung, and Surabaya in 2010 deviates from a previous pattern in 1996 and 2003. This indicates a high urbanization rate in those cities in the last 15 years. On the other hand, the population in Micropolitan areas has naturally grown along with the population growth.

The figure also shows a tendency for Jakarta to become a primate city. Jakarta stands out as the largest city that also has the highest population growth. The total population in Jakarta is more than 27.9 million in 2010, a significant increase from 17.7 million in 1996 or about 4-percent growth per year. As a comparison, Surabaya's population grows from 5.8 million in 1996 to 7.0 million in 2010, increases about 2 percent per year. Jakarta grows two times higher than Surabaya and far above the average population growth in Indonesia at 1.49 percent per year (BPS, 2010a).

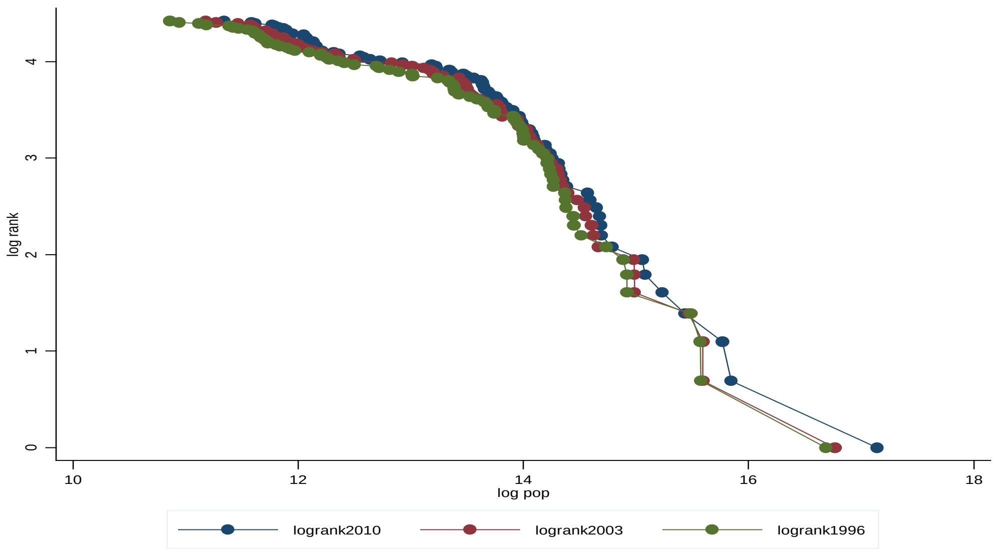


Figure 2-1 Rank-size distribution for urban areas in Indonesia, 1996 – 2010

The relationship between city size and economic output is shown in Figure 2-2. The economic output is higher as the city size increases, as commonly observed in many countries (Glaeser & Mare, 1994). The graph also shows a substantial gap between the Micropolitan cities on the lower tail and the metropolitan on the right side. As previously discussed, Jakarta has been developed as a primate city not only in the view of its population but also in its economic output. On the other hand, we observe a division of smaller cities with less than 400 thousand populations in the lower tail (marked with a red-dotted circle in Figure 2-2). A substantial gap of the economic output between the Metropolitan and the Micropolitan areas indicates an imbalance growth pattern across regions. The Micropolitan areas, particularly those with a total population below 400 thousands, are not able to catch up with the metropolitan areas to develop their economy. On the other hand, a better economic condition in the

Metropolitan attracts more residents and the urban population can become more concentrated in those areas.

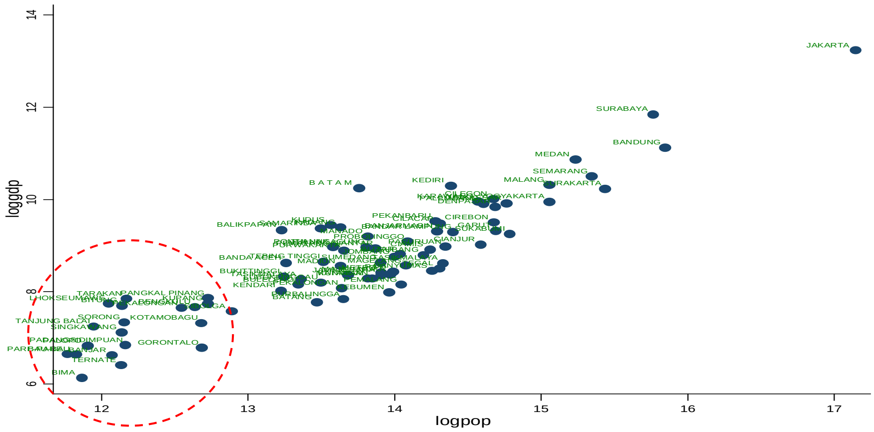
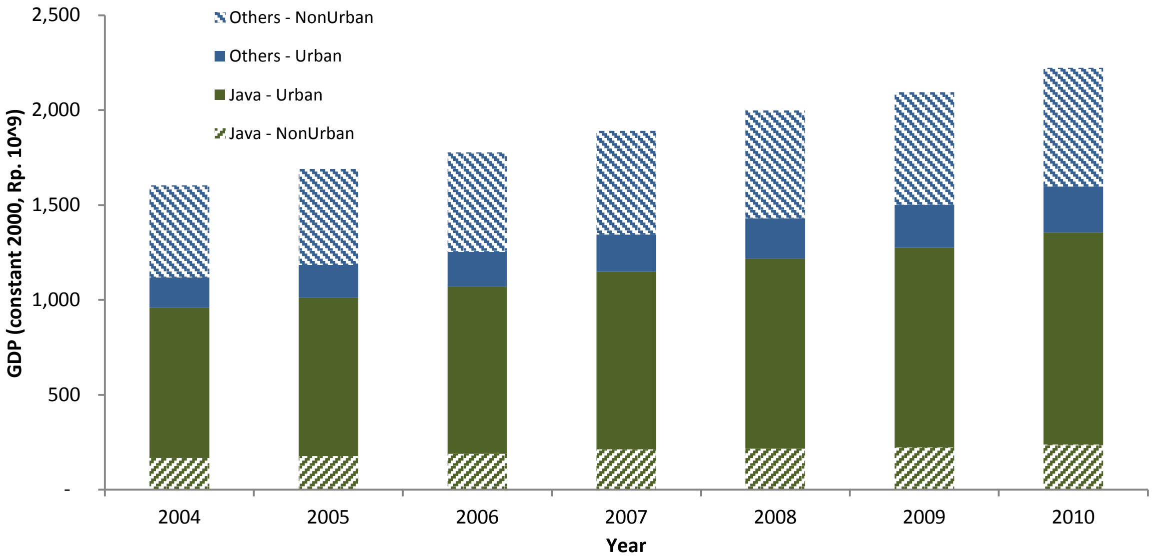


Figure 2-2 Population and economic output in 2010

We observe that in the earliest stage, a regency that developed to become an urban area experiences a high population growth. This condition is shown in the Micropolitan areas outside Java. The population growth tends to decrease as the city is developed further, as shown in the metropolitan areas outside Java and in the Micropolitan areas in Java. The middle-size cities, ranged between 400 thousand to 1 million populations, have a tendency to experience a stagnant growth in their population. In contrast, the large metropolitan cities experience a high urbanization rate. In turn, this trend reinforces the metropolitan areas to become more dominant in the economy. To conclude, we observe that the middle-size cities tend to be trapped into a stagnant growth. These cities cannot compete with the large metropolitan cities, particularly in Java, to attract more population and to improve their economy.

2.4.2. The economic role of urban areas

Urban areas play a dominant role in Indonesia's economy in recent years, as shown in Figure 2-3. The total share of economic output from urban areas is increasing from 59.3 percent in 2004 to 61.2 percent in 2010. The figure indicates two important features in the contemporary setting of Indonesia's economy. First, it reflects a substantial role of Java urban areas in the economy. About 50 percent from the total output in 2010 is generated from urban areas in Java. On the other hand, the share of urban areas outside Java is not substantial at 11 percent, lower than the total share of non-urban areas outside Java at 28 percent. The share of metropolitan areas outside Java is also lagged behind their counterparts in Java. Second, that figure reflects a dominant share of the primary sectors in most of the regions outside Java. The economic share of urban areas outside Java, in another side, tends to be stagnant. The economic growth in the regions outside Java is still driven by agriculture and the mining sector.



Source: Indonesia Regional Output 2004 – 2010 (BPS, 2010).

Figure 2-3 Share of economic output from urban areas, 2004 – 2010

Table 2-5 depicts the distribution of employment among sectors in urban areas. The share of agricultural and mining workers in urban areas is 19 percent, substantially lower than the national average. However, the average share of agriculture and mining workers in urban areas is higher in Java at 21 percent than that in other regions at 12 percent. This reflects another side of Java in Indonesia’s economy. Java is still dominant in rice production in which more than 50 percent of domestic rice is still produced in that island (BPS, 2011a).

Table 2-5 Distribution of workers for urban areas in 2010

VARIABLE	AGRIC & MINING		MANUFACTURING		OTHER SECTORS		TOTAL	
	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
All Urban	**10,551,059 (19%)**	**24%**	**10,397,528 (19%)**	**75%**	**33,610,112 (62%)**	**65%**	**54,558,699**	**50%**
Metropolitan	9,139,825 (20%)	21%	8,891,986 (19%)	64%	27,640,890 (61%)	53%	45,672,701	42%
Micropolitan	1,411,234 (16%)	3%	1,505,542 (17%)	11%	5,969,222 (67%)	12%	8,885,998	8%
Java	**9,322,665 (21%)**	**22%**	**9,249,134 (21%)**	**67%**	**26,002,726 (58%)**	**50%**	**44,574,525**	**41%**
Metropolitan	8,518,395 (21%)	20%	8,330,885 (20%)	60%	24,248,900 (59%)	47%	41,098,180	38%
Micropolitan	804,270 (23%)	2%	918,249 (26%)	7%	1,753,826 (50%)	3%	3,476,345	3%
Other Island	**1,228,394 (12%)**	**3%**	**1,148,394 (12%)**	**8%**	**7,607,386 (76%)**	**15%**	**9,984,174**	**9%**
Metropolitan	621,430 (14%)	1%	561,101 (12%)	4%	3,391,990 (74%)	7%	4,574,521	4%
Micropolitan	606,964 (11%)	1%	587,293 (11%)	4%	4,215,396 (78%)	8%	5,409,653	5%
National	**43,260,438 (40%)**		**13,905,076 (13%)**		**51,858,616 (48%)**		**109,024,130**	

Note: Average share of relevant sectoral workers to total workers within city groups is in parenthesis.

The concentration of manufacturing workers in urban areas is substantial at 75 percent. The share of manufacturing workers is dominant in Java that 60 percent of the manufacturing workers reside in Java urban areas. A different figure is observed in urban areas outside Java where the share of manufacturing workers is estimated at 8 percent, a comparable level with the manufacturing workers in Java micropolitan areas. This condition explains our previous remarks that Java has experienced a higher economic growth that driven by a concentration of the manufacturing workers in its urban areas. In particular, the micropolitan cities in Java have shifted from agriculture to the manufacturing sector. In addition, we also observe a trend that tertiary sectors such as finance and services are become more dominant in Java metropolitan areas. On the other hand, the industrialization process in urban areas outside Java indicates a slower development. The share of manufacturing workers in urban areas outside Java is low at 8 percent, indicating a slow industrialization process that hindered these urban areas to accelerate the economic development compare to urban areas in Java.

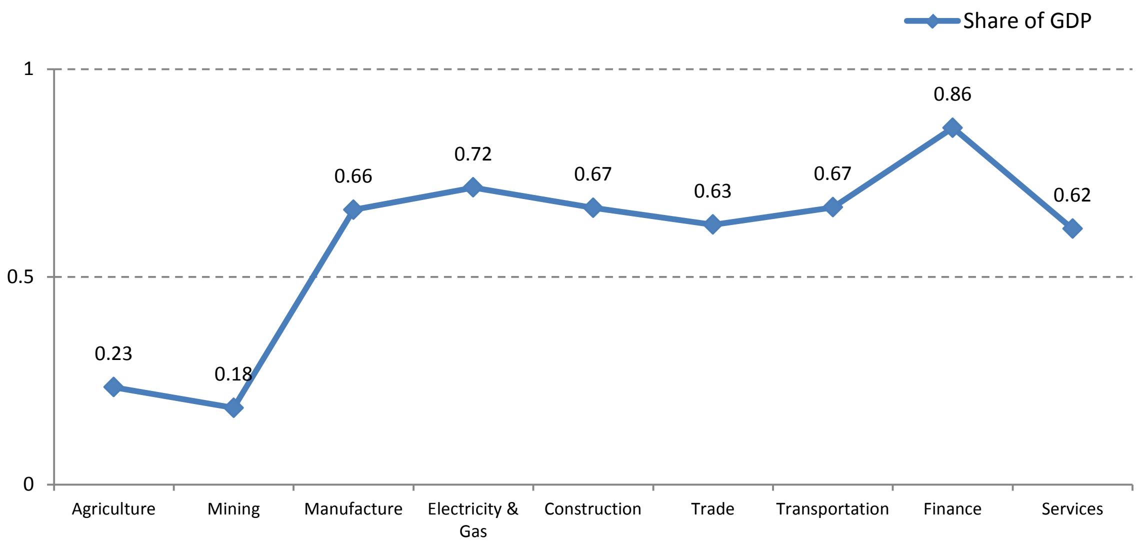


Figure 2-4 Share of economic output in urban areas by sector in 2010

The share of sectoral output from urban areas is shown in Figure 2-4. The graph shows a significant share of urban areas to the economic output in secondary and tertiary sectors. About 60 percent of economic production in the secondary and tertiary sectors is generated from urban areas. On the other hand, the share of urban areas to the agriculture and mining sectors is not substantial at 25 percent. This confirms our previous discussion that urban areas in Indonesia have shifted from the primary sectors. A dominant role of urban areas is driven by the accumulation of capital and workers in the secondary and tertiary sectors. In particular, the financial sector has become more concentrated in urban areas that 86 percent of the total output from this sector is generated in urban areas.

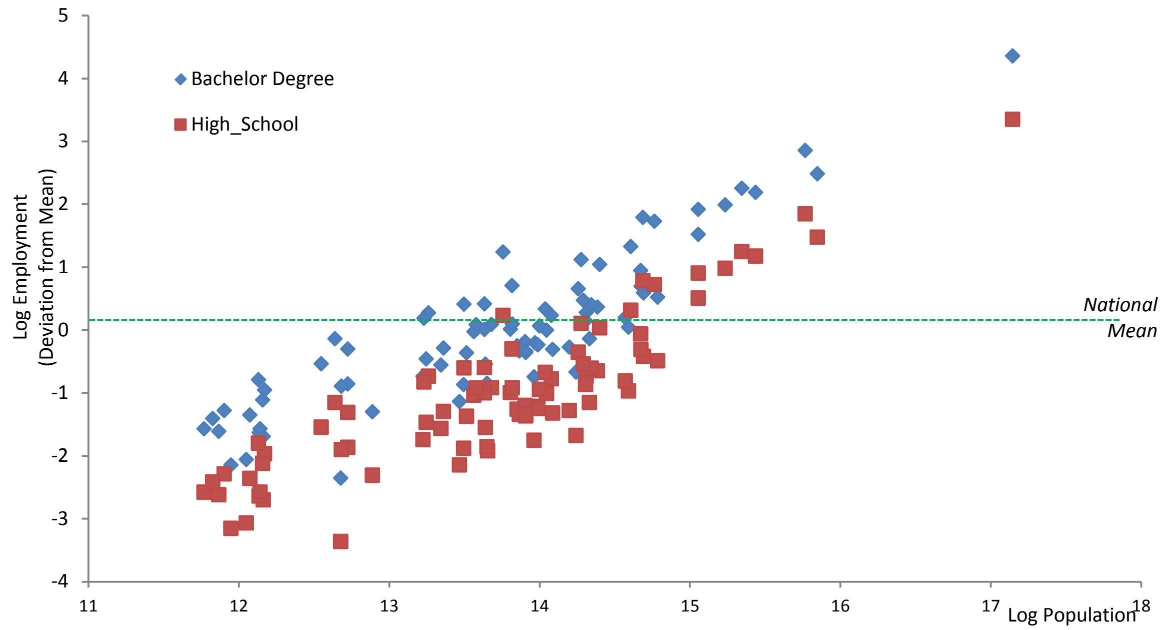


Figure 2-5 Share of skilled workers in urban areas in 2010

The relationship between the total population and the share of skilled workers is shown in Figure 2-5. We observe a positive correlation between the city size and a concentration of skilled workers in urban areas. The share of workers with high school education is increasing with city size. A similar pattern is shown for workers with a bachelor degree background. Moreover, the figure depicts that the share of workers with a bachelor's degree is higher in the Metropolitan areas compare to that of workers with a high school education. The bachelor degree holder tends to be concentrated in the metropolitan areas. This partly explains our previous findings that higher productivity is observed in the metropolitan areas because of a concentration of skilled workers. As argued by Glaeser & Mare (1994), the productivity in urban areas is not only driven by an abundant supply of labour, but also by the intensity of skilled workers in those areas.

Our last review focuses on the province capital. In general, we observe that the province capitals are more developed than the other regions in Indonesia. As explained in the previous section, the spatial planning regulation stipulates a policy that the province capitals are the national priority areas for economic development. The provision of public infrastructure and industrial zones tend to be concentrated in the province capital. Based on our delineation process, there are 28 province capitals that meet the category as urban areas in Indonesia. Table 2-6 compares some of the characteristics between the province capital and other urban areas in Indonesia. In addition to the comparison for all regions in Indonesia, the table also reports the comparison for Java and other islands.

Table 2-6 Comparison between province capital and other regencies

INDICATORS (Average)	ALL REGIONS		JAVA		OTHER ISLANDS	
	CAPITAL	R_URBAN	CAPITAL	R_URBAN	CAPITAL	R_URBAN
GDP 2010 (Rp. billion)	22,547	5,974	53,968	7,919	6,837	3,093
GDP Cap 2010 (Rp. thousand)	17,311	7,556	33,073	7,905	9,430	7,041
Popdens (per km2)	5,913	1,960	11,626	2,774	3,056	754
University (th.pop)	0.057	0.024	0.044	0.018	0.064	0.032
Hospital (th.pop)	0.023	0.013	0.016	0.011	0.026	0.015
Road Quality (% vill)	0.91	0.73	0.92	0.71	0.9	0.75

Source: Statistics Indonesia (2010b) and Statistics Indonesia (2011)

The average economic output in the province capital is about four times higher than the rest of urban areas. Particularly in Java, the economic output in the capitals is about 8 times higher than the other urban areas. As discussed in the previous section, three largest cities in Java, Jakarta, Bandung, and Surabaya, dominate the economy. A similar figure is observed in urban areas outside Java that the economic output in the province capital is about twice higher than other areas. The per capita output is also higher in the province capital, particularly in Java. The population density in the capital is three times higher than the rest of urban areas. A substantial difference in the population density is observed in Java. This confirms our previous finding on a concentration of the population in Java metropolitan areas, particularly in the three largest cities. The province capitals have a higher level of local infrastructures. Since the local infrastructures are presented in per capita term, the level of infrastructure services tends to be higher in urban areas outside Java. All in all, infrastructure services are also higher in the province capital. In general, we observe a huge gap in the economic development between the province capital and the rest of urban areas across regions.

2.5. Conclusions

This chapter proposes a new definition of urban areas in Indonesia based on the functional approach. The delineation process identifies 83 urban areas. Urban areas are classified into Metropolitan areas and Micropolitan areas according to their total population. A Metropolitan area is associated with a total population of more than one million, and a Micropolitan area is associated with a total population below one million. There are 43 areas that identified as Metropolitan and the other 40 areas are classified as Micropolitan. More than 123 million population lives in urban areas in Indonesia. These urban areas contributed to 61.2 percent of Indonesia's economic output in 2010. It reflects a transformation of this country from a resource-based economy to become an industrialized economy that driven by the economic activities in urban areas.

The distribution pattern among urban areas in Indonesia shows the concentration of urban areas in Java. Moreover, there is a tendency that this concentration of population and economic activities is particularly materialized in the large cities. On the other hand, the performance of small and medium cities tends to be stagnant. Most of the province capital, either in Java or other islands, has a potential to be developed as a metropolitan area and become the center for economic activities. The economic gap between Java and other islands is substantial that metropolitan areas in other islands cannot catch up with advance progress in Java's metropolitan.

This delineation involves some quantitative indicators such as the population density, commuting ties, and the share of urban workers. We utilize the recent statistical and spatial data to support the process. However, we also recognize some limitations in performing this delineation. For instance, we rely on the workers' commuting data to define the inter-regency connectivity. This indicator can be improved further when the actual commuting data for all regions is available in Indonesia. To sum up, we expect that this delineation process can identify the current configuration of urban areas in Indonesia, given the constraints in data availability and other factors that may affect this delineation process.

3. AGGLOMERATION ECONOMIES AND CITY STATUS: EVIDENCE FROM INDONESIA

3.1. Introduction

Agglomeration economies represent the external productivity gains from a concentration of workers and firms in urban areas. Rosenthal and Strange (2004) concludes that the elasticity of urban agglomeration is ranged from 3 percent to 8 percent. This wide-range of agglomeration magnitude depends on the characteristics of the studies (Melo, Graham, and Noland, 2009).

Empirical studies on agglomeration economies are mostly carried out in developed countries. Limitation in a statistical data is one of the main constraints to conduct such studies in developing countries. In particular, there are only few studies that estimate the magnitudes of agglomeration economies in Indonesia. A notable example is Henderson and Kuncoro (1996) that examines localization economies in manufacturing industries in Java. Sjöberg and Sjöholm (2004) shows that manufacturing firms tend to agglomerate in the large metropolitan areas in Indonesia.

This chapter estimates the agglomeration economies from aggregate sectors in Indonesia. The main feature of this study is the utilization of micro-level data. We utilize available information from the latest survey. We combine an individual-level data, a regency-level data, and the recent geospatial data . We use urban areas defined in Chapter 2 in this empirical study.

This study also includes a dummy variable of province capital to examine its effect on wage disparities across urban areas. The economic development may be prioritized in some regions such as the province capital. On the other hand, some cities may grow because of its strategic location. Moreover, we conduct a separate estimation for Java and other islands. As discussed in Chapter 2, a rapid urbanization trend is observed in Java, far above the trend in other regions.

Based on our empirical estimation, the elasticity of agglomeration in Java urban areas ranges between 2 percent and 3 percent. We also confirm a positive effect of the spatial spillover to the wage level in Java urban areas. On the other hand, the productivity gain from the agglomeration in urban areas outside Java is found to be insignificant. A higher productivity observed in the province capital can be explained by the concentration of skilled workers, particularly in the regions outside Java.

This chapter is organized into seven sections. After a short introduction in this section, the second section discusses the empirical model for our estimation strategy. The third and fourth sections discuss the data and the instrumentation strategy. The fifth section discusses the estimation results at individual level. The sixth section discusses a robustness check for worker's groups. We draw the conclusions in the sixth section. We also include Annex in this chapter to discuss our preliminary estimation at regency level.

3.2. Empirical Model

There are two common approaches to the estimation of agglomeration economies: the production function approach and the wage equation approach (Melo, et.al, 2009). The wage equation approach has the advantage that it can use data from basic surveys such as the labour force survey and the population census. This estimation approach is also preferable in dealing with endogeneity issues (Combes, Duranton, Gobillon, and Roux, 2010). However, it has a limitation in dealing with the omitted variables (Rosenthal & Strange, 2004). We use the wage equation approach since the endogeneity issues on the worker's quality and quality are critically important as shown by Combes et.al. (2010). To control for the effect of workers' characteristics to wage disparity, we use a micro-level data in estimating the net agglomeration effect.

There are two main indicators to measure the agglomeration externality: the employment density and market potential. The employment density represents a concentration of human capital or firms in urban areas that become the main forces of the agglomeration economies. This variable captures the magnitude of agglomeration as suggested in urban economics theory. As argued in Melo, et.al. (2009), the employment density is preferable in measuring the urban agglomeration since it can represent the benefits from a concentration of economic activities and it is more robust to the differences in area sizes across regions (see e.g. Rosenthal & Strange, 2004 and Fingleton, 2011 for further discussion). The productivity in one urban area can also be driven by access to the market from other regions. The market potential variable is introduced to measure the agglomeration effect beyond a boundary of an urban area. Some previous studies have combined both variables to estimate the agglomeration effect, such as studies by Combes, et.al (2010) and Fingleton & Longhi (2013). This paper applies a similar strategy in which we use the employment density and the market potential variables to explain the agglomeration economies.

We follow Fingleton & Longhi (2013) in deriving the theoretical model for our empirical estimation. That paper distinguishes two rival models, namely the Urban Economics (UE) and the New Economic Geography (NEG). The UE theory is derived from Abdel-Rahman and Fujita (1990) and Fujita and Thisse (2002, p. 102) that explain the relationship between wages and the employment density. The NEG model describes a spatial difference in wages that is derived from Fingleton (2011). In this paper, we use a more generic term of the employment density and the market potential models in place of the UE and the NEG models. The term, market potential, is commonly used in previous studies, e.g. Hanson (2005) and Combes, et.al (2010).

The employment density model assumes a perfectly competitive market where a competitive final sector obtains its input from an intermediate sector with monopolistic competition. The intermediate sector utilizes labour as a single input. The final sector utilizes labour, land, and the composite products from the intermediary sector. The production is normalized per unit area and the congestion is negligible. The wage equation is derived from the first order condition for profit maximization of the final sector. Fingleton & Longhi (2013) derives the wage equation for this employment density model as:

$$\ln(w_{at}) = \kappa + \gamma \ln(E_{at}) + \varepsilon_{at} \quad (1)$$

where w_{at}, κ, and E_{at} are the wage level, a constant, and the employment density in year t, respectively. The coefficient γ represents the magnitude of agglomeration economies. The error term ε_{at} captures unobserved characteristics in urban area a in year t. Previous studies include other explanatory variables such as the unemployment rate to explain the wages

(Fingleton & Longhi, 2013). Because of data limitation, we do not include this variable in our estimation.

The market potential model pays a special attention to the spatial spillover from one region to surrounding regions (Fujita, Krugman, & Venables, 1999). There are various definitions of the market potential variable. In this paper, we follow Fingleton (2011) that consider a simple form of a market potential model. The market potential defined as a sum of total output for all regions weighted by the inverse of trade cost between regencies. The wage equation for the market potential model is defined as:

$$w_{at} = \theta \left[\sum_{c=1}^{C} \frac{\mathrm{Y_{ct}}}{\mathrm{Trade_{act}}} \right]^{\frac{1}{\sigma}} \tag{2}$$

Based on this theoretical model, the market potential is defined as follows:

$$MP_{at} = \sum_{c=1} \frac{Y_{ct}}{Trade_{act}} \tag{3}$$

MP_{at} represents the market potential of regency a in year t. Variable Y_{ct} represents the total income of area c in year t, and $Trade_{act}$ represents the trade cost between regency a and regency c in year t. The trade cost is a function of distance between regencies a and c. Substituting Equation (3) to Equation (2) and taking logarithm leads to:

$$\ln w_{at} = \ln(\theta) + \frac{1}{\sigma} \ln\left(MP_{a,t}\right) + \epsilon_a \tag{4}$$

The trade cost is specified as $Trade_{ac} = e^{\tau \ln D_{ac}} = D_{ac}^{\tau}$. The coefficient τ reflects the concavity of the trade cost function between two areas. We assume linearity of the trade cost with $\tau = 1$. We combine the employment density model in Equation (1) and the market potential model in Equation (4) to obtain the following specification:

$$\ln(w_{at}) = b_1 + b_2 \ln(E_{at}) + b_3 \ln(MP_{at}) + e_{at} \tag{5}$$

where $b_1 = \kappa + \ln(\theta)$, $b_2 = \gamma$, $b_3 = \frac{1}{\sigma}$, and $e_{at} = \varepsilon_{at} + \epsilon_{at}$. We extend this employment density and market potential models by including local amenities and the province capital dummy as additional explanatory variables. The share of the population located on a sea shore and mountains represents the local amenities. The equation we estimate is:

$$\ln(w_{at}) = b_1 + b_2 \ln(E_{at}) + b_3 \ln(MP_{at}) + b_4 amenities_{a,t} + b_5 capitol_a + e_{at} \tag{6}$$

The endogeneity issue of the worker's quantity and quality may lead to correlation between the local characteristics and the error term. There are two main reasons for this. First, the employment density and the market potential may not have causal relationship with the wage. As argued in the previous studies (e.g. Ciccone & Hall, 1996 and Combes, et.al, 2010), the employment density can be simultaneously determined with the wage rate. An urban area with a higher wage level can attract more workers and this increases the employment density in that area. The market potential variable can be endogenous to the area's productivity since this variable is calculated from the economic output from all regencies. Second, the error term may also include unobserved variables that can be correlated with the employment density. For instance, the unobserved characteristics of productivity difference across urban areas may affect the population pattern and may be capitalized into the wage.

We utilize the instrumentation strategy to deal with this endogeneity of workers' quantity that caused by a reverse causality and missing variables. To deal with the endogeneity issue on worker's quality, we utilize a longitudinal data as suggested by previous studies (e.g., Glaeser and Mare 2001 and Combes, et.al 2008). Moreover, we include worker's characteristics in estimating Equation (6) to avoid the biased estimates caused by any correlation between the local characteristics and worker's characteristics. We first estimate the empirical model by using the ordinary least square for a micro data at individual level. We next apply the 2SLS estimation model by involving instruments of long-lagged population density and market potential, area ruggedness, and geological characteristics.

3.3. Data

This paper utilizes three main data sources: the Labour Force Survey (Sakernas), the Village Potential Survey (Podes), and the Geospatial Map. The first dataset is Indonesia's Labour Force Survey from 2008 to 2010. The survey includes basic information about workers' characteristics such as age, gender, marital status, education level, sectoral occupation, and the wage. Information about workers' home and working location is also available from the labour force survey. The second data source is the Indonesia Village Potential Survey on 2008 and 2011. We use this dataset to identify the local characteristics of the urban areas. In particular, we estimate the fraction of the population in the sea shore and mountains from this survey. Another variable derived from this dataset is the area ruggedness as one of the instrumental variables. The third data source is the spatial data of Indonesia in 2007. Since the administrative division of

Indonesia has been changed in recent years, we modify the boundary in 2007 to meet the latest administrative division in 2010.

We calculate the employment density at regency level from the labour force survey. The wage is calculated from the monthly wage of workers. It is also possible to calculate the average daily wage since data on the working days is available from the survey. We decide to use the average monthly wage since our preliminary exercise indicates that the utilization of the average daily wage gives a similar result.

Sectoral occupations included in the estimation are manufacturing, trade, transportation and communication, finance, and services. We exclude the part-time workers that have less than 35 working hours in a week. We also exclude workers in agriculture, mining, and electricity, gas, and water sectors. Workers in agriculture and mining sectors are excluded since we only focus on the secondary and the tertiary sectors in urban areas. This is a common approach for studies in urban economics. The exclusion of workers in the agricultural sector substantially affects the average wage among the regencies since the share agricultural worker is still dominant in some regencies. Workers in the electricity and water sector are also excluded from this estimation due to a limitation from the survey data. The labour force survey only includes a small number of observations for workers in this sector, mainly in the province capital. Moreover, we also exclude workers in the government sector since this type of occupation does not directly relate to urban economics.

We define the education level in three groups based on the years of schooling. The first group represents workers with 0 to 9 years of schooling or those with the education up to junior high school. The second group represents workers with an educational background of 10 to 14 years or the senior high school and diploma level. The last group represents workers with at least 15 years of education, i.e. workers with a bachelor degree or higher.

Table 3-1 Summary statistics for individual workers in urban regencies

VARIABLE	**ALL REGIONS**		**JAVA**		**OTHER ISLANDS**	
	Mean	**S.Dev**	**Mean**	**S.Dev**	**Mean**	**S.Dev**
Log Monthly Wage	13.711	0.75	13.656	0.76	13.823	0.71
Age	35.8	11.91	36.1	11.95	35.1	11.83
Education (3 level)	1.62	0.68	1.58	0.68	1.71	0.67
Gender (Male)	0.631	0.482	0.632	0.482	0.629	0.483
Commute	0.14	0.34	0.16	0.37	0.09	0.28

Note: Based on individual samples from 127 regencies in three years (2008-2010). Total samples for all regencies (184,315); Java (123,800); Others (60,515)

The summary statistics for individual data in Table 3-1 is derived from the aggregation on working location. There are 184,315 samples from the period of 2008 to 2010. The table shows a lower average wage for workers in Java compare to other islands. The difference in this wage level may reflect a disparity in the price level between Java and the other regions. Moreover, the education level in Java is lower than that in other islands. A significant concentration of workers in Java urban areas may relate to this average education. As the average city size is higher in Java, a share of the low-educated workers is also higher. Thus, this condition does not imply that skilled workers are more dominant in urban areas outside Java. We discuss this issue further in the next section when we conduct the estimation that addresses the endogeneity issue on workers' quantity and quality. The summary statistics also indicate a higher fraction of commuting workers in Java. The fraction of commuting workers in Java is substantial at 14 percent from total workers compare to that in other regions that estimated around 9 percent.

The share of the population living in a sea shore and mountains is derived from the Village Potential Survey in 2008 and 2011. We calculate the total population of the villages located at the sea shore and divide it with the total regency population to obtain the sea shore population in a percentage term. The sea shore population in 2008 is calculated from the village survey in 2008, and the sea shore population in 2010 is calculated from the village survey in 2011. The sea shore population in 2009 is estimated from the average sea shore population between 2008 and 2010. The calculation of the population share in the mountains applies a similar method. There are about 13 percent of the urban population that lives in sea shore and about 11 percent of urban population lives in the mountains.

Data availability is a crucial constraint to economic research in developing countries. There are some variables that we should estimate because of data limitation. For instance, we calculate the land size of a regency since we cannot obtain reliable data from the previous surveys. The official information on the land-area is only available at province level. The Village Potential Survey on 2008 includes a statistic for the land area of each village. However, this information is imprecise since the sum of land area from that survey does not match to the official total land area of Indonesia. The calculation of regency's area by using the geospatial map is also challenged by a measurement error due to a low-resolution of the spatial data. To deal with this issue, we use the land area at the province level in 2010 as a baseline to calculate the regency area. We estimate a land size of the regency based on geospatial data in 2007 and adjust this data with the total land area for each province. By using this procedure, we obtain the total area of regency that adjusted for each province. We argue that this approach can lead us to a better approximation to the regency area rather than relying on either the village potential data or the geospatial data.

The inter-regency distance is calculated from a linear distance between two regencies. Given the archipelagic setting in Indonesia, it is difficult to obtain a precise distance between two regencies, particularly when the regencies are. One may calculate the actual distance between regencies in one island by using the road network that connects the regencies. This calculation method is become possible by using the recent features in the mapping software. However, we cannot apply that calculation method in this study since we deal with the regencies that located in different island. Moreover, we cannot obtain adequate spatial data of the road network for all regions in Indonesia. Therefore, we apply a geospatial analysis to calculate a direct distance of the central point between two regencies. We identify the central point of a regency from a location of the sub-regency that assigned as a capital district.

The market potential variable is calculated from the sum of regency's output weighted by the inverse of trade cost between regencies as defined in Equation (8). The source of regency's output data is obtained from Indonesia Regional Gross Domestic Products (GDP) from 2008 to 2010 (BPS, 2010b). We use the direct distance between regencies to calculate the trade cost. We construct a regency distance matrix that consists of a total of 497 regencies. The distance matrix is utilized to calculate the sum of market potential for each regency.

3.4. Instruments

We apply the 2SLS regression in addition to the least squares estimation to deal with the endogenous quantity of workers. We use the long-lagged population density and the area's geological characteristics as instruments for the current level of employment density. We assume these variables to be correlated with the current employment density, but not with the current wage level. We also use the long-lagged market potential as the instrument for the current market potential. Altogether, we define five instruments to control the employment density and market potential. The instruments are the population density in 1996, market potential in 1996, geological rocks, the area's physiography, and the area's ruggedness. The first instrument is the historical population density that is commonly used in previous studies since it is introduced by Ciccone & Hall (1996). We use the population density in 1996 as the instrument for the current employment density since we cannot obtain the employment data at regency level in 1996. We calculate the regency population in 1996 from the Village Potential survey in 1996. The population at sub-regency level in 1996 is adjusted to meet the regency division in 2010.

The calculation of 1996 market potential is similar to the calculation of the current market potential. However, it is not possible to calculate the regency output in 1996 based on the current definition of regency administration. To deal with this issue, we use the regency population in 1996 as a proxy for the regency output in 1996. By using this proxy, we calculate the market potential in

1996 from the sum of the regency population that weighted by the inverse of the trade cost between regencies.

We use geological rocks to explain the regency's density based on an assumption that Indonesia's population have a long historical culture in agriculture. The geographical characteristics are considered as an important factor to explain the settlement structure in one region. The geological rocks explain the difference in soil fertility. The sedimentary and volcanic rocks explain a higher land fertility of the urban area. Indonesia is located in the dynamic tectonic plates where volcanic and tectonic activities can be observed in several regions. The physiography and the area ruggedness are also important to explain a historical development of the settlement areas in Indonesia. We consider that regencies with the low plain and low hill types are preferable for the establishment of settlements. We argue that this topographical characteristic can explain the distribution of urban areas in Sumatera. The eastern part of this island is relatively flatter compare to the western region where the mountainous area of Bukit Barisan is stretched along the west coast. The distribution of cities in Java is also dominant in the northern part of the island, where the areas' morphology is flatter compare to that in the southern region. The distribution of cities in Kalimantan, Sulawesi, and Papua islands also shows the similar pattern in which most of the cities are located near to the coastal area.

The identification of the geological rocks and the physiography utilizes a combination of spatial layers from Geological Map (Ministry of Energy and Mineral Resources, 2010) and the Geospatial Map 2007. We simplify the topsoil mineralogy into four categories: sedimentary rocks, volcanic rocks, cretaceous rocks, and others. A similar procedure is conducted for the regency's physiography. This variable is simplified into three categories: Low-Plain, Low-Hills, and the High-Plain or Mountainous Area.

We calculate the regency's ruggedness as the fifth instrument to control for the employment density variable. The calculation of local terrain ruggedness is conducted by taking the difference between villages with the highest altitude and those at lowest altitudes within regency. This variable captures the variations of altitude at regency level to represents the suitability of an area to develop settlements or built up areas.

Table 3-2 Summary statistics for the instrumental variables

Variables	Obs	Mean	Std. Dev.	Min	Max
Logdens1996	127	7.536	1.065	5.434	9.866
LogMP1996	127	7.646	1.013	5.643	9.899
Ruggedness	127	218.26	259.33	0	995
Physiography					
• Low Plain	127	0.409	0.492	0	1
• Low Hills	127	0.244	0.430	0	1
• High Plain & Mountain	127	0.346	0.476	0	1
Geological Rocks					
• Sedimentary	127	0.283	0.451	0	1
• Volcanic	127	0.472	0.500	0	1
• Cretaceous	127	0.150	0.357	0	1
• Other type	127	0.094	0.293	0	1

Note: Number of observations: 127 regencies (Java: 80; Other Islands: 47)

The summary statistic for the instrumental variables is shown in Table 3-2. The table shows that the 1996 log population density is 7.5 and the 1996 log market potential is 7.6. The average ruggedness is about 218 meter and we can observe a substantial variation of the area's ruggedness among the regencies. The physiography variable shows that the low plain type is dominant at 41 percent. The urban regency with the volcanic-rocks type is also dominant at 47 percent.

We examine the first stage estimation by showing the value of adjusted R^2 and the pairwise correlation to explain that the instruments have a good explanatory power to explain the current density and market potential. The correlation between main variables and their instruments is shown in Table 3-3. The table reports adjusted R^2 in the first stage regression for employment density and market potential with the instruments. The pairwise correlation between variables is also reported in the table. Since the geological instruments for Geological Rocks and Physiography are represented by the dummy variables with a discrete value, presenting their pairwise correlation to the main variables may not be useful. Therefore, we only report the result of adjusted R^2 from first stage regressions of geological variables to the current employment density and market potential.

Table 3-3 Adjusted R^2 and correlation for variables in the first stage

Variable	**Log (employment density)**	**Log (market potential)**
Log (employment density)	(1.0)	(0.58)
Log Pop Density 1996	0.9641 (0.9819)	0.2915 (0.5416)
Log MP 1996	0.9513 (0.9754)	0.3314 (0.5772)
Ruggedness	0.2512 (-0.5031)	-0.0022 (0.0218)
Geological Rocks (4 dummies)	0.0719	0.0538
Physiography (3 dummies)	0.0802	0.0417

Note: Adjusted R^2 in plain text and pairwise correlation in parenthesis, 381 Observations

The population density in 1996 indicates a substantial correlation with the current employment density. The market potential in 1996 also shows a strong correlation with a current employment density, but the correlation between the current market potential and the 19996 market potential is weaker.

Since it is not possible to estimate past regency's economic output based on the current administrative division, we replace it with regency's population in 1996 in the calculation of long-lagged market potential in 1996. This limitation in data availability may lead to an issue of a weak instrument on 1996 market potential. The geological instruments have a good explanatory power to explain the employment density whereas their correlation with market potential is weaker. Areas' ruggedness indicates a stronger correlation with the employment density compare to the other geological instruments. In general, we expect that these instruments have a good explanatory power in explaining the employment density and market potential.

3.5. Estimation Results

This section discusses results from the empirical estimation at individual level. The main objective is to identify the agglomeration magnitude by using the employment density and market potential models. The empirical model is based on Equation (6). We include the worker's characteristics as explanatory variables to separate their effect on wage disparity from the net agglomeration externality as suggested in Combes, Duranton & Gobillon (2008). We also include a province capital dummy as the explanatory variable. Our preliminary estimation at regency level indicates the importance of this variable to explain wage disparities across urban areas. We include the results from regency-level estimations in Annex 3.1.

There are two methods of conducting this micro-level estimation, namely the one-stage and the two-stage method. The one-stage method includes all variables at individual level in one estimation model to identify the agglomeration magnitude. It is based on an assumption that the wage level depends on the worker's characteristics as well as local characteristics. The two-stage method utilizes two estimation procedures. The first estimation identifies the net wage after controlling the worker's characteristics (age, education, gender, etc.). The residual wage level from the first estimation is then estimated at regency-level estimation by including the local characteristics (see e.g. Combes et.al, 2008 and Fingleton & Longhi, 2013 for further discussion). This study uses the one-stage method because of its simplicity that all explanatory variables are included in one regression.

The labour force surveys in Indonesia are conducted for random samples of workers. Given this feature, it is not possible to construct a panel data at individual level. To avoid estimation bias due to the unobserved individual characteristics, we apply a *repeated cross section* strategy (Deaton, 1985) by using an individual fixed-effect from workers in the same cohort. The utilization of this variable is based on an assumption that workers who were born in the same period would share a similar characteristic.

We apply the 2SLS estimation by including instrumental variables to address the endogeneity issue on worker's quantity. We assume a simple form of market potential variable with a coefficient for $\tau = 1$ that represents a linearity of trade cost to the distance between two regencies. To justify this assumption, we conduct preliminary estimation at regency level by using different coefficient for τ in calculating the market potential variable. We discuss this preliminary estimation in Annex 3.2.

We include age, age squared, education, and dummy for gender and marriage as explanatory variables for worker's characteristics. To control the wage differences across sectors, we include dummy variables for five urban occupations, i.e. manufacturing, trade, transportation/communication, finance, and services. Moreover, we include the year dummy variable to control factors that affect the wages such as the inflation and other economic shocks.

We conduct a separate estimation on urban areas in Java and other islands in addition to the estimation on the nation level. As an alternative, the estimation strategy may utilize a dummy variable of the island group to control the unobserved characteristic across islands. We decide to run separate estimation for Java and other island instead of using the island dummy variable. There are two reasons for this. First, we do not control the price level because of data limitation. The price level among the islands can be substantial and this may affect the wage level in urban areas. Second, we want to emphasize the estimations to the unbalanced distribution of urban areas between Java and the other island. The previous result in Chapter 2 shows that urban areas in Java have a unique characteristic that distinguish the island from other regions. The distribution of urban areas in Java affects the overall economic condition on this island. We argue that the pattern of urban areas in Java is comparable to the pattern of urban areas in the advanced economies. We observed that urban areas in Java have been developed to become an integrated urban system. In our view, the pattern of urban areas in Java can be compared with that in developed countries with archipelagic features where the distribution of urban areas is concentrated in the main island. Therefore, we decide to conduct a specific estimation on Java and compare the result with that in other islands.

Table 3-4 depicts the results from individual-level estimation. We compare the least-squares and 2SLS results from the estimations for all regions and those for Java and other islands. The first two columns represent the least-squares results, and the next two columns represent the 2SLS results. We also report the coefficient from the worker's characteristics in the table.

Individual characteristics such as age, marital status, education level, and gender are significant to explain the wage. The education level stands as the most significant factor to explain the worker's wage with the coefficient that range between 35 and 41 percent. The second variable that affects the wage is gender. Male workers earn a higher wage that range between 17 and 21 percent. The estimation results also suggest that commuting workers in Java have a higher wage, holding other variables constant. This represents a condition that commuting workers from sub-urban areas earn a higher wage compare to the local workers in order to compensate their commuting cost. However, we cannot confirm the significance of commuting characteristic on the wages for the estimation outside Java. The sectoral occupations are also included in the estimation, but we do not report the results in the table. In general, the results suggest that wage differences among sectors are statistically significant. We conclude that workers in the financial sector have a higher wage level compare to workers in other sectors. This finding is aligned with several surveys on the standard wage level in Indonesia, such as the survey from Kelly Services (2013).

Table 3-4 Estimation results for individual-level estimation

VARIABLE	**ALL REGIONS**				**JAVA**				**OTHER ISLANDS**			
	OLS		**2SLS**		**OLS**		**2SLS**		**OLS**		**2SLS**	
Ln (Wage)	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**
Ln(EmpDensity)	0.033	-0.031	0.028	-0.0006	0.053	0.025	0.058	0.030	0.030	-0.023	0.007	-0.004
	(0.015)[b]	(0.018)[c]	(0.015)[c]	(0.020)	(0.021)[b]	(0.015)[c]	(0.023)[b]	(0.014)[b]	(0.023)	(0.022)	(0.022)	(0.029)
Ln(MP)		0.138		0.058		0.254		0.244		0.174		0.045
		(0.026)[a]		(0.028)[b]		(0.021)[a]		(0.044)[a]		(0.045)[a]		(0.074)
PCapital	0.176	0.171	0.184	0.181	0.204	-0.093	0.196	-0.088	0.045	0.038	0.068	0.064
	(0.043)[a]	(0.037)[a]	(0.041)[a]	(0.037)[a]	(0.070)[a]	(0.056)	(0.070)[a]	(0.074)	(0.057)	(0.052)	(0.053)	(0.051)
Popshore	0.437	0.580	0.425	0.486	0.063	0.278	0.068	0.274	0.378	0.307	0.379	0.361
	(0.198)[b]	(0.159)[a]	(0.194)[b]	(0.1770)[a]	(0.334)	(0.206)	(0.330)	(0.192)	(0.208)[c]	(0.138)[b]	(0.210)[c]	(0.195)[c]
Popmountain	-0.275	-0.441	-0.311	-0.378	-0.043	0.022	-0.017	0.040	-0.549	-0.156	-0.629	-0.517
	(0.153)[c]	(0.172)[b]	(0.164)[c]	(0.171)[b]	(0.162)	(0.128)	(0.173)	(0.122)	(0.419)	(0.277)	(0.444)	(0.489)
Commute	0.149	0.118	0.152	0.140	0.178	0.149	0.177	0.149	0.017	-0.002	0.027	0.021
	(0.020)[a]	(0.018)[a]	(0.020)[a]	(0.019)[a]	(0.019)[a]	(0.016)[a]	(0.019)[a]	(0.016)[a]	(0.035)	(0.034)	(0.034)	(0.032)
Married	0.109	0.106	0.109	0.107	0.113	0.107	0.113	0.107	0.120	0.125	0.119	0.120
	(0.008)[a]	(0.007)[a]	(0.008)[a]	(0.008)[a]	(0.009)[a]	(0.008)[a]	(0.009)[a]	(0.008)[a]	(0.011)[a]	(0.010)[a]	(0.011)[a]	(0.011)[a]
Age	0.043	0.044	0.043	0.044	0.043	0.044	0.043	0.044	0.043	0.045	0.043	0.044
	(0.003)[a]	(0.002)[a]	(0.003)[a]	(0.003)[a]	(0.002)[a]	(0.001)[a]	(0.002)[a]	(0.001)[a]	(0.006)[a]	(0.005)[a]	(0.006)[a]	(0.006)[a]
Age-squared	-0.0004	-0.0004	-0.0004	-0.0004	-0.0005	-0.0005	-0.0005	-0.0005	-0.0004	-0.0004	-0.0004	-0.0004
	(0.000)[a]	(0.000)[a]	(0.0000)[a]	(0.0000)[a]	(0.000)[a]	(0.000)[a]	(0.0000)[a]	(0.0000)[a]	(0.000)[a]	(0.000)[a]	(0.000)[a]	(0.0000)[a]
Education	0.401	0.401	0.401	0.402	0.410	0.408	0.410	0.408	0.356	0.344	0.357	0.354
	(0.012)[a]	(0.010)[a]	(0.012)[a]	(0.011)[a]	(0.012)[a]	(0.011)[a]	(0.012)[a]	(0.011)[a]	(0.018)[a]	(0.014)[a]	(0.018)[a]	(0.018)[a]
Gender (Male)	0.196	0.190	0.196	0.194	0.210	0.188	0.210	0.189	0.167	0.170	0.167	0.168
	(0.017)[a]	(0.016)[a]	(0.017)[a]	(0.017)[a]	(0.019)[a]	(0.018)[a]	(0.019)[a]	(0.019)[a]	(0.028)[a]	(0.025)[a]	(0.028)[a]	(0.027)[a]
Hansen			12.604	14.266			11.486	8.684			4.799	6.238
(P_value)			(0.0498)	(0.0268)			(0.0745)	(0.1922)			(0.5698)	(0.3971)
Underidentification			5.4e+05	1.2e+05			2.9e+05	4.9e+04			1.9e+05	50.895
(P_value)			(0.0000)	(0.0000)			(0.0000)	(0.0000)			(0.0000)	(0.0000)
Weak Identification			4.7e+05	2.1e+04			1.7e+05	7497.792			2.0e+05	7.01
(Critical Values)			(19.86)	(17.70)			(19.86)	(17.70)			(19.86)	(17.70)
R2			0.2947	0.3071			0.3277	0.3645			0.2269	0.1156
RMSE			0.6265	0.6209			0.62	.6028			0.6257	0.2178

Note: The result is based on OLS (reg) and 2SLS estimation (ivreg28) using Stata. All regressions include a constant, the dummy variables for 5 urban sectors (manufacturing, trade, transportation, finance, and service), three year dummies, and dummy for cohorts. Instruments are logDens1996, logMP1996, Ruggedness, Physiography (3 dummies) and Geological Rocks (4 dummies). Number of observations: 184,315 samples (Java: 123,800 and other: 60,515) from 3 years survey (2008-2010)

a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

The post-estimation test for the 2SLS estimations in Java and other island indicates the relevant instruments. The Hansen's J statistics is insignificant, suggesting that the instruments are not correlated with the error term. The Cragg-Donald's F statistic indicates that we can reject the null hypothesis for weak instruments. The Anderson canonical correlations test also suggests that we can reject the null for an under-identification of the instruments.

The table shows that the coefficients of employment density are significant Java urban areas. The density elasticity of an individual wage ranges between 5.3 percent and 5.8 percent from the employment density model. A combined employment density and market potential model reduces the elasticity to become 2.5 percent to 3 percent. On the other hand, estimation results for urban areas outside Java indicate that the coefficient for employment density is insignificant.

The market potential is also significant in Java. Its coefficient ranges between 24 percent and 25 percent, substantially higher than the magnitude of urban agglomeration. However, we cannot confirm a similar finding for urban areas outside Java. The coefficient for market potential is only significant in the OLS estimation for urban areas outside Java. We argue that a distribution pattern of urban areas in Java leads to a significant effect of the market potential. The metropolitan areas in Java are endowed with a substantial economic size and populations that become the main factor that affect their potential market. The micropolitan areas can also gain some benefit when they have better access to the metropolitan areas such as Jakarta, Bandung, Surabaya, Semarang, and Surakarta. Given that Java is located in the southern part of Indonesia, access to market in other islands becomes additional explanation to a higher market potential that observed in urban areas in the northern coast of this island. This partly explains a situation that most of the urban areas in the northern coast are more developed compare to urban areas in the southern coast of Java.

The province capital dummy is insignificant in this individual level estimation. This result is different with that from our preliminary estimation at regency level. As shown in Annex 3.1, the coefficient for province capital is significant in Java and other islands in the estimation with employment density model. This variable is also significant for urban areas outside Java in the estimation with a combined model of the employment density and market potential. Results from this section suggest that the significance of province capital variable on wage disparities is no longer hold after the worker's characteristics are taken into account. We observe that worker's characteristics are the main indicator to explain wage disparities among urban areas outside Java. Skilled workers are more concentrated in the province capital outside Java compare to other urban areas in that region. Given a condition that urban areas outside Java are more scattered, the province capital stands out as a dominant area for economic activities, and this attracts more skilled workers to reside in the capital cities. The concentration of skilled workers in large urban areas, particularly in the province capital, affects the wage level across urban areas as suggested in the previous studies (e.g. Combes et.al, 2008 and Lee, 2009).

3.6. Robustness check by group of workers

In general, our estimation results suggest that worker's characteristics are statistically significant to explain wage disparities. To identify the effect of worker's characteristics, we conduct further estimation for particular group of workers to examine the agglomeration economies in Indonesia. We apply three types of estimation to assess the robustness of our findings from this individual-level estimation. First, we conduct a separate estimation for male and female workers. The objective is to examine the magnitude of agglomeration externalities in urban areas based on the participation of gender groups in the labour force. In the second estimation, we conduct separate estimation on five occupation sectors and discuss the evidence of agglomeration externality for each sector. The third robustness check focuses on the education level of workers. We investigate each group of workers based on their education and discuss their effect to the agglomeration. We only apply the 2SLS estimation in this robustness check since the previous results has confirmed the importance of addressing the endogeneity issue.

The first check focuses on the gender groups. We apply a separate estimation for male and female workers. We use similar strategy with previous section by comparing the results from the employment density and the market potential models. We also conduct separate estimation for Java and other islands in addition to the estimation for all regions.

Table 3-5 describes the estimation result of male and female workers. The individual characteristics such as marital status, age, and education are statistically significant to explain wage difference for both groups. The education level appears as the most influential characteristic to explain wage differences in both groups. The effect of commuting to the wage is insignificant in urban areas outside Java. The estimation results for Java show that the coefficient for commuting variable is higher for female workers. The coefficient for marital status, in a contrary, is higher for male workers.

The coefficient for province capital is statistically significant for both the estimation in Java and other islands. This result indicates that the wage level of female workers is higher in the province capital. This indicates a tendency that female workers have a higher opportunity to be employed in the province capital since the type of occupations is more various in that area.

Consistent with the previous results, the agglomeration externalities in urban areas outside Java are not significant in the estimation for both gender groups. The evidence of agglomeration externality is more robust for female workers in Java urban areas. We conclude that doubling the size of female workers in Java urban areas increases the productivity from 5 to 9 percent.

The results for male workers in Java indicate that the agglomeration externality is only significant in the employment density model, but its significance is dropped when the market potential variable is taking into account. This finding confirms a previous study of Fingleton & Longhi (2013) on urban areas in the United Kingdom. However, we expect a more robust result from this estimation since we include two important variables on individual characteristics, i.e. the education level and the commuting variable that based on actual information from individual-level dataset. In general, our result suggests that Indonesia can expect a boost in the productivity of urban areas from an increasing female participation rate in the labour force.

Table 3-5 2SLS estimation results for gender groups

VARIABLE	ALL REGIONS				JAVA				OTHER ISLANDS			
	MALE		FEMALE		MALE		FEMALE		MALE		FEMALE	
Ln (Wage)	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**
Ln(EmpDensity)	0.012	-0.009	0.049	0.014	0.038	0.014	0.090	0.054	0.001	-0.014	0.015	0.009
	(0.014)	(0.018)	(0.017)[a]	(0.024)	(0.021)[c]	(0.013)	(0.028)[a]	(0.018)[a]	(0.022)	(0.028)	(0.024)	(0.031)
Ln(MP)		0.047		0.082		0.208		0.312		0.059		0.027
		(0.025)[c]		(0.036)[b]		(0.040)[a]		(0.059)[a]		(0.071)		(0.078)
PCapital	0.183	0.181	0.185	0.178	0.202	-0.035	0.194	-0.182	0.059	0.052	0.092	0.090
	(0.040)[a]	(0.037)[a]	(0.046)[a]	(0.040)[a]	(0.067)[a]	(0.065)	(0.081)[b]	(0.105)[c]	(0.054)	(0.051)	(0.056)[c]	(0.054)[c]
Popshore	0.313	0.370	0.589	0.655	0.161	0.338	-0.135	0.128	0.223	0.206	0.594	0.580
	(0.146)[b]	(0.136)[b]	(0.263)[b]	(0.232)[a]	(0.356)	(0.244)	(0.332)	(0.160)	(0.163)	(0.143)	(0.241)[b]	(0.233)[b]
Popmountain	-0.325	-0.385	-0.282	-0.357	-0.078	-0.023	0.060	0.123	-0.473	-0.344	-0.765	-0.694
	(0.142)[b]	(0.152)[b]	(0.215)	(0.216)[c]	(0.154)	(0.123)	(0.233)	(0.170)	(0.398)	(0.425)	(0.455)[c]	(0.505)
Commute	0.138	0.127	0.190	0.175	0.161	0.133	0.216	0.192	0.025	0.016	0.037	0.035
	(0.020)[a]	(0.019)[a]	(0.024)[a]	(0.022)[c]	(0.019)[a]	(0.017)[a]	(0.024)[a]	(0.021)[a]	(0.033)[a]	(0.031)	(0.043)	(0.041)
Married	0.159	0.157	0.043	0.043	0.163	0.151	0.048	0.055	0.161	0.164	0.058	0.059
	(0.008)[a]	(0.008)[a]	(0.014)[a]	(0.013)[c]	(0.011)[a]	(0.010)[a]	(0.011)[a]	(0.010)[a]	(0.010)[a]	(0.010)[a]	(0.022)[a]	(0.022)[a]
Age	0.047	0.047	0.039	0.040	0.046	0.047	0.040	0.040	0.049	0.049	0.040	0.040
	(0.002)[a]	(0.001)[a]	(0.005)[a]	(0.004)[c]	(0.002)[a]	(0.002)[a]	(0.003)[a]	(0.002)[a]	(0.003)[a]	(0.003)[a]	(0.008)[a]	(0.009)[a]
Age-squared	-0.00049	-0.00048	-0.0004	-0.00041	-0.00048	-0.00049	-0.00043	-0.00041	-0.00049	-0.00049	-0.0004	-0.0004
	(0.00002)[a]	(0.00002)[a]	(0.0001)[a]	(0.00005)[c]	(0.00002)[a]	(0.00002)[a]	(0.00003)[a]	(0.00003)[a]	(0.00003)[a]	(0.00003)[a]	(0.0001)[a]	(0.0001)[a]
Education	0.376	0.377	0.415	0.413	0.394	0.393	0.400	0.396	0.322	0.318	0.396	0.393
	(0.010)[a]	(0.010)[a]	(0.017)[a]	(0.015)[c]	(0.012)[a]	(0.011)[a]	(0.012)[a]	(0.011)[a]	(0.016)	(0.015)[a]	(0.019)[a]	(0.020)[a]
Hansen	10.789	11.678	13.582	15.999	9.273	6.378	12.215	8.347	4.084	6.352	5.375	6.309
(P_value)	0.095	0.070	0.035	0.014	0.159	0.382	0.057	0.214	0.665	0.385	0.497	0.390
Underidentification	3.40E+05	7.90E+04	2.0e+05	4.1e+04	1.80E+05	3.20E+04	1.1e+05	1.7e+04	1.20E+05	1.20E+04	7.0e+04	5736.852
(P_value)	0.000	0.000	0.000	0.0000	0.000	0.000	0.0000	0.0000	0.000	0.000	0.0000	0.0000
Weak Identification	3.00E+05	1.40E+04	1.6e+05	7082.577	1.00E+05	4872.527	6.3e+04	2655.469	1.30E+05	1714.566	6.8e+04	816.243
(Critical Values)	19.86	17.70	19.86	17.70	19.86	17.70	19.86	17.70	19.86	17.70	19.86	17.70
R2	0.28	0.29	0.30	0.32	0.31	0.34	0.33	0.37	0.21	0.22	0.24	0.25
RMSE	0.60	0.60	0.66	0.65	0.59	0.58	0.66	0.63	0.61	0.60	0.65	0.64
Observations	*116,300*		*68,015*		*78,231*		*45,569*		*38,069*		*22,446*	

Note: The result is based on 2SLS estimation (ivreg28) using Stata. All regressions include a constant, the dummy variables for 5 urban sectors (manufacturing, trade, transportation, finance, and service), three year dummies, and dummy for cohorts. Instruments are logDens1996, logMP1996, Ruggedness, Physiography (3 dummies) and Geological Rocks (4 dummies). a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

The second estimation to check the robustness of this estimation is conducted on the urban sectors. As previously explained, there are five occupational sectors that included in the dataset: manufacturing, trade, transportation, finance, and services. We conduct estimation on each sector group by using a similar strategy with the previous section. We only report the results from the 2SLS regression that has been considered as the main strategy in this paper. The estimation results are reported in Table 3-6. We do not include the estimation results for some variables such as the local amenities and individual characteristics. The main findings for these variables refer to the previous section. We focus the discussion on the main variables such as the employment density, the market potential, and the province capital dummy.

The estimation for manufacturing sector shows a significant coefficient for market potential variable in urban areas outside Java at 22 percent. Similar condition holds for Java where the combined density and market potential model yields a coefficient for market potential at 35 percent. However, the coefficient for employment density is insignificant in a combined density and market potential model. This finding is aligned with the previous studies on the agglomeration externality on manufacturing sector in Indonesia. For instance, Kuncoro, A (2009) concludes that the evidence of agglomeration from the interaction among the aggregate manufacturing activities (urbanization effect) is weaker than agglomeration effect from the concentration of a specific manufacturing industry (localization effect). A specific estimation for the localization effect is beyond the scope of this study. However, we draw this conclusion to verify general outcomes from previous studies by using this individual-level estimation.

Table 3-6 Robustness check on sectoral workers

VARIABLE	ALL REGIONS		JAVA		OTHER ISLANDS	
Ln (Wage)	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**
1. Manufacturing						
Ln(EmpDensity)	0.056	0.001	0.092	0.033	0.011	-0.018
	(0.027)[b]	(0.034)	(0.037)[b]	(0.025)	(0.036)	(0.030)
Ln(MP)		0.153		0.356		0.2191
		(0.052)[a]		(0.075)[a]		(0.113)[c]
PCapital	0.126	0.101	0.111	-0.222	0.043	0.025
	(0.067)[c]	(0.058)[c]	(0.094)	(0.097)[b]	(0.073)	(0.064)
#Observations	*51281*		*41445*		*9836*	
2. Trade						
Ln(EmpDensity)	0.021	0.004	0.046	0.028	0.004	-0.010
	(0.014)	(0.018)	(0.020)[b]	(0.015)[c]	(0.021)	(0.026)
Ln(MP)		0.036		0.200		0.058
		(0.027)		(0.041)[a]		(0.064)
PCapital	0.214	0.211	0.253	0.000	0.083	0.074
	(0.039)[a]	(0.036)[a]	(0.068)[a]	(0.077)	(0.052)	(0.051)
#Observations	*68173*		*42939*		*25234*	
3. Transportation						
Ln(EmpDensity)	0.012	-0.012	0.035	0.012	0.016	-0.001
	(0.016)	(0.020)	(0.024)	(0.015)	(0.026)	(0.037)
Ln(MP)		0.047		0.240		0.057
		(0.026)[c]		(0.042)[a]		(0.081)
PCapital	0.182	0.186	0.232	-0.058	0.055	0.051
	(0.050)[a]	(0.047)[a]	(0.080)[a]	(0.079)	(0.072)	(0.069)
#Observations	*28312*		*16657*		*11655*	
4. Finance						
Ln(EmpDensity)	0.038	-0.007	0.053	0.034	-0.006	-0.037
	(0.016)[b]	(0.018)	(0.020)[a]	(0.016)[b]	(0.024)	(0.028)
Ln(MP)		0.083		0.166		0.102
		(0.028)[a]		(0.037)[a]		(0.074)
PCapital	0.184	0.173	0.228	0.010	0.056	0.053
	(0.040)[a]	(0.033)[a]	(0.068)[a]	(0.063)	(0.058)	(0.053)
#Observations	*8523*		*5652*		*2871*	
5. Service						
Ln(EmpDensity)	0.016	0.016	0.062	0.043	0.004	0.009
	(0.012)	(0.016)	(0.018)[a]	(0.012)[a]	(0.016)	(0.021)
Ln(PMarket)		0.000		0.182		-0.017
		(0.025)		(0.035)[a]		(0.047)
PCapital	0.216	0.216	0.193	-0.031	0.112	0.113
	(0.031)	(0.031)[a]	(0.068)[a]	(0.063)	(0.037)[a]	(0.038)[a]
#Observations	*28026*		*17107*		*10919*	

Note: The result is based on 2SLS estimation (ivreg28) using Stata. All regressions include a constant, popshore, popmountain, commute, married, age, age-squared, male, education, and three year dummies. a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

The estimations confirm the existence of agglomeration economies on trade, finance and service sectors in Java urban areas. The magnitude of the agglomeration effect for the service sector is higher than that in other sectors. Similar to the previous section, the evidence of agglomeration economies on urban areas outside Java is insignificant. The wage level in a province capital outside Java, in contrast, is statistically higher than the wage level in other urban areas. This result reflects a concentration of service sector in the province capital outside Java. The effect of the market potential to economic productivity is statistically significant for all sectors in Java urban areas. This result emphasizes our previous findings on the spatial spillover in Java. The evidence of spatial spillover on urban areas outside Java is statistically significant for the manufacturing sector.

The third robustness check is undertaken for each group of education level. Similar with the previous check, we only report the results for main explanatory variables that derived from 2SLS estimation. The results in Table 3-7 indicate no significant effect of employment density, market potential, and province capital to the productivity of urban areas outside Java. The estimation check for each group suggests that the wage difference in urban areas outside Java can be explained by workers' characteristics. This result, again, supports the previous findings.

The evidence of agglomeration externalities is statistically significant in Java urban areas. The estimation results for a group of lower education level suggest a positive effect of agglomeration at 3 percent and that of market potential at 25 percent. The second group reports inconclusive estimates for the effect of the employment density, but the magnitude of market potential is significant at 24 percent.

Table 3-7 Robustness check on education level

VARIABLE	ALL REGIONS		JAVA		OTHER ISLANDS	
Ln (Wage)	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**	**Dens**	**Dens&MP**
1. Education 1 (≤ 9 yrs.)						
Ln(EmpDensity)	0.022	0.012	0.062	0.031	0.006	0.002
	(0.016)	(0.023)	(0.022)[a]	(0.017)[c]	(0.024)	(0.031)
Ln(MP)		0.022		0.252	0.069	0.020
		(0.034)		(0.045)[a]	(0.058)	(0.077)
PCapital	0.218	0.217	0.208	-0.077		0.066
	(0.044)[a]	(0.042)[a]	(0.065)[a]	(0.068)		(0.057)
#Observations	*90924*		*66006*		*24918*	
2. Education 2 (10–14 yrs.)						
Ln(EmpDensity)	0.018	-0.017	0.051	0.026	0.003	-0.014
	(0.016)	(0.021)	(0.028)[c]	(0.017)	(0.023)	(0.028)
Ln(MP)		0.073		0.240		0.068
		(0.029)[a]		(0.052)[a]		(0.081)
PCapital	0.173	0.169	0.186	-0.099	0.079	0.073
	(0.045)[a]	(0.040)[a]	(0.081)[b]	(0.086)	(0.055)	(0.050)
#Observations	*72417*		*44339*		*28078*	
3. Education 3 (≥15 yrs.)						
Ln(EmpDensity)	0.056	0.015	0.076	0.053	0.021	0.017
	(0.015)[a]	(0.018)	(0.023)[a]	(0.016)[a]	(0.019)	(0.027)
Ln(MP)		0.085		0.206		0.017
		(0.032)[a]		(0.044)[a]		(0.069)
PCapital	0.139	0.133	0.162	-0.081	0.056	0.056
	(0.040)[a]	(0.036)[a]	(0.088)[c]	(0.077)	(0.052)	(0.051)
#Observations	*20974*		*13455*		*7519*	

Note: The result is based on 2SLS estimation (ivreg28) using Stata. All regressions include a constant, popshore, popmountain, commute, married, age, age-squared, male, sectoral dummies, and three year dummies. a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

The result from workers with high education suggests a significant evidence of agglomeration economies on Java urban areas. This finding suggests that skilled workers have become the mainspring of agglomeration economies. The concentration of skilled workers in urban areas has long been acknowledged as the main factor of agglomeration economies as suggested in the previous studies such as Rosenthal & Strange (2008) and Glaeser & Saiz (2004). Our findings suggest a significant effect of skilled workers to agglomeration externalities in urban areas in Indonesia. The agglomeration effect is ranged between 5 percent and 7 percent for the estimation for skilled workers in Java urban areas. This magnitude is higher than a baseline finding from the estimation for all workers that ranged between 2 percent and 3 percent. This also reflects a considerable gap in the development stage between Java and other islands. The gap is not only caused by a high concentration of urban population in Java, but also by the accumulation of educated workers in that island.

3.7. Conclusions

This paper presents an empirical estimation to examine the evidence of agglomeration economies for urban areas in Indonesia. We address the endogenous quantity of labour by using the 2SLS estimation strategy. We also address the endogeneity of workers' quality by using longitudinal dataset for the estimation at regency level. Our estimation is based on wage equation approach that allows a utilization of micro-level data for individual workers. This micro-level estimation is beneficial in estimating the magnitude of agglomeration economies after other factors such as local amenities and individual characteristics are properly measured. Moreover, we extend the employment density model by including market potential in the estimation. We utilize a long-lagged value of market potential to address the endogeneity of this variable.

Our estimation results indicate the agglomeration economies for Java urban areas. The coefficient for employment density in Java is significant at 2.5 to 3 percent. The market potential is also significant to explain economic productivity in Java's urban areas. The effect of market potential in Java is statistically significant at 25 percent, similar to the result for the study on urban areas in UK (Fingleton & Longhi, 2013). However, we find no conclusive results for the effect of employment density and market potential to the productivity of urban areas outside Java. We observe that economic activities and the population density for cities outside Java is still concentrated in the province capital. The province capital tends to be endowed with higher amenities and local infrastructure, and this condition may encourage a concentration of population.

The results reflect current challenges on regional disparity in Indonesia, particularly on a substantial gap between urban areas in Java and those in other regions. A higher level of infrastructure service and local amenities in province capital affects the concentration of skilled workers in urban areas outside Java. Skilled workers concentrated in province capitals become the main explanations for a higher wage levels observed in those capitals. On the other hand, low-skill workers outside Java tend to reside in smaller cities or in the rural area where agriculture sector is still dominant. This condition is contrast with urban areas in Java, where capital cities attracts workers in all skill levels. Urban areas in Java experienced urbanization economies in which interaction of all sectors would lead to positive externalities for areas' productivity. Workers in all skill levels have incentives to look for an occupation in Java metropolitan and this can increase the urbanization rate in those areas. This condition confirms our previous finding in Chapter 2 where the three largest cities in Indonesia experience a higher population growth compare to other cities. Our extended estimation shows the significance of female workers' participation to increase the area's productivity. Moreover, the externality in urban areas is driven by economic activities in trade, finance, and service sectors, particularly in Java.

Annex for Chapter 3

Annex 3.1: Results from regency-level estimation

This preliminary estimation identifies the agglomeration magnitude by using the regency-level estimation for urban areas in Indonesia. We use the employment density and market potential models in this estimation. The main objective is to explain the importance of including the province capital dummy as explanatory variable to identify its effect on the wage disparities across urban areas. The administrative division in Indonesia defines the administrative hierarchy at national, provincial, and regency level. To undertake the administration process in province level, the government assigns one regency as a province capital. The provision of main infrastructures is typically prioritized in this capital. For instance, the airport and the hospital are more likely to be developed in the capital city. Moreover, the minimum wage level in this city is regularly supervised and regulated by the government. We consider that these specific natures of province capital can exogenously affect the wage level in those areas. The productivity gain can be misleading when the unique role of these capital cities is attributed to the agglomeration externalities.

The results of least-squares estimation are shown in Table 3-8. The estimation results for all regions, Java, and other islands are shown in the left, middle and right columns respectively. The table shows that the impact of employment density on wage is statistically significant in all estimation levels. The density elasticity is significant and higher in Java with a range between 8 to 12 percent. The effect of local amenities is uncertain, in which the coefficients for these variables are only significant in the estimation for all regions. The province capital has a significant effect to wage disparity in all estimation levels. We observe that by including the province capital variable, the density effect to the wages is adjusted about 3 percent. This result indicates a condition that the average wage is substantially higher in the province capital.

Table 3-8 Panel data estimation for employment density on wage

VARIABLE Ln (Wage)	ALL REGIONS		JAVA		OTHER ISLANDS	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(EmpDensity)	0.076	0.049	0.124	0.089	0.059	0.036
	(0.017) [a]	(0.016)[a]	(0.022)[a]	(0.024)[a]	(0.024)[b]	(0.025)
PCapital		0.264		0.262		0.128
		(0.050)[a]		(0.087)[a]		(0.062)[b]
Pop_Shore	0.478	0.411	-0.182	-0.175	0.170	0.211
	(0.129)[a]	(0.118)[a]	(0.328)	(0.312)	(0.136)	(0.132)
Pop_Mountain	-0.355	-0.300	-0.066	-0.115	-0.051	-0.069
	(0.144)[b]	(0.137)[b]	(0.186)	(0.181)	(0.235)	(0.231)

Note: The result is based on fit population-averaged panel-data model (xtgee) using Stata.
381 observations (Java: 240; other: 141) from panel of 127 regencies in three years (2008–2010).
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

We confirm this initial finding by conducting 2SLS estimation to address the endogeneity of workers' quantity. The result from 2SLS estimation is shown in Table 3-9. The 2SLS estimation confirms the results from the least-square model. The province capital dummy variable is statistically significant in all estimation levels. The coefficient for employment density is adjusted about 3 percentage points when the province capital is included in the estimation. The estimation for areas outside Java reports a significant of province capital dummy to explain the wage level. However, the coefficient for employment density is no longer significant on the estimation in urban areas outside Java. In other words, we cannot substantiate the evidence of agglomeration externalities in urban areas outside Java once we include the province capital dummy.

Table 3-9 2SLS estimation for employment density on wage

VARIABLE Ln (Wage)	ALL REGIONS		JAVA		OTHER ISLANDS	
	(1)	(2)	(3)	(4)	(5)	(6)
Ln(EmpDensity)	0.061	0.034	0.143	0.100	0.035	0.008
	(0.019)[a]	(0.017)[b]	(0.022)[a]	(0.023)[a]	(0.020)[c]	(0.022)
PCapital		0.267		0.266		0.140
		(0.045)[a]		(0.075)[a]		(0.056)[b]
Pop_Shore	0.475	0.394	-0.128	-0.127	0.228	0.269
	(0.135)[a]	(0.135)[a]	(0.483)	(0.458)	(0.152)	(0.154)[c]
Pop_Mountain	-0.443	-0.376	0.184	0.056	-0.351	-0.399
	(0.194)[b]	(0.181)[b]	(0.165)	(0.173)	(0.377)	(0.386)
Hansen	12.716	11.762	7.388	9.227	5.245	4.532
(P_value)	(0.0478)	(0.0675)	(0.2865)	(0.1612)	(0.5128)	(0.605)
Underidentification	1192.304	1164.373	678.552	607.476	491.419	462.168
(P_value)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Weak	1158.601	1070.064	522.422	378.438	591.938	473.888
Identification	(19.86)	(19.86)	(19.86)	(19.86)	(19.86)	(19.86)
R2	0.2418	0.3632	0.3828	0.443	0.0924	0.1425
RMSE	0.2579	0.2364	0.2345	0.2227	0.2207	0.2145

Note: The result is based on 2SLS estimation (ivreg28) using Stata. There are 381 observations (Java: 240; Other: 141) from panel of 127 regencies in three years (2008–2010).The instruments are log of 1996 population density, area ruggedness, physiography, and geological rocks.
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

Table 3-9 also includes the results from the post-estimation test. In general, we can conclude that applying 2SLS estimation strategy can reduce the endogeneity bias. The Hansen statistics shows that we cannot reject the null that all instruments are not correlated with the error term. The Cragg-Donald's F statistic shows that the null for a weak instrument is rejected at one percent level of significance, indicating that the instruments are relevant to explain the employment density. The Anderson canonical correlations test suggests that the null hypothesis of the under-identification is rejected at one percentage level. In sum, we show that the chosen instrumental variables are indispensable to handle the endogeneity issue. This result is consistent with findings from the previous studies in which the long-lagged population density and the geological variables are relevant instruments to address the endogeneity issue on workers' quantity.

There are two main findings from this Annex. The first is a necessity to include variable of the province capital in explaining the wage level. Without adequate control on this unique city status, the effect of employment density to wage can be overvalued. The second finding is our confirmation to the existence of agglomeration economies on urban areas in Java. We argue that an outstanding condition of urban areas in Java cultivates a positive externality from agglomeration. To confirm these findings, we conduct the estimation by combining the employment density and market potential models.

We assume a simple form of market potential variable with a coefficient for $\tau = 1$ that represents a linearity of trade cost to the distance between two regencies. The market potential is also assumed to be endogenous to the wage level, thus we include 1996 market potential as an instrument to explain the current market potential.

The results of least-squares regressions are shown in Table 3-10. The coefficient for employment density is only significant in Java's urban areas. The coefficient for employment density is adjusted about 3 percentage levels when the market potential variable enters the estimation. However, the significance of employment density is not consistent with the results at all regions and islands outside Java, particularly in the 2SLS estimation.

Table 3-10 Estimation results for employment density and market potential on wage

VARIABLE Ln (Wage)	ALL REGIONS		JAVA		OTHER ISLANDS	
	OLS	**2SLS**	**OLS**	**2SLS**	**OLS**	**2SLS**
Ln(EmpDensity)	0.006 (0.018)	0.044 (0.022)[b]	0.062 (0.018)[a]	0.072 (0.018)[a]	-0.006 (0.026)	0.012 (0.028)
Ln(MP)	0.123 (0.027)[a]	-0.025 (0.038)	0.314 (0.031)[a]	0.237 (0.064)[a]	0.149 (0.042)[a]	-0.015 (0.076)
PCapital	0.279 (0.048)[a]	0.263 (0.047)[a]	-0.068 (0.069)	0.026 (0.101)	0.130 (0.057)[b]	0.140 (0.057)[b]
Popshore	0.598 (0.120)	0.356 (0.154)[b]	0.101 (0.221)	0.092 (0.318)	0.240 (0.122)[b]	0.269 (0.159)
Popmountain	-0.394 (0.132)[a]	-0.341 (0.191)[c]	-0.026 (0.135)	0.043 (0.177)	0.041 (0.221)	-0.423 (0.443)
Hansen (P_value)		11.341 (0.0784)		7.917 (0.2443)		6.238 (0.3971)
Underidentification (P_value)		235.88 (0.0000)		84.175 (0.0000)		50.895 (0.0000)
Weak Identification		39.542 (17.70)		11.973 (10.22)[c]		7.01 (17.70)
R2		0.3299		0.6893		0.1156
RMSE		0.2425		0.1664		0.2178

Note: The result is based on fit population-averaged panel-data model (xtgee) and 2SLS (ivreg28) estimations using Stata. There are 381 observations (Java: 240; other: 141) from panel of 127 regencies in three years (2008–2010).
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

A contrasting result is shown on the result of province capital dummy. The coefficient for province capital dummy is only significant in the estimation on islands outside Java. This result amends our preliminary findings for a significant effect of the province capital variable to the wage level in Java urban areas. A province capital outside Java tends to endowed with a higher population compare to the rest of urban areas outside Java. Therefore, we conclude that the economic activities outside Java are still concentrated in the province capitals. In other words, we still observe a technical and pecuniary type of external economies in urban areas outside Java, as suggested in urban economics theory (Fujita, Krugman, & Venables, 1999). A favourable environment in the province capital attracts more firms and workers to locate and this condition increases the economic output in that area. We confirm this finding in the next estimation strategy when the effect of workers' characteristics is taken into consideration.

The result also shows that the coefficient for market potential is statistically significant in Java urban areas. We observe that the metropolitan areas in Java are endowed with larger market potential. On the other side, a micropolitan area can gain the benefit from the market potential from its strategic location to access the market in the metropolitan area. Urban areas in Java are proportionately distributed along the island. Jakarta and Bandung are developed as the prime city in the west and Surabaya is developed as the prime city in the east. On the other hand, the effect of market potential to economic productivity in urban areas outside Java is become insignificant once the endogeneity issue is taken into account.

The results of post-estimation tests in 2SLS estimation are included in the lower part of the table. The tests indicate a problem of weak instrument, since we cannot reject the null hypothesis from the Cragg-Donald's F statistic that the endogenous variables are not correlated with the instruments. This problem is particularly observed on the estimation in urban areas outside Java. We observe that the 1996 market potential instrument has a weak correlation with the current market potential. The calculation of 1996 market potential by using the total population instead of the total regency's output may lead to this problem. Since the population size does not necessarily reflect the economic output, long-lagged market potential in 1996 does not have a good explanatory power to explain the current market potential.

In general, we conclude that the city status as province capital is no longer significant to explain the wage level in Java. For areas outside Java, the province capital stays as a dominant factor to explain the wage level, but the existence of agglomeration economies cannot be observed. We also observe that the market potential has a positive effect to the economic productivity in Java. We also observe that the market potential has a greater magnitude than the employment density to explain the productivity. However, we consider this result as preliminary since the significance of market potential variable can be influenced by the assumption and the method to specify that variable.

Annex 3.2: Robustness check for the market potential variable

We conduct the estimation by using different values of market potential to check the robustness for the effect of this variable. The specification of market potential depends on our assumption to the trade cost between regencies. The previous estimation is based on an assumption on that trade cost is linear to inter-regency distance with a coefficient for $\tau = 1$. We change this assumption and assess the value of market potential by assuming the concavity of the trade cost.

There are two types of robustness check for market potential variable. In first check, we set the coefficient for $\tau = 0.5$ to allow a concave form of the trade cost in all regions. The second robustness check considers different values of τ in calculating the inter-island and the intra-island trade cost. We assume a value of $\tau = 0.5$ for the intra-island trade cost and a value of $\tau = 1$ for the inter-island trade cost. This is based on an assumption that a trade between two regencies in one island is easier since it can utilize the road network. This condition may affect the concavity of trade cost function in the calculation of market potential variable.

We calculate the current value of market potential by using different assumptions on the trade cost as explained above. Similar to the previous estimation, we also use the 1996 market potential as instruments for the current market potential to control for the endogeneity issue for this variable. The long-lagged market potential in 1996 is also calculated by using those two assumptions. A correlation between the market potential variable and the 1996 market potential is shown in Table 3-11. The table shows the relationship between the current market potential and its long-lagged value in 1996 for each assumption of the trade cost, including the baseline assumption in which the trade cost is assumed to be linear to inter-regency distance.

The table shows that the current market potential has a strong correlation with the 1996 market potential for each assumption of the trade cost. The correlation coefficient is higher on the third assumption where the intra-island trade cost is set to be lower than that for the inter-island trade.

Table 3-11 Correlation between market potential variables

	Ln(MP)	LnMP_05	LnMP1.05	LnMP96	LnMP96_05	LnMP96_105
LnMP	1	0.9244	0.8432	0.6329	0.7757	0.716
LnMP_05		1	0.9104	0.6108	0.8987	0.8248
LnMP_0105			1	0.5683	0.917	0.9587
LnMP96				1	0.5167	0.4963
LnMP1996_05					1	0.9313
LnMP1996_105						1

Note: logPM and logPM96 are estimated with $\tau = 1$ and numbers for other variables represents the value of $\tau = 0.5$ and $\tau = 1$ & 0.5 respectively

We observe that this third assumption can yield a better approximation of the market potential variable compare to the baseline scenario on a linearity of the trade cost. The correlation between the market potential variable and the instrument of 1996 market potential also shows substantial coefficient for the assumption of $\tau = 0.5$. This result suggests a possibility to improve the estimates of market potential variable when we employ a better assumption on the trade cost coefficient. Based on this, we reiterate the estimation by using the two assumptions of the trade cost. The estimation strategy is similar to that in the baseline estimation in which we conduct the least-squares and the 2SLS regression. The estimation results are presented in Table 3-12.

Table 3-12 Estimation results for the robustness check on market potential

VARIABLE	ALL REGIONS				JAVA				OTHER ISLANDS			
	OLS		2SLS		OLS		2SLS		OLS		2SLS	
Ln (Wage)	**τ=.5**	**τ=1&.5**	**τ=.5**	**τ=1&.5**	**τ=.5**	**τ=1&.5**	**τ=.5**	**τ=1&.5**	**τ=.5**	**τ=1&.5**	**τ=.5**	**τ=1&.5**
Ln(EmpDensity)	0.001 (0.019)	0.039 (0.020)[b]	0.061 (0.020)[a]	0.069 (0.022)[a]	0.040 (0.017)[b]	0.042 (0.017)[b]	0.070 (0.019)[a]	0.073 (0.020)[a]	0.006 (0.029)	-0.008 (0.027)	0.023 (0.021)	0.013 (0.027)
Ln(MP)	0.322 (0.064)[a]	0.028 (0.029)	-0.154 (0.074)[b]	-0.078 (0.031)[b]	0.972 (0.074)[a]	0.831 (0.067)[a]	0.472 (0.114)[a]	0.364 (0.117)[a]	0.362 (0.140)[a]	0.167 (0.052)[a]	-0.252 (0.164)	-0.025 (0.069)
PCapital	0.332 (0.053)[a]	0.288 (0.057)[a]	0.234 (0.049)[a]	0.196 (0.053)[b]	-0.053 (0.066)	-0.048 (0.066)	0.122 (0.058)[b]	0.139 (0.063)[b]	0.163 (0.066)[b]	0.206 (0.063)[a]	0.121 (0.052)[b]	0.130 (0.062)[b]
Popshore	(0.662) (0.130)[a]	(0.487) (0.142)[a]	0.272 (0.154)[c]	0.178 (0.152)	0.149 (0.220)	0.173 (0.220)	0.038 (0.366)	0.031 (0.364)	0.264 (0.137)[c]	0.386 (0.135)[a]	0.240 (0.173)	0.245 (0.152)
Popmountain	-0.402 (0.134)[a]	-0.331 (0.140)[b]	-0.274 (0.184)	-0.222 (0.180)	-0.093 (0.127)	-0.086 (0.128)	0.012 (0.169)	0.015 (0.169)	0.051 (0.226)	0.077 (0.225)	-0.575 (.453)	-0.438 (0.459)
Hansen (P_value)			11.15 (0.0839)	9.932 (0.1275)			5.718 (0.4555)	5.647 (0.4639)			3.327 (0.7668)	4.176 (0.6529)
Underidentification (P_value)			486.834 (0.0000)	712.744 (0.0000)			159.597 (0.0000)	132.607 (0.0000)			229.828 (0.0000)	143.188 (0.0000)
Weak Identification			119.402 (17.70)	253.363 (17.70)			26.917 (17.70)	21.023 (17.70)			66.174 (17.70)	28.393 (17.70)
R2			0.2916	0.3225			0.6884	0.6691			0.0672	0.1064
RMSE			0.2493	0.2438			0.1666	0.1717			0.2237	0.2189

Note: The result is based on fit population-averaged panel-data model (xtgee) and 2SLS (ivreg28) estimations using Stata.
There are 381 observations (Java: 240; other: 141) from a panel of 127 regencies in three years (2008–2010).
Denotation τ=.5 and τ=1&.5 correspond to assumptions of the trade cost
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level. Standard errors in parenthesis

The results from this robustness check confirm the main findings of the baseline estimation. Coefficients of employment density and the market potential in Java are statistically significant in both scenarios of the trade cost. The coefficient for employment density is significant around 7 percent based on 2SLS estimation result. The effect of market potential is estimated between 36 and 47 percent, depends on the assumption of the trade cost. This coefficient for market potential is substantially increased compare to the baseline result.

The concavity assumption of trade cost leads to a greater effect of the market variable to the economic productivity. The post-estimation tests of 2SLS regressions indicate a better explanatory power of the instruments on both assumptions of the trade cost. In particular, the estimation in Java reports a substantial value of R^2 and the standard deviation is lower than the baseline result.

The estimation for urban areas outside Java reports a significant effect of the province capital to explain the wage level with a coefficient between 12 and 13 percent. This finding is consistent with our baseline regression where the coefficient for province capital dummy is also estimated around that level.

We observe that the assumption for a strict concavity of the trade cost function can effect the estimation results. The estimation at the nation level can be biased when we are not able to include an appropriate control to the unobserved characteristics of urban areas among the island groups. Therefore, the result suggests that an empirical estimation on urban areas within one continent or one island can yield a more robust result. The estimation of trade cost function for Indonesia is beyond the scope of this paper. We only conduct a robustness check by assuming the trade cost function based on the archipelagic condition of Indonesia. In general, we can conclude that an empirical estimation on Java is more robust since we can include a higher weight on the intra-island trade in specifying the market potential variable. Java has been transformed into an urbanized island where the urbanization trend can be observed in all urban areas. The improvement of transportation network can enhance the spatial spillover among urban areas in one island. The road network gives a positive effect to the connectivity between urban areas in one island, but its impact on the connectivity between urban areas in different island is trifling. Nevertheless, a general estimation at nation-level is more challenging since we cannot include an appropriate control on the connectivity among urban areas in all islands.

4. AGGLOMERATION COSTS IN JAVA: EVIDENCE FROM MICRO-LEVEL DATA

4.1. Introduction

The consumption side of agglomeration economies represents an incentive for people to live in urban areas besides their motivation to acquire a higher income. People choose to reside in the urban area to have better access to a wide variety of consumption amenities (Glaeser, Kolko, & Saiz, 2001). In turn, the concentration of the population increases the cost of living in urban areas. People can tolerate the higher cost of living in an urban area since they benefit from consumption amenities in that area. However, the empirical studies on the consumption side of agglomeration economies are considerably limited compare to those on the production side (Asahi, Hikino, & Kanemoto, 2008).

Previous studies utilize an aggregate level data to measure the cost of living in an urban area. The average commercial land price and the residential land price are the common variables for this measurement, as suggested in the study by Tabuchi & Yoshida (2000) on urban areas in Japan. This aggregate-level estimation identifies the consumption values of urban areas controlling for the properties at city level, such as the average income and city amenities. A more detail property at municipality level, such as local infrastructures, is commonly included as additional control for the rent values (e.g. Asahi, et.al., 2008). However, this aggregate-level estimation is not able to include adequate control for the individual characteristic among households in one region. Households at all income level may have a different level of housing quality, although they inhabit in the same region. For instance, high-income households may reside near to the slump area where low-income families typically dwell in. Moreover, the house price may be determined by a specific character of its locality such as access to the main road or a nearness to the railway station.

This paper extends our task to analyse an evidence of agglomeration economies in Indonesia from the consumption perspective. Based on findings from the previous chapter, the agglomeration economies from productivity side can be observed in Java metropolitan areas. We conduct the empirical estimation on the consumption side of agglomeration to examine the rapid expansion of metropolitan areas in this island. Chapter 2 identifies a rapid growth of metropolitan areas compare to micropolitan areas in Java. The average population growth in metropolitan areas is estimated at 2.5 percent per-year between 2003 and 2010, whereas micropolitan areas only grow at 1.2 percent in the same period. This condition indicates the trend of a higher concentration of Java's population in metropolitan areas.

We observe that the reason for people to reside in Java metropolitan areas may beyond the motivation to obtain a higher income. There is a tendency that people chose to reside in metropolitan areas in order to have better access to consumption amenities. Java has been developed as an urbanized island. Nevertheless, there is a trend that economic development becomes more concentrated in the metropolitan areas. For instance, the three largest cities in Java experience a rapid trend of urbanization compare to other cities.

This paper applies an empirical estimation at micro-level where information of each household is available. To our knowledge, this is the first study that utilizes a micro-level data on this estimation of the consumption side of agglomeration. Our main objective is to analyse the benefit of agglomeration from the consumption side in Java metropolitan areas. By using this micro-level dataset, we are able to control the house characteristics in estimating the consumption values of a city. Main variables such as income, house rent, and transportation modes are available from the survey and it is possible to identify the location of each sample at sub-regency (kecamatan) level. This specific feature distinguishes this study from the previous studies. Following Asahi, et.al, (2008), we also include the variables for local infrastructure at sub-regency level. These variables are derived from the statistical data at village level and the spatial analysis.

A rapid increase of the city population drives the expansion of settlements in the city core as well as the peripheries. A large gap in infrastructure and local amenities between large and small cities encourages more people to live in the metropolitan. A typical city in Indonesia has a monocentric form in which the economic activities are concentrated in the city center. On the other hand, the distribution of settlement areas may expand beyond the center. Authorities from all jurisdictions, either in the core or in sub-urban areas, are competing to provide better amenities to attract more residents. This condition affects the land price in both the core and sub-urban areas.

In general, we observe that the land price is attenuated with distance to the core. However, this pattern may not be identical in all jurisdictions since some district may provide a higher level of consumption amenities. Although some districts have a same distance to the city center, the land price can be more expensive in the districts with higher amenity level. This indicates that the house rent is not only affected by the size of a city or the distance of one area from the center, but also by the level of consumption amenities at the local level. Moreover, a house rent may also depend on quality or characteristics of the property. Therefore, the utilization of micro-level data is necessary to distinct the main indicators that affect the house rent.

The estimation focuses on urban areas in Java, particularly in the metropolitan areas with the total population more than one million. There are three reasons for this. First, the previous chapter concludes that the evidence of agglomeration externalities is only observable in Java urban areas. Second, we assume that the house rent in the metropolitan areas has achieved an equilibrium condition. Third, the distribution of metropolitan population is likely to spread beyond several jurisdictions. This wide settlement distribution allows us to assume that the house rent at the city edge is equivalent to the rural land rent. This feature is important to support our assumption for the inter-city equilibrium condition. We justify this assumption by conducting a descriptive examination in the following sections.

This paper is organized into six sections. After a short introduction in this section, the second section discusses an empirical model for our estimation strategy. The third and the fourth sections discuss the data and instrumental variables. The fifth section discusses the empirical findings based on our estimation strategy. We draw the conclusion in the sixth section.

4.2. Empirical Model

This chapter estimates the consumption side benefits of urban agglomeration, using an empirical model that modifies the framework in Kanemoto (1980) and Asahi, et.al (2008) to be applicable to the available data set. The consumer's utility in an urban area is a function of the composite consumption good, z, housing, h, city size, N, and local public goods, G:

$$U = U(z, h, N, G). \quad (1)$$

All workers/residents are assumed to commute to the CBD. A worker has a standard budget constraint:

$$I(x) \equiv Y - t(x) = z + R(x)h, \quad (2)$$

where $Y, t(x)$, and $R(x)$ are income, commuting cost, and house rent, respectively. The composite consumer good is taken as the numeraire. Each worker chooses the composite consumer good and housing to maximize the utility subject to this budget constraint, taking the housing rent as given. The result of the utility maximization can be expressed by the bid rent function that is commonly used in urban economics:

$$R(Y, t, N, G, u) \equiv \max_{\{z,h\}} \left\{ \frac{Y - z}{h} : U(z, h, t, N, G) \geq u \right\} \quad (3)$$

The bid rent function represents the maximum rent that a household can pay given the utility level. We assume that workers are freely mobile across metropolitan areas. We also assume that a worker obtains the same income when he/she moves to another metropolitan area. This assumption is unrealistic because we have seen in the previous chapter that the wage rate tends to be higher in larger cities. The extension to capture the endogeneity of the income level is left for the future. Based on these assumptions, residents with the same income level achieve the same level of utility in all metropolitan areas.

The main purpose of the chapter is to estimate the consumption-side benefits of urban agglomeration, which is the marginal utility of city size divided by the marginal utility of the numeraire, $MB_N = (\partial U / \partial N)/(\partial U / \partial z)$. From the first order conditions for the maximization problem in Equation (3), it is easy to show that [1]

$$MB_N = h\frac{\partial R}{\partial N} \tag{4}$$

Thus, estimating the bid rent function (3) immediately yields the marginal benefit of agglomeration. Now, we convert the marginal benefit into an elasticity form. Using the expenditure function, the marginal benefit satisfies $MB_N = -\partial E(1, R, t, N, G)/\partial N$. Then, the marginal benefit in elasticity term is $MB_N/(E/N) = ([\partial R/\partial N]/[R/N])(hR/E)$. The benefits of local infrastructure can be derived in exactly the same way. The marginal benefit of local infrastructures is defined as $MB_G = -\,\partial E(1, R, t, N, G)/\partial G$ or in elasticity term is $MB_G/(E/G) = ([\partial R/\partial G]/[R/G])(hR/E)$.

[1] This can be derived as follows. The Lagrangian for the maximization problem (3) is

$$\mathcal{L} = \left\{\frac{Y - z}{h} + \delta[U(z, h, t, N, G) - u]\right\}$$

From the envelope property, we have $\partial R / \partial N = \partial L / \partial N = \delta(\partial U / \partial z)$. From the first order condition for the consumption good, we obtain $\frac{-1}{h} + \delta\frac{\partial U}{\partial z} = 0$. Combining these immediately yields (4)

We define an empirical model based on this bid rent specification. We extend the model by including the house characteristics and the local amenities at the regency level in the bid rent function. Because the commuting cost data are not available, we assume that all workers commute to the CBD and use the average commuting time from the sub-regency to the CBD, t_{mj}. The bid rent function to be estimated is then:

$$\log(R_{kmj}) = b_0 + b_1 \log(Y_{kmj}) + b_2 \log(N_m) + b_3 \log(G_{mj}) + b_4 A_{mj} + b_5 t_{mj} + b_6 H_{kmj} + \varepsilon_{kmj}, \quad (5)$$

where R_{kmj} is housing rent per square meter for household *k* in sub-regency *j* of metropolitan *m*. Y_{kmj} is monthly income of household k in sub regency *mj*. N_m is the total population of metropolitan *m*. G_{mj} is the local infrastructures in sub regency *mj*. A_{mj} is the local amenity in sub regency *mj*. t_{mj} is the commuting time from sub regency *mj* to the CBD. H_{kmj} is the house characteristics for household *k* in sub-regency *j* of metropolitan *m*. The equation is log-linear in R_{kmj}, Y_{kmj}, N_m, and G_{mj} , but linear in A_{mj}, t_{mj}, and H_{kmj}.

Coefficient b_2 measures elasticity of the house rent with respect to the city size $\left(\frac{\partial \ln(R)}{\partial \ln(N)} = \frac{N}{R}\frac{\partial R}{\partial N}\right)$. Our objective is to estimate the income elasticity with respect to the agglomeration, $\sigma_N = \frac{\partial \ln(Y)}{\partial \ln(N)} = MB_N/(E/N)$. It follows that the elasticity is calculated as $\sigma_N = b_2(hR/E)$. We calculate σ_N by using the Delta method in each of the estimation strategy. Similar procedure is applied to estimate the income elasticity with respect to the local infrastructures, $\sigma_{\mathrm{G}} = \frac{\partial \ln(Y)}{\partial \ln(\mathrm{G})} = MB_G/(E/G) = b_3(hR/E)$.

Based on above specification, there are three groups of variables that become the main focus in this estimation. The first group represents the city-level property such as the population size and the commuting time. The second group represents the local infrastructure at sub-regency level, such as the road density and the hospital density. The third group represents housing characteristics such as the type of land ownership and access to a safe water source. We estimate Equation (5) by using a household-level data from several datasets. The main variables for this empirical study are described further in the next section.

4.3. Data

This paper focuses on Java metropolitan areas that defined in Chapter 2. From total 42 urban areas in Java, there are 29 areas that meet a category as metropolitan areas. These metropolitan areas vary in land size and in a number of jurisdictions. The metropolitan areas that included in our estimation are listed in Table 4-1. The population size also varies among the cities. Jakarta metropolitan, the largest city, is a home for almost 28 million residents. On the other side, Kuningan, the smallest metropolitan, has a total population of 1.04 million. The number of jurisdictions within a metropolitan area also varies from Jakarta that consists of 13 regencies and 165 sub-regencies to Pemalang that only consists of 1 regency and 12 sub-regencies.

Table 4-1 Urban areas with at least one million population in Java

IDCITY	NAME	REGENCY	SUB-REGENCY	POPULATION 2010
30020	Jakarta	13	165	27,936,112
30021	Sukabumi	2	42	2,640,090
30022	Cianjur	1	27	2,171,281
30023	Bandung	4	71	7,624,877
30024	Garut	1	32	2,404,121
30025	Tasikmalaya	1	23	1,675,675
30026	Ciamis	1	19	1,532,504
30027	Kuningan	1	14	1,035,589
30028	Cirebon	2	40	2,363,585
30030	Sumedang	1	21	1,093,602
30031	Subang	1	20	1,465,157
30033	Karawang	1	15	2,127,791
30036	Cilacap	1	23	1,642,107
30037	Banyumas	1	25	1,554,527
30039	Kebumen	1	20	1,159,926
30040	Magelang	2	21	1,299,950
30041	Surakarta	6	91	5,055,615
30042	Pati	1	18	1,190,993
30044	Jepara	1	14	1,097,280
30045	Semarang	5	67	3,557,356
30048	Pemalang	1	12	1,261,353
30050	Tegal	2	19	1,634,438
30051	Yogyakarta	5	75	2,393,240
30053	Kediri	2	27	1,768,275
30054	Malang	3	37	3,456,645
30055	Pasuruan	2	25	1,698,730
30056	Surabaya	5	81	7,029,665
30057	Jombang	1	20	1,202,407
30059	Probolinggo	2	24	1,313,306
		70	***1,088***	***92,386,197***

Note: Number of Regencies and Sub-Regencies is based on administrative division in 2010

This empirical study utilizes two main data sources: Indonesia's National Socio-Economic Survey (Susenas) in 2011 and Village Potential Survey (Podes) in 2011. The Socio-Economic Survey includes the observations of individual and household level with detail information about their characteristics such as income, house rent, expenditure, house facilities, and other socio-economic variables. There are 39,211 observations from this survey in 2011. The second dataset is Indonesia Village Potential Survey in 2011. We use this dataset to identify the characteristics of the sub-regency in the metropolitan area such as the variables on local amenity and infrastructures. We estimate the level of local infrastructures such as health facilities, banking offices, and minimarkets.

We include four variables to represents the local infrastructure at sub-regency level. The first variable is the road density. We calculate the total length of the primary, secondary, and tertiary road hierarchy to represent the transportation infrastructure. This data is derived from the geospatial map for Java in 2007. We only include three types of road hierarchy given the limitation of the spatial data for the road network. The data resolution of the spatial map on the road network is only reliable up to the tertiary road hierarchy. To obtain the road density at sub-regency level, we divide the total road length by the sub-regency area.

We use the sum of a hospital and other health facilities at sub-regency as the second variable to represent the health infrastructure. This variable is derived from the Village Potential Survey in 2011. This variable on health infrastructure is also calculated per unit area. The third variable is the local infrastructure for economic activities. We calculate the number of bank office branches at sub-regency level as a proxy for financial facilities. This variable is also derived from the Village Potential Survey in 2011. The bank facility is calculated per unit area, similar to previous variables. The last variable for local infrastructure is the number of minimarket and local stores in the sub-regency. This data is also derived from the village survey and is normalized per unit area of sub-regency.

The variable on local amenities is estimated from the flood prone areas at sub-regency level. We calculate this data by using the percentage of villages that experiences flood in last three years, based on the village survey data in 2011. The variable on the total population is calculated from the population census in 2010. This variable represents the city size, an important variable in our estimation.

The average house rent and the average household income at the sub-regency are derived from the National Socio-Economic Survey in 2011. The population density at sub-regency level is derived from the Village Potential Survey in 2011. The commuting-time variable is not directly available from the survey. We estimate the commuting time by assuming a travel speed from the sub-regency to the core about 20 km per hour. Based on this assumption, we calculate the commuting time by multiplying the distance and the travel speed.

The summary statistics at sub-regency level are listed in Table 4-2. The average distance to core areas is about 17.57 km with a maximum distance of 84.71 km from the sub-regency in the edge of Jakarta metropolitan. We observe a large variation in the main variables at sub-regency level, such as the population size and the total household. Moreover, the availability of local infrastructures is varied across sub-regencies, such as access to the piped water, the high school, the minimarket, and the bank offices. The variation on road density is also substantial with an average of 70.39 per square km and a standard deviation of 54.03 per square km. The descriptive examination for the main variables is discussed further in the following passages.

Table 4-2 Summary statistics for sub-regency in the metropolitan

Variable	Mean	Std. Dev.	Min	Max
Distance to core (km)	17.57	12.92	0	84.71
Monthly rent(Rp /m2)	10,943.95	11,218.27	954.16	89,660.94
Average Income (Rp.)	1,217,707	651,391	242,553	5,387,785
Population	79,515	57,917	8,794	514,179
Households	21,944	14,298	2,934	144,353
High School	7.51	7.13	0	48.00
Piped Water (%)	20%	31%	0%	100%
Minimarket	697.24	599.55	6	5,601
Bank	7.74	9.98	0	91.00
Commuting Time (min)	52.70	38.75	0	254.13
Road Density (/km2)	70.39	54.03	0.13	376.06

Note:

- Based on the Village Potential Survey in 2011
- Total observation: 1,088 sub-regencies

The distribution of population from the city center is illustrated in Table 4-3. There is a trend in the last eight years that city residents are become more concentrated in sub-urban areas with a distance about 20 km from the core. The share of the core area's population declines about 2 percent in the last eight years, whereas the share of the sub-urban population within 20 km from the core increases about the same level. This trend is stronger in th five largest metropolitan areas: Jakarta, Bandung, Semarang, Surakarta, and Surabaya. The population share in the region between 10 km and 20 km from the core increases about 4 percent and the share of the core area's population decreases about the same level. The share of the population beyond 20 km from the city center is relatively steady.

In general, we observe that share of the population living in sub-urban areas between 10 km and 30 km increases in Java metropolitan areas. There are two possible reasons for this distribution pattern. First, the improvement of the road network in a city reduces the transportation cost and the city residents respond it by moving away from the city core. Second, a significant increase in city size may induce congestion in the core area and this condition drives the residents to move from the core to sub-urban areas in order to avoid the crowds.

Table 4-3 Distribution of population within metropolitan cities in Java, 2003 and 2011

Location	All Cities		Five Largest Cities	
	2003	2011	2003	2011
Within 10 km from CBD	37.6%	35.4%	33.1%	29.0%
10 to 20 km from CBD	29.9%	31.8%	26.9%	31.0%
20 to 30 km from CBD	18.2%	18.9%	21.1%	21.9%
30to 40 km from CBD	9.2%	9.1%	11.8%	11.7%
More than 40 km from CBD	5.1%	4.9%	7.1%	6.4%

Note:

- Based on population at sub-regency level from Indonesia Village Potential Survey in 2003 and 2011
- Linear distance (in km) is calculated from mid-point of central place of cities

We also compare the population distribution and the pattern of population density. The descriptive statistics is shown in Table 4-4. In general, we observe a monocentric pattern in the structure of metropolitan areas in Java where the core areas are developed as a center of economic activities and a center for settlement areas.

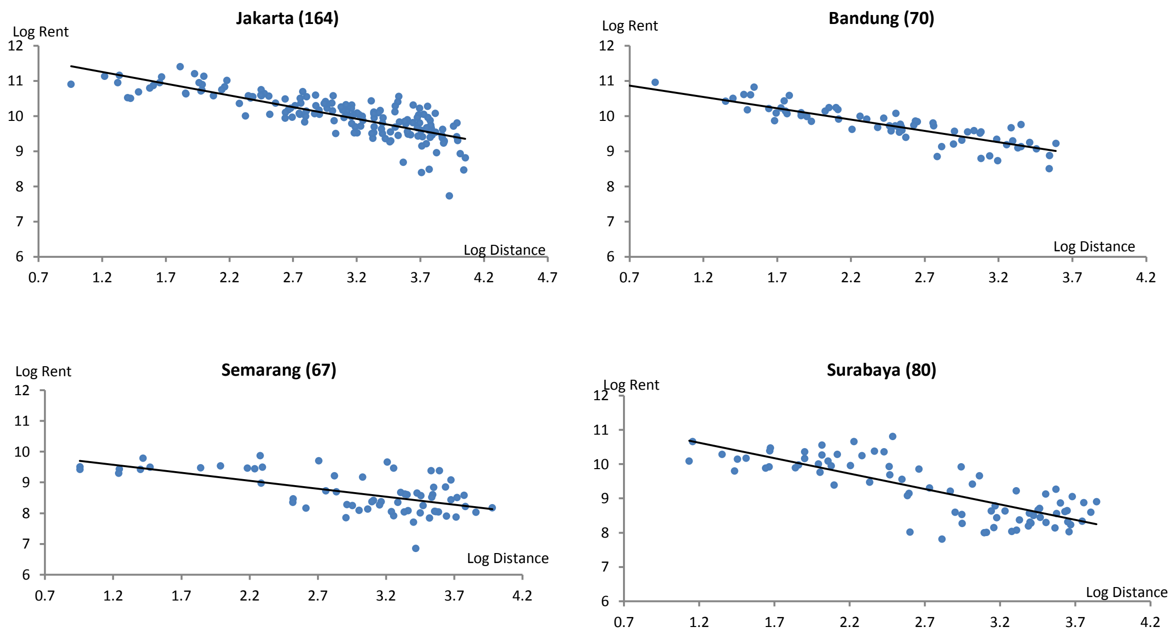
Table 4-4 Population density within the city in 2003 and 2011

Location	All Cities (/sq. km)		Five Largest Cities (/sq. km)	
	2003	2011	2003	2011
Within 10 km from CBD	6,592	6,984	12,811	14,062
10 to 20 km from CBD	2,610	3,660	5,343	8,149
20 to 30 km from CBD	1,938	2,642	3,052	4,315
30to 40 km from CBD	1,888	2,376	2,638	3,446
More than 40 km from CBD	1,885	2,424	2,966	3,846
Average	***3,665***	***4,337***	***5,957***	***7,497***

Note:

- Based on average rent value at sub-regency (kecamatan) level from Indonesia Household Survey in 2011
- Linear distance (in km) is calculated from mid-point of central place of cities

The population density in Java metropolitan increases from 3.7 thousand people per square km in 2003 to 4.3 thousand people per square km in 2011. A significant progress is shown in the largest cities where the population density increases from 6 thousand people per square km in 2003 to become 7.5 thousand people per square km in 2011. The concentration of population within 10 km from the core is dominant in the largest cities and it shows an increasing trend over a period of eight years. Consistent with our previous observation for the total population, there is a tendency for a higher concentration of the population in the sub-urban areas that range between 10 km and 20 km from center, particularly in the largest cities.



Note:
- Average monthly house rent per m2 at sub-regency (kecamatan) level from Indonesia Household Survey in 2011
- Linear distance (in km) is calculated from mid-point of central sub-regency of the city
- Number of sub-regency samples in parenthesis

Figure 4-1 Estimated house rent price and distance to core in 4 cities in Java

Figure 4-1 shows that the house rent is attenuated with distance in the four largest cities. The land rent value is decreasing with the distance to city center, the common feature of a monocentric city. The relationship between the house rent and the distance to the core is stronger in Bandung metropolitan.

Among the four large cities in this figure, Bandung has a unique character as a city located in the inland part of Java. Bandung is located at the mountainous area. We observe that the distribution of settlement is attenuated with distance as we move away from the core areas with a relatively uniform pattern. The topographical condition of this city effects the distribution of settlement and the structure of built-up areas. We consider this topographical characteristic as an important factor that affects the distribution of settlement.

Table 4-5 Average household income and house rent within the city in 2011

Location	**All Cities**		**Five Largest Cities**	
	Income	**House Rent**	**Income**	**House Rent**
Within 10 km from CBD	1,406.83	1.41	2,053.31	29.65
10 to 20 km from CBD	1,219.96	1.22	1,648.15	16.13
20 to 30 km from CBD	1,087.18	1.09	1,234.62	10.13
30to 40 km from CBD	1,011.35	1.01	1,119.18	9.42
More than 40 km from CBD	955.70	0.96	1,040.33	11.60
Average	*1,216.21*	*1.22*	*1,504.70*	*16.46*

Note:

- Average monthly household income at sub-regency level (in thousand Rp.) from Indonesia Household Survey in 2011
- Average rent value at sub-regency level (in thousand Rp.) from Indonesia Household Survey in 2011
- Linear distance (in km) is calculated from mid-point of central place of cities

The distribution of population from the core area to the city edge is affected by the income level. As shown in Table 4-5, we observe a strong relationship between the average income level and the distance. This relationship is stronger in the five largest cities in Java. The average income of residents living in the core area is about twice higher than that of residents in the city edge beyond 40 km from center. This condition reflects two common features for the behaviour of high-income residents in urban areas. First, high-income residents may have a higher value of time. They compensate a higher house rent by living in the core area to minimize the commuting time. The second reason is their motivation to have better access to local amenities. The residents can increase their benefit from consumption by choosing to live near to better facilities around core areas.

A similar pattern is observed on the attenuating house rent by the distance to the core area. The average house rent around the city core is about 1.4 thousand rupiahs per square meter per month or about 1.5 USD per square meter per year. The house rent is gradually decreasing until the city edge. The house rent in core areas is almost 30 USD per square meter per year or about twenty times higher than the average rent in a typical district.

Table 4-6 Ratio of public transport users and road density in 2011

Location	**All Cities**		**Five Largest Cities**	
	Public Trans.	**Road (/km2)**	**Public Trans.**	**Road (/km2)**
Within 10 km from CBD	21.1%	4.27	19.1%	9.47
10 to 20 km from CBD	22.7%	2.73	20.6%	5.77
20 to 30 km from CBD	21.9%	1.93	19.9%	2.88
30to 40 km from CBD	23.3%	1.91	21.7%	2.66
More than 40 km from CBD	35.2%	2.32	33.6%	3.36
Average	*22.8%*	*2.96*	*21.3%*	*5.22*

A relationship between the local infrastructures and the distance to the core is also significant, as shown in Table 4-6. The road density in core areas is twice higher than that in sub-urban areas beyond 20 km from the core. A stronger correlation is shown in the large cities where the road density in the core is three times higher than that in sub-urban areas. However, the statistic on utilization of public transportation shows a puzzling result. The average use of public transportation in average is less than 23 percent, except for areas beyond 40 km from the core where about 35 percent of the households count on the public transport. The citizens' mobility in cities in Java is still depending on the private transportation modes such as motorcycle and car. The infrastructure for public transportation is still limited in all cities. The share of public transportation in the largest cities is even lower. The table shows that only 19 percent of the core area's residents in the largest cities depend on public transportation.

The results from descriptive examination signify a common pattern of city structure in Java metropolitan areas. In particular, there are two preliminary findings for the relationship between the city size and the house rent. First, the city size has a significant effect to the house rent, as it is indicated by a substantial difference between the average house rent in all cities and that in the five largest cities. We conduct an empirical estimation in the next section to statistically confirm this trend. Second, we observe a tendency that the house rent beyond 40 km from the city core is started to rebound in the largest cities. This indicates a higher level of local amenities at the city edge. In order to attract more resident to live in their regency, the authority at the city edge develops better facilities and infrastructures. On the other hand, this condition may also reflect a trend of a polycentric city in which the sub-urban regencies are developed as a new center for economic activities and residential areas. To confirm this finding, we conduct an empirical estimation by employing a household-level data to examine the effect of the location and the availability of local amenities to the land rent.

4.4. Estimation Results

We conduct empirical estimation in this section by using household-level data to identify the consumption side of agglomeration economies in Java metropolitan areas. The estimation is based on an empirical model of bid rent function from Equation (5). There are 39,211 households from 29 urban areas included in the estimation. The house rent data is derived from the socio-economic survey in 2011. The survey includes information about the house rent from each household. This data reflects the households' self-valuation about their house rent price. This valuation can be affected by their assessment to house characteristics in addition to their assessment on the average bid rent. For instance, the household may consider the land ownership status and the house facilities in estimating the house rent. In order to separate the actual bid rent value from the effect of the housing characteristic, we include the variables for housing characteristics in a reduced form of bid rent function.

There are four variables to represent housing characteristic. The first variable is the land certificate as a proxy for the house ownership status. This variable differentiates the land status based on the property right. There are three types identified from the questionnaire: the land certificate, the building utilization right, and the land utilization right. The second variable is the land size in square meter to capture the rent value based on the housing space. The third variable is access a safe water source. We define the criteria for a safe water source based on a definition from the World Health Organization (UNICEF, 2005). Piped-water connection, public standpipe, borehole, protected dug well, protected spring, and rainwater collection are defined as safe water sources. The fourth variable is the capacity of electric connectivity. The household survey includes five classes of electricity power for housing connection: 450 watt, 900 watt, 1300 watt, 2200 watt, and more than 2200 watt. The variable on electricity thus represents a utilization level of the electricity equipment of the household.

We use three strategies to estimate this empirical model. The first estimation strategy applies an ordinary least squares (OLS) regression to estimate the effect of the city size to the house rent. We apply random effect estimation as the second strategy to control for the unobserved characteristics at the metropolitan area. The dataset includes the information about household location that consists of two-level structure of jurisdiction, a total of 29 urban areas with 1,088 sub-regencies. By using this location at sub-regency level and metropolitan level, it is possible to construct unbalanced panel data and to conduct the random-effect estimation. Based on this strategy, the error term can be distinguished into two types: across urban areas and across sub-regencies within the urban areas. To deal with the error term within urban areas, we construct unbalanced panel data at metropolitan level.

We apply the 2SLS model as the third estimation strategy to address a possible endogeneity issue of the city size. We include three instruments to represent long-lagged city population and geological characteristics. The first instrument is the city population in 1996 to represent long-lagged population. This instrument is commonly applied in previous studies since it is introduced in a study by Ciccone & Hall (1996). The second instrument is the area's physiography. We derive this data by combining Indonesia's Geospatial Map in 2007 and Indonesia's Geological Map in 2010. There are three categories for the physiographical condition: the Low Plain, the Low Hills, and the High Plain or Mountainous Area. The third instrument is the area's ruggedness that derived by taking the difference between a village at the highest altitude and that at the lowest altitude in a metropolitan area. Using these three instruments, we conduct 2SLS estimation and compare the result to that from the OLS and random-effect models.

Table 4-7 reports results from the three estimation strategies. We also compare the results for the estimation that includes the house characteristics. The coefficients for city size and local infrastructure are statistically significant and positive. The house characteristics are statistically significant to explain the house rent, except for the access to a safe water source. The house size variable reports a significant and negative coefficient, but its magnitude is small between 0.006 and 0.007. A negative coefficient indicates that per-area rental space is decreasing in house size. The access to a safe water source has a positive coefficient, but it is only significant in the random-effect estimation. The electric capacity variable is statistically significant and has a positive coefficient that ranged between 0.168 and 0.209. Among the variables for housing characteristics, the electric capacity variable has the largest coefficient among the house characteristics. We observe that the coefficients for city size decrease when the house characteristics are included in the estimation. On the other hand, the coefficient for household income increases when house characteristics are included. In sum, the results suggest that including house characteristics leads to better estimates. The coefficient for city size is ranged between 0.316 and 0.365. The coefficient for local infrastructure is also significant at 0.136 to 0.155. The coefficients for commuting time are significant in all estimations, but the effect to the house rent is small. The coefficient for local amenities of flood prone area is only significant in the random effect estimation.

Table 4-7 Estimation for bid rent function at household level

Variable *log(Rent)*	**OLS**		**RE**		**IVREG**	
log (City Size)	0.466 (0.043)[a]	0.365 (0.035)[a]	0.399 (0.077)[a]	0.341 (0.032)[a]	0.403 (0.054)[a]	0.316 (0.042)[a]
log (Income)	0.180 (0.023)[a]	0.268 (0.015)[a]	0.155 (0.005)[a]	0.235 (0.005)[a]	0.196 (0.024)[a]	0.277 (0.015)[a]
Commuting time	-0.006 (0.001)[a]	-0.005 (0.001)[a]	-0.007 (0.000)[a]	-0.006 (0.000)[a]	-0.005 (0.001)[a]	-0.004 (0.001)[a]
Land Certificate		-0.178 (0.020)[a]		-0.161 (0.008)[a]		-0.190 (0.021)[a]
House Size		-0.007 (0.000)[a]		-0.006 (0.000)[a]		-0.007 (0.000)[a]
Safe Water		0.038 (0.042)		0.075 (0.009)[a]		0.044 (0.041)
Electric Capacity		0.199 (0.018)[a]		0.168 (0.004)[a]		0.209 (0.019)[a]
Log Infrastructure	0.177 (0.030)[a]	0.136 (0.025)[a]	0.177 (0.004)[a]	0.142 (0.003)[a]	0.205 (0.034)[a]	0.155 (0.026)
Flood	0.021 (0.094)	0.032 (0.076)	-0.083 (0.013)[a]	-0.045 (0.012)[a]	0.013 (0.094)	0.027 (0.075)
Value of Agglomeration (MB_N)	34.980 (3.257)[a]	27.339 (2.614)[a]	29.923 (5.792)[a]	25.580 (2.430)[a]	30.258 (4.070)[a]	23.685 (3.168)[a]
Elasticity (σ_N)	0.180 (0.017)[a]	0.141 (0.013)[a]	0.154 (0.030)[a]	0.132 (0.013)[a]	0.156 (0.021)[a]	0.122 (0.016)[a]
Value of Infrastructure (MB_G)	13.247 (2.283)[a]	10.227 (1.843)[a]	13.269 (0.288)[a]	10.615 (0.262)[a]	15.386 (2.563)[a]	11.633 (1.979)[a]
Elasticity (σ_G)	0.068 (0.012)[a]	0.053 (0.009)[a]	0.068 (0.001)[a]	0.055 (0.001)[a]	0.079 (0.013)[a]	0.060 (0.010)[a]
Observations	39211	38793	39211	38793	39211	38793
Hansen (P_value)					5.675 (0.129)	3.534 (0.316)
Underidentification (P_value)					1.2e+05 (0.000)	1.10E+05 (0.000)
Weak Identification					1.8e+05 (16.85)	1.70E+05 16.85
R2 RMSE	0.4785 0.7967	0.6111 0.68761	0.4737	0.6075	0.4764 0.7983	0.6099 0.6886

Note: The result are based on OLS (regress), RE (xtreg, re) and 2SLS (ivreg28) using Stata.
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level.
Standard errors in parenthesis

Post-estimation test for the 2SLS regression indicates the relevant instruments. The Hansen J statistic indicates that the instruments are not correlated with the error term. Based on the Cragg-Donald's F statistic, the null for the weak instrument is rejected at 1 percent level. The 2SLS estimation results suggest the importance of addressing the endogeneity of the city size. The 2SLS estimation increases the coefficients for income and infrastructure and reduces that for the city size.

In all of the estimation strategies, the marginal benefit of agglomeration is statistically significant with an elasticity that ranges between 12.2 percent and 14.1 percent. The consumption value of the local infrastructure is also significant with an elasticity that ranges between 5.3 percent and 6 percent. Different with Asahi, et.al., (2008), we observe that the effect of local infrastructures is lower than the agglomeration effect.

To identify the local infrastructure that has a most significant effect to the house rent, we conduct further estimation for each type of local infrastructure. The result of this robustness check on the local infrastructure is shown in Table 4-8. We only report the 2SLS estimation results, considering the endogeneity of the city size variable.

The table compares the results of four types of the local infrastructure. The coefficients for all of the local infrastructures are statistically significant at 1 percent level. Among the local infrastructures, the road density has the largest coefficient at 0.33. The elasticity of the local infrastructure on is also significant in all types of the infrastructure. The marginal benefit of road density is substantial at 12.9 percent in elasticity term, followed by that of the minimarket at 5.8 percent. The agglomeration elasticity is ranged between 6.3 percent and

12.3 percent, depends on the infrastructure type. In general, we conclude that the road network has the largest elasticity among the local infrastructures.

Table 4-8 Comparison for type of local infrastructure at Household Level

Variable *log(Rent)*	**Log Road Density**	**Log Hospital**	**Log Bank**	**Log Minimarket**
log (City Size)	0.162	0.386	0.310	0.319
	(0.048)[a]	(0.037)[a]	(0.038)[a]	(0.042)[a]
log (Income)	0.270	0.248	0.278	0.278
	(0.015)[a]	(0.017)[a]	(0.016)[a]	(0.015)[a]
Commuting time	-0.0003	-0.006	-0.004	-0.004
	(0.001)	(0.001)[a]	(0.001)[a]	(0.001)[a]
Land Certificate	-0.162	-0.170	-0.177	-0.192
	(0.018)[a]	(0.022)[a]	(0.021)[a]	(0.022)[a]
House Size	-0.007	-0.006	-0.007	-0.007
	(0.000)[a]	(0.000)[a]	(0.000)[a]	(0.000)[a]
Safe Water	0.044	0.081	0.048	0.045
	(0.038)	(0.050)	(0.042)	(0.041)
Electric Capacity	0.190	0.177	0.198	0.209
	(0.017)[a]	(0.021)[a]	(0.019)[a]	(0.019)[a]
Log Infrastructure	0.333	0.131	0.137	0.151
	(0.034)[a]	(0.025)[a]	(0.018)[a]	(0.027)[a]
Flood (SR)	0.018	-0.009	0.006	0.026
	(0.072)	(0.076)	(0.076)	(0.076)
Value of Agglomeration	12.180	28.919	23.213	23.904
(MB_N)	(3.574)[a]	(2.746)[a]	(2.879)[a]	(3.180)[a]
Elasticity	0.063	0.0149	0.119	0.123
(σ_N)	(0.018)[a]	(0.014)[a]	(0.015)[a]	(0.016)[a]
Value of Infrastructure	24.984	9.849	10.293	11.356
(MB_G)	(2.553)[a]	(1.871)[a]	(1.368)[a]	(1.999)[a]
Elasticity	0.129	0.051	0.053	0.058
(σ_G)	(0.013)[a]	(0.010)[a]	(0.007)[a]	(0.010)[a]
Observations	38153	19565	36956	38793
Hansen	1.568	0.624	3.878	3.520
(P_value)	(0.6666)	(0.8909)	(0.2749)	(0.3182)
Underidentification	1.0e+05	6.6e+04	1.1e+05	1.1e+05
(P_value)	(0.000)	(0.000)	(0.000)	(0.000)
Weak Identification	1.2e+05	1.4e+05	1.7e+05	1.7e+05
	(16.85)	(16.85)	(16.85)	(16.85)
R2	0.6295	0.5868	0.6187	0.6094
RMSE	0.6726	0.6715	0.6867	0.689

Note: The results are based on 2SLS (ivreg28) using Stata.
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level.
Standard errors in parenthesis

We also conduct further estimation for each variable of the house characteristics to identify the house characteristic that has a most significant effect to the house rent. We only report the 2SLS estimation results and focus the discussion on the coefficients of the house characteristics. The results from this robustness check are shown in Table 4-10.

Table 4-9 Comparison for housing characteristics in household level estimation

Variable *log(Rent)*	**Land Certificate**	**House Size**	**Safe Water**	**Electric Capacity**
log (City Size)	0.375	0.368	0.402	0.391
	(0.051)[a]	(0.046)[a]	(0.054)[a]	(0.054)[a]
log (Income)	0.224	0.362	0.193	0.145
	(0.022)[a]	(0.021)[a]	(0.024)[a]	(0.021)[a]
Commuting time	-0.005	-0.005	-0.005	-0.005
	(0.001)[a]	(0.001)[a]	(0.001)[a]	(0.001)[a]
House Characteristics	-0.364	-0.006	0.037	0.098
	(0.028)[a]	(0.000)[a]	(0.051)	(0.019)[a]
Log Infrastructure	0.183	0.181	0.204	0.199
	(0.032)[a]	(0.030)[a]	(0.034)[a]	(0.033)[a]
Flood (SR)	0.030	0.004	0.016	0.018
	(0.088)	(0.082)	(0.094)	(0.092)
Value of Agglomeration	28.088	27.572	30.145	29.336
(MB_N)	(3.816)[a]	(3.451)[a]	(4.072)[a]	(4.067)[a]
Elasticity	0.145	0.142	0.155	0.151
(σ_N)	(0.020)[a]	(0.018)[a]	(0.021)[a]	(0.021)[a]
Value of Infrastructure	13.712	13.555	15.283	14.952
(MB_G)	(2.397)[a]	(2.217)[a]	(2.584)[a]	(2.477)[a]
Elasticity	0. 071	0.070	0.079	0.077
(σ_G)	(0.012)[a]	(0.011)[a]	(0.013)[a]	(0.013)[a]
Observations	39211	39211	39211	38793
Hansen	5.326	3.681	5.89	5.589
(P_value)	0.1494	0.298	0.1171	0.1334
Underidentification	1.20E+05	1.20E+05	1.20E+05	1.10E+05
(P_value)	(0.000)	(0.000)	(0.000)	(0.000)
Weak Identification	1.80E+05	1.80E+05	1.80E+05	1.70E+05
	16.85	16.85	16.85	16.85
R2	0.4951	0.5829	0.4764	0.4822
RMSE	0.7839	0.7125	0.7983	0.7933

Note: The results are based on 2SLS (ivreg28) using Stata.
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level.
Standard errors in parenthesis

The results confirm our previous finding that the coefficients for the land ownership, house size, and electricity connection are statistically significant to explain the house rent. The land ownership has the largest explanatory power to explain disparities in the house rent price. This finding is different with the previous estimation where the electricity connection has the most significant effect when all house characteristics are included in the estimation. The housing size is statistically significant but its coefficient is small. The electricity connection is significant and it is associated with 9.8 percent increase in the house rent. Access to a safe water source has no significant effect to the house rent, similar to the previous estimation.

As explained in the previous section, our dataset has a unique feature in the house rent variable since it is based on a subjective valuation of the house occupant. Most of the respondents are actually the house owner and their valuation may not reflect the market value of the house rent. The statistic shows that there are only 11.4 percent of the samples that actually rent the house. We conduct further estimation to check the robustness of our estimation. We apply a specific estimation from the respondents who actually rent the house. The estimation strategy is similar to the previous task where we include the housing characteristics in addition to the main variables. Since the entire household samples are not the house owner, we exclude the land certificate variable from the estimation. The estimation results from this robustness check are shown in Table 4-11.

The results from this robustness check confirm most of our previous findings. The commuting time variable is statistically significant and its coefficient is consistent with the previous estimation. The safe water source is statistically significant in this estimation, which is different from the previous results of all respondents. In general, this result reflects a significant effect of the house characteristics on the price of a rented house.

Table 4-10 Estimation for bid rent function using samples of house renters

Variable *log(Rent)*	**OLS**	**RE**	**IVREG**
log (City Size)	0.381	0.433	0.365
	(0.035)[a]	(0.066)[a]	(0.034)[a]
log (Income)	0.214	0.200	0.220
	(0.034)[a]	(0.017)[a]	(0.034)[a]
Commuting time	-0.006	-0.007	-0.006
	(0.001)[a]	(0.000)[a]	(0.001)[a]
House Size	-0.010	-0.009	-0.010
	(0.001)[a]	(0.000)[a]	(0.001)[a]
Safe Water	0.303	0.291	0.305
	(0.067)[a]	(0.040)[a]	(0.067)[a]
Electric Capacity	0.080	0.077	0.082
	(0.024)[a]	(0.010)[a]	(0.024)[a]
Log Infrastructure	0.030	0.044	0.035
	(0.027)	(0.011)[a]	(0.027)
Flood (SR)	-0.083	-0.052	-0.090
	(0.095)	(0.039)	(0.095)
Value of Agglomeration	28.580	32.484	27.374
(MB_N)	(2.613)[a]	(4.972)[a]	(2.586)[a]
Elasticity (σ_N)	0.147	0.167	0.141
	(0.013)[a]	(0.026)[a]	(0.013)[a]
Value of Infrastructure	2.230	3.303	2.602
(MB_G)	(2.032)	(0.836)[a]	(2.031)
Elasticity (σ_G)	0.011	0.017	0.013
	(0.010)	(0.004)[a]	(0.010)
Observations	4426	4426	4426
Hansen			3.172
(P_value)			(0.3659)
Underidentification			1.60E+04
(P_value)			(0.000)
Weak Identification			3.80E+04
			(16.85)
R2	0.4793	0.4766	0.4791
RMSE	0.68379		0.6832

Note: The result are based on OLS (regress), RE (xtreg, re) and 2SLS (ivreg28) using Stata.
a = Significant at 1% level; b = Significant at 5% level; c = Significant at 10% level.
Standard errors in parenthesis

A contrasting result is shown for the variables of local infrastructures. The coefficients for local infrastructures are insignificant in the OLS and 2SLS estimation. This may reflect a condition that most of the house renters in our sample inhabit in areas with a similar level of infrastructure. It is likely that most of the samples are the CBD residents. The level of infrastructure service in the core area is relatively similar among the cities. Therefore, it is difficult to distinguish the effect of local infrastructure to the house rent since there are no adequate variations for this variable.

The city size is statistically significant and its coefficient is ranged between 0.365 and 0.433. The elasticity for agglomeration economies is ranged between 14.1 percent and 16.7 percent, which is higher than the results from all household samples. This indicates a condition that the market value of the house rent tends to be higher than the estimated house rent from the self-assessment of a house owner.

In sum, we conclude the evidence of the consumption side of agglomeration economies in Java metropolitan areas. The estimation results indicate that the motivation to have better access to the consumption amenities drives a concentration of population in Java metropolitan areas.

4.5. Conclusions

In this paper, we conduct an empirical study to identify the agglomeration economies from the consumption perspective in Java metropolitan areas. Our estimation shows that doubling the city size increases the household income between 12.2 percent and 14.1 percent. We also estimate the effect of the local infrastructures as suggested by Asahi, et.al, (2008). Our estimation suggests that the elasticity for local infrastructure ranges between 5.3 percent and 6 percent, lower than that of the city size. The road network has the largest consumption value compare to the other types of local infrastructures. The commuting time is statistically significant and its coefficient is negative, suggesting the attenuation of housing rent with distance to the CBD. We find no significant effect of the share of flood prone area to the house rent.

The results indicate a significant effect of the house characteristics to the house rent. The characteristics such as the house ownership status, the housing size, and the electricity connection are statistically significant to explain a difference in the house rent. However, the access to a safe water source is insignificant to the house rent. The micro-level estimation enables us to include house characteristics as the explanatory variables. This estimation strategy improves the estimates for the main variables, particularly for the income variable that tends to be underestimated in the baseline estimation without house characteristic variables.

This empirical model focuses on the agglomeration effect from the consumption side in Java metropolitan areas. In the previous chapter, we discuss the production side of agglomeration by investigating the wage disparity among urban areas in Indonesia. A more comprehensive study can be derived from a combined approach for the production and consumption side of agglomeration. This approach can examine the wage effect and the amenity effect of agglomeration in one empirical study. However, that approach may require a comprehensive theoretical framework and datasets at micro-level.

Our empirical study in this chapter and in the previous chapter is based on a micro-level dataset that allows us to include more control on the individual characteristics in estimating the net agglomeration effect. Nevertheless, we are not able to conduct an integrated estimation due to a limitation in our dataset. The empirical estimation in Chapter 3 is based on the labour force survey that has an important feature on the worker's commuting pattern. But, this dataset is only reliable for empirical estimation at the regency level since the information about worker's location is only available at that level. On the other hand, the empirical estimation in this chapter utilizes a micro-level dataset at the household level in which the information about the household's location is available up to sub-regency level. Even so, the dataset does not cover the information about working location of households. We expect that information from the labour force survey and the household survey in Indonesia can become more integrated in the future. Therefore, we support the establishment of specific surveys and statistical data about urban areas in Indonesia in the future.

5. CONCLUSIONS AND POLICY IMPLICATIONS

This study focuses on urban areas in Indonesia. There are four main objectives in this study. First, it proposes a definition of urban areas in Indonesia by using a functional approach in the delineation procedure. Second, it examines the recent figures of urban areas in Indonesia and their temporal development in the last decades. Third, it investigates the evidence of agglomeration economies in Indonesia from productivity perspective. Four, it assesses the evidence of agglomeration externalities from the consumption perspective with particular emphasis on metropolitan areas in Java. This chapter presents a summary of the main findings and discusses policy implications emerge from the results of this study.

Chapter 2 discusses the delineation process of urban areas in Indonesia and examines their temporal development. There are two particular features that distinguish this study from the previous delineation methods in Indonesia. First, we conduct a detail assessment at the sub-regency level to identify the core areas. Second, we construct a commuting matrix to identify the inter-regency connectivity. The matrix is derived from workers' commuting pattern that available from recent surveys on the labor force in Indonesia (see Appendix 2). The delineation process yields a total of 83 urban areas in Indonesia. There are 43 urban areas that meet the category as Metropolitan cities. Although their land share is less than 5 percent from total land in Indonesia, urban areas are home to more than 123 million people or about 52 percent of Indonesia's population in 2010.

The descriptive statistic elucidates an imbalanced distribution of urban areas among the regions. Population in metropolitan areas represents 84 percent of the total urban population in Indonesia. The population growth in Java metropolitan areas is substantial at 1.8 percent per-year whereas the population in the micropolitan city in Java only grows at a modest level of 0.5 percent during a period of 1996 to 2010. An opposite condition is observed in urban areas outside Java in which the Metropolitan has an average growth rate of 2.6 percent whereas Micropolitan areas grow at a higher rate of 3.8 percent per year in the same period. We also identify a problem for the micropolitan cities to catch up with the economic development in metropolitan areas. Moreover, the middle-size cities between 400 thousand and 1 million populations tend to be stagnant in attracting more workers and improving their productivity.

The contribution of urban areas to Indonesia's economy is substantial at 61.2 percent in 2010. Urban areas are developed to become a center of economic activities for urban sectors such as manufacturing, trade, transportation, finance, and services. In particular, urban areas have been developed to become the center for the manufacturing sector, in which the share of manufacturing workers that resides in urban areas is substantial at 75 percent.

Chapter 3 discusses the results of empirical estimation on the productivity side of agglomeration economies in Indonesia. The estimation is based on a combination of the employment density model and the market potential model. The endogeneity issue on workers' quality and quantity is properly addressed. We use a micro dataset at individual level to separate the effect of individual characteristics in estimating the agglomeration externality.

Moreover, this study examines the effect of historical events to the development of urban areas by including a dummy variable for province capital. The result suggests an evidence of agglomeration economies for urban areas in Java. The net agglomeration elasticity is estimated around 2 percent to 3 percent. The market potential is also a significant determinant of wages in Java urban areas. Its elasticity is around 25 percent. However, there is no conclusive finding for the effect of urban agglomeration and market potential in urban areas outside Java.

Several findings emerge from the robustness check in Chapter 3. First, we observe that the wage level for female workers is higher in larger cities. Second, the estimation for manufacturing workers indicates an insignificant effect of agglomeration. On the other hand, the estimation for trade, finance, and service workers shows a significant effect of agglomeration. Third, the wage level for skilled workers with high educational background is also significant to the agglomeration externalities.

Chapter 4 focuses on evidence of agglomeration in Java metropolitan areas from the consumption perspective. We conduct an empirical estimation at the household level, a specific feature that distinguishes this study from the previous studies. By using this micro-level dataset, we are able to control the house characteristics in estimating the consumption values of a city. The result indicates a significant magnitude of agglomeration on the consumption side. The elasticity for agglomeration ranges from 12 percent to 14 percent. Moreover, the local infrastructures, such as the road network, health facilities, bank offices, and minimarkets, significantly affect the consumption values of a city. The elasticity for local infrastructure ranges between 5.3 percent and 6 percent.

Findings from this study suggest some important policy implications on the development of urban areas in Indonesia. First, our delineation process in Chapter 2 indicates the necessity to for the establishment of urban areas in some regions. The fact that urban areas are unevenly distributed across the archipelago has become a constraint in economic development. In particular, it is important to support the development of urban areas in the central regions of Kalimantan and Sulawesi and most of the eastern regions of Indonesia.

Second, the concentration of urban areas in Java has transformed this island to become one urban system. The results from Chapter 3 suggest a substantial productivity gain from market potential across urban areas. The improvement of regional connectivity can reduce the trade cost across urban areas. In turn, this improvement strengthens the benefit from spatial spillover and accelerates the economic development in this island.

Third, our findings in Chapter 4 suggest a significant effect of local infrastructures to the consumption values in Java metropolitan areas. The provision of local infrastructures should be balanced in all urban areas to anticipate an overconcentration of urban population in large metropolitan areas, particularly in Jakarta. However, the provision of infrastructures has other consequences on the cost side. To have a comprehensive conclusion, empirical studies on the cost side of infrastructures are needed in the future

This study has limitations in data and empirical methods to draw the conclusions. These limitations should be taken into consideration in interpreting the results. First, the delineation method employs a set of indicators that based on some assumptions. For instance, we rely on the workers' commuting data to define the inter-regency connectivity. This indicator can be improved further when the actual commuting data for all regions is available in Indonesia. Second, our empirical study on the productivity side of agglomeration utilizes a panel data that limited in three years of observations. Moreover, the calculation of regency-level data is challenged by changes in administrative division for Indonesia. This constraint may affect the assessment of some variables. Third, the difference of price level across the regions can substantially affect the wage rate. We do not control for the effect of this price level in estimating the productivity side of urban agglomeration. This may affect the empirical results, particularly in the comparison of urban areas across regions in Indonesia. We will take an initiative to share data and information derived from this study to motivate further research and discussion on urban economics in Indonesia.

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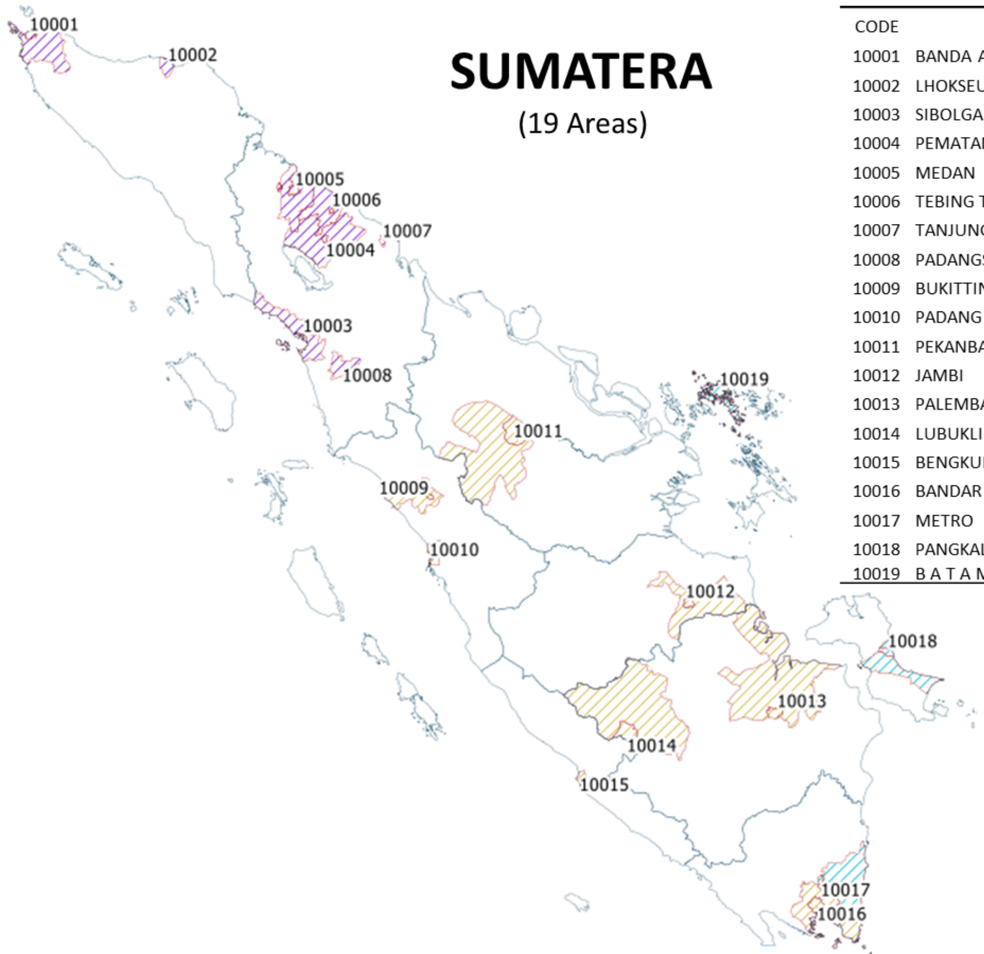
APPENDIX

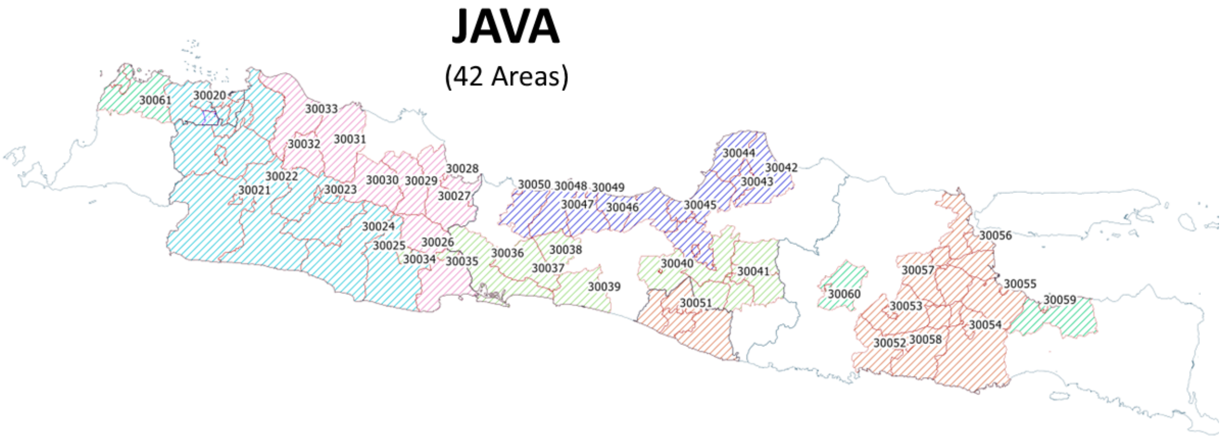
1. Maps for distribution of urban areas in Indonesia

Figure A-1 Distribution of urban areas in Indonesia



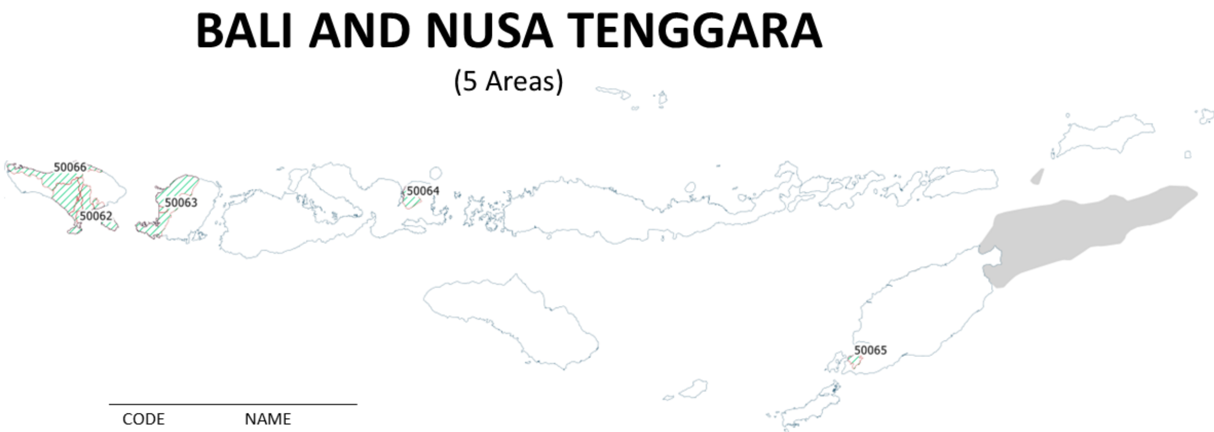
CODE	NAME
10001	BANDA ACEH
10002	LHOKSEUMAWE
10003	SIBOLGA
10004	PEMATANG SIANTAR
10005	MEDAN
10006	TEBING TINGGI
10007	TANJUNG BALAI
10008	PADANGSIDIMPUAN
10009	BUKITTINGGI
10010	PADANG
10011	PEKANBARU
10012	JAMBI
10013	PALEMBANG
10014	LUBUKLINGGAU
10015	BENGKULU
10016	BANDAR LAMPUNG
10017	METRO
10018	PANGKAL PINANG
10019	B A T A M

Figure A-2 Urban areas in Sumatera



CODE	NAME	CODE	NAME	CODE	NAME	CODE	NAME
30020	JAKARTA	30031	SUBANG	30042	PATI	30053	KEDIRI
30021	SUKABUMI	30032	PURWAKARTA	30043	KUDUS	30054	MALANG
30022	CIANJUR	30033	KARAWANG	30044	JEPARA	30055	PASURUAN
30023	BANDUNG	30034	TASIKMALAYA	30045	SEMARANG	30056	SURABAYA
30024	GARUT	30035	BANJAR	30046	BATANG	30057	JOMBANG
30025	TASIKMALAYA	30036	CILACAP	30047	PEKALONGAN	30058	BLITAR
30026	CIAMIS	30037	BANYUMAS	30048	PEMALANG	30059	PROBOLINGGO
30027	KUNINGAN	30038	PURBALINGGA	30049	PEKALONGAN	30060	MADIUN
30028	CIREBON	30039	KEBUMEN	30050	TEGAL	30061	CILEGON
30029	MAJALENGKA	30040	MAGELANG	30051	YOGYAKARTA		
30030	SUMEDANG	30041	SURAKARTA	30052	TULUNGAGUNG		

Figure A-3 Urban areas in Java

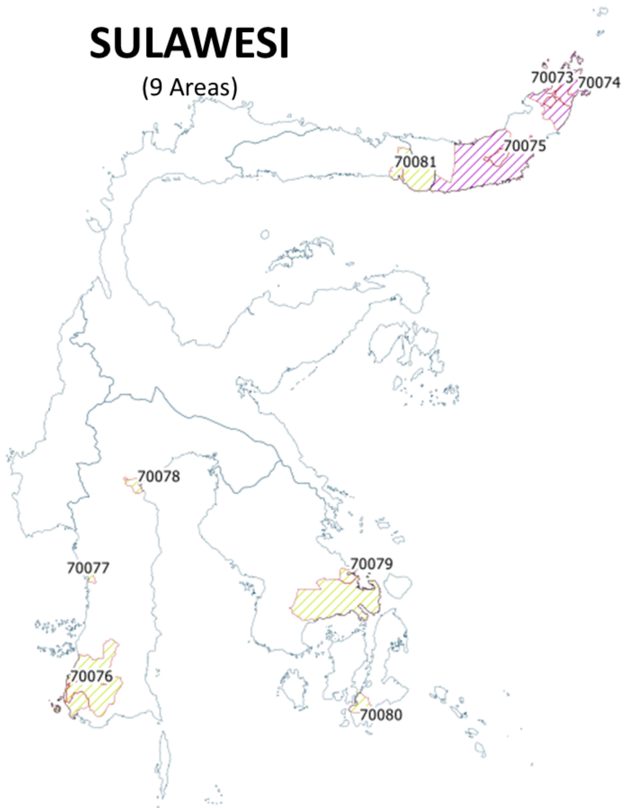


CODE	NAME
50062	DENPASAR
50066	BULELENG
50063	MATARAM
50064	BIMA
50065	KUPANG

Figure A-4 Urban areas in Bali and Nusa Tenggara

CODE	NAME
60067	PONTIANAK
60068	SINGKAWANG
60069	BANJARMASIN
60070	BALIKPAPAN
60071	SAMARINDA
60072	TARAKAN

Figure A-5 Urban areas in Kalimantan



CODE	NAME
70073	MANADO
70074	BITUNG
70075	KOTAMOBAGU
70076	MAKASSAR
70077	PARE-PARE
70078	PALOPO
70079	KENDARI
70080	BAU-BAU
70081	GORONTALO

Figure A-6 Urban areas in Sulawesi

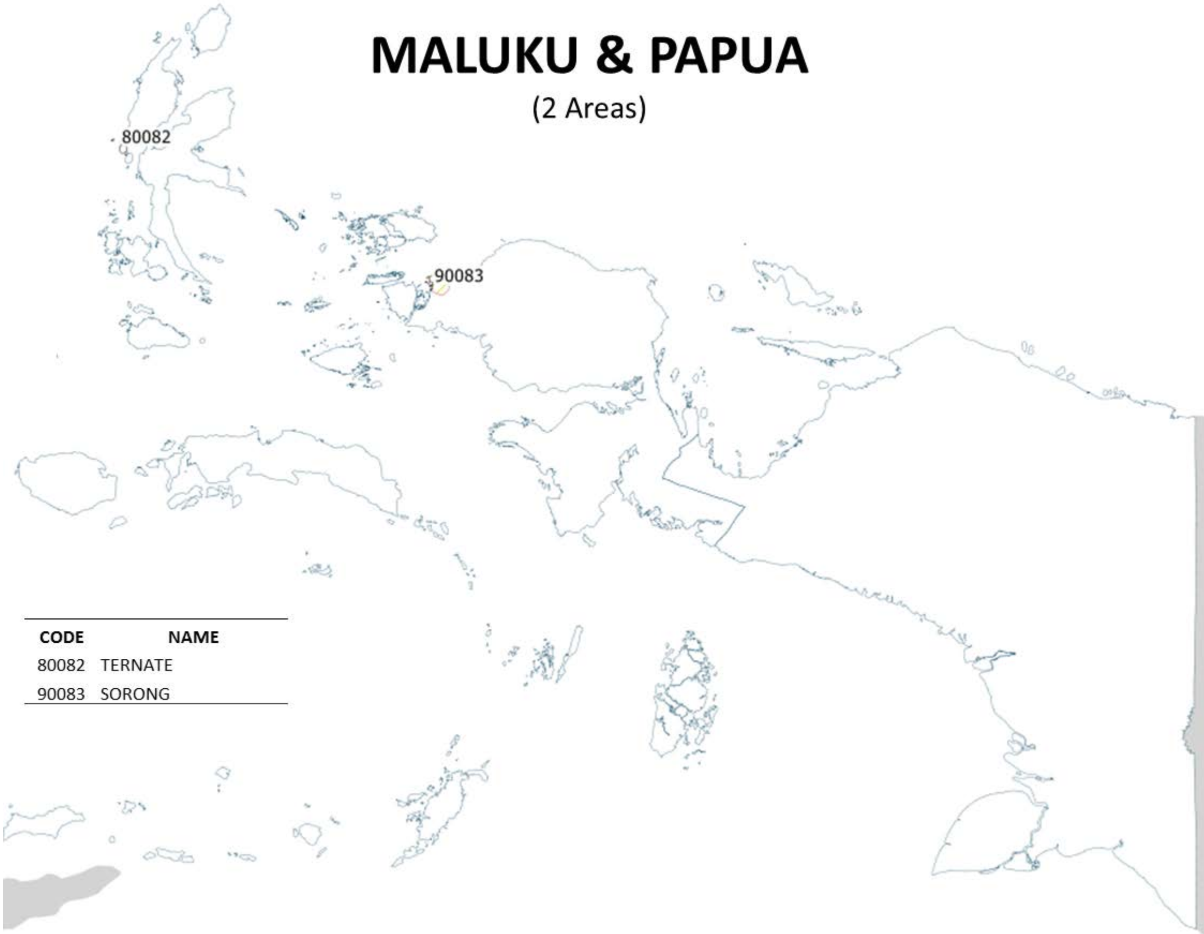


Figure A-7 Urban areas in Maluku and Papua

2. Commuting matrix by province in 2010

General remarks for commuting matrices:

1. Left column: Regency's ID represents a home location of the workers.
2. First row: Regency's ID represents a working location of the workers
3. The value inside the cells represents the share of employment inhabits at regency in the left column and work at regency in the first row.
4. Diagonal cells represents fraction of workers inhabits and works at the same regency.
5. Red-shaded cells represent the connectivity between home and working locations based on commuting threshold of 5 percent.

11	NANGGROE ACEH DARUSSALAM																						
IDKAB	**1101**	**1102**	**1103**	**1104**	**1105**	**1106**	**1107**	**1108**	**1109**	**1110**	**1111**	**1112**	**1113**	**1114**	**1115**	**1116**	**1117**	**1118**	**1171**	**1172**	**1173**	**1174**	**1175**
1101	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1102	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1103	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1104	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1105	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01
1106	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
1107	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.00	0.00	0.00	0.00
1109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
1112	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1113	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1114	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
1115	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1116	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1117	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
1118	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
1171	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00
1172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
1173	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
1174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00
1175	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99
Total	**1.00**	**1.01**	**1.01**	**1.00**	**1.01**	**1.00**	**1.00**	**0.86**	**1.00**	**1.00**	**1.00**	**0.99**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.14**	**1.00**	**0.97**	**1.00**	**1.00**

12 SUMATERA UTARA

IDKAB	1201	1202	1203	1204	1205	1206	1207	1208	1209	1210	1211	1212	1213	1214	1215	1216	1217	1218	1219	1220	1221	1222	1223	1224	1225	1271	1272	1273	1274	1275	1276	1277	1278
1201	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1202	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1203	0.00	0.01	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
1204	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1205	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1206	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1207	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
1209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00
1210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1211	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1212	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.28	0.01	0.00	0.00
1213	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00
1214	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1215	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1216	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1218	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
1219	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1220	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1221	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
1222	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1223	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1224	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1225	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1271	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1272	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00
1273	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00
1274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00
1275	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00
1276	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.80	0.00	0.00
1277	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00
1278	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Total	**1.00**	**1.01**	**0.96**	**1.02**	**1.00**	**1.00**	**1.01**	**1.03**	**0.95**	**1.00**	**1.00**	**0.78**	**1.01**	**1.00**	**1.00**	**1.00**	**1.00**	**1.01**	**1.01**	**1.01**	**1.02**	**1.00**	**0.99**	**1.00**	**1.00**	**0.98**	**0.99**	**1.05**	**0.95**	**1.39**	**0.84**	**0.98**	**1.00**

13 SUMATERA BARAT

IDKAB	1301	1302	1303	1304	1305	1306	1307	1308	1309	1310	1311	1312	1371	1372	1373	1374	1375	1376	1377
1301	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1302	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
1303	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.01	0.00	0.00	0.00	0.00
1304	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1305	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.00	0.00
1306	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.02
1307	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.00	0.00
1308	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00
1309	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1311	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1371	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00
1372	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.00
1373	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00
1374	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.01	0.00	0.00
1375	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.01	0.00
1376	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.87	0.00
1377	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.91
Total	**1.01**	**0.99**	**1.01**	**1.03**	**1.02**	**1.04**	**0.88**	**1.01**	**1.00**	**1.00**	**1.00**	**1.00**	**1.05**	**0.96**	**0.98**	**0.97**	**1.13**	**0.98**	**0.93**

14	RIAU											
IDKAB	**1401**	**1402**	**1403**	**1404**	**1405**	**1406**	**1407**	**1408**	**1409**	**1410**	**1471**	**1473**
1401	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1402	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1403	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1404	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
1405	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1406	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.09	0.00
1407	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
1408	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
1409	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00
1410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
1471	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00
1473	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Total	**1.00**	**1.00**	**1.00**	**0.99**	**1.01**	**0.92**	**1.00**	**1.01**	**0.99**	**1.00**	**1.08**	**1.00**

15	JAMBI										
IDKAB	**1501**	**1502**	**1503**	**1504**	**1505**	**1506**	**1507**	**1508**	**1509**	**1571**	**1572**
1501	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
1502	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1503	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1504	0.00	0.00	0.00	0.98	0.01	0.00	0.00	0.00	0.00	0.01	0.00
1505	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.06	0.00
1506	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
1507	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
1508	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
1509	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.99	0.00	0.00
1571	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.97	0.00
1572	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88
Total	**1.08**	**1.00**	**1.00**	**0.98**	**0.98**	**1.00**	**1.00**	**1.01**	**1.00**	**1.03**	**0.92**

16	SUMATERA SELATAN														
IDKAB	**1601**	**1602**	**1603**	**1604**	**1605**	**1606**	**1607**	**1608**	**1609**	**1610**	**1611**	**1671**	**1672**	**1673**	**1674**
1601	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1602	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1603	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1604	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
1605	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
1606	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1607	0.00	0.00	0.00	0.00	0.00	0.01	0.82	0.00	0.00	0.00	0.00	0.17	0.00	0.00	0.00
1608	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1609	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
1610	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.02	0.00	0.00	0.00
1611	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00
1671	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00
1672	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00
1673	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00
1674	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93
Total	**1.00**	**1.02**	**1.04**	**1.02**	**1.04**	**1.01**	**0.83**	**1.00**	**0.99**	**0.97**	**1.00**	**1.18**	**0.96**	**0.98**	**0.95**

17	BENGKULU									
IDKAB	**1701**	**1702**	**1703**	**1704**	**1705**	**1706**	**1707**	**1708**	**1709**	**1771**
1701	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1702	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
1703	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1704	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
1705	0.01	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.05
1706	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
1707	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
1708	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
1709	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.84	0.13
1771	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.96
Total	**1.02**	**1.02**	**1.02**	**1.00**	**0.95**	**1.00**	**1.00**	**0.97**	**0.86**	**1.15**

18	LAMPUNG													
IDKAB	**1801**	**1802**	**1803**	**1804**	**1805**	**1806**	**1807**	**1808**	**1809**	**1810**	**1811**	**1812**	**1871**	**1872**
1801	0.99	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1802	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.01	0.00
1803	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.14	0.00
1804	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1805	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01
1806	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1807	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1808	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
1809	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.89	0.03	0.00	0.00	0.05	0.00
1810	0.00	0.21	0.00	0.00	0.03	0.00	0.00	0.00	0.01	0.74	0.00	0.00	0.02	0.00
1811	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
1812	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.98	0.00	0.00
1871	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00
1872	0.00	0.00	0.00	0.06	0.04	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.87
Total	**0.99**	**1.17**	**0.88**	**1.05**	**1.08**	**1.01**	**1.00**	**1.01**	**0.92**	**0.79**	**1.00**	**0.98**	**1.21**	**0.90**

19	KEPULAUAN BANGKA BELITUNG						
IDKAB	**1901**	**1902**	**1903**	**1904**	**1905**	**1906**	**1971**
1901	0.96	0.00	0.01	0.00	0.00	0.00	0.03
1902	0.00	0.99	0.00	0.00	0.00	0.01	0.00
1903	0.00	0.00	1.00	0.00	0.00	0.00	0.00
1904	0.01	0.00	0.00	0.92	0.00	0.00	0.07
1905	0.00	0.00	0.00	0.00	1.00	0.00	0.00
1906	0.00	0.00	0.00	0.00	0.00	1.00	0.00
1971	0.02	0.00	0.00	0.04	0.01	0.00	0.94
Total	**0.99**	**0.99**	**1.00**	**0.96**	**1.01**	**1.01**	**1.04**

21	KEPULAUAN RIAU						
IDKAB	**2101**	**2102**	**2103**	**2104**	**2105**	**2171**	**2172**
2101	1.00	0.00	0.00	0.00	0.00	0.00	0.00
2102	0.00	0.93	0.00	0.00	0.00	0.00	0.07
2103	0.00	0.00	0.96	0.00	0.04	0.00	0.00
2104	0.00	0.00	0.00	1.00	0.00	0.00	0.00
2105	0.00	0.00	0.02	0.00	0.98	0.00	0.00
2171	0.00	0.00	0.00	0.00	0.00	1.00	0.00
2172	0.00	0.03	0.00	0.00	0.00	0.00	0.97
Total	1.00	0.96	0.98	1.00	1.02	1.00	1.04

31	JAKARTA BOGOR DEPOK TANGERANG BEKASI													
IDKAB	**3171**	**3172**	**3173**	**3174**	**3175**	**3201**	**3216**	**3271**	**3275**	**3276**	**3603**	**3604**	**3671**	**3674**
3171	0.80	0.03	0.09	0.04	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
3172	0.08	0.70	0.08	0.03	0.05	0.01	0.01	0.00	0.02	0.01	0.00	0.00	0.00	0.00
3173	0.07	0.04	0.75	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3174	0.03	0.01	0.07	0.79	0.05	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.00
3175	0.02	0.03	0.05	0.04	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3201	0.03	0.01	0.01	0.01	0.00	0.88	0.00	0.03	0.01	0.01	0.01	0.00	0.00	0.00
3216	0.01	0.02	0.01	0.00	0.02	0.00	0.90	0.00	0.03	0.00	0.00	0.00	0.00	0.00
3271	0.01	0.01	0.02	0.00	0.00	0.08	0.00	0.87	0.00	0.01	0.00	0.00	0.00	0.00
3275	0.05	0.07	0.07	0.03	0.04	0.00	0.06	0.00	0.67	0.00	0.00	0.00	0.00	0.00
3276	0.17	0.04	0.10	0.02	0.01	0.04	0.00	0.01	0.00	0.58	0.01	0.00	0.01	0.00
3603	0.02	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.00	0.06	0.03
3604	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.98	0.00	0.00
3671	0.04	0.01	0.03	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.75	0.00
3674	0.18	0.01	0.08	0.03	0.01	0.01	0.00	0.00	0.00	0.01	0.03	0.00	0.02	0.63
Total	**1.52**	**0.97**	**1.39**	**1.17**	**1.14**	**1.03**	**0.99**	**0.92**	**0.73**	**0.62**	**0.98**	**0.99**	**0.88**	**0.67**

31	JAKARTA BOGOR DEPOK TANGERANG BEKASI (COMBINED CORE)									
IDKAB	**DKI**	**3201**	**3216**	**3271**	**3275**	**3276**	**3603**	**3604**	**3671**	**3674**
DKI	0.965	0.003	0.005	0.001	0.006	0.003	0.010	0.000	0.006	0.001
3201	0.051	0.882	0.002	0.033	0.006	0.012	0.009	0.000	0.001	0.003
3216	0.071	0.002	0.897	0.000	0.028	0.000	0.001	0.000	0.001	0.000
3271	0.036	0.081	0.004	0.869	0.003	0.007	0.000	0.000	0.000	0.000
3275	0.257	0.004	0.060	0.002	0.669	0.004	0.000	0.000	0.003	0.000
3276	0.356	0.036	0.003	0.009	0.001	0.577	0.006	0.001	0.011	0.000
3603	0.069	0.003	0.001	0.000	0.000	0.000	0.835	0.003	0.057	0.032
3604	0.003	0.000	0.001	0.000	0.000	0.000	0.015	0.980	0.001	0.000
3671	0.201	0.000	0.000	0.000	0.000	0.001	0.041	0.001	0.754	0.002
3674	0.306	0.006	0.001	0.000	0.000	0.007	0.028	0.002	0.023	0.627
Total	**2.32**	**1.02**	**0.97**	**0.91**	**0.71**	**0.61**	**0.94**	**0.99**	**0.86**	**0.66**

32 36 WEST JAVA - BANTEN (INCL. JAKARTA)

IDKAB	3101	3171	3172	3173	3174	3175	3201	3202	3203	3204	3205	3206	3207	3208	3209	3210	3211	3212	3213	3214
3101	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3171	0.00	0.80	0.03	0.09	0.04	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3172	0.00	0.08	0.70	0.08	0.03	0.05	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3173	0.00	0.07	0.04	0.75	0.05	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3174	0.00	0.03	0.01	0.07	0.79	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3175	0.00	0.02	0.03	0.05	0.04	0.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3201	0.00	0.02	0.01	0.01	0.01	0.00	0.87	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3202	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3203	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3204	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
3205	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
3206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3207	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00
3209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.01	0.00	0.01	0.00	0.00
3210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.99	0.00	0.00	0.00	0.00
3211	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00
3212	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00
3213	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.02
3214	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97
3215	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
3216	0.00	0.01	0.02	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3217	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3271	0.00	0.01	0.01	0.02	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3272	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3273	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3274	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.00	0.00	0.00
3275	0.00	0.05	0.07	0.07	0.03	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3276	0.00	0.17	0.04	0.10	0.02	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3277	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3278	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3279	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3601	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3602	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3603	0.00	0.02	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3604	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3671	0.00	0.04	0.01	0.03	0.10	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3672	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3673	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3674	0.00	0.18	0.01	0.08	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	**1.00**	**1.52**	**0.97**	**1.41**	**1.17**	**1.13**	**1.02**	**1.06**	**1.00**	**0.97**	**0.99**	**1.00**	**1.02**	**0.99**	**1.00**	**1.00**	**0.96**	**1.00**	**0.98**	**1.00**

IDKAB	3215	3216	3217	3271	3272	3273	3274	3275	3276	3277	3278	3279	3601	3602	3603	3604	3671	3672	3673	3674
3101	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3171	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3172	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3173	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.00
3175	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3201	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
3202	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3203	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3204	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3205	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3206	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3207	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3209	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3211	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3212	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3213	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3214	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3215	0.96	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3216	0.01	0.89	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3217	0.00	0.00	0.84	0.00	0.00	0.10	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3271	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3272	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3273	0.00	0.00	0.00	0.00	0.01	0.97	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3274	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3275	0.00	0.06	0.00	0.00	0.01	0.00	0.00	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3276	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.58	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.00	0.00	0.00
3277	0.00	0.00	0.05	0.00	0.00	0.16	0.00	0.00	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3278	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3279	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3601	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3602	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00
3603	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00	0.06	0.00	0.00	0.03
3604	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.91	0.00	0.04	0.03	0.00
3671	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.75	0.00	0.00	0.00
3672	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.02	0.00	0.96	0.00	0.00
3673	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.09	0.01	0.05	0.82	0.00
3674	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.02	0.00	0.00	0.62
Total	**1.00**	**1.01**	**0.89**	**0.92**	**0.97**	**1.32**	**1.01**	**0.73**	**0.63**	**0.84**	**0.99**	**0.98**	**1.01**	**0.99**	**0.99**	**1.04**	**0.89**	**1.05**	**0.86**	**0.67**

33	CENTRAL JAVA																																		
IDKAB	**3301**	**3302**	**3303**	**3304**	**3305**	**3306**	**3307**	**3308**	**3309**	**3310**	**3311**	**3312**	**3313**	**3314**	**3315**	**3316**	**3317**	**3318**	**3319**	**3320**	**3321**	**3322**	**3323**	**3324**	**3325**	**3326**	**3327**	**3328**	**3329**	**3371**	**3372**	**3373**	**3374**	**3375**	**3376**
3301	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3302	0.01	0.96	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3303	0.00	0.01	0.98	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3304	0.00	0.00	0.01	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3305	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3306	0.00	0.00	0.00	0.00	0.01	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3307	0.00	0.00	0.00	0.01	0.00	0.00	0.98	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3308	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00
3309	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.01	0.04	0.00	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.01	0.00	0.00	0.00
3310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.87	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
3311	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	0.00	0.00
3312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.84	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00
3314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
3315	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00
3316	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3317	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3318	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3319	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.97	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3321	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02	0.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.29	0.00	0.00
3322	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.06	0.00	0.00
3323	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3324	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00
3325	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
3326	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
3327	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3328	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.01	0.00	0.00	0.00	0.00	0.00	0.06
3329	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.98	0.00	0.00	0.00	0.00	0.00	0.01
3371	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00
3372	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.05	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00
3373	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.86	0.02	0.00	0.00
3374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
3375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00
3376	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.93
Total	**1.01**	**0.99**	**1.00**	**1.01**	**1.01**	**0.99**	**0.99**	**0.98**	**0.86**	**0.89**	**0.97**	**1.00**	**0.94**	**0.97**	**0.99**	**0.99**	**1.00**	**0.99**	**1.07**	**0.99**	**0.67**	**1.02**	**1.01**	**0.92**	**0.94**	**1.05**	**0.98**	**1.00**	**1.01**	**0.99**	**1.30**	**0.91**	**1.45**	**1.03**	**0.99**

34	YOGYAKARTA				
IDKAB	**3401**	**3402**	**3403**	**3404**	**3471**
3401	0.89	0.03	0.02	0.03	0.03
3402	0.00	0.75	0.00	0.06	0.19
3403	0.00	0.02	0.92	0.01	0.03
3404	0.01	0.02	0.00	0.85	0.10
3471	0.00	0.04	0.00	0.07	0.88
Total	**0.90**	**0.86**	**0.95**	**1.01**	**1.23**

35 EAST JAVA

IDKAB	3501	3502	3503	3504	3505	3506	3507	3508	3509	3510	3511	3512	3513	3514	3515	3516	3517	3518	3519	3520	3521	3522	3523	3524	3525	3526	3527	3528	3529	3571	3572	3573	3574	3575	3576	3577	3578	3579
3501	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3502	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3503	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3504	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3505	0.00	0.00	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3506	0.00	0.00	0.00	0.01	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3507	0.00	0.00	0.00	0.00	0.00	0.00	0.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.01
3508	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3509	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3510	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3511	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3512	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3513	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
3514	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00
3515	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.81	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00
3516	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.87	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.02	0.00
3517	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
3518	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3519	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.00
3520	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.95	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
3521	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3522	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3523	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3524	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3525	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00
3526	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00
3527	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3528	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3529	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3571	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3572	0.00	0.00	0.00	0.01	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3573	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.01
3574	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00
3575	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.01	0.00
3576	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.07	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.82	0.00	0.03	0.00
3577	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00
3578	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00
3579	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.92
Total	**1.01**	**1.01**	**0.99**	**1.02**	**1.05**	**1.01**	**0.99**	**1.00**	**1.00**	**1.00**	**0.99**	**1.00**	**1.04**	**1.12**	**0.96**	**0.98**	**0.98**	**0.96**	**0.89**	**0.97**	**1.01**	**1.01**	**0.99**	**0.99**	**1.00**	**0.99**	**1.00**	**1.00**	**1.00**	**1.01**	**0.93**	**1.07**	**0.96**	**0.86**	**0.86**	**1.09**	**1.29**	**0.93**

51	BALI								
IDKAB	**5101**	**5102**	**5103**	**5104**	**5105**	**5106**	**5107**	**5108**	**5171**
5101	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5102	0.00	0.81	0.12	0.01	0.00	0.00	0.00	0.00	0.06
5103	0.00	0.01	0.89	0.01	0.00	0.00	0.00	0.00	0.09
5104	0.00	0.00	0.02	0.92	0.00	0.00	0.00	0.00	0.05
5105	0.00	0.00	0.01	0.04	0.88	0.01	0.02	0.00	0.04
5106	0.00	0.00	0.01	0.02	0.00	0.94	0.00	0.00	0.02
5107	0.00	0.00	0.00	0.01	0.01	0.01	0.97	0.00	0.00
5108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
5171	0.00	0.00	0.17	0.01	0.00	0.00	0.00	0.00	0.81
Total	**1.00**	**0.83**	**1.21**	**1.02**	**0.90**	**0.96**	**0.99**	**1.00**	**1.07**

52	NUSA TENGGARA BARAT									
IDKAB	**5201**	**5202**	**5203**	**5204**	**5205**	**5206**	**5207**	**5208**	**5271**	**5272**
5201	0.84	0.01	0.00	0.00	0.00	0.00	0.00	0.06	0.08	0.00
5202	0.02	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
5203	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5204	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
5205	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
5206	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.02
5207	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
5208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
5271	0.03	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.94	0.00
5272	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.98
Total	**0.90**	**0.98**	**1.00**	**1.00**	**1.01**	**1.00**	**1.00**	**1.07**	**1.05**	**1.00**

53	NUSA TENGGARA TIMUR																				
IDKAB	**5301**	**5302**	**5303**	**5304**	**5305**	**5306**	**5307**	**5308**	**5309**	**5310**	**5311**	**5312**	**5313**	**5314**	**5315**	**5316**	**5317**	**5318**	**5319**	**5320**	**5371**
5301	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01	0.00	0.00	0.00	0.00
5302	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5303	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
5304	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5305	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5306	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5307	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5308	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5309	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5311	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.85	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00
5314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5315	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
5316	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
5317	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00
5318	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
5319	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
5320	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
5371	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99
Total	**0.98**	**1.00**	**0.99**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.99**	**1.01**	**1.00**	**0.85**	**1.00**	**1.00**	**1.02**	**1.00**	**1.00**	**1.15**	**1.00**	**1.01**

61	KALIMANTAN BARAT													
IDKAB	**6101**	**6102**	**6103**	**6104**	**6105**	**6106**	**6107**	**6108**	**6109**	**6110**	**6111**	**6112**	**6171**	**6172**
6101	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
6102	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6103	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6104	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.07	0.00
6105	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6106	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6107	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
6109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
6110	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
6111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
6112	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.04	0.00
6171	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.97	0.00
6172	0.02	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97
Total	**1.01**	**1.00**	**1.00**	**0.93**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.98**	**1.10**	**0.98**

62	KALIMANTAN TENGAH													
IDKAB	**6201**	**6202**	**6203**	**6204**	**6205**	**6206**	**6207**	**6208**	**6209**	**6210**	**6211**	**6212**	**6213**	**6271**
6201	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6202	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6203	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
6204	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6205	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6206	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6207	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6208	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
6209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92	0.00	0.00	0.00	0.00	0.08
6210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.01
6211	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
6212	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.92	0.00	0.00
6213	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
6271	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00
Total	**1.00**	**1.01**	**0.99**	**1.00**	**1.00**	**1.00**	**1.00**	**0.99**	**0.94**	**0.99**	**1.00**	**0.92**	**1.00**	**1.09**

63	KALIMANTAN SELATAN												
IDKAB	**6301**	**6302**	**6303**	**6304**	**6305**	**6306**	**6307**	**6308**	**6309**	**6310**	**6311**	**6371**	**6372**
6301	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6302	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6303	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.04
6304	0.00	0.00	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	0.01
6305	0.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6306	0.00	0.00	0.00	0.00	0.02	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6307	0.00	0.00	0.00	0.00	0.00	0.01	0.96	0.00	0.01	0.00	0.01	0.01	0.00
6308	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.02	0.00	0.01	0.00	0.00
6309	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.03	0.00	0.00
6310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
6311	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.97	0.00	0.00
6371	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.01
6372	0.01	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.91
Total	**1.00**	**1.00**	**0.96**	**0.82**	**1.01**	**0.98**	**0.97**	**0.98**	**1.00**	**1.01**	**1.03**	**1.24**	**0.97**

64	KALIMANTAN TIMUR													
IDKAB	**6401**	**6402**	**6403**	**6404**	**6405**	**6406**	**6407**	**6408**	**6409**	**6410**	**6471**	**6472**	**6473**	**6474**
6401	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6402	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6403	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
6404	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6405	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6406	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6407	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
6408	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
6409	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
6410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
6471	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00
6472	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96	0.00	0.00
6473	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
6474	0.00	0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.94
Total	**1.00**	**1.00**	**1.03**	**1.05**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.99**	**0.98**	**1.00**	**0.94**

71 SULAWESI UTARA

IDKAB	7101	7102	7103	7104	7105	7106	7107	7108	7109	7110	7111	7171	7172	7173	7174
7101	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.07	0.00	0.00	0.00	0.05
7102	0.00	0.83	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.14	0.00	0.01	0.00
7103	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7104	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7105	0.00	0.01	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
7106	0.00	0.00	0.00	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.00	0.12	0.02	0.00	0.00
7107	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
7108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7109	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00
7110	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
7111	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.01	0.05
7171	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
7172	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.99	0.00	0.00
7173	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.90	0.00
7174	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.94
Total	**0.91**	**0.89**	**1.00**	**1.00**	**1.01**	**0.88**	**0.99**	**1.00**	**0.98**	**1.01**	**1.02**	**1.33**	**1.01**	**0.94**	**1.05**

72 SULAWESI TENGAH

IDKAB	7201	7202	7203	7204	7205	7206	7207	7208	7209	7210	7271
7201	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7202	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7203	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7204	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7205	0.00	0.00	0.00	0.00	0.84	0.00	0.00	0.00	0.00	0.06	0.10
7206	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
7207	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
7208	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
7209	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
7210	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.74	0.26
7271	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.02	0.96
Total	**1.00**	**1.00**	**1.00**	**1.00**	**0.86**	**1.00**	**1.00**	**1.00**	**1.00**	**0.82**	**1.31**

73	SULAWESI SELATAN																							
IDKAB	**7301**	**7302**	**7303**	**7304**	**7305**	**7306**	**7307**	**7308**	**7309**	**7310**	**7311**	**7312**	**7313**	**7314**	**7315**	**7316**	**7317**	**7318**	**7322**	**7325**	**7326**	**7371**	**7372**	**7373**
7301	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7302	0.00	0.98	0.01	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7303	0.00	0.01	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7304	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7305	0.00	0.00	0.00	0.01	0.87	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00
7306	0.00	0.00	0.00	0.00	0.01	0.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.01
7307	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7308	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00
7309	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7310	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
7311	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7312	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7313	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7314	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7315	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00
7316	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7317	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00
7318	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
7322	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.01
7325	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
7326	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.98	0.00	0.00	0.00
7371	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00
7372	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00
7373	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.00	0.00	0.00	0.00	0.97
Total	**1.00**	**0.99**	**0.99**	**1.01**	**0.90**	**0.78**	**1.01**	**0.89**	**1.00**	**0.98**	**0.99**	**1.00**	**1.00**	**1.01**	**0.99**	**0.99**	**1.02**	**1.03**	**1.00**	**1.00**	**0.98**	**1.44**	**1.03**	**0.98**

74	SULAWESI TENGGARA											
IDKAB	**7401**	**7402**	**7403**	**7404**	**7405**	**7406**	**7407**	**7408**	**7409**	**7410**	**7471**	**7472**
7401	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02
7402	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7403	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.00
7404	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
7405	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00	0.07	0.00
7406	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
7407	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
7408	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
7409	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
7410	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
7471	0.00	0.00	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.97	0.00
7472	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.96
Total	**1.03**	**1.00**	**0.96**	**1.00**	**0.95**	**1.00**	**1.00**	**1.00**	**1.00**	**1.01**	**1.08**	**0.98**

75	GORONTALO					
IDKAB	**7501**	**7502**	**7503**	**7504**	**7505**	**7571**
7501	0.99	0.01	0.01	0.00	0.00	0.00
7502	0.00	0.92	0.01	0.00	0.03	0.05
7503	0.00	0.00	1.00	0.00	0.00	0.00
7504	0.01	0.02	0.00	0.86	0.00	0.11
7505	0.00	0.00	0.00	0.00	0.99	0.00
7571	0.00	0.03	0.01	0.02	0.00	0.93
Total	**0.99**	**0.97**	**1.02**	**0.90**	**1.01**	**1.10**

76	SULAWESI BARAT				
IDKAB	**7601**	**7602**	**7603**	**7604**	**7605**
7601	0.99	0.00	0.00	0.00	0.00
7602	0.01	0.99	0.00	0.00	0.00
7603	0.00	0.00	1.00	0.00	0.00
7604	0.00	0.00	0.00	1.00	0.00
7605	0.00	0.00	0.00	0.00	0.99
Total	**1.00**	**1.00**	**1.00**	**1.00**	**0.99**

81	MALUKU										
IDKAB	**8101**	**8102**	**8103**	**8104**	**8105**	**8106**	**8107**	**8108**	**8109**	**8171**	**8172**
8101	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8102	0.00	0.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13
8103	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00
8104	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8105	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
8106	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
8107	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
8108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
8109	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
8171	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00
8172	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.92
Total	**1.00**	**0.95**	**0.97**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.03**	**1.05**

82	MALUKU UTARA								
IDKAB	**8201**	**8202**	**8203**	**8204**	**8205**	**8206**	**8207**	**8271**	**8272**
8201	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8202	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8203	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
8204	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
8205	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
8206	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
8207	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
8271	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.03
8272	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.98
Total	**1.01**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.97**	**1.01**

91	PAPUA BARAT										
IDKAB	**9101**	**9102**	**9103**	**9104**	**9105**	**9106**	**9107**	**9108**	**9109**	**9110**	**9171**
9101	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9102	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9103	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
9104	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9105	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
9106	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
9107	0.00	0.00	0.00	0.00	0.00	0.00	0.95	0.00	0.01	0.00	0.04
9108	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
9109	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.98	0.00	0.00
9110	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.98	0.00
9171	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.98
Total	**1.00**	**1.00**	**0.99**	**1.00**	**1.01**	**1.01**	**0.99**	**1.00**	**0.99**	**0.99**	**1.01**

94	PAPUA																						
IDKAB	**9401**	**9402**	**9403**	**9404**	**9408**	**9409**	**9410**	**9411**	**9412**	**9413**	**9414**	**9415**	**9417**	**9418**	**9419**	**9420**	**9426**	**9427**	**9428**	**9431**	**9435**	**9436**	**9471**
9401	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9402	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9403	0.00	0.00	0.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.13
9404	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9408	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9409	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9410	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9411	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9412	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9413	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9414	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9415	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9417	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9418	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9419	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
9420	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98	0.00	0.00	0.00	0.00	0.00	0.00	0.02
9426	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00
9427	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
9428	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
9431	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
9435	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
9436	0.00	0.00	0.00	0.00	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.84	0.00
9471	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.97
Total	**1.01**	**0.98**	**0.87**	**1.00**	**1.00**	**1.00**	**1.16**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**0.99**	**1.00**	**0.99**	**1.00**	**1.02**	**1.00**	**1.00**	**0.84**	**1.12**