CONVERGENCE AMONG INDONESIAN REGIONS: PRE VS. POST DECENTRALIZATION

By

Akhmad Adi Purawan

THESIS

Submitted to
KDI School of Public Policy and Management
in partial fulfillment of the requirements
for the degree of

MASTER OF PUBLIC POLICY

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ABSTRACT

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Despite the 2009 decentralization, inter-regional income disparities have remained a contentious issue in Indonesia. Using a newly-constructed regional data set, this study examines whether Indonesian provinces have been converging, which implies that poorer provinces have had higher growth rates than wealthy provinces, and whether decentralization has promoted convergence across regions. The study finds that variations in worker productivity across 26 Indonesian provinces have diminished over time from 0.780 in 1992 to 0.708 in 2000, then declined to 0.666 in 2007, indicating evidence of sigma (σ) convergence. Based on absolute (unconditional) beta (β) convergence hypothesis, regression analyses reveal that the estimated parameters on initial worker productivity for the 1992-2000, 2000-2007 and 1992-2007 periods were -0.0127, -0.0105, –0.0117, respectively. This suggests that absolute beta convergence has also occurred, which means that poor, Indonesian provinces have had higher growth rates than wealthier provinces, thus enabling catch up. However, both sigma convergence and absolute beta convergence measures show that the *rate* of convergence during pre-decentralization (1992-2000) is higher than that during post-decentralization (2000-2007). Finally, the study applies panel data techniques to estimate the impact of covariates on provincial growth of worker productivity during the 1993-2007 periods. The results show that, first, beta convergence also occurred in Indonesia in conditional sense. Second, foreign direct investments, within-region inequality, trade openness, and oil and gas activities have had positive impact on provincial productivity growth.

Keywords: regional growth, convergence, decentralization.

Dedicated to Tia & Razan

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CHAPTER 1

INTRODUCTION

1.1 STATEMENT OF PROBLEM

Income disparity and inequality among Indonesian regions is one of the topics that have been frequently discussed among scholars and policy makers. This issue is important since Indonesia is a multiethnic and multicultural country in which people expect government to apply an egalitarian policy. In fact, income disparity and inequality among Indonesian regions are severe. This can be clearly seen by comparing across provinces in Indonesia, as the capital city and rich resource regions have extremely high regional GDP per person relative to the rest of Indonesia (figure 1-1). As shown in the figure, regional GDP per person of Jakarta and East Kalimantan are more than US$ 5,000 meanwhile the rest is markedly less even below US$ 500 in some cases.

Figure 1-1 Regional GDP per Person across Provinces in Indonesia 2007[1]

[1] http://www.economist.com/displayImage.cfm?imageURL=http://media.economist.com/images/20090912/CSR939.gif

The central government had implemented some policies to reduce income disparity and inequality among regions. Since 1967 to 2000, the Indonesian government ran a highly-centralized system in order to reduce income disparity and inequality as well as pursue economic growth. During this era, the central government implemented trickle-down economics. The central government believed that the accumulation of wealth by the rich is good for the poor since some of the increased wealth of the rich is expected to trickles down to the poor (Aghion & Bolton, 1997). The government thus provided tax cuts or other benefits to businesses and rich individuals in the belief that this would indirectly benefit the broad population. Because of that, the central government accumulates capital and infrastructure in Jakarta under vision that the Jakarta's wealthy ness will do trickle-down to the other provinces, which led to highly-unequal distribution of wealth across regions under sufficiently high rates of capital accumulation.

Although the government achieved an excellent economic growth, regional income disparity and inequality are not reduced yet and may even worsen. Between 1993 and 1997, when Indonesia's average growth rate exceeded seven percent annually, regional income inequality rose significantly (Akita & Alisjahbana, 2002). These problems are more severe since capital and skilled labor have been highly concentrated in Jakarta as the capital city. Some regions accused the government of unfair policies, resulting in tense political situation and mass riots. In 1997 the Suharto regime that supported the centralized system was ousted, and a new regime came to power proposing, among other changes, a decentralized system. The Governance and Fiscal Balance Law enacted by Indonesian Parliament in May 1999, aimed to decentralize both political and economic power away from the central government after decades of highly centralized and autocratic rule (Ahmad & Mansoor, 2002).

Regardless of the political circumstances, every policy that the government creates must entail pros and cons among scholars, taking into account whether the policy is effective

or ineffective in reducing income disparity and inequality. Therefore, reviewing the policy base using actual data is critically important. One of the approaches to investigate the effectiveness of government policy in reducing income disparity and inequality among regions is by determining convergence of income per worker/ per capita.

1.2 PURPOSE OF THE STUDY

The purpose of this study is to conduct an economic analysis in term of long term growth whether there is evidence of income convergence or divergence which is resulted from government policies in reducing income disparity, and provide recommendations to improve income convergence in Indonesia.

1.3 SIGNIFICANCE OF THE STUDY

Since income disparity and inequality between regions is the most popular issue in Indonesia in recent years, study about income convergence is worth and the issue needs to be addressed. This study employs economic analyses based on empirical data to contribute to the general understanding of theories and applications in the field of economic development. What is expected of this study is that it will have an impact on policy formation and implementations by providing more rational policy framework to examine either political or economic issues. Finally, this study aims to contribute to the literature on income convergence across Indonesian regions.

1.4 RESEARCH QUESTION

To achieve the purpose of the study, this study would answer: (1) whether the provinces in Indonesia have exhibited income convergence or divergence; (2) whether or not poorer provinces have higher growth rates than wealthy provinces (thus enabling 'catch-up'); and (3) the role of the decentralization policy in regional income convergence in Indonesia.

1.5 SCOPE AND LIMITATION

This income/ productivity convergence study focuses on analyzing long term provincial economic growth. Although nowadays there are thirty-three provinces in Indonesia, since the data is collected from about 10 years before decentralization initiative in 1999, this study utilizes twenty-six provinces classification in accordance with their initial GDP data. Otherwise, this study could not capture new provinces long term growth individually.

In addition, this study also would not to addressed the impact of the decentralization which the decentralization policy as endogenous variables. Instead, this study would only use pre-decentralization and post-decentralization periods to analyze the trend in both periods and compare the results of the two periods. By doing so, we may draw a conclusion about implication of the decentralization policy.

CHAPTER 2

LITERATURE REVIEW

2.1 BACKGROUND INFORMATION OF THE PROBLEM

2.1.1 Income Disparity in Indonesia

For more than 32 years during President Suharto's regime, Indonesia adopted a highly-centralized system where the administration authority was centered in the capital city Jakarta. In that period, education, industry, trade, administration, finance, entertainment, and many other activities were concentrated in Jakarta, attracting people from other parts of the country like a magnet. Jakarta's economic dominance can be seen from the city's contribution to Indonesia's Gross Domestic Product (GDP), even after the fall of Soeharto's regime in 1998 (Table 2-1).

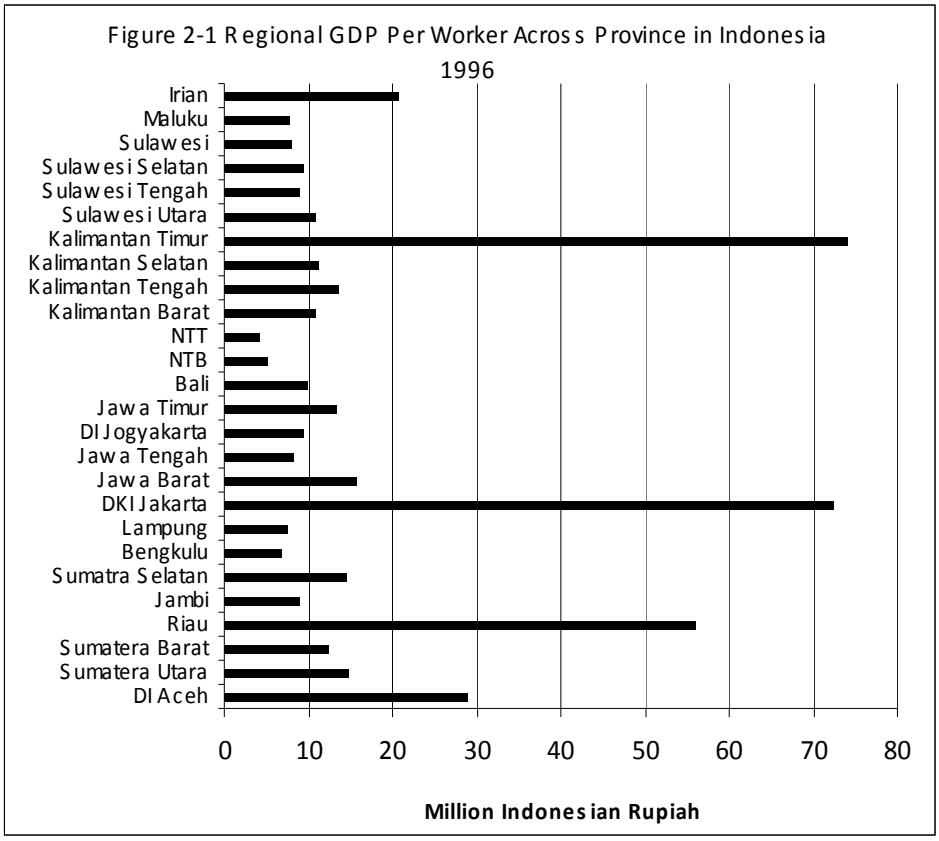
Table 2-1 Jakarta's Contribution to Indonesia's Gross Domestic Product

Sector	2000		2005	
	Indonesia's GDP*	Jakarta's Contribution	Indonesia's GDP*	Jakarta's Contribution
Agriculture	218.0	0.2%	234.6	0.1%
Mining	175.3	0.0%	182.6	0.0%
Manufacturing	315.0	13.6%	490.7	10.4%
Electricity, gas and water	16.6	10.0%	16.1	12.3%
Construction	76.5	31.8%	111.1	26.2%
Trade, hotel and restaurant	199.1	17.9%	275.4	23.1%
Transportation and communication	62.4	21.0%	116.0	20.1%
Financial and business	80.5	63.4%	146.3	62.1%
Services	121.8	15.7%	176.7	19.3%
TOTAL	1,265.0	14.9%	1,749.5	16.9%

* in trillion rupiahs and based on the prices of the year of 2000
Source: Indonesia's Central Bureau of Statistics

Under Soeharto's regime, Jakarta and the natural resource-rich regions produce Gross Regional Domestic Product (GRDP) more than double of the rest of the country, which confirm how the disparity among regions are occurred in Indonesia. The consequences are

the income between people in the country are also differ depending on how rich the region where they live (figure 2-1).



Note: Using 2000 constant prices
Source: Author's own calculation using Indonesian Central Statistic Agency (BPS)'s Gross Regional Domestic Product 1996 and Economically Active Population 1996

The significantly higher regional GDP per worker for natural resource-rich regions such Kalimantan Timur and Riau are understandable, but for Jakarta it is surely driven by government interventions that lured businesses to the capital city.

It is not surprising then that migration inflows to Jakarta are also significantly higher than those for other regions. People have relocated from the country sides, often crossing the sea to pursue the dreams of better life and improving livelihood in Jakarta. As a result, Jakarta and other neighboring provinces such as Jawa Barat and Lampung had much higher population density than other areas, while in regions outside Jakarta the migration inflows are small, so much that in some cases the rates are negative (table 2-2).

Table 2-2 Life Time Migration 1971, 1980, 1990 and 1995

Province	1971	1980	1990	1995
Nanggroe Aceh Darussalam	-4,853	27,355	67,722	47,067
Sumatera Utara	341,686	130,056	-317,175	-473,001
Sumatera Barat	-236,996	-427,366	-426,894	-576,648
Riau	161,970	256,484	553,955	714,828
Jambi	128,437	246,094	393,549	370,591
Sumatera Selatan	128,252	275,473	488,648	458,821
Bengkulu	11,285	82,255	204,512	265,318
Lampung	*971,375*	*1,725,039*	*1,559,404*	*1,650,867*
DKI Jakarta	*1,659,420*	*2,164,391*	*2,088,980*	*1,782,099*
Jawa Barat	*-821,539*	*-524,065*	*640,011*	*1,723,484*
Jawa Tengah	-1,544,524	-2,891,281	4,015,587	-4,341,844
D.I. Yogyakarta	-167,151	-77,658	243,373	-514,434
Jawa Timur	-476,620	-1,164,400	-1,915,086	-2,070,394
B a l i	-35,062	-54,463	-98,700	-72,247
Nusa Tenggara Barat	20,811	7,006	-29,751	-32,034
Nusa Tenggara Timur	-16,004	-8,799	-53,132	-60,710
Kalimantan Barat	-14,304	32,498	80,141	123,783
Kalimantan Tengah	38,564	114,956	192,674	267,580
Kalimantan Selatan	-18,138	-26,942	70,861	76,360
Kalimantan Timur	15,825	257,969	536,668	652,463
Sulawesi Utara	-12,169	-32,965	-65,751	-142,156
Sulawesi Tengah	16,663	150,614	237,782	303,816
Sulawesi Selatan	-174,742	-403,687	-422,295	-488,046
Sulawesi Tenggara	-4,865	14,836	129,175	134,738
Maluku	5,615	60,169	89,531	24,750
Papua	27,064	77,741	230,544	226,920

Source : Population Census 1971, 1980, 1990 and Inter-censal Population Survey (SUPAS) 1995

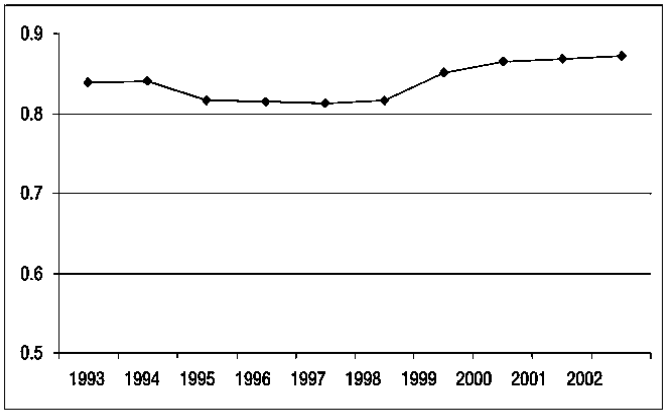
Movement of people means migration of workers. The person who migrates is typically educated and skilled, while those left behind are uneducated and unskilled. As a result, Indonesia faced growing inequality and income disparity among regions due to relocations of highly-productive workers to Jakarta. Although some natural resources are located in regions outside of Jakarta, ironically those regions remain undeveloped. Most of the revenues from commodity exports were appropriated by Jakarta. As a result, Jakarta has had an abundance of surplus resources, while the rest has been starving for capital.

2.1.2 Studies

There is tremendous inequality and income disparity among regions in Indonesia. Using coefficient of variations of provincial GDP per capita to measure disparity of income

per capita, Resosudarmo and Vidyattama (2006) calculate the coefficient of variations of Indonesian provincial GDP per capita 1993-2002 in 1993 prices to be 0.855 (figure 2-2). Compared with other developing countries, Indonesia has relatively higher income per capita disparities across regions (table 2-3).

Figure 2-2 Indonesia Income Per Capita Disparity 1993-2002



Source: Resosudarmo & Vidyattama (2006)

Table 2-3 Developing Countries Coefficient Variations

Country	*Year*	
	1996	*1997*
Brazil		0.563
China		0.692
India		0.387
Mexico		0.473
Nepal	0.157	
Pakistan		0.186
Philippines		0.530
Poland	0.206	
Rumania	0.189	
Russia		0.625
Thailand		0.797
Uganda		0.274
Uzbekistan		0.353
Vietnam		1.067

SOURCE: Shankar and Shah (2003).

Akita and Alisjahbana (2002), using Theil index applied to district-level GDP and population data, report that overall regional income inequality increased significantly over the 1993-1997 period (from 0.262 to 0.287). During the same time Indonesia achieved an annual average growth rate of more than seven percent per annum. The increase in regional disparities was due mainly to a rise in the within-province inequality component, especially in the Province of Riau, Jakarta, West Java and East Java (Akita & Alisjahbana, 2002).

From the two studies, it can be concluded that regional inequality and income disparity has been persistently high in Indonesia. To correct this structural problem would require well-designed regional policies.

2.1.3 Historical Background

Income disparity and inequality in Indonesia under Soeharto's regime is like time boom which any time can explode. Since the beginning of the 1990s, the provinces that lack

in prosperity protested against the central government, demanding larger budget transfer and greater authority to develop their regions (Resosudarmo & Vidyattama, 2006). After economic crises hit Indonesia in 1997, there were political riots that resulted in the fall of the regime. After the fall of the Suharto's regime[2], newly elected representatives in parliament and national assembly proposed to amend a Constitution inter-alia to strengthen the power of provinces.

In 1999, Law Number 22/1999 was enacted to signal the start of decentralization in Indonesia. Law Number 22/1999 assigned all government expenditures to the district[3] except for finance, foreign affairs, defense, religion, and state administration. The new legislation recognized political reality – Indonesia across the country wanted greater involvement in the management in their day-to-day affairs. In particular, the natural resource-rich regions wanted a larger share of resource pie - which was seen as having been preempted and often misused by the elite in Jakarta (Ahmad & Mansoor, 2002). The Law Number 22/1999 is come into force in 2001. Therefore, In 2001 Indonesia become highly decentralized one from highly centralistic government system (Balisacan, Pernia, & Abuzar, 2002).

In 2004, Law Number 22/1999 was revised by Law Number 32/2004 due to criticism from some parties that Law No. 22/1999 had been too 'progressive'[4]. The overly progressive nature of the law created less harmonious relations not only between central, provincial and district governments, but also between districts, as well as between local executives and local

[2] 1997's Asian Financial Crisis made the Indonesian rupiah drop, causing huge debts in foreign currency and often short-term debt. At the start of May 1998, students were holding demonstrations on university campuses across the country. They were demanding that President Suharto should step down. Suharto was forced to resign on May 21.

[3] Indonesia consist 4 layers of spatial power: Central Government, Province, District, and Village.

[4] Since part of central government authority is decentralized to the districts, the provinces did not have authority to govern other than administrative. In addition, districts did not have obligation to make report and coordination to the provinces. That made central government policy difficult to implement in certain regions. Provinces also could not maintain the cross-district problems. There was also a different political system between central government and region which the mayor was elected by and responsible to the local parliament (parliamentary system), in contrast to the amendment of Constitution which states that the President is elected by the people (presidential system).

parliaments. Nevertheless, Law Number 32/2004 was aligned with the decentralization of administration authority system.

Decentralization makes us intuitively expect regional economic growth in Indonesia to be heading towards convergence. If this assumption is correct, growth in Jakarta and other rich provinces during Suharto's era were expected to slow down, and vice versa growth in other provinces were expected to accelerate.

2.1.4 Decentralization and Economic Growth in Other Countries

Decentralization offers considerable opportunities for better governance. Rosen and Gayer (2008) noted that there are three advantages of a decentralized system: tailoring output to local tastes, fostering intergovernmental competition, and experimentation and innovation in locally provided goods and service. A centralized government tends to provide the same level of public services throughout the country, regardless of the fact that people's needs differ. Under decentralized system, individuals with similar tastes for public goods group together, so communities provide the types and quantities of public goods desired by their inhabitants. The decentralized system also may create incentives for government managers to produce more efficiently and be more responsive to their citizens. A system of diverse government enhances the chances that new solutions to problems will be sought (Rosen & Gayer, 2008). Therefore, decentralization appears to be more popular among developing and transitional countries (Martinez-Vazquez & McNab, 2001).

What impact decentralization has on economic growth in other countries? The empirical study in India conclude that different measures of fiscal dezentralization have positively significant correlation on regional growth in India (Zhang and Zou, 1997). In contrast, Zhang and Zou (1998) discover the opposite finding in China in which fiscal decentralization assosiated with slower growth, similar with the case of the United States

which found by Davoodi, Xie, and Zou (1995), although in 2000, Lin and Liu (2000) found that fiscal decentralization have a positive and significant effect on economic growth in China (Zhang & Zou, 1997; Lin & Liu, 2000; Zhang & Zou, 1998; Davoodi, Xie, & Zou, 1995 on Martinez-Vazquez & McNab, 2001).

Anyway, there is belief that fiscal decentralization is an effective tool for increasing the efficiency of public expenditures since subnational governments could satisfying the needs and preferences of local taxpayers based in better knowledge of these preferences than national government. Oates (1993) then argue this "static" advantage should have present in a "dynamic" setting on economic growth (Martinez-Vazquez & McNab, 2001).

2.2 THEORETICAL FRAMEWORK

To measure economic growth, economist use data on gross domestic product (GDP) which measures the total income of everyone in the economy (Mankiw, 2007). Since economic growth is measured over periods, we may know some economies grow faster than others. Is it possible regions that starts off poor then grow faster than regions that start off rich? If it is possible, then the poor regions will tend to catch up with the rich regions. This property of catch up is called *convergence* (Mankiw, 2007).

2.2.1 Absolute and Conditional Convergence

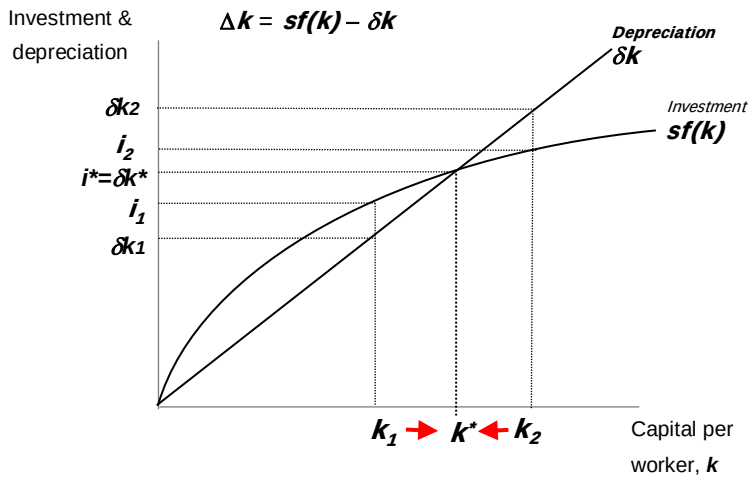
The Solow growth model[5] predicts that two regions will converge depends on why they differ in the first place (Mankiw, 2007). According to the model, convergence should occur between regions if they have same steady state level of capital, as determined by their saving rates, population growth rates, and the efficiency of labor. Thus, if all regions were

[5] The Solow growth model is named after economist Robert Solow and was developed in the 1950s and 1960s. In 1987 Solow won the Nobel Prize in economics for his work in economic growth. The model was introduced in Robert M. Solow, "Contribution to the Theory of Economic Growth," *Quarterly Journal of Economics* (February 1956): 65-94 (Mankiw, 2007).

initially identical except for their levels of capital, then the model predicts that convergence would occur in an *absolute* sense. Equilibrium is therefore unique for all regions. Notice that this means the poorer economy with the smaller capital stock will naturally grow more quickly to reach the steady state, while the richer economy with the larger capital stock will naturally grow more slowly to reach the steady state. It occurred since the marginal product of capital is higher in the poor regions than in the rich ones, thus the poor will accumulate more capital and grow at a faster rate than the rich.

In the figure 2-3, the steady state level of capital k^* is the level at which investment equals depreciation, indicating that the amount of capital will not change over time. Below k^* which represent the regions that starts off poor, investment exceeds depreciation, so the capital stock grows. Above k^* which represent the regions that start off rich, investment is less than depreciation, so the capital stock shrinks.

Figure 2-3 Investment, Depreciation, and the Steady state



Source: Mankiw (2007)

If, however, regions had different steady states, perhaps because the regions have different rates of saving but the same in the population growth rates and the efficiency of labor, then convergence applies only in a *conditional* sense. Structural heterogeneities in the beginning therefore lead to multiple equilibria: regions converging to different steady-states

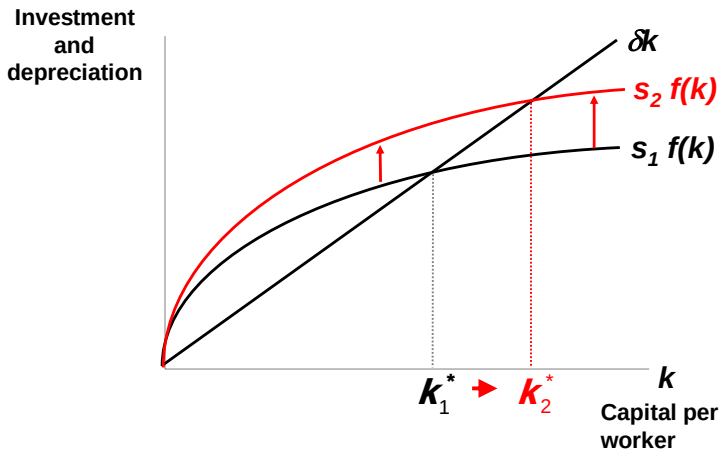
depending on initial conditions. In other words, we should not expect absolute convergence to occur if economies have different fundamentals.

2.2.2 Determinant of the Economic Growth

According to the Solow growth model, there are three variables which determine steady state level of capital: saving rates, population growth rates, and the efficiency of labor. According to Mankiw (2007), those three variables could be explained as follow.

Increase in the saving rate raises investment and causing capital stock grows toward a new steady state (figure 2-4). An increase in the saving rate *s* implies that the amount of investment for any given capital stock is higher. It therefore shifts the saving function upward. At the initial steady state k_1*, investment now exceed depreciation. The capital stock rises until the economy reaches a new steady state k_2* with more capital and output.

Figure 2-4 An Increase in the Saving Rate

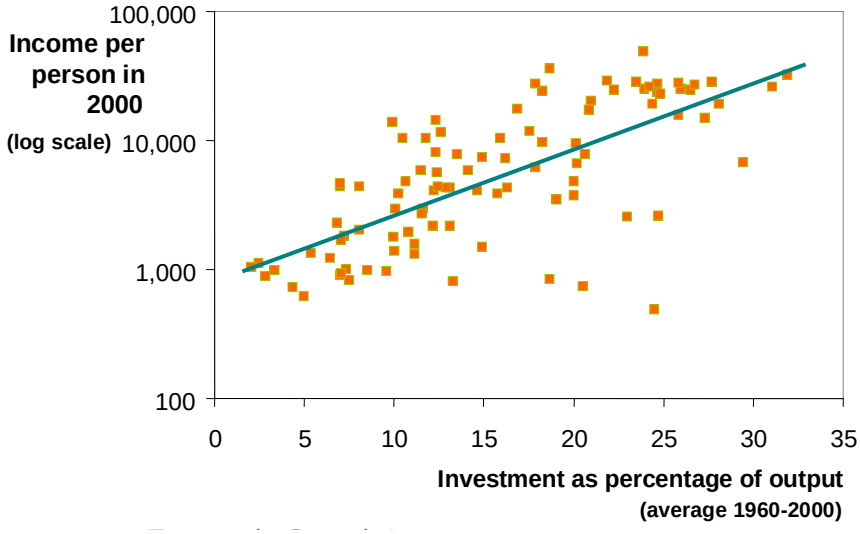


Source: Mankiw (2007)

From figure 2-4 we can conclude that saving rate *s* has positive correlation with capital stock *k**. Since *k*, according to the Solow growth model, is function of output per worker γ or $\gamma = f(k)$, we can conclude also that the saving rate has a positive correlation with income per capita. It means that if the saving rate is high, then income per capita is high as well. On the other hand, if the saving rate is low, then income per capita is low as

well. This relationship can be seen in international evidence on investment rates and income per person (figure 2-5).

Figure 2-5 International Evidence on Investment Rates and Income per Person



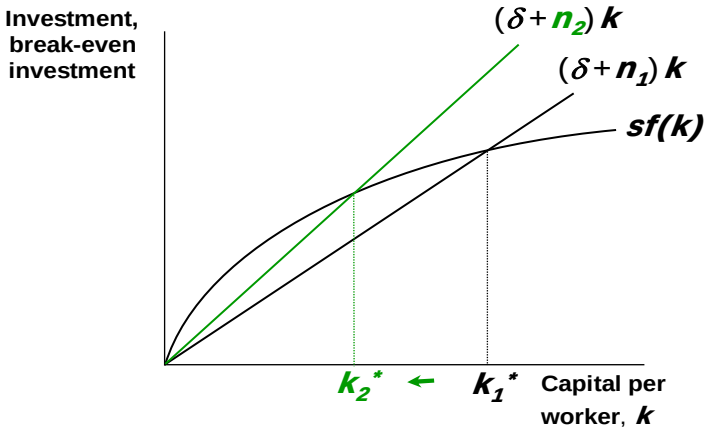
Source: Mankiw (2007)

An increase in population growth causes an increase in break-even investments and leads to a lower steady state capital stock per worker (figure 2-6). An increase in the rate of population growth rate from n_1 to n_2 shifts the line representing population growth and depreciation upward. The new steady state k_2* has a lower level of capital per worker than the initial steady state k_1*. Thus, the Solow model predicts that economies with higher rates of population growth will have lower levels of capital per worker and therefore lower incomes.

From figure 2-6 we can conclude that population growth n has negative correlation with per worker capital stock k*. Since k, according to Solow growth model, is function of output per worker γ or $\gamma = f(k)$, we can conclude also that population growth has a negative correlation with income per capita. It means that if population growth is high, income per capita will be low. On the other hand, if population growth is low, income per

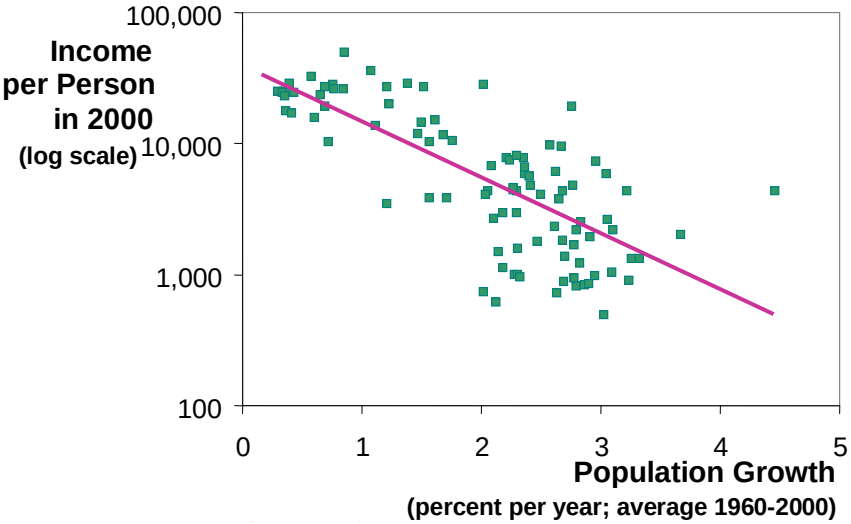
capita becomes high. This relationship can be seen in international evidence on population growth and income per person (figure 2-7).

Figure 2-6 The Impact of Population Growth



Source: Mankiw (2007)

Figure 2-7 International Evidence on Population Growth and Income per Person



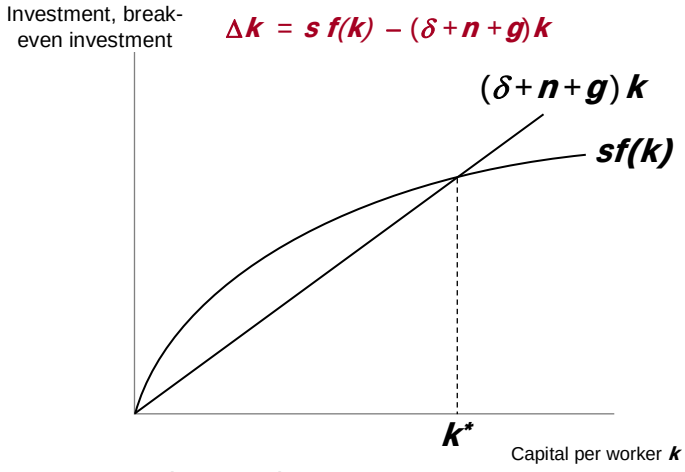
Source: Mankiw (2007)

The Solow model exhibits that the rate of saving is a main determinant of the steady state capital stock. However, higher saving brings to faster growth in the model, but only for a while (Mankiw, 2007). An improvement in the saving rate boost up growth only until region reaches the new steady state. If the region keeps a high rate of saving, it will keep a large capital stock and high output level, but it will not keep a high growth rate forever. In other word, the saving rate and population growth are correlated with the level

of GDP, but not with growth. In fact, the model shows that in the long run, these variables have no impact on the growth.

The Solow model clarify that the technological progress is the only variable which can lead to sustained growth in the output per worker. In the term of technological progress, labor can be defined as effective number of workers since labor is not only defined as *n* but also by *g* which corresponds to the rate of labor-augmenting technological progress (Mankiw, 2007). Participation of technological progress does not alter the steady state. Since efficiency of labor is growing at rate *g*, output per worker must also be growing at rate *g* in the steady state (Figure 2-8). Therefore, technological progress increases standards of living.

Figure 2-8 Technological Progress and the Solow Growth Model



Source: Mankiw (2007)

2.2.3 Measures of Economic Convergence

There are two economic convergence measures: Sigma (σ) convergence and Beta (β) convergence (Barro & Sala-I-Martin, 1990; Lall & Yilmaz, 2000; Resosudarmo & Vidyattama, 2006; Prasasti, 2006).

In the sigma (σ) convergence, the convergence is measured by the dispersion of income per capita across countries/regions, using coefficient of variation or standard deviation divided by its mean (Resosudarmo & Vidyattama, 2006). As descriptive statistic analysis, sigma (σ) convergence is focus on reducing of income disparity cross country/region. If the dispersion declines, that disparity between regions tends to be smaller and there is evidence of convergence (Prasasti, 2006).

Beta (β) convergence concerns about poor countries/regions growth rate in terms of per capita income/output. In this concept, convergence occurred when poor countries/regions have higher growth rates than wealthy countries/regions. A negative coefficient on initial levels is interpreted as evidence of β convergence (Sala-I-Martin, 1996; Barro and Sala-I-Martin, 1991). However, although all countries/regions may have the same growth rate in the future, β convergence concept would not guarantee the unification value of per capita income/output for all countries/regions (Solow 1956; Swan 1956 on Resosudarmo & Vidyattama, 2006).

Procedure to test β convergence is by looking for absolute convergence in advance, and then by testing explained or conditional convergence (Prasasti, 2006). Absolute convergence occurred if poorer regions which have lower GDP initially have higher growth rates than richer regions so that eventually all regions will reach the same level of steady-state GDP. The result is found by create an initial condition as the only one independent variable for income growth, in which poor countries/regions have lower income than wealthy countries/regions (Prasasti, 2006).

Conditional convergence includes some variable other than initial income which likely determine income growth rate (Prasasti, 2006). Lall and Yilmaz (2000) suggest that the stocks of public and human capital are important determinants regional economic growth. By testing conditional convergence we can find whether or not poorer provinces have higher

growth rates than wealthy provinces if other variables are constant. This conditional convergence is important to asses the impact of certain policies (Prasasti, 2006).

2.3 SUMMARY OF SIMILAR STUDIES

There have been several studies examining regional income convergence in Indonesia. Following Barro's growth model, Garcia and Soelistianingsih (1998) used provincial data set for periods 1975-1993, 1980-1993, and 1983-1993 and applied Ordinary Least Square (OLS) cross section technique to analyze the convergence issues. The findings were that the provincial level of education has a significantly positive impact on regional growth, while the effect of the provincial level of fertility is negative. In addition, increasing the role of oil and gas sectors had a significantly positive impact on regional growth in the 1975-1993 periods but was insignificant during the 1983-1993 periods (Garcia & Soelistianingsih, 1998). According to Resosudarmo and Vidyattama (2006), the use of OLS cross-section technique failed to cover regional heterogeneity; i.e. individual specific effect.

Prasasti (2006) researched regional disparity of per capita GDP using 1993 constant prices for 30 provinces in Indonesia over the period 1993-2003. The methods of analyses are Williamson Index, OLS regression using panel data, and convergence analyses. The research showed that the regional disparity using Williamson Index tend to decrease towards the equalization. OLS regression analyses showed that key factors that affect significantly increasing speed of convergence are initial GDP per capita, human capital characteristic, dummy resources, and dummy crisis. Econometric analyses indicated that Indonesia would have to grow by at least 4.5 percent per year to achieve convergence.

Utilizing a panel data technique and the general specification growth model, Resosudarmo and Vidyattama (2006) investigate the determinants of the Indonesian provincial income per capita growth by estimating the provincial income per capita growth

for the 1993-2002 periods. The study found that there is a conditional regional income per capita growth convergence despite the existence of regional income disparity and the determinants of the provincial income per capita growth are trade openness, saving of physical capital and the contribution of the gas and oil sectors.

2.4 CRITICAL ANALYSES OF RESEARCH

All three of the previous studies use time series data up to 2003 and did not take into account the decentralization policy in 1999 in their analyses. For this purpose, this study will use time series data until 2007 and include the decentralization policy periods as a factor when analyzing the results. In addition, this study will not use provincial income (regional GDP) per capita as a proxy of growth rate, but instead, use regional GDP per worker which captures the productivity of labor in each province[6]. I focus on productivity impact because I believe it captures more appropriately the underlying mechanisms that either close or widen the gap between advanced and lagging regions. Examples of gap-closing mechanisms are technological spillovers and capital inflows to emerging but relatively less productive economies; examples of gap-accentuating mechanisms are agglomeration economies and migration of skilled workers to rich regions.

This research will calculates income convergence by answering the questions whether poorer provinces have higher growth rates than wealthy provinces (and thus are playing catch-up), if there is any evidence of convergence or divergence, and the role of the decentralization policy in regional income convergence in Indonesia.

[6] The OECD defines labor productivity as the ratio of a volume measure of output to a volume measure of input. Volume measures of output are normally GDP or gross value added (GVA), expressed at constant prices i.e. adjusted for inflation. The three most commonly used measures of input are: hours worked; workforce jobs; and number of people in employment. *See* OECD Manual: "Measuring Productivity; Measurement of Aggregate and Industry-Level Productivity Growth." (2002). This study use GDP as the measure of output and number of people in employment as the measure of input.

CHAPTER 3

RESEARCH METHODS

3.1 INTRODUCTION

Income disparity and inequality among regions is one of the important issues in Indonesia because of its impact on national security. The central government historically has aimed to prevent potential resentment brought by regional disparities, which in the past has motivated a few of the resource-rich regions to secede, and in so doing threatened national unity. Therefore, the central government had implemented a number of equity-promoting policies to reduce income disparity and inequality among regions.

It is important to recognize that for every policy that a government created, there must have pros and cons when reviewing by scholars. That is why, it is important to examine the empirical evidence in order to ascertain whether the policy is effective or ineffective. One of the approaches that can help reveal the effectiveness of government policy in reducing income disparity and inequality among regions is by determining whether there is convergence in productivity – measured by regional output per worker. Considering these issues, this study aims: (1) to analyze whether the provinces in Indonesia have exhibited income convergence or divergence; (2) to investigate whether or not poorer provinces have higher growth rates than wealthy provinces (thus enabling 'catch-up'); and (3) the role of the decentralization policy in regional income convergence in Indonesia.

3.2 RESEARCH DESIGN

Economic growth can be considered as material standard of living which measures how many quantities of goods and services people are able to consume. To measure economic growth, economists use data on gross domestic product (GDP) which measures the

total income of everyone in the economy (Mankiw, 2007). Since economic growth is measured over periods, we can determine which economies grew faster than others.

This study utilized quantitative research since it reliant on econometric methods. The design focus was descriptive, seeking to provide further insight into the research problem by describing the variables of interest. A longitudinal study was utilized to investigate some variables that were repeatedly measured over time to track changes in behavior over time and monitor long-term effects. To analyze the convergence issue in Indonesia, the study needed regional GDP or Gross Regional Domestic Product (GRDP) and economically active population data from provinces in Indonesia, as well as control variables as suggested by Solow growth model.

Tests of convergence hypotheses can be distinguished based on whether it is "sigma convergence" or "beta convergence" that the researcher would like to establish. Sigma convergence refers to the tendency for the dispersion in productivity (or income) across regions to diminish over time, whereas beta convergence to the tendency for poor regions to grow faster than rich ones (Sala-i-Martin, 1996). Factors which determine regional income convergence in Indonesia will be identified by conditional β convergence analysis, which controls for various determinants of steady state.

Although similar studies have already been conducted (Garcia & Soelistianingsih, 1998; Haryanto, 2001; Prasasti, 2006; Resosudarmo & Vidyattama, 2006), these studies used GDP per capita to examine the trend of regional disparity in Indonesia and to test the convergence hypothesis. This study will not use provincial income (regional GDP) per capita as proxy of growth rate. Instead, this study will use regional GDP per worker, which captures productivity of labor in each province.

3.3 RESEARCH INSTRUMENT

3.3.1 Sigma (σ) Convergence

To examine σ convergence, the dispersion is measured by computing the standard deviation of logarithm of GDP per worker for each year (Barro and Sala-i-Martin (1995) on Haryanto, 2001). The standard deviation for each year will be calculated by this following formula:

$$SD_t = \sqrt{\frac{1}{n} \sum_{i=1}^{n} (\ln \bar{y}_t^2 - \ln y_{it})^2}$$

Where, SD_t represent standard deviation at period t, ln $\tilde{y}_t$ the logarithm of the average GDP per worker across Indonesian provinces at period t, ln y_{it} the logarithm of GDP per worker in region i at period t, and n the number of provinces. Convergence occurs if the dispersion of GDP per worker across a group of economies or individuals tends to fall over time (Barro & Sala-i-Martin, 2004).

3.3.2 Beta (β) Convergence

Using inferential statistics, the aims of beta (β) convergence analysis is to get evidence whether or not the coefficient of initial regional GDP per worker is negative; meaning provinces with higher income per worker will have lower growth rates than provinces with lower income per worker (Resosudarmo & Vidyattama, 2006).

There are two versions of Beta (β) convergence, absolute convergence and conditional convergence. Absolute convergence is occurred when all regions initially identical except for their levels of capital so that regions that starts off poor grow faster than regions that start off rich (and thus are playing 'catch-up') and hence all regions converge to the same steady state equilibrium, without adjusting for other factors. If however regions had

different fundamental, the convergence applies only in conditional sense. Conditional convergence can be done by adjusting for other factors.

3.3.2.1 Absolute β Convergence

Absolute β convergence occurs when poor provinces income per worker grow faster than wealthy ones without conditioning on any other fundamentals and hence the poor apt to catch up or converge to the wealthy (Haryanto, 2001). The absolute/ unconditional β convergence is examined by applying the following formula:

$$Y_i = \alpha_0 + \alpha_1 \log y_{i0} \qquad (1)$$

Where:

Y_i = growth rate in region i over t years
y_{i0} = initial regional GDP per worker in region i
α_0 = the intercept of equation
α_1 = the estimated coefficient of y_{i0}

To compute the growth rate of regional GDP per worker, this study used compounded annual growth rate (CAGR)[7] by measure the growth rate over t years. The equation is:

$$Y_i = (\log y_{it} - \log y_{i0})/t \qquad (2)$$

Where:

Yi = growth rate in region i over t years
y_{it} = regional GDP per worker in region i at t year
yi_0 = initial regional GDP per worker in region i
t = amount of time series over t years

3.3.2.2 Conditional β Convergence

To identify whether regions had different fundamentals in which case convergence applies only in a *conditional* sense, this study will control for a number of variables as suggested by Resosudarmo & Vidyattama (2006). The conditional β convergence is examined by applying the following formula:

[7] The compound annual growth rate (CAGR) is year-over-year growth rate of an investment over a specified period of time. The compound annual growth rate is calculated by taking the n-th root of the total percentage growth rate, where n is the number of years in the period being considered. See A Forbes Digital Company http://www.investopedia.com/terms/c/cagr.asp

$$Y_{i,t} = \beta_0 + \beta_1 \log y_{i0} + \beta_x X_{it} + \beta_z Z_{it} + \beta_d D_t + \eta_i + \varepsilon_{it} \qquad (3)$$

Where i is index for provinces, t is index for time, η_i is unobserved provincial specific effect that is time invariant, meanwhile ε_{it} is stochastic error term.

$Y_{i,t}$ is regional GDP per worker growth rate in region i at time t. X_{it} is the vector of variables that are suggested in the Solow's neoclassical model. According to the model, there are three variables which determine steady state level of capital: saving rates, population growth rates, and the efficiency of labor which has been verified by Mankiw, Romer, and Weil (1992), using provincial rate physical capital accumulation, provincial rate of human capital accumulation, and provincial rate of population. Following Mankiw, Romer, and Weil (1992), in this paper, $\beta_x X_{it} = \beta_2 \ln s_{kit} + \beta_3 \ln s_{hit} + \beta_4 \ln n_{it}$; where s_{kit}, s_{hit} and n_{it} are the rate of physical capital accumulation, human capital accumulation, and population growth in the province. Following Resosudarmo & Vidyattama (2006), this study also included provincial and district government investments and provincial rate of financial development as the vector of variables.

Z_{it} is the vector of variables of interest. Resosudarmo & Vidyattama (2006) pointed out that a number of variables such as civil liberties, rule of law, and exchange rate distortion do not vary across provinces within a country and therefore are not suitable for an inter-regional study. However, many variable used in international growth studies can be used in an inter-regional growth study. Following Resosudarmo & Vidyattama (2006), this study include foreign direct investment, inequality, openness, and the role of oil and gas variables. Meanwhile, D_t is dummy variables.

If β_1 in equation (3) is negative, we claim that there is a conditional β convergence. Why we call it is conditional, this is because we control the variation of variables in X_{it} and Z_{it}.

3.4 DATA SOURCES AND VARIABLE DEFINITIONS

The data set for σ convergence and absolute β convergence is the Indonesian provincial GDP and economically active population for 1992-2007 from Indonesian Central Statistical Agency (BPS). While, the data set for conditional β convergence is panel data set of the Indonesian provinces for 1993 - 2007 which were built from publications of the Indonesian Central Statistical Agency (BPS) and the Indonesian central bank (Bank Indonesia). However, some control variable data set (X_{it} and Z_{it}) for 1993 – 2002 is utilized from Resosudarmo & Vidyattama (2006) data set. The variables described as follows:

Regional/provincial gross domestic product (*GDP) per worker* (y_{it}), this variable use regional/provincial GDP at 2000 constant prices. Noted that this variable is different from Resosudarmo & Vidyattama (2006)'s papers which use *regional GDP per capita.*

Provincial rate physical capital accumulation (s_{kit}), compute by the ratio of total provincial gross fixed capital formation to provincial GDP. This study also utilizes *Provincial government investments* (sgp) which are the provincial government capital expenditures and *District government investments* (sgk) which are the total of all district government capital expenditures per provincial GDP.

Provincial rate of human capital accumulation (s_{hit}), this variable is measured by the ratio of provincial working-age population (persons 15 years and over) that is in secondary school to total working-age population in the province.

Provincial rate of population growth (n_{it}), this data is computed as the instantaneous annualized growth of population, $ln\ (pop_t/pop_{t-j})/j$. the original data source is the Indonesian Central Statistical Agency.

Provincial rate of financial development (gfin), this variable is measured by the ratio of provincial total credit and saving in the bank to provincial GDP.

Foreign direct investment (gfdiar), this variable is measured by the ratio of the amount of provincial annual approved foreign investment to provincial GDP.

Inequality (gini), the proxy of this variable is provincial gini ratio.

Trade openness (opentrade), this variable is measured by the ratio of the total value of provincial exports and imports to provincial GDP.

Role of oil and gas (poilgas), this variable is measured by the ratio of value added from oil and gas sectors to total provincial GDP.

Year dummy, this study also includes year dummies to capture the overall changes of national environments such as macroeconomic and social political conditions.

To compute all the vector of variables, this study will found fourteen data for each province in Indonesia which is 33 provinces from 2003 to 2007. The detail of the data and the source are shown in table:

Table 3-1 Data and the Source

Variable	Data 2003-2007	Source
Provincial income per worker	provincial gross domestic product (GDP)	Indonesian Central Statistical Agency (BPS)
	economically active population	Indonesian Central Statistical Agency (BPS)
Provincial rate physical capital accumulation	provincial gross fixed capital formation	Indonesian Central Statistical Agency (BPS)
	provincial government capital expenditures	Indonesian Central Statistical Agency (BPS)
	total of all district government capital expenditures	Indonesian Central Statistical Agency (BPS)
Provincial rate of human capital accumulation	provincial working-age population (persons 15 years and over) that is in secondary school	Indonesian Central Statistical Agency (BPS)
	total working-age population in the province	Indonesian Central Statistical Agency (BPS)
Provincial rate of population growth	provincial population	Indonesian Central Statistical Agency (BPS)
Provincial rate of financial development	total credit in financial institutions in the province	Indonesian central bank (Bank Indonesia)
	total saving in financial institutions in the province	Indonesian central bank (Bank Indonesia)
Foreign direct investment	the amount of provincial annual approved foreign investment	Indonesian central bank (Bank Indonesia)
Inequality	Gini ratio	Indonesian Central Statistical Agency (BPS)
Trade openness	provincial exports	Indonesian Central Statistical Agency (BPS)
	provincial imports	Indonesian Central Statistical Agency (BPS)
Role of oil and gas	value added from oil and gas sectors	Indonesian Central Statistical Agency (BPS)

3.5 DATA COLLECTION PROCEDURES

The data for each province will be found by excerpt from various publications of Indonesian Central Statistical Agency (BPS) and the Indonesian central bank (Bank Indonesia) website.

Since this study followed the data which reported by Resosudarmo & Vidyattama (2006), this study used twenty-six provinces data category, although the number of provinces in Indonesia has changed over time. From its independence in 1945 up to 1976, there are twenty-six provinces, namely: Aceh, North Sumatera, Riau, West Sumatera, Jambi, South Sumatera, Lampung, Bengkulu, Jakarta, West Java, Central Java, Yogyakarta, East Java, West Kalimantan, Central Kalimantan, South Kalimantan, East Kalimantan, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, Bali, West Nusa Tenggara, East Nusa Tenggara, Maluku, and Papua. In 1976, East Timor, the Portuguese colony, joined Indonesia, but became an independent nation in 1999. In 2000, Bangka Belitung became a new province separated from South Sumatera, as well as Banten from West Java, Gorontalo from North Sulawesi, and North Maluku from Maluku. In 2003, Riau Islands and West Papua became new provinces separated from Riau and Papua. In 2004, another new province was established, namely West Sulawesi, which used to be part of South Sulawesi. As a result of these changes, in 2007 there are thirty-three provinces in Indonesia.

This study remerges the new provinces data to each original province, in which Bangka Belitung is merged into South Sumatera data, as well as Banten into West Java, Gorontalo into North Sulawesi, North Maluku into Maluku, Kepulauan Riau into Riau, West Papua into Papua, and West Sulawesi into South Sulawesi.

3.6 DATA ANALYSIS PROCEDURES

To answer the question whether the provinces in Indonesia have exhibited income convergence or divergence, this study utilizes the results of σ convergence, absolute and conditional β convergence analyses. Meanwhile to answer the question whether or not poorer provinces have higher growth rates than wealthy provinces (thus enabling ‘catch-up’), this

study utilizes the results of absolute and conditional β convergence analyses. Finally, to identify the role of the decentralization policy in regional income convergence in Indonesia, this study utilizes the results of σ convergence and absolute β convergence analyses.

To perform the analysis, this study will compute regional GDP per worker. To compute regional GDP per worker, this study use "Economically Active Population who were Working", which can be explained as all persons 15 years and over who worked for pay or assisted others in obtaining pay or profit for the duration at least one hour during the survey week[8].

Regional GDP per worker is defined as:

$$\text{Regional GDP per worker} = \frac{\text{Regional GDP (time, region)}}{\text{Economically Active Population (time, region)}}$$

The regional GDP per worker utilize for performing either σ convergence or β convergence analyses. For σ convergence analysis, the regional GDP per worker will be continued by computing the standard deviation. For β convergence analyses, the regional GDP per worker will be continued by computing the average growth rate.

For β convergence analyses, this study regress the average growth rates as dependent variable in the y-axis and independent variables in the x-axis. If the coefficient of initial regional GDP per worker is negative, we can conclude that it is evidence of convergence.

For conditional β convergence analysis, this study adopts a panel data approach. To avoid the possibility of arbitrary heteroskedasticity, this study reports the result from robust standard-error estimations. When the panel model is implemented to investigate the relationship between the vector of variables and productivity growth, this study regress a two-

[8] In terms of labor data, BPS divided the population into two groups: person under 15 years old (not economically active) and persons 15 years and over (economically active). Then, BPS defines the "labor force" as persons 15 years old and over who were working or temporarily absent from work but having jobs, which both are categorized as employed, as well as those who did not have work but were looking for work. "Not in labor force" are persons 15 years old and over, but not classified in labor force, such as students, housekeepers and others. *See* http://dds.bps.go.id/eng/aboutus.php?id_subyek=19&tabel=1&fl=2

year average data. Since the data covers 1993-2007, there are fourteen overlapping periods in the panel: period 1 (1993-1994), period 2 (1994-1995), period 3 (1995-1996), period 4 (1996-1997), period 5 (1997-1998), period 6 (1998-1999), period 7 (1999-2000), period 8 (2000-2001), period 9 (2001-2002), period 10 (2002-2003), period 11 (2003-2004), period 12 (2004-2005), period 13 (2005-2006), and period 14 (2006-2007). To capture convergence focus, the logarithmic of regional GDP per worker at the beginning of each of the two-year periods are included in the regression.

3.7 VALIDITY

This study use method of convergence analysis introduced by Barro & Sala-I-Martin (1990), which found evidence of conditional convergence in which regions converge to national steady state at 2 percent annual rate. Barro (1991) and Barro and Sala-i-Martin (1991, 1992) are also did empirical works that test for convergence. Convergence analysis also underlies *Economic Growth* written by Barro and Sala-I-Martin (1995, 2004). In the Indonesian case, many scholars such as Garcia & Soelistianingsih (1998), Haryanto (2001), Prasasti (2006), Resosudarmo & Vidyattama (2006) use the convergence framework as suggested by Barro and Sala-i-Martin to analyze convergence among regions of Indonesia.

In respect of conditional convergence, this study used the Solow growth model which is also called 'the neoclassical model' (Barro & Sala-i-Martin, 2004) which has been verified by Mankiw, Romer, and Weil (1992), using provincial rate physical capital accumulation, provincial rate of human capital accumulation, and provincial rate of population growth as the independent variables, as well as the vector of variables of interest which has been included by Resosudarmo & Vidyattama (2006).

3.8 RELIABILITY

Barro and Sala-i-Martin studies are the most cited on many economic convergence studies (Lall & Yilmaz, 2000). The convergence framework then has been applied to the Indonesian case by scholars such as Garcia & Soelistianingsih (1998), Haryanto (2001), Prasasti (2006), and Resosudarmo & Vidyattama (2006). From analysis of conditional convergence, Garcia & Soelistianingsih (1998) found that the provincial level of education has a significantly positive impact on regional growth, while the effect of the provincial level of fertility is negative. Haryanto (2001) found that income distribution aim to converge during the high national economic growth periods, poor districts grow faster than the wealthy ones, and the speed of convergence among 285 districts can be speeded up by enhancing capital accumulation in poor districts, providing its infrastructure, building up the quality of their workforce by investing more in education, ensuring transfer of technology to the local industry, and controlling the population growth rate. Meanwhile, Prasasti (2006) found that key factors that affect significantly increasing speed of convergence are initial GDP per capita, human capital characteristic, dummy resources, and dummy crisis. Resosudarmo & Vidyattama (2006) found that there is conditional convergence in regional income per capita growth and provincial income per capita growth determine by trade openness, saving of physical capital, and the contribution of the gas and oil sectors.

From such studies, we can conclude that most of the Indonesian case studies in line with the Solow growth model. In addition, since this study will use the data built from publications of the Indonesian Central Statistical Agency (BPS) and the Indonesian central bank (Bank Indonesia) which the same as previous studies, this study may found alike results.

3.9 CONCLUSION

To sum up, this study seeks evidence of productivity convergence. In addition, this study also seeks to identify the role of the decentralization policy in regional income convergence in Indonesia. By using sigma (σ) convergence approach which computes the standard deviation of regional GDP per worker logarithm for each year, I will be able to establish whether variations in per worker output across Indonesia's regions diminish over time or not, therefore whether convergence or divergence occurred. By using beta (β) convergence, I will be able to establish whether poorer provinces have higher growth rates than wealthy provinces (and thus are playing 'catch-up') and hence all regions converge to the same steady state equilibrium in absolute sense and conditional sense.

CHAPTER 4

FINDINGS AND ANALYSIS

4.1 INTRODUCTION

This chapter will present the results of data that processed by research methods in Chapter 3, account for sigma (σ) convergence and beta (β) convergence and the analyses of the results.

4.2 RESULTS AND ANALYSIS

4.2.1 Sigma (σ) convergence

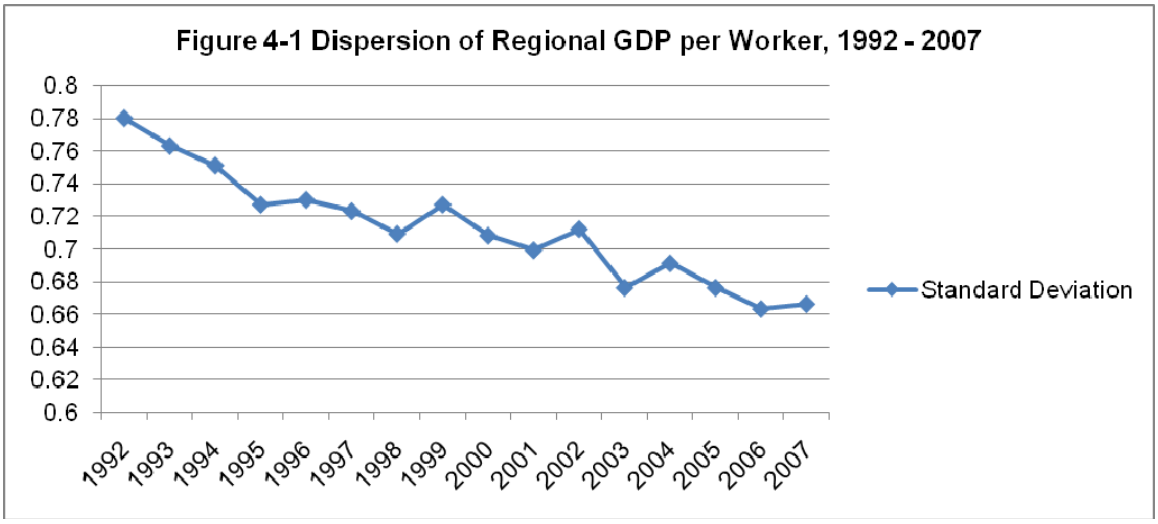
Table 4-1 and figure 4-1 depict the standard deviation of the Regional GDP per Worker logarithm for twenty-six provinces in Indonesia. The analyses of the result will divide the data 1992 to 2007 into two parts: 1992-2000 indicating pre-decentralization periods, 2000-2007 indicating post-decentralization periods. As shown in the figure, the dispersion of income per worker decline from 0.780 in 1992 to 0.708 in 2000, then 0.666 in 2007. According to Barro and Sala-i-Martin (2004), convergence occurs if the dispersion of real per capita/ per worker income across a group of economies or individuals tends to fall over time. Therefore, by σ convergence analysis we can conclude that convergence occurs across provinces in Indonesia before and after decentralization.

Three previous studies strengthen the result of this study. Using a regional inequality index which was built by Williamson (1995), Prasasti (2006) found similar results: the index tends to declined from 1.5247 in 1993 to 0.8974 in 2003 which decreasing index indicates reducing disparity and inequality. Using income per capita logarithm for the 285 districts from 1983 to 1998, Haryanto (2001) found the dispersion of income per capita logarithm decline from 0.266 in 1983 to 0.242 in 1993, although then rocket to 0.297 in 1998. Using

Indonesian provincial GDP from 1975 to 1993, Garcia and Sulistianingsih (1998) also shows that the dispersion of GDP per capita across provinces decreased from 0.39 in 1975 to 0.28 in 1993.

Table 4-1 Standard Deviation of the log of Regional GDP per Worker

ln Regional GDP per Worker	Mean	Standard Deviation	Max	Min
1992	2.385	0.780	4.278	1.171
1993	2.426	0.763	4.250	1.209
1994	2.461	0.751	4.315	1.289
1995	2.555	0.727	4.311	1.397
1996	2.555	0.730	4.305	1.420
1997	2.572	0.723	4.341	1.454
1998	2.501	0.709	4.255	1.448
1999	2.502	0.727	4.335	1.497
2000	2.565	0.708	4.382	1.439
2001	2.571	0.699	4.418	1.488
2002	2.604	0.712	4.461	1.538
2003	2.651	0.676	4.385	1.567
2004	2.664	0.691	4.471	1.584
2005	2.700	0.676	4.430	1.577
2006	2.731	0.663	4.434	1.659
2007	2.749	0.666	4.495	1.691



Although the dispersion of income per worker across provinces tends to fall over time, we can see in the figure 4-1 that the fall of dispersion in pre-decentralization initiative

(1992-2000) is faster than post-decentralization initiative (2000-2007). This fact is provable by take a look at the slope of the pre-decentralization initiative (1992-2000) and post-decentralization initiative (2000-2007) in figure 4-2 and figure 4-3. The slop of the pre-decentralization periods (0.008) is greater than post-decentralization periods (0.007).

Figure 4-2 Scatter Plot Standard Deviation 1992-2000 and Log Regional GDP 1992-2000

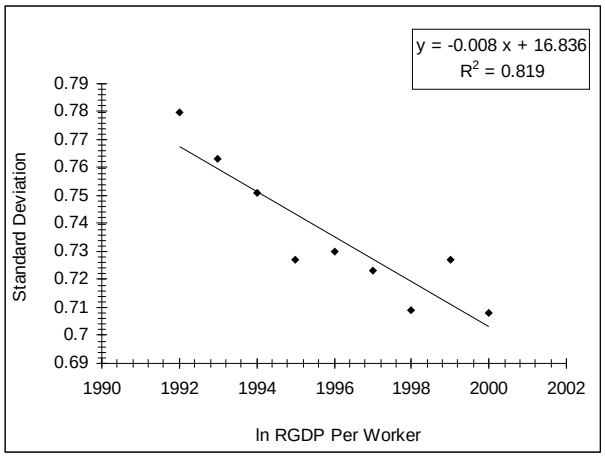
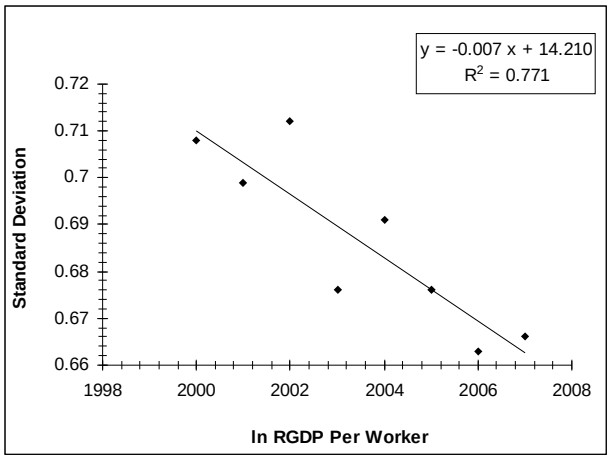


Figure 4-3 Scatter Plot Standard Deviation 2000-2007 and Log Regional GDP 2000-2007



This empirical data suggest that, although in long run per worker income across provinces tends to fall over time, the decentralization policies do not appear to be the factor that promotes faster income convergence. It is understandable since in the decentralization era, regions rich in natural resources get more portion of the natural resources gain than those regions that are poor in natural resources[9].

[9] Decentralization in Indonesia consists of 3 sectors: political decentralization, administrative decentralization, and fiscal decentralization. Political decentralization applies on direct election for Governor/Mayor. Administrative decentralization applies on some licensing policy that decentralized from central government to regions. Fiscal decentralization consists of 3 budget distributions: General Allocation Budget, Special Allocation Budget, and Tax and Natural Resources Share Budget. General Allocation Budget is budget allocation from central government to regions to reduce inequality among regions. Special Allocation Budget is budget allocation from central government to implement central government program in regions. Meanwhile, Tax and Natural Resource Share Budget is budget allocation from central government to particular regions according to particular regions potency in natural resources and tax. In fact, Tax and Natural Resources Share Budget have much bigger amount than General Allocation Budget and Special Allocation Budget. Meanwhile, before decentralization, all provinces' revenue was taken by central government, and then it would distribute proportionally regardless of regions potency.

4.2.2 Beta (β) convergence

As mentioned in the Solow growth model, convergence should occur between regions if they have same steady state level of capital, as determined by their saving rates, population growth rates, and the efficiency of labor. Thus, if all regions were initially identical except for their levels of capital, then the model predicts that convergence would occur in an *absolute* sense. This means the poorer economy with the smaller capital stock will naturally grow more quickly to reach the steady state, while the richer economy with the larger capital stock will naturally grow more slowly to reach the steady state. If, however, regions had different steady states, then convergence applies only in a *conditional* sense.

4.2.2.1 Absolute β Convergence

In computing absolute β convergence, this study assumes that provinces have same steady state level of capital. This study computes absolute β convergence for the periods of 1992-2000, 2000-2007, and 1992-2007 representing pre-decentralization, post-decentralization, and long term growth (including pre and post-decentralization) successively. Regional GDP per Worker in 1992, 2000 and 1992 refer to the initial income level for the regression for 1992-2000, 2000-2007, and 1992-2007 respectively. By equation (2) in Chapter 3, we get average annual growth for 1992-2000, 2000-2007, and 1992-2007 as shown in table 4-2.

To calculate the relationship between the initial regional GDP per worker in 1992 or 2000 and subsequent average annual growth for 1992-2000, 2000-2007, or 1992-2007, we provide charts as depicted in figure 4-2, figure 4-3, and figure 4-4. Note that, as I detailed in Chapter 3, regional GDP per worker is my measure of workers' productivity.

Table 4-2 Provincial GDP per Worker (2000 constant price)

Provinces	Regional GDP per Worker 1992 (million Rp)	Regional GDP per Worker 2000 (million Rp)	Regional GDP per Worker 2007 (million Rp)	Average Annual Growth 1992-2000	Average Annual Growth 2000-2007	Average Annual Growth 1992-2007
DI Aceh	28.60	22.42	22.94	-3.0%	0.3%	-1.5%
Sumatera Utara	11.16	14.18	19.63	3.0%	4.6%	3.8%
Sumatera Barat	10.03	13.08	17.42	3.3%	4.1%	3.7%
Riau	59.70	50.33	49.48	-2.1%	-0.2%	-1.3%
Jambi	7.66	9.52	12.45	2.7%	3.8%	3.2%
Sumatra Selatan	12.14	13.81	18.32	1.6%	4.0%	2.7%
Bengkulu	6.26	7.09	9.14	1.2%	3.6%	2.5%
Lampung	5.89	7.68	9.96	3.3%	3.7%	3.5%
DKI Jakarta	63.34	66.51	86.64	0.6%	3.8%	2.1%
Jawa Barat	12.50	14.14	17.62	1.5%	3.1%	2.3%
Jawa Tengah	6.59	7.50	9.76	1.6%	3.8%	2.6%
DI Jogyakarta	6.62	8.03	10.31	2.4%	3.6%	3.0%
Jawa Timur	10.59	12.00	15.35	1.6%	3.5%	2.5%
Bali	7.76	9.63	11.85	2.7%	3.0%	2.8%
NTB	4.20	6.99	8.39	6.4%	2.6%	4.6%
NTT	3.22	4.22	5.43	3.4%	3.6%	3.5%
Kalimantan Barat	8.33	10.84	13.10	3.3%	2.7%	3.0%
Kalimantan Tengah	12.48	13.59	16.31	1.1%	2.6%	1.8%
Kalimantan Selatan	9.15	11.91	16.21	3.3%	4.4%	3.8%
Kalimantan Timur	72.07	80.03	89.59	1.3%	1.6%	1.5%
Sulawesi Utara	8.22	11.20	13.17	3.9%	2.3%	3.1%
Sulawesi Tengah	8.05	8.82	12.62	1.1%	5.1%	3.0%
Sulawesi Selatan	8.39	10.38	13.27	2.7%	3.5%	3.1%
Sulawesi Tenggara	7.35	7.41	10.43	0.1%	4.9%	2.3%
Maluku	7.17	n.a	7.15	-4.6%*	2.6%**	0.0%
Irian	16.78	22.84	20.77	3.9%	-1.4%	1.4%
Mean	15.93	17.77	20.67	1.8%	3.1%	2.4%
Standard Deviation	18.80	19.03	21.50	2.3%	1.5%	1.4%
Coefficient of Variation	1.179951	1.071247	1.040293	1.284647	0.500861	0.596624
Minimum	3.22	4.22	5.43	-4.6%	-1.4%	-1.5%
Maximum	72.07	80.03	89.59	6.4%	5.1%	4.6%
Range	68.84	75.82	84.17	10.9%	6.5%	6.1%

* Average annual growth 1992-1999

** Average annual growth 2001-2007

Figure 4-4 Scatter Plot Average Annual Growth 1992-2000 and Provincial GDP per Worker 1992

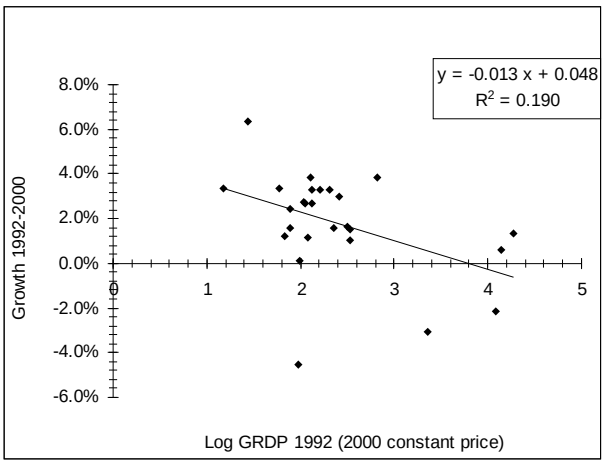


Figure 4-5 Scatter Plot Average Annual Growth 2000-2007 and Provincial GDP per Worker 2000

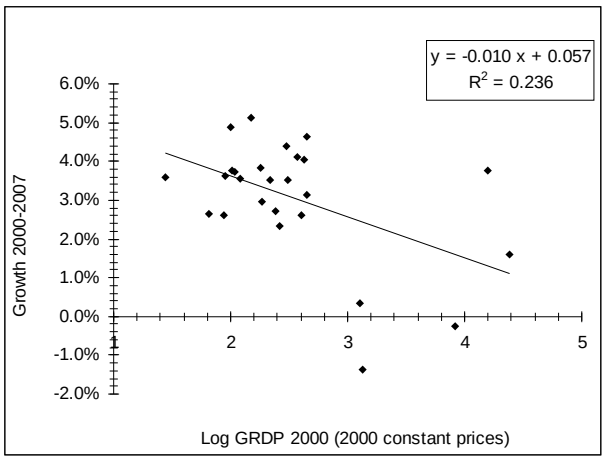
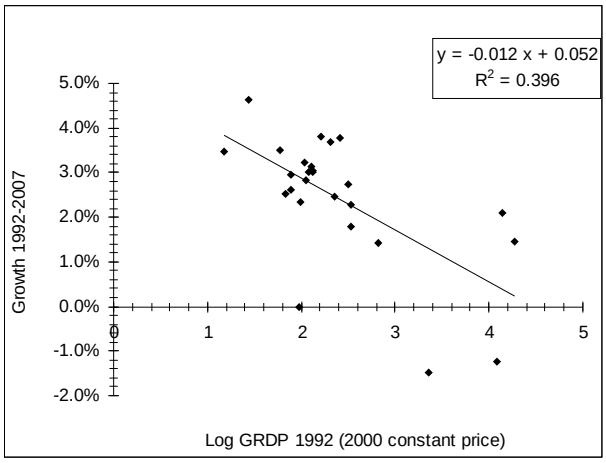


Figure 4-6 Scatter Plot Average Annual Growth 1992-2007 and Provincial GDP per Worker 1992



As shown in figure 4-4, figure 4-5, and figure 4-6, either GDP per Worker 1992-2000, GDP per Worker 2000-2007 or GDP per Worker 1992-2007 are a downward sloping thus linking the initial income and growth which point out that the absolute convergence take place across twenty-six provinces in Indonesia. According to Haryanto (2001) and Resosudarmo and Vidyattama (2006), the negative correlation between initial income and growth indicates that poor provinces grow faster than the wealthy provinces so that provinces with lower GDP per worker seems catch up the provinces with the higher GDP per worker.

The regression result is shown in Table 4-3. As presented in the tables, the estimated parameters for period 1992-2000, 2000-2007 and 1992-2007 shows negative correlation which are -0.0127, -0.0105, –0.0117 respectively indicating absolute/ unconditional β convergence occurred in which poor provinces have higher growth rates than the wealthy provinces so that catch up the wealthy provinces. However, this study noted that the relationship between the initial income per worker and the growth of income per worker was moderate, which is presented by the coefficient correlations -0.436 for periods 1992-2000, -0.485 for periods 2000-2007, and -0.629 for periods 1992-2007. In addition, the values of t-statistic (-2.371, -2.720, -3.968) are higher than the critical value 5% significance level (-1.711) which are statistically significant.

Table 4-3 Unconditional Convergence Result

Variable	Periods		
	1992-2000	2000-2007	1992-2007
Constant	0.0482 (3.578)	0.0571 (5.642)	0.0521 (7.071)
ln Y_{1992}	-0.0127 (-2.371)	-	-
ln Y_{2000}	-	-0.0105 (-2.720)	-
ln Y_{1992}	-	-	-0.0117 (-3.968)
r^2	0.190	0.236	0.396
r	-0.436	-0.485	-0.629
Std. Error	0.021	0.014	0.011

*Number in parentheses is t-statistic
*Dependent Variable: Average Annual Growth

This study notes that among the periods, only period 1992-2000 (period of pre-decentralization) exhibit highest estimated parameters which means the initial GDP of the provinces gives more impact to the growth. This absolute/ unconditional convergence result strengthens a σ convergence result that the fall of dispersion in pre-decentralization initiative (1992-2000) is more significant than post-decentralization initiative (2000-2007).

4.2.2.2 Conditional Convergence

For conditional convergence, this study utilizes time series data from 1993 up to 2007 using panel data analysis. Characteristic of the variables are presented in table 4-4.

Table 4-4
Characteristics of the Variables

Variables	Mean	Standard Deviation	Maximum	Minimum
prodgrowth $Y_{i,t}$	0.023	0.072	0.340	-0.328
ln y_{i0} (lninitprod)	2.574	0.704	4.471	1.209
$ln\ s_{kit}$ (lsk)	-1.561	0.451	-0.714	-3.926
$ln\ s_{hit}$ (lsh)	-2.208	0.460	-1.231	-2.981
$ln\ n_{it}$ (lpopgrowth)	0.037	0.087	0.550	-0.065
poilgas	0.065	0.143	0.641	0.000
opentrade	0.746	0.330	2.193	0.134
gfdiar	0.074	0.145	1.366	0.000
gini	29.811	3.375	42.000	23.197
gfin	0.614	0.628	5.100	0.130
sgk	0.027	0.029	0.330	0.000
sgp	0.010	0.007	0.047	0.001

Panel data analysis in which productivity growth is the dependent variable is presented in Table 4-5.

Table 4-5 Panel Data Analysis Result

```
Fixed-effects (within) regression               Number of obs      =       364
Group variable:  cprov                          Number of groups   =        26

R-sq:  within  =  0.4427                        Obs per group: min =        14
       between =  0.1904                                       avg =      14.0
       overall =  0.0362                                       max =        14

                                                F(24,314)          =     10.45
corr(u_i, Xb)  =  -0.9853                       Prob > F           =    0.0000

                                  (Std. Err. adjusted for clustering on cprov)
```

prodgrowth	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lninitprod	-.4553322	.0736138	-6.19	0.000	-.6001709	-.3104935
lsk	-.0047073	.0217437	-0.22	0.829	-.0474892	.0380745
lsh	-.0229193	.0377149	-0.61	0.544	-.0971251	.0512866
lpopgrowth	-.0918369	.0736642	-1.25	0.213	-.2367747	.0531008
gfdiar	.0573479	.0389437	1.47	0.142	-.0192758	.1339715
gini	.0020569	.0020852	0.99	0.325	-.0020458	.0061595
opentrade	.0418153	.0226479	1.85	0.066	-.0027455	.0863761
poilgas	.3433743	.1142117	3.01	0.003	.1186573	.5680913
gfin	-.0298309	.0132018	-2.26	0.025	-.0558061	-.0038557
sgk	-.1809508	.1884599	-0.96	0.338	-.5517547	.1898531
sgp	-2.392225	1.140176	-2.10	0.037	-4.635576	-.1488742
y02	.072651	.0143136	5.08	0.000	.0444883	.1008137
y03	.0204975	.017202	1.19	0.234	-.0133483	.0543432
y04	.0375276	.01759	2.13	0.034	.0029184	.0721368
y05	-.0584464	.0281819	-2.07	0.039	-.1138957	-.0029971
y06	-.0335202	.0411213	-0.82	0.416	-.1144282	.0473879
y07	.0024205	.0383606	0.06	0.950	-.0730558	.0778968
y08	.0121657	.0408932	0.30	0.766	-.0682937	.0926251
y09	.0390751	.0473917	0.82	0.410	-.0541702	.1323205
y10	.0805134	.045426	1.77	0.077	-.0088643	.1698912
y11	.0674347	.0482193	1.40	0.163	-.0274391	.1623085
y12	.087969	.0435274	2.02	0.044	.0023267	.1736113
y13	.1105953	.043326	2.55	0.011	.0253494	.1958412
y14	.1273286	.0444071	2.87	0.004	.0399554	.2147018
_cons	1.027202	.2004841	5.12	0.000	.6327404	1.421664
sigma_u	.28200971					
sigma_e	.05709173					
rho	.96062922	(fraction of variance due to u_i)				

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Table 4-5 shows the evidence that initial regional GDP per Worker exhibit negative sign indicating that the conditional convergence occurs across twenty-six provinces in Indonesia, even after control for a number of variables as suggested in Solow model and the vector of variables of interest. This evidence clarify that convergence also occurred in Indonesia in conditional sense. Except initial regional GDP per worker, all the coefficient of the vector of variables is statistically not significant. Therefore, we may say that a number of variables do not much vary across provinces within a country.

From the panel data results, this study noted that regression result of the vector of variables that are suggested in the Solow model such as provincial rate physical capital accumulation (*lsk*), provincial rate of human capital accumulation (*lsh*), and provincial rate of population growth (*lpopgrowth*) shows a negative sign indicating a negative correlation between those variables and income growth. The negative correlation of provincial rate physical capital accumulation and provincial rate of human capital accumulation do not fit in the Solow model which suggests a positive correlation. In the case of provincial rate physical capital accumulation, probably this occurred because provincial gross fixed capital formation as a proxy physical capital accumulation in the province failed to push the economy toward its new steady state as the model suggestion.

Similar scenario might be happened in the provincial rate of financial development (*gfin*) and provincial and district government investments (*sgp* and *sgk*) which show a negative sign indicating a negative correlation between those variables and income growth. In this case, saving rates do not raises investment and therefore capital stock failed to push the economy toward its new steady state. This may happen because people use credits from the bank were used for purchasing foodstuffs and other consumption expenditures. Another scenario that may be happened is the financial development at the same time depends upon the growth causing what is called endogeneity in econometrics. It occurred if for instance the central bank which apply a policy in which poor regions (low growth regions) will have more opportunity to get credit rather than rich regions (high growth regions) so that the correlation between financial development and growth are negative.

In respect of the vector of variables of interest such as foreign direct investment (*fdiar*), inequality (*gini*), trade openness (*opentrade*), and role of oil and gas (*poilgas*), all of them show a positive sign indicating a positive correlation between those variables and income growth. As Resosudarmo and Vidyattama (2006) said, these facts are likely occurred

since foreign direct investment brings a new technology inflow and human capital improvement. In addition, province may capture the gain from international trade by openness and create huge revenues that could encourage growth by oil and gas. The result of inequality which shows a positive impact to the productivity growth is similar with Forbes (2000), although most of the study which adding inequality as an independent variable to some variant of Robert J. Barro's cross-country growth regression found that income inequality has a negative impact on growth (Alesina & Perotti, 1994; Alesina & Rodrik, 1994; Persson & Tabellini, 1994; Birdsall et al., 1995; Clarke; 1995, Deininger & Squire, 1998 on Forbes, 2000). Similar with this study, Forbes (2000) uses panel data technique which makes it possible to control for time-invariant region-specific effects, therefore eliminating a potential source of omitted-variable bias.

To get broader analysis in this conditional convergence analysis, this study also run panel data technique for period 1993 to 2000 and 2000 to 2007 which represent pre-decentralization and post decentralization respectively. The results are shown in table 4-6 and table 4-7. It has been noted that the results are bit different with longer term period of 1993-2007. The comparison of the association between vector variables against average productivity growth results among the three periods are shown in the table 4-8.

From the table 4-8, we can see that either pre or post exhibit or in the long term exhibit convergence by the negative sign of provincial initial income per worker. The result for pre and post decentralization periods in respect of provincial rate of financial development**,** foreign direct investment, trade openness, and role of oil and gas are consistent with long term growth result. It has been noted that the role of oil and gas are statistically significant in the post decentralization period.

Table 4-6 Panel Data Analysis Result Pre-Decentralization Period

```
Fixed-effects (within) regression               Number of obs      =       182
Group variable:  cprov                          Number of groups   =        26

R-sq:  within  =  0.5973                        Obs per group: min =         7
       between =  0.1499                                       avg =       7.0
       overall =  0.0564                                       max =         7

                                                F(17,139)          =     18.46
corr(u_i, Xb)  =  -0.9813                       Prob > F           =    0.0000

                                    (Std. Err. adjusted for clustering on cprov)
```

prodgrowth	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
lninitprod	-.449386	.0966523	-4.65	0.000	-.6404848	-.2582871
lsk	.0088875	.0480705	0.18	0.854	-.0861564	.1039314
lsh	-.1176958	.0645731	-1.82	0.071	-.2453682	.0099766
lpopgrowth	-.8912791	.4695609	-1.90	0.060	-1.819684	.0371263
gfdiar	.0581406	.0730831	0.80	0.428	-.0863577	.202639
gini	-.0040643	.0027161	-1.50	0.137	-.0094345	.0013059
opentrade	.0221961	.0579011	0.38	0.702	-.0922846	.1366768
poilgas	.2389743	.3795198	0.63	0.530	-.5114037	.9893523
gfin	-.0571757	.0252288	-2.27	0.025	-.1070575	-.007294
sgk	-2.89267	2.285957	-1.27	0.208	-7.412413	1.627074
sgp	-.4530191	2.772676	-0.16	0.870	-5.935092	5.029053
y02	.0684355	.0146182	4.68	0.000	.0395327	.0973383
y03	.0177993	.018262	0.97	0.331	-.018308	.0539065
y04	.0348916	.0193318	1.80	0.073	-.0033308	.073114
y05	-.1125776	.0429241	-2.62	0.010	-.197446	-.0277091
y06	-.1336194	.0643752	-2.08	0.040	-.2609005	-.0063382
y07	-.1109629	.0600222	-1.85	0.067	-.2296375	.0077117
_cons	1.14802	.3029516	3.79	0.000	.5490311	1.747009
sigma_u	.30676021					
sigma_e	.05366761					
rho	.97030159	(fraction of variance due to u_i)				

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Interesting results are shown in respect of provincial rate physical capital accumulation and provincial rate of human capital accumulation variables between pre and post decentralization periods. Provincial rate physical capital accumulation in the pre-decentralization period shows positive sign, conversely negative sign in the post as well as in the long term period. Probably, before decentralization applied in the country, provincial gross fixed capital formation as a proxy physical capital accumulation in the province able to push the economy. If the aim of decentralization is increasing the efficiency (Oates, 1972; Bahl & Linn, 1992; Guess, Loehr, & Martinez-Vazques, 1997; Spahn, 1997 Burki, Perry, and Dilinger, 1999; shah, 1999 on Martinez-Vazques & McNab, 2001), unfortunately provincial gross fixed capital formation in Indonesia after decentralization is less efficient than central

government did before decentralization. Thus, provincial gross fixed capital formations which contribute positively to the growth are other way round after decentralization.

Table 4-7 Panel Data Analysis Result Post-Decentralization Period

```
Fixed-effects (within) regression               Number of obs      =       182
Group variable:  cprov                          Number of groups   =        26

R-sq:  within  =  0.6478                        Obs per group: min =         7
       between =  0.0893                                       avg =       7.0
       overall =  0.0153                                       max =         7

                                                F(17,139)          =     10.37
corr(u_i, Xb)  =  -0.9974                       Prob > F           =    0.0000

                                  (Std. Err. adjusted for clustering on cprov)
------------------------------------------------------------------------------
             |               Robust
  prodgrowth |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  lninitprod |   -1.19925   .1508732    -7.95   0.000    -1.497554   -.9009473
         lsk |  -.0009503   .0337861    -0.03   0.978    -.0677514    .0658508
         lsh |   .1163112   .0474933     2.45   0.016     .0224085    .2102139
  lpopgrowth |   .2819678   .1241582     2.27   0.025     .0364851    .5274505
      gfdiar |   .1231257   .0522317     2.36   0.020     .0198543    .2263971
        gini |   .0054336   .0024147     2.25   0.026     .0006593    .0102078
   opentrade |   .0804718   .0291082     2.76   0.006     .0229196    .1380239
     poilgas |   .6021924   .1505561     4.00   0.000     .3045163    .8998686
        gfin |  -.0336976   .0454053    -0.74   0.459    -.1234718    .0560767
         sgk |  -.2335809   .1821494    -1.28   0.202    -.5937225    .1265608
         sgp |  -.4219019   1.750573    -0.24   0.810    -3.883095    3.039292
         y02 |   .0349642    .019985     1.75   0.082    -.0045496    .0744781
         y03 |   .1139543   .0181253     6.29   0.000     .0781174    .1497911
         y04 |    .151774   .0315559     4.81   0.000     .0893824    .2141656
         y05 |   .1657778   .0320284     5.18   0.000     .1024519    .2291036
         y06 |   .2000834   .0380544     5.26   0.000     .1248432    .2753237
         y07 |   .2346389   .0453236     5.18   0.000     .1450261    .3242518
       _cons |   3.104305   .4341671     7.15   0.000      2.24588    3.962731
-------------+----------------------------------------------------------------
     sigma_u |   .7612478
     sigma_e |   .04430814
         rho |   .99662366   (fraction of variance due to u_i)
------------------------------------------------------------------------------
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The positive impact of the decentralization could be seeing in term of provincial rate of human capital accumulation. While long term and pre-decentralization periods show a negative association to the economic growth, the post-decentralization shows a positive. It may occur, since after the amendment of constitution in 2001, provincial governments have obligation to allocate at least twenty percent of the annual budget[10] and not take a charge for basic and secondary education. By this policy, people in basic and secondary age have an opportunity to go to school freely and therefore the proportion of provincial working-age

[10] See Article 31 of 1945 Indonesian Constitution Amendment

population (persons 15 years and over) that is in secondary school to total working-age population in the province bigger than pre-decentralization period. Thus, the educated people support the economic growth since they are more efficient as worker.

Table 4-8 Association of the Vector Variables and Economic Growth

Variable	Pre and Post Decentralization	Pre Decentralization	Post Decentralization
Provincial initial income per worker	Negative	Negative	Negative
Provincial rate physical capital accumulation	Negative	Positive	Negative
Provincial rate of human capital accumulation	Negative	Negative	Positive
Provincial rate of population growth	Negative	Negative	Positive
Provincial rate of financial development	Negative	Negative	Negative
Foreign direct investment	Positive	Positive	Positive
Inequality	Positive	Negative	Positive
Trade openness	Positive	Positive	Positive
Role of oil and gas	Positive	Positive	Positively significant

4.3 SUMMARY

To sum up, this study provides a clear answer to the research questions. In respect of the question whether the provinces in Indonesia have exhibited income convergence or divergence, this study shows that by using sigma (σ) convergence approach which computes the standard deviation of logarithm of regional GDP per worker for each year, variations in per worker output across Indonesia's regions diminish over time indicating convergence occurs across provinces in Indonesia. Additionally, by using beta (β) convergence in regression analysis, both absolute and conditional β convergence found a negative correlation between initial income and growth indicating that convergence takes place across twenty-six provinces in Indonesia.

The absolute and conditional β convergence results which show a negatively significant sign of regression equations estimated parameters answer the questions whether or not poorer provinces have higher growth rates than wealthy provinces (thus enabling 'catch-up'). This evidence clarify that poor provinces have higher growth than the wealthy provinces so that catch up the wealthy provinces.

In term of the absolute β convergence, the result shows that convergence occurred in an *absolute* sense whereas all provinces converge to the same steady state equilibrium, without adjusting other factors. In term of the conditional β convergence, by controlling some variables which determine the growth, this study also gives evidence that convergence also occurred in Indonesia in *conditional* sense. Except initial regional GDP per worker, all the coefficient of the vector of variables is statistically not significant indicating that a number of variables do not much vary across provinces within a country. Indeed, using panel data technique to estimate the Indonesian provincial growth of the income per worker for the 1993 - 2007 periods, conditional β convergence analysis shows that foreign direct investment, inequality, trade openness, and role of oil and gas have positive impact to provincial productivity growth.

In respect of the role of the decentralization policy in regional income convergence in Indonesia, this study concludes that the decentralization policies do not appear to be the factor that promotes faster income convergence. The evidence is shown by σ convergence analysis which clarify that convergence occurred faster in pre-decentralization than post-decentralization as shown by the slope of the fall of dispersion of pre-decentralization era is greater than post-decentralization era. The absolute β convergence analysis also clarify that among period of 1992-2000 (pre-decentralization), 2000-2007 (post-decentralization), and 1992-2007 (long run, pre- and post-decentralization), only period of pre-decentralization exhibit highest estimated parameters.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter will present an analysis of the results as they relate to the overall research questions, and provide supporting evidence for the main arguments. Recommendations for policymakers will be presented at the end of the chapter.

5.2 THESIS STATEMENT

This study proved that in long term growth in either pre-decentralization or post-decentralization in Indonesia, income convergence is exhibited in *absolute* and *conditional* sense. However, using sigma (σ) convergence approach, this study found that the fall of dispersion in pre-decentralization initiative (1992-2000) is greater than post-decentralization initiative (2000-2007) indicating that convergence occurred faster in pre-decentralization than post-decentralization. Additionally, the absolute β convergence result found that only the period 1992-2000 (period of pre-decentralization) exhibited higher estimated parameters.

Notwithstanding the political background, this empirical data confirm that decentralization is not a factor for achieving faster income convergence. Instead, the decentralization makes income disparity and inequality more severe. It occurs because in the decentralization era, regions rich in natural resources get a greater portion of the natural resources gain than those regions without natural resources. In other word, decentralization

creates wider disparity in which rich regions become richer, conversely poor regions become poorer.

5.3 RECOMMENDATIONS

From that empirical data, this study suggests that besides accommodating political issues; the central government also has to think about economic issues when proposing a policy. The policy must be fairly applied since every people in the country has same obligation, so that they must gain the same right as well. If the political background of decentralization was made up of jealousy of regions to Jakarta's overwhelming capital, policymakers may have also drawn up a similar problem for the next decades since decentralization likely gives a benefit only for those provinces rich in natural resources. At least, the problem that may appear in the short term is the migration of people from poor provinces to rich provinces.

This problem also as not simple might be though, since movement of people means migration of workers. The person who migrates is typically educated and skilled, while those left behind are uneducated and unskilled. In the long term, these productive people increase the efficiency of labor so that rich provinces will grow faster, on the other hand poor provinces will more severely damaged by the outflow and the gap is more and more wide open.

The attraction to conduct regional administration themselves through decentralization policy is also cause another problem, i.e. separation of province or district. Some societies in the regions ask the central government to hand over the power to govern their self by locked out of the original province. The societies think that by self-governing, they will achieve welfare for the society faster, relative to the original provinces.

The central government accommodated the aspiration since they believe that the new regional government will provide services closer to the people. In fact, most of the aspiration is based on a passion of the regional elites to hold power in the regions, not aim to provide excellent service to the people. It seems that the separation policy is failed to reach the objective.

Government should take a comprehensive evaluation whether the policy is effective or not since those policies require many resources especially money for the cost of bureaucracy. Government could invite an expert from university or international agencies to provide a comprehensive study and disseminate the result to all the people. Public policy is not solely about politics accommodations, enlightening the people by giving the truth is more appreciated.

5.4 CONCLUSION

This study already gives broader perspective about the decentralization policy in Indonesia, especially in term of economic issues. The study utilized quantitative research since it reliant on econometric methods. The data for each province obtained from Indonesian Central Statistical Agency (BPS) and the Indonesian central bank (Bank Indonesia) for 1992 to 2007. The longitudinal study was utilized to investigate some variables that were repeatedly measured over time to track changes in behavior over time and monitor long-term effects.

This study finds that variations in worker productivity across 26 Indonesian provinces have diminished over time indicating evidence of convergence. The estimated parameters on initial worker productivity of regression analyses in the absolute β

convergence analysis also reveals negative sign indicating convergence occurred in absolute sense.

This study also applies panel techniques to estimate the impact of covariates on provincial growth of worker productivity during the 1993-2007 periods. The result shows that, first, beta convergence also occurred in Indonesia in conditional sense. Second, foreign direct investment, within-region inequality, trade openness, and oil and gas activities have had positive impact on provincial productivity growth. In addition, this study concludes that the decentralization policies do not appear to be the factor that promotes faster provincial productivity growth convergence.

It is expected that this study will have an impact on policy formation and implementations which alter policy makers' perspectives to provide smart policies for the people in the country.

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