

**Decentralization and Public Service Delivery in
Indonesia:
The case of Road Infrastructure**

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Submitted to
Central European University
Department of Political Science

In partial fulfillment of the requirements for the degree of Master of Arts

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Budapest, Hungary
2013

Abstract

This thesis focuses on the recent decentralization in Indonesia and its effect on road infrastructure provision. Theoretically, the decentralization of decision-making power to the local governments would improve the matching of public infrastructure depend on the local preferences. To analyze the impact of decentralization of public service delivery after the implementation of Law No. 22/1999, I employed descriptive statistics to see the improvement of local road infrastructure and OLS regression to examine the relationship between the local government quality and the change of the local road infrastructure stocks after decentralization. Using data from PODES 2000 and 2008, this thesis finds that (1) decentralization has improved the availability of local road infrastructures (2) there is a positive relationship between the improvement of the local roads infrastructure stocks and the mayors/regents' quality. The outcome of this thesis will be valuable to the Indonesian government to improve the road infrastructure provision in the decentralized system.

Keywords: decentralization, infrastructures, Indonesia, public service delivery, local government, and good governance

Acknowledgements

I would like to thank my thesis supervisor, Professor Achim Kemmerling, Department of Public Policy, for his guidance, feedback, and support. I would also like to thank Assistant Professor Levente Littvay, Department of Political Science, for his valuable information and help on statistic methods. I am also deeply thankful to my academic writing instructor, Zsuzsanna Toth, Centre for Academic Writing, for immense help to make this thesis meets academic standards.

Furthermore, I would like to thank to Marko Kukec, Mike Tsai, Amanda Smith, Jennifer Ross, Erin Kay Vandenberg, Charmila Ajmera, and Justin Bagan for constructive comments on earlier drafts.

Lastly, I would like to thank my parents for their continuous and unconditional support.

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List of Abbreviations

- BPS** – Badan Pusat Statistik / Statistics Centre Bureau
BAPPENAS – Badan Perencanaan dan Pembangunan Nasional/ National Development Planning Board
DAK – Dana Alokasi Khusus / Special Allocation Fund
DAU – Dana Alokasi Umum / General Allocation Fund
DPRD – Dewan Perwakilan Rakyat Daerah / Local House of Representative (Regional Council)
GRDP – Gross Regional Domestic Product
KPPOD – Komite Pemantau Pelaksanaan Otonomy Daerah/ Committee Monitoring the Implementation of Regional Autonomy
LEG – Local Economic Governance
PODES – Potensi Desa / Village Potential Statistics
OLS – Ordinary Least Square

Introduction

Recently, many governments in developing countries have reformed their system of government from centralized to decentralized because the benefits of decentralization looked promising. Decentralized systems are believed to ensure efficiency and quality of public service delivery by devolving resources and decision-making powers to the local governments (Robinson, 2003, p. 8). The efficiency argument maintains that decentralization will maximize the productivity of the public sector (such as infrastructure, education, and health) by allowing local governments to have better decision-making control on the allocation. Decentralization will ensure the provision of public services that meet the needs of constituents in given jurisdictions (Furtado, 2001, p. 4) since the local governments have a better knowledge of local priorities than the central government (Bardhan, 2002; Faguet, 2011; Oates, 2008). Additionally, it is also believed that local governments can be more accountable in resource allocation (Robinson, 2003) because they are elected by the jurisdiction constituents (D. A. Rondinelli, Nellis, & Cheema, 1983).

However, there are many critics of decentralization on public services delivery. Burki et al. (1998, pp. 3–4) suggest that there is no guarantee that decentralization can be better than centralization with regard to the public service delivery. They argue that there is no assurance that political autonomy of local governments will lead to improvement of public good provision. There is a probability that the local political elites and the local bureaucracy would make provision of public services ineffective due to inadequate capacities to manage the newly received tasks. The success of decentralization depends on the performance of the local governments. It is argued that without having the capacity, integrity and willingness of the local governments to provide better public service efficiently, decentralization will fail

(Furtado, 2001, p. 4). As governance is a key to the success of decentralization on public service delivery, government values will be the focus of this thesis.

The literature reviewed briefly in this thesis encompasses both theoretical and empirical approaches toward decentralization. They will be discussed in three parts: the explanation of decentralization and its debates, the explanation of the effect of decentralization on public service delivery and the explanation of the relationship between decentralization and the quality of government. For the concept of decentralization itself, Rondinelli et al (1989; 1983), Schneider (2003) and Treisman (2007) definition of decentralization and its categorizations will be used. As for the theoretical approach towards decentralization, the work of Wolman (1990) and Oates (2008) will be used to understand how decentralization might promote public service delivery. The two main factors of decentralization based on Wolman (1990), namely efficiency values and government values, are the main concepts of the theoretical background of my thesis. As for the empirical approaches, specific cases of decentralization in developing countries in the regions will be used, such as Africa (Conyers, 2007; Khaleghian, 2004; Okojie, 2009), Latin America (Ausland & Tolmos, 2005; Hiskey & Seligson, 2003), and Asia (Asthana, 2004; Green, 2005; A. Kuncoro, Adrison, & Isfandiarni, 2013; Mahal & Srivastava, 2000; Shen & Zou, 2008; Usman, 2001).

To analyze the impact of decentralization, this thesis will focus on the change in the efficiency of public service delivery after decentralization in Indonesia. Indonesia will be used as a strong case to see the effect of decentralization in developing country since the World Bank referred to its 2001 wave of decentralization in Indonesia as a *Big-Bang*, mostly because of the scale and the speed of the decentralization reform undertaken (Hofman, 2003). In 1999, the new laws introduced in Indonesia after the fall of the authoritarian regime, namely Law No. 22/1999 and Law No. 25/1999, shifted the country from one of the most

centralized system in the world to one of the most decentralized. According to Law No. 22/1999, numerous responsibilities for public service delivery were devolved to local governments, while central government kept only a limited amount of control. Municipalities and cities are obligated to provide public services in several sectors, such as education, industry, health, transportation and other services. As well, after the implementation of the Law No. 22/1999, the quality of public services in districts and cities depends on the willingness of local government apparatus to fulfill the standard of sound public service provision. Moreover, the success of decentralization of public service provision also depends on the capacity of local government to allocate the funds in order to achieve efficiency and effective public service delivery.

To limit the scope of the public services, this research will use a case study of the provision of infrastructure services in Indonesia after Law No. 22/1999 was implemented, particularly on the local road infrastructure. As Andres et al. (2008) argue investment infrastructure is one of the factors that can trigger economic growth. Moreover, the local road infrastructures connect all economic sectors across region and increase the mobility of people that will enhance the national economic development. However, the success of road infrastructures depend on the willingness of decision-makers to allocate the government budget on providing and maintaining the local road infrastructure. The problem of decentralization in Indonesia is that decentralization leads to disparity in local road quality among regions because not all local governments have the capacity to increase the efficiency of public service delivery on infrastructure in their jurisdictions. In many cases, the infrastructure investments have proven to be ineffective to the intended beneficiaries, when designed, allocated or managed poorly. Several local governments in Indonesia have failed to provide better local infrastructures after the implementation of Law No. 22/1999 (KPPOD, 2011, p. 41). Based on this background, the questions that will be put forward in this thesis

are: (1) **does decentralization lead to effective public service delivery after the implementation of Law No. 22/1999 in Indonesia?** and (2) **does the local government quality affect the change of local road infrastructure stocks in decentralized system in Indonesia?**

The purpose of the research is to develop an empirical evidence to verify the role of decentralization on public service delivery in Indonesia and the relationship between decentralization and local government quality. In this respect, the results of this research would be valuable to the Indonesian government to evaluate its decentralized system with regard to its effects on provision of local infrastructures, and particularly roads. This research also contributes alternative evidence on how decentralization impacts public service delivery in Indonesia as a developing country and how the local government quality affects decentralization. In the literature on the effect of decentralization of public service delivery in Indonesia, there has been little discussion about the governments' factors as their explanatory variable, especially on the integrity and capacity of mayor to create an effective government.

To test for the effect empirically, this thesis uses quantitative methods. To answer the first question, I used three statistical methods: descriptive statistics, contingency table and a paired sample t-test. To answer the second question, I adopted two statistical methods: correlation and ordinary least squares (OLS) or linear least squares with robust standard error and ordered probit for my estimation method. My problem in the quantitative analysis was choosing the best indicator of the improvement of the local road infrastructure after Law No. 22/1999 was implemented (response variable) and the indicator of the local government quality (explanatory variable). I solved those problems by using the change of local road infrastructure stocks between 2000 and 2008 as my response variable; and the forming capacity and integrity of Regents/Mayors in district and the performance of the government on maintaining road infrastructure as my explanatory variable. I chose topography,

geography, population, and real income of districts as my control variables. The second problem is getting the good quality data for my response variable, explanatory variable, and control variables that have the same level analysis (district level) and the periods that I needed. I solved these problems by using PODES data in 2000 and 2008 for my response variable, KPPOD 2007 for my explanatory variables and BPS data between 2000 and 2001 for my explanatory variables. The last challenge was choosing the best statistic method.

The findings of this research indicate that there is a significant difference between the local roads quality in 2000 and the local roads quality in 2008. After the implementation of Law No. 22/1999, most of the districts improved their local road infrastructure. According to OLS Regression, there is a significantly positive relationship between the forming capacity and integrity of regents or mayors and the change of local road infrastructure. Interestingly, it is followed by the negative relationship between the government performance on maintaining the road infrastructure and the change of the local roads infrastructure stocks.

This thesis consists of four chapters. The first chapter introduces the theoretical background. It is divided into three parts: (a) definition of the concepts of decentralization and the types of decentralization; (b) the relationship between decentralization and public service delivery; (c) the relationship between decentralization and the quality of local government. The first chapter starts with the definition of decentralization and its types. Then, I explain why decentralization is implemented by a state and how decentralization works. Finally, I summarize a variety of previous empirical findings on the effects of decentralization. For the second parts, I point out the definition of public services and infrastructures and I describe the process of decentralization on public service delivery and mention its problems. In the last part of first chapter, I also explain the relationship between decentralization and the quality of local government. The second chapter is devoted to describe the process of decentralization in Indonesia, includes fiscal decentralization, political decentralization and administrative

decentralization. Then, I give explanations of the condition of the infrastructure in Indonesia after Law No. 22/1999 was implemented. In the third chapter, I explain the data, the research methodology and the empirical model to answer my research questions. The last chapters, I report and discuss the findings as well as some problems that stems from those results. The thesis ends with the conclusions as well as suggestions for future researches.

Chapter 1: Theoretical Background

1.1 Defining Concepts of Decentralization

The purpose of this section is to briefly introduce the concept of decentralization. The concept of decentralization itself is very ambiguous due to different approaches on how to define decentralization and how to divide it into categories. There are many dimensions where decentralized system is defined as a status, process, or tool. Because of the multi-dimensions of decentralization, every researcher creates his-own definition of what decentralization is. To provide general information about decentralization, I will divide this section into four parts: firstly, I will describe what decentralization is. It consists of the definition of decentralization and also the types of decentralization. Then, I will explain why decentralization is implemented by a state. After that, I will address how decentralization works as a system. Finally, I will summarize a variety of previous empirical findings of decentralization.

1.1.1. What is Decentralization?

Decentralization was defined as ‘the transfer of responsibility for planning, management and resource raising and allocation from the central government and its agencies to: (a) field units of central government ministries or agencies, (b) subordinate units or levels of government, (c) semiautonomous public authorities or corporations, (d) area wide, regional or functional authorities, or (e) nongovernmental private or voluntary organization’ (D. A. Rondinelli, Nellis, & Cheema, 1983: 13). Unlike Rondinelli et al. (1983), Treisman (2000) defined decentralization as a structure. He stresses that the degree of decentralization is a character system; it is about how a government system is organized (Treisman, 2000, p. 5).

Based on Treisman (2000), the government bodies consists of legislative, executive, and judicial branches that have their own functions in government systems. Each of these bodies has a jurisdiction that can be defined in terms of population or territory. The jurisdiction of the legislative body consist of “a set of points in space within the laws that it passes have legitimate force”; the jurisdiction of executive body consist of “a set of points in which it has the right to implement and enforce laws; and the jurisdiction of judicial consist of “a set of point within which cases that originate are heard by it” (Treisman, 2000, p. 3). Every jurisdiction consists of a set of tiers. *First tier* is the state entire territory. The subset of the first tier is called *second tier*. And those that are proper subsets of only first and second tier jurisdictions are *third tier*, and so on (Treisman, 2007, p. 22). This approach is called structural decentralization that refers to the number of the tiers of government.

In this research, I use three types of decentralization based on Rondinelli et al. (1983) and Schneider (2003). They are political decentralization, administrative decentralization, and fiscal decentralization. *Political decentralization* refers to the distribution of authority, responsibility and financial resources from central government to local regional governments or other decentralized units such as semi-autonomous public corporations, regional, or functional authorities (D. A. Rondinelli et al., 1983) that are focus on the organization, articulation, participation, contestation, and aggregation of interest (Schneider, 2003, p. 39).

The second type of decentralization is *administrative decentralization*. It focuses on how modernization of bureaucracies is achieved, which have been defined as efficient, effective and rational (Schneider, 2003, p. 37). Administrative decentralization includes the means and mechanisms for fiscal cooperation in sharing public revenues among all levels of government; for fiscal delegation in public revenue raising and expenditure allocation; and for fiscal autonomy for state, regional, or local government (D. A. Rondinelli et al., 1983). There are three major forms of administrative decentralization, which are:

- a. *De-concentration*: the handing over of some amount of administrative authority or responsibility to lower levels within central government ministries and agencies (D. A. Rondinelli, Nellis, & Cheema, 1983: 14).
- b. *Delegation*: a shifting of responsibility of government for producing goods and supplying services that were previously offered by central government agencies and ministries to parastatal, public corporations, or to publicly regulated private enterprises. (D. A. Rondinelli, Nellis, & Cheema, 1983: 15).
- c. *Devolution*: shifting responsibilities from central government to local governments or administrative units by giving autonomy and impence to those local governments without direct control from central government (D. a. Rondinelli et al., 1989).

Finally, the last type of decentralization is *fiscal decentralization*. It focus on maximizing social welfare by having combination of economic stability, allocative efficiency, and distributive equity (Schneider, 2003, p. 36). Fiscal decentralization includes organization and procedures for increasing citizen participation in selecting political representatives and in making public policy; devolution of powers and authority to local government; and institutions and procedures allowing freedom of association and participation of civil society organization in public decision-making, in providing socially beneficial service, and in mobilizing social and financial resources to influence political decision making (D. a. Rondinelli et al., 1989).

1.1.2 Why Decentralization?

There are various reasons why decentralization is implemented by developing countries. Some countries changed their government system because of civil war (Uganda), or political crises (Indonesia), or a response to ethnic desire to have greater participation in the political process (Ethiopia) (Green, 2005). However, to make the reason for the use of decentralized systems clear, Smoke (2001, p. 3) point outs three reasons why developing

countries shift their power from central government to local government. *First*, the central government failed to promote adequate development. *Second*, international economic condition and structural adjustment programs have to be changed to improve public sector performance. *Third*, political climates need to be changed to encourage the local governments.

However, to view the reason for the implementation of a substantially decentralized system, it is better if we have a look at the objectives of decentralization. Based on D. A. Rondinelli et al. (1983), there are six objectives of decentralization, which are: (1) achieving broad political objectives, such as political stability; (2) promoting administrative effectiveness, such as good local governance; (3) endorsing economic and managerial efficiency by allowing the government to achieve development goals; (4) increasing government responsiveness on the needs and demands of society; (5) greater self-determination and self-reliance among sub-ordinate units of administrative or non-governments organization in promoting in their authority, and (6) accomplishing the appropriateness of the means by which policies and programs are designed and carried out to achieve the goals of decentralization (D. A. Rondinelli et al., 1983, pp. 9–13).

1.1.3 How Does Decentralization Work?

Those objectives of decentralization can be achieved if the system employs two main important factors: *efficiency values* and *governance values* (Wolman in Bennet, 1990). Efficiency values refer to the maximization of social welfare by contrasting the provision of public goods with the market for private goods. Wolman argues that:

When public goods are provided, tax and service packages should reflect as accurately as possible the aggregated preferences of community members. However, because individual preferences for public goods differ, there will be some divergence between the preferences of individual community members and the tax and service packages reflecting the aggregated community preferences. It is likely that the average divergence of individual preferences from the tax and service package adopted by the

community through its government will be less in small communities of relatively like-minded individuals than it will be in larger, more heterogeneous areas. [...Allocative] efficiency and social welfare are thus likely to be maximized under highly decentralized political structures (Wolman in Bennet, 1990: 27)

Based on public choice approach, under conditions of reasonably free will, the provision of some public goods is more economically efficient when a larger number of local institutions are involved than when a larger number of local institutions is the provider (Rondinelli, McCullough, & Johnson, 1989: 59). Also, Oates (2008) point out four basic elements on how decentralization can improved allocation of resources in public sector, which are (i) regional or local governments know better the preferences and particular circumstances of their constituencies compare to the central government; (ii) based on Tiebout model, an individual can seek out jurisdictions that provide output wells suited to their tastes, therefore, they will choose the jurisdiction that provides their preferences and needs; (iii) decentralized levels of government face competition among their neighbors, here, the local government compete to provide public service to attract individuals or business stakeholders to stay in their jurisdictions; (iv) decentralization may encourage experimentation and innovation as individual jurisdiction, thus they will know which the policy is the most suitable for their region (Oates, 2008, p. 2).

However, efficiency values will not be achieved without the implementation of good governance. Therefore, beside the efficiency values, Wolman also proposed *government values* as the main factor of decentralization. It refers to (a) responsiveness and accountability, (b) diversity, (c) and political participation. Wolman argues that:

Decentralization, by placing government closer to the people, fosters greater responsiveness of policy-makers to the will of the citizenry and, it is argued, results in a closer congruence between public preferences and public policy. This is not only because decision-makers in decentralized units are likely to be more knowledgeable about and attuned to the needs of their area than are centralized national-government decision-makers, but also because decentralization permits these decision-makers to be held directly accountable to the local citizenry through local elections (Wolman in Bennet, 1990: 27).

To implement the government values based on accountability, diversity, and political participation, Einhorn presents four effective channels of local accountability. Those channels are (a) voice mechanisms for citizens to express their views to government bodies; (b) exit mechanisms for citizens to switch to private service providers or to move to other localities; (c) central government law, rules, budget constraints and oversight over local government decisions concerning them; (d) public sector management arrangements that promote accountability (Einhorn, 2001, p. 1).

1.1.4 Empirical Findings of Decentralizations

The existing theories of decentralization in developing countries offer a variety of hints on the impact of the implementation of this system itself. Those impacts are still debatable as to whether or not this system will bring benefit to citizens. There is much empirical evidence to suggest that in some cases, decentralization has positive impacts on service delivery, government performance, economic growth or reducing corruption. On the other hand, there are also some results, which show that decentralization creates higher perceived corruption and poorer service delivery performance. Therefore, this section reviews some previous empirical findings about decentralization and public service delivery and analyzes the impact of decentralization based on case studies in a variety of developing countries in Africa, South America and Asia.

First of all, based on comparative analysis in Latin America, Africa, and Asia, Conyers and Robinson (2007) found that the comparative evidence on equity and efficiency outcomes of decentralization are very limited and uneven in coverage, rendering the task of generalization difficult. The results suggest that the consequences for equity and efficiency outcomes are largely negative, with poorer people and regions being disadvantaged by decentralization reforms or receiving a much lower share of the resulting benefits of improved service delivery (Robinson, 2007: 3-4).

In the case of Africa, Khalegian (2004) found that decentralized countries have higher coverage rates than centralized ones in the low income group, on the other hand, decentralized countries have lower coverage rates than centralized ones, with an average difference in high income group. Similar evidence suggesting that decentralization has not had a significant positive impact on the quality of public service in the region is reported by Conyers (2007). By looking the historical periods of decentralization in sub-Saharan Africa and doing some literature review about decentralization and service delivery in that region, she concluded that decentralization experience in sub-Saharan Africa have failed to have a positive impact on service delivery.

Okojie (2009) found the factors of the failure of decentralization on public service delivery in Africa, based in Nigeria case. First, there is the over-concentration of political and financial power as well as human resources at the federal level to the detriment of state and local governments. Second, there are inadequate finance and insufficient tax power on local governments. Third, decentralization in Nigeria has limit power of local government on budgeting and staffing. Fourth, there is no set minimum standard for quality, quantity, and access from central government to local government. Fifth, there is a lack of human resources in local governments.

In Latin America, decentralization also does not always bring positive impacts to the country. Hiskey and Seligson (2003) evaluated the relationship between decentralization and the efficiency of public expenditure in Bolivia. By doing analysis of two large national public opinion surveys, they found that decentralization can bolster citizen levels of system support at the national level, but the renewed emphasis on local government can have the opposite effect of producing more negative views of the political system when the performance of local institutions falters. Moreover, Ausland and Tolmos (2005) believe that there are probability that the level of corruption increase in decentralized system. By analyzing the

relationship between good governance, corruption in Peru and controlling for a number of relevant variables and with few statistical degrees of freedom, they found a statistical significance between fiscal and political decentralization and corruption (Ausland & Tolmos, 2005, pp. 26–30).

In Asia, there are various impacts of decentralization on public service delivery. In the case of fiscal decentralization in China, Shen and Zou (2008) found that there are many problems on organizing public service delivery after sub-national governments have been assigned primary responsibility for public services provision and financing. Those problems are: (a) insufficient financing for core public services; (b) the large gap between expenditure and revenue assignment at the local level; and (c) the lack of a strong fiscal transfer system. They argue that the larger portion of expenditure responsibilities on sub-national government has resulted in insufficient financing and provision for core public services, and particularly a default in the delivery of vital services in many rural and poor localities (Shen & Zou, 2008, pp. 9–15).

A contrasting picture emerges from comprehensive set of within country regression results by Mahal and Srivastava (2000) who examines inert-state differences delivery system in India. They evaluated the relationship between decentralization of decision-making and the effectiveness of specific public services. After doing a regression analysis by using a survey data that covers 1,7000 villages and 33,000 households in almost states in India in 1994, they found that the indicators of democratization and public participation such as frequency of elections, presence of non-governmental organizations, parent teacher associations and indicator variables for decentralized stated generally have the expected positive effect, even though these are not always statistically identical from zero (Mahal & Srivastava, 2000, pp. 21–22).

However, corruption is also a problem in Asia because it hinders the success of decentralization especially if there is an absence of controls on the behavior of bureaucrats both in central or local governments. Based on the result of empirical study by Asthana (2004) which focuses on provision of water supply, decentralization creates significantly higher level of corruption in water supply agencies which are run by local government compare to the agencies run by the state government.

In the case of Indonesia, one of the problems of decentralization on public service delivery is the limited administrative capacity of the local government bureaucrats on allocating the budgets for providing public service delivery. Usman (2001) argues that the process of allocating funds on public service delivery depends entirely on the head of the region, assisted by his or her own senior staff, together with local assembly (Usman, 2001, p. 16). Meanwhile, the level of corruption by local bureaucrats in many regions is still high that influence the efficiency of public service delivery in Indonesia (Usman, 2001, p. 24). Most of local government budgets have allocated to their expenses, such as office building, cars etc, rather than to public goods that increase local economic development. He gave an example from North Sulawesi and Gorontalo. There is no funding allocated for school operation, in which one of the main sector of public goods. The parents of student have to pay the fee by them self (Usman, 2001, p. 18).

There are several ways to allocate resources more efficiency. One of them is by promoting an effective government that providing public service to local preferences and increasing the accountability of local governments to its citizens by having fewer level of bureaucracy and better knowledge of local costs. Additionally, accountability in effective government will improve the economic growth and the welfare of the citizens. This argument is supported by Kuncoro (2012). After doing regression analysis on local economic governance data, he found that the local economic governance can create a conducive

investment climate to support the growth of economic activities, if the local governments focus on providing public services such as the quality of infrastructure. This means economic growth will be achieved only if the local government has a capacity for allocating the budget and accountability to provide public good to its citizens. In the meantime, Green (2005) argue that an effective governance is not possible in a corrupt environment such Indonesia. However, if Indonesia promotes greater accountability and transparency, it will go a long way to creating a climate of honesty.

1.2 Decentralization and Public Service Delivery

In this section, I will provide the definition of public services and infrastructure. Infrastructure is one of the services that local governments have to provide to the citizens in a decentralized system. After that, I will explain the relationship between public service delivery and decentralization. Lastly, I will address several challenges of local governments face when delivering public services.

1.2.1 Definition of Public Services and Infrastructures

Humphreys (1998, p. 6) defined public services as those services that are mostly funded by taxation; this includes in certain areas of public management: health, education, transportation, defense, justice or home affairs and noncommercial semi-state organizations. In addition, public services are monopolistic or oligopolistic which is often noticeable by an absolute or lack of competition which means there is no sense of seeking to entice customers away from their competitor (Humphreys, 1998, p. 9).

One public service that local governments can provide is infrastructure, this includes public utilities (power, telecommunications); public works (roads or major dams), or other services (the World Bank, 1994, p. 2). The quality of infrastructures strongly influences the economic development in a region because they affect the distribution cost of production input and output (KPPOD, 2011, p. 21). Hence, good infrastructure can enhance a region's

productivity and in the long term it will lead to economic growth and general welfare of society.

There are many types of infrastructures such as health, education, transportation, and other types. However, this research about decentralization and public service delivery focuses on road infrastructure in particular. I chose road infrastructure because it is one of the key factors in sustainable economic growth and poverty reduction. Road infrastructures are needed to connect all economic sectors between regions or within a region. Roads link rural and urban areas, which reduces disparity of economic growth between rural and urban areas (Kwon, 2001, p. 1).

1.2.2 Public Service Delivery in Decentralized Systems

One of the objectives of decentralization is the improvement of productivity, cost-efficiency and quality by devolving resources and decision making powers to local governments (Robinson, 2007, p. 8). Economists believe that many developing countries, which have experience the pitfalls of centralized infrastructure service provision, such as administrative and fiscal inefficiency, poor service quality, or inadequate decision-making, may have a better public service delivery in decentralized systems. Theoretically, decentralization can improve efficiency, transparency, and responsiveness of service provision compared to centralized systems. This is because when policies are made at levels of government closer to the citizens, the policies will better reflect the demands of those people. Therefore, local governments are more responsive to their citizens than the central government (Akin, Hutchinson, & Strumpf, 2001, p. 1).

There are three factors that must be considered for the success in public service delivery in a decentralized system. Firstly, *assigning functional and expenditure responsibilities* is important to have the public services based on local preferences. They depend on the relative competence of the different levels of government in carrying out a

particular functional area (Kim, 2008, p. 11). The local governments have to allocate the budget based on the local preference to ensure efficiency of public service delivery. Second, *adequacy of financial resource* is needed to improve equity, quality and efficiency of public services. Devolution of the responsibility of service provision to local governments is usually accompanied by some element of financial decentralization through resource transfers, usually as a share of central taxation, or enhanced powers to raise revenues through a variety of local taxes. Furthermore, to manage that financial decentralization, there should be a good *technical and managerial capacity* (D. A. Rondinelli et al., 1983, p. 15). Technical and managerial capacities are crucial aspects especially the capacity on allocating the budget for public service delivery. In this research, the variable of technical and managerial capacity is my main concern of the success of decentralization. I am particularly interested in the local government capacity as in some districts, even though revenue based on their local resources or government transfer is high, the local governments fail to provide the public service that citizens need. I believe that the main determinant of success and failure in infrastructure is largely a matter of government performance.

1.2.3 The Problems of Decentralization on Public Service Delivery

One of the outcomes of decentralization is disparity between the regions. Even though decentralization may lead to an optimal provision of public services in one region, it does not ensure competitiveness with other regions. Several researches argue that poorer regions could not compete for mobile factors with the richer ones; consequently, poor regions would get poorer and rich regions richer (Lessmann, 2006, p. 1). Firdaus and Wiwiek (2012) found that after the introduction of a decentralized system in Indonesia, there were significant differences in household income between the regions on Java Island.

The disparity between regions is due to the various problems during the implementation of the decentralization process. Some of those problems are (a) technical and

administrative capacity constraint; (b) inadequate devolution of power, particularly over finance and staff; (c) vague and or inappropriate systems and procedures; (d) inadequately qualified, underpaid and unmotivated staff; and (e) lack of downward accountability and political interference from the top (D. A. Rondinelli et al., 1983).

1.3 Decentralization and The Quality of Local Government

In this section, I will briefly explain the concepts of local government and good governance. Then, I will point out the relationship between good local governance and decentralization. This relationship is important to understand, as I will test it in my empirical analysis.

1.3.1. The concepts of local government and good governance

Shah (2006, p. 1) defined local government as “specific institutions or entities created by national constitutions or by state constitutions, or by ordinary legislation of a higher level of central government; or by provincial or state legislation, or by executive order to deliver a variety of services to a relatively small geographically delineated area.” The term local government refers to the institution, or structure, which exercises authority or carries out governmental functions at the local level (Miller, 2002, p. 3).

In decentralization, local governments are delegated to produce goods and supply services that were previously offered by central government agencies (delegation). Additionally, local governments also have some amount of administrative authority or responsibilities to provide public service efficiently (de-concentration). Lastly, local governments have responsibilities to provide public service delivery without direct control from central government (devolution). To deliver public services efficiently, the local governments need to have competence on allocation of resources (revenue, transfer from centre, investment). Also, the local governments have to provide public services based on local preferences.

1.3.2 The relationship between the quality of local government and decentralization

Local government is often portrayed as an agent of central government to provide public services to its jurisdiction (Miller, 2002, p. 3). Meanwhile, local governance itself defined as the processes through which public choice is determined, policies formulated and decisions are made and executed at the local level, and to the roles and relationships between the various stakeholders which make up the society (Miller, 2002, p. 3).

The success of process devolution, delegation and de-concentration depends on the quality of governance. There are three aspects of good local governance: *responsiveness*, *responsibility*, and *accountability*. Firstly, responsive governance means that the local governments do the right things by delivering services consistent with citizens' preferences. Second, responsible governance means that the local governments do the right things by managing its fiscal resources prudently. Finally, accountable governance means that the local governments should be accountable to their electorate. However, according to the UNDP (2001, p. 3), local governments also have to be professional in order to enhance the capacity and moral disposition of government administrators so they can provide effective and efficient public services. Additionally, the local governments have to promote transparency through the provision of information that is easily accessible. The effort of local governments in combating corruption in bureaucracy is also one of the key factors of the success of decentralization in public service delivery (UNDP, 2001). To sum up, the performance of the local government in providing public services can be measured based on the effort of the local government in implementing good governance.

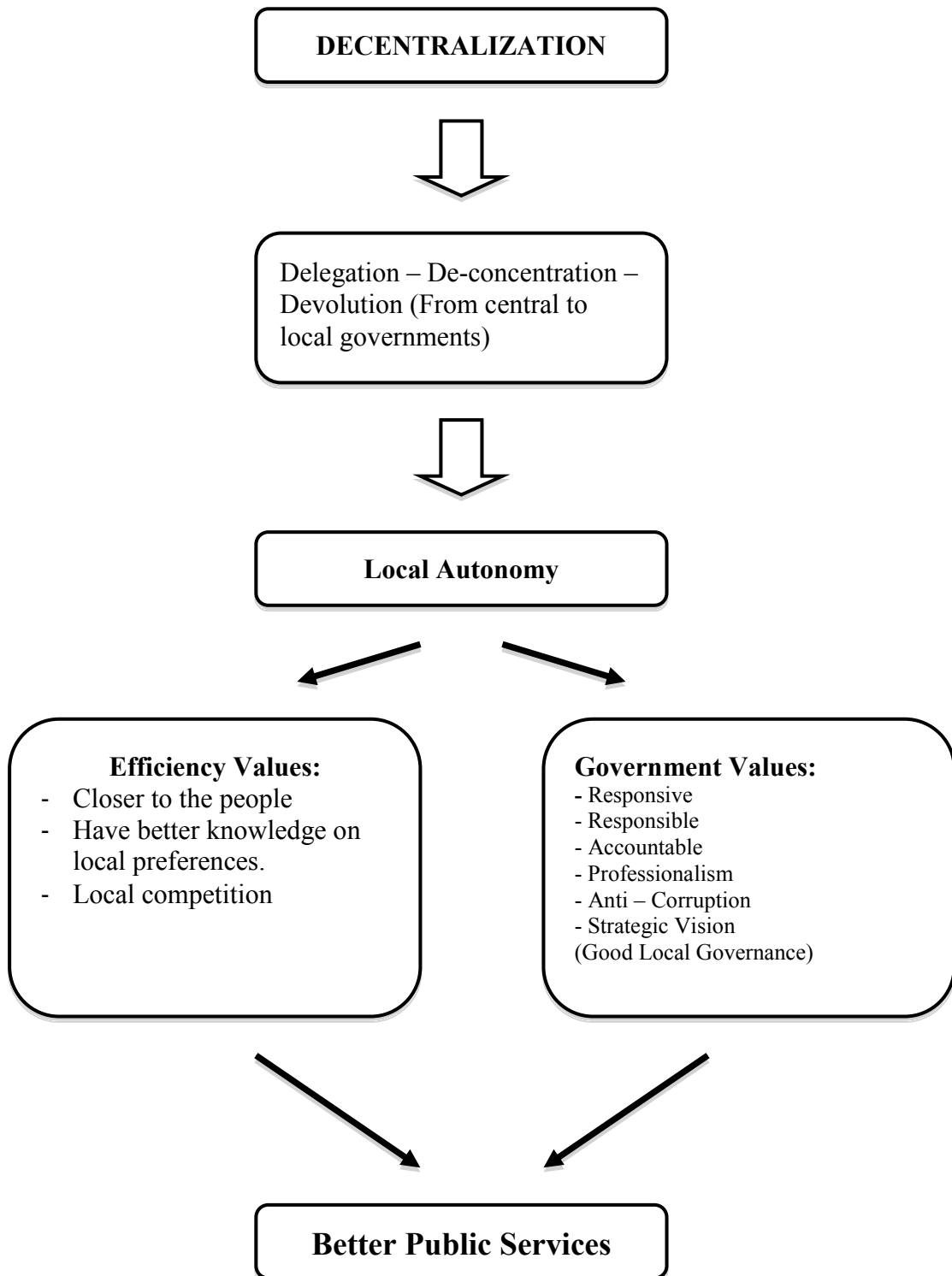
Besides being influenced by systems and institutions, the performance of the local government also depends on the government officials who operate these systems (KPPOD, 2011, p. 59). A good local government should set strong limits and guidelines to minimize misconducts by its officials and promote effective governance. It can be realized by having a

leader in the government who has the capacity and integrity to guarantee effective implementation of government policies. Previous studies (KPPOD, 2011) have shown the importance of the role of regent and mayors in local government. The results of the 2007 JPIP study in East Java found that “the decision makers who brought about innovations in the regions were mostly regents/ mayors, at up to 73.2%” (KPPOD, 2011, p. 59). If the mayors and regents can create a good governance environment in their institutions, the efficiency on public service delivery will be easier to achieve.

1.4 Conclusion

One of the main objectives of decentralization is providing better public services to the citizens based on their preferences. To understand the process of decentralization of public service delivery, Figure 1 shows the diagram of theoretical background. Decentralized system are believed to promote better public services by devolving decision making powers, delegating several responsibilities, and de-concentrating authorities to local governments. It is argued that local governments would provide public service efficiently and effectively because decentralization brings decision making closer to the people, so local preferences can be better reflected in the policies. However, to apply decentralization successfully, the key factor is not only efficiency, but also government’s values. Without the capacity and the willingness of local governments to provide better public services, decentralization may degrade public service provision. Therefore, responsiveness, responsibility, accountability and professionalism of the local government as well as an anti-corrupt attitude and having a strategic vision are key elements contributing to the success of decentralized public service delivery.

Figure 1 Diagram of Theoretical Background



Chapter 2: The Context

2.1. *The History of Decentralization in Indonesia*

Decentralization in Indonesia has essentially transformed the country from a formerly strong centralized government to one of the most decentralized, particularly in the fiscal, administrative, and political sector (Hofman, 2003, p. 1). Indonesia began the process of decentralization in 1905, when Dutch colonial leaders began to divide local governments into municipalities (*gemeenten*) and districts (*gewesten*) (Shah, 2006, pp. 233–234). However, a regional autonomy was never implemented, especially during the Soekarno and Soeharto regimes¹. Regional autonomy was seen as a threat to the unity of Indonesia. Under the authoritarian leadership, the local governments had limited authority to maintain their financial and administration (Green, 2005, p. 3). They had to follow the central governments instructions for policy implementation and its management.

After the fall of the Soeharto regime in 1998 reforms carried out. Indonesia implemented Law No. 22/1999 on local government and Law No. 25/1999 on finance balance between the central and local governments. Law No. 22/1999 and Law No. 25/1999 began a new chapter in decentralization in Indonesia. Law No. 22/1999 gives broad autonomy to the regions in all but a few tasks that are explicitly assigned to the center (Hofman, 2003: 2). It transfers functions, personnel, and assets from the central government to the provincial, as well as the city and the district governments.

¹ Soekarno was the first president of Indonesia from 1947 to 1967. Soeharto was the second president of Indonesia from 1967 to 1998. Both of them are strong leader with authoritarian regimes.

2.2 Current System of Decentralization: Administrative, Fiscal, and Political

To understand the current system of decentralization after Law No. 22/1999, I will divide this section into three parts: administrative decentralization, fiscal decentralization, and political decentralization. This section will explain on how de-concentration, devolution, and delegation work in Indonesia. It is useful to understand the division of territory, the division of functions and responsibilities, revenue sharing, and accountability of local governments after Law 22/1999 was implemented.

2.2.1 Administrative Decentralization

Indonesia is comprised of 33 provinces, including 399 districts, 98 cities, and approximately 80,000 villages, which are divided among five levels of government. These are in descending orders of hierarchy: (1) central government; (2) provincial governments; (3) district governments (*Kabupaten*- rural area) and city governments (*Kotamadya* – urban area); (4) sub-districts and sub-cities (*kecamatan*); (5) the village governments (*Kelurahan* in urban areas and *Desa* in rural areas) (Eckardt & Shah, 2006, p. 235).² The hierarchy of the government according to the Law Number 22/1999 is drawn in Appendix I. This figure is helpful to understand the process of de-concentration from first tier government to the lowest tier.

Law No. 22/1999 devolved all governance functions from central government to local governments (Chowdhury, Yamauchi, & Dewina, 2009, p. 3). It states that the municipalities and cities are obliged to execute authorities in the fields of public work, public health, education and culture, agriculture, transportation, trade and industry, investment, environment, land administration, cooperative and labor affairs. However, the revised Law No. 22/1999, namely Law No. 32/2004 removed the omnibus assignment of the residual functions to regional governments from national government and stipulated fifteen functions

² For more information: see the structure of administrative organization of local government in Appendix 1. Figure (II) Framework of Government According to the Law Number 22/1999

and a number of discretionary functions. The obligatory functions of sub-national governments include (1) development planning and control; (2) planning, utilization, and supervision of zoning; (3) public order and peace; (4) providing public means and facilities; (5) handling of health sector; (6) education; (7) social welfare; (8) employment promotion; (9) facilitating the development of cooperative and small and medium size business; (10) environment; (11) agriculture; (12) demographics and civil registry; (13) administration affairs; (14) capital investment; (15) other mandatory affairs as instructed by the laws and regulations (Eckardt & Shah, 2006, p. 240).

As a result of the implementation of Law No. 22/1999 and Law No. 32/2004, local governments are more independent in promoting their own interest, developing their own institutions, initiating their own policies, managing their own financial resources, and mobilizing support from their own communities than the authority that they had during centralized system (Rasyid, 2002). Moreover, those laws also give additional powers and the responsibilities to district and city governments. The *bupati* (the head of districts) and *walikota* (the head of districts) as the head of the autonomous local government will be directly responsible to the local assembly (*Dewan Perwakilan Rakyat Daerah*, DPRD), while the de-concentrated agencies for devolved functions will be abolished and the civil servants of these agencies will be placed under the authority of the regional governments (Usman, 2001, p. 2). To understand the responsibilities of local government on providing public services, table 5 (Appendix II) about the distribution of functions across level of government was demonstrated. It is useful to understand the functions of local government in several sectors, such as health, education, industry, agriculture, transportation and other services.

There were some debates on why the third tier (*kabupaten* and *kota*) and not the second tier (provinces) that receive the greater autonomy according to Law No. 22/1999. It has been argued that the decentralization governments unit should be the closest unit to the

people, in order to give the most efficient and effective delivery of public service (Brodjonegoro, 2001, p. 3). Moreover, there is a perception these provinces are potential drivers of political disintegration (Eckardt & Shah, 2006, p. 240) because most Indonesian provinces have characteristics of certain ethnicities or religions that could trigger separatism and instability (Brodjonegoro, 2001, p. 3).

2.2.2 Fiscal Decentralization in Indonesia

Law No. 25/1999 significantly strengthens the local government's share in government spending (Chowdhury et al., 2009, p. 3). Based on the enactment of Article 7 of Law No. 25/1999, the central government must transfer at least 25 percent of domestic net revenues (total domestic revenue minus revenue sharing) to sub-national levels of government. Ten percent of that amount accrues to the provincial governments and 90 percent to the local governments, which carries out the bulk of expenditure responsibilities (Eckardt & Shah, 2006, p. 236).

Furthermore, Indonesia's fiscal system relies on two main inter-government transfers. Those two types are: (a) an unconditional non-matching transfer or general allocation grant (the DAU grant) that gives the full autonomy to local governments in spending and managing the grant and (b) a conditional matching transfer, the special allocation grant (the DAK grant) for the special projects or programs in local government, which will be under monitoring and evaluation from respective central ministries (Aritenang, 2008, p. 4).

The DAU grant is the main source of revenue for most local governments and under Law No. 22/1999 follows a formula based on two components: (i) a minimum allocation, which local governments receive regardless of their fiscal gap, consisting a lump sum equally divided across all local governments and a compensation of civil service bills, and (ii) a fiscal gap component, estimating the difference between local government's won fiscal capacity and fiscal need (Eckardt & Shah, 2006, p. 251). Under Law No. 25/1999 and Law No. 33/2004,

there are special allocation grants (DAK grants), which the national government can use to finance special needs and also to promote special national priorities of local governments with lower than average fiscal capacity. DAK grants are designed to be matching grants to ensure that they truly meet local demand by providing at least 10 percent of the total cost through their own resources. They also need to prove that DAK projects cannot be financed through their own budgets (Eckardt & Shah, 2006, p. 255).

However, Brodjonegoro argues that “the fiscal decentralization in Indonesia tends to be more expenditure decentralization in which lower level of governments have more expenditure responsibilities but on the revenue side, they have to depend on transfers from central government (Brodjonegoro, 2001, p. 6). He added that this kind of decentralization would prevent local governments from providing services at consistent quality due to the lack of local government funds.

2.2.3. Political Decentralization

In political decentralization, Law No. 22/1999 and Law No. 32/2004 give full authority to citizens to elect the governor and the local legislature at the provincial level and the mayor (*walikota*) or the regent (*bupati*) and also the local legislature at the district level. Consequently, local governments are more independent and thus able to develop their own institutions and manage their own financial resources. They have more space to build up their capacity and creativity to provide public services. They are also more accountable because their constituents elect them. Therefore, under this new system, people could expect that their government would do better for bringing them into prosperity (Rasyid, 2002, p. 4).

The new laws have reformed the political system in Indonesia. In the past, based on Law No. 5/1974, the central government decided who would be elected to the second tier and third tier governments (Rasyid, 2002, p. 3). Rasyid (2002, p. 3) argue that “the central government enjoyed discretionary power to apply its own conditions to justify any of its

decisions”. Moreover, in the Soekarno and Soeharto regimes, the governor, the regent, and the mayor functioned as the representatives of the central government and the head of the region and the locality. In contrast, now politicians are able to serve the in second tier (provincial) or third tier (districts or cities) without being elected by central government, but being elected by the citizens in one jurisdiction (Rasyid, 2002, p. 3). Therefore, it has been argued that the decentralization after Law No. 22/1999 was implemented held the elected leaders in provinces or districts or cities more accountable than before the introduction of Law No. 22/1999.

2.3 Decentralization on Public Service Delivery in Indonesia

One of the main objectives of decentralization in Indonesia is to promote better delivery of public services, based on local preferences. The reform of public service delivery is the most critical part of the regional autonomy program. Before the implementation of Law No. 22/1999 and Law No. 25/1999, the central government monopolized public good provisions in Indonesia. In the beginning of 1999, sweeping legislative and administrative changes in local governments brought momentous changes to decisions on the selection and financing of local public infrastructures and goods (Chowdhury et al., 2009, p. 5). The new laws devolved several responsibilities, and delegated all responsibility for urban and rural infrastructure services to the local governments. This included the provision of healthcare, education, and infrastructure services (Chowdhury et al., 2009, p. 5). In 2002, local governments financed 44.3 percent of transportation development, 21 percent of healthcare and social services, and 16 percent of education development (Eckardt and Shah 2006).

However, there are some challenges for the local governments to implement new functions delegated to them by the central governments. First, decentralization in Indonesia lacks integrity and limits the capacity of the local governments to provide public services in their jurisdictions. This results in inefficient public service delivery. Brodjonegoro (2001, p. 4) argues that “the willingness of [the] local government apparatus to fulfill the standard of

public services and the willingness of local government to accept non-local professional persons to do public services will be the key to smoothen the decentralization process.”

Second, decentralization in Indonesia has led to greater disparities between regions. Disparities in Indonesia have been severe compared to other countries, especially since the financial crisis in 1997 (Aritenang, 2008, p. 5). This is because many local governments were not ready to provide needed services, due to their insufficient capacity and lack of resources. The varying level of the economic performance of Indonesia’s districts and municipalities proves the disparity between regions since decentralization (Kuncoro, 2012: 88). Some districts have seen steady economic progress, strong investment, and job creation. But many others have lagged behind, failing to increase their economic growth. Kuncoro and Suryanto (2003) collected statistical evidence that there was a high level of persistence in the relative position of regional income, consistent with a low degree of mobility in income distribution. They claimed that the location of the districts or municipalities matters and provide Java island as an example, as being the centre of government before decentralization, was the richest region among the others island.

2.4 The Local Road Infrastructures in Indonesia

During the financial crisis of 1997-1998, the investment in the infrastructure sector of Indonesia decreased significantly due to the lack of the capacity of the fiscal budget to support infrastructure development (Meliala, 2012, p. 4). However, after the implementation of Law Number 25/1999, the government sped up the infrastructure development by increasing the allocation budget for public spending every year (Meliala, 2012, p. 4). It had been argued that increasing spending on infrastructure projects would provide a better quality of living for citizens, which would lead to the increased productivity and would thus enhance economic growth (Meliala, 2012, p. 4).

However, if we compare Indonesia to several other Asian countries, the infrastructure in Indonesia appears relatively poor. The Global Competitiveness Report 2010-2011 indicated that Indonesia's infrastructure performance was very low (KPPOD, 2011, p. 21). Indonesia ranked 90 out of 139 countries for infrastructure development, while Malaysia and Thailand were ranked 27 and 46, respectively (KPPOD, 2011, p. 21). For the quality of the roads, Indonesia was ranked at 97, while Malaysia was 21 and Thailand came 36 (KPPOD, 2011, p. 21). According to the report of the Ministry of National Development Planning (BAPPENAS), the road density in major cities in Indonesia in 2003 was low compared to cities in developed countries. For example, the road density of cities in the USA is 6.6, in Australia, it is 8.7, and in Europe, it is 2.1 on average, while the road density in Jakarta is only 0.61 km per-inhabitant.³

Moreover, BAPPENAS reports that national roads in Indonesia were mostly in sound condition. However, the roads in provinces are less well maintained. In 2006, only 28 percent of all national roads were in good condition, while only 11 percent of the roads in provinces were established to be well maintained. The roads in districts were mostly very poor and more than half of the roads have sustained heavy damage without any substantive maintenance. Figure 2 displays the percentages of villages with asphalt roads. Based on the figure 2, the villages in Java in 2005 had the highest percentage of asphalt roads, with a range of 80 to 100 percent. Kalimantan and West Papua were far below the other island on providing paved roads in Indonesia.

³ www.bappenas.go.id

Figure 2 Percentages of Villages with Asphalt Road



Source: PODES 2005, BPS

According to BAPPENAS, there are three main problems with road infrastructure in Indonesia: (1) financial resources in regard to low and slowing investment in infrastructure, (2) regulations and institutional framework in regard to policy making, and (3) rules and investment and the decentralization issue in regard to changing responsibility of infrastructure development. Compared to other countries, the ratio of infrastructure investment to GDP is quite small, much lower than in China, Thailand, or Vietnam. The World Bank estimates that Indonesia's infrastructure expenditure in 2007 was only 3.4% of the total Gross Domestic Product (GDP). It is still far lower than the infrastructure expenditure before the implementation of Law Number 25/1999 (KPPOD, 2011, p. 21). Most local governments only allocated 14% of their budgets to public works sector in 2007. For the roads and the bridges in 2007, the average funding allocated was only fifty two million rupiah per kilometer of road, or around a quarter of the amount needed for periodic maintenance alone (KPPOD, 2011, p. 21).

Second, BAPPENAS claimed that the regulation and institutional framework in Indonesia had hindered the improvement of local road infrastructure in Indonesia.⁴ The government faced the challenge of stimulating more private investment in infrastructure because it was less attractive for private corporations to invest in road infrastructure in Indonesia. For example, in the toll road sector, infrastructure projects involving private-sector participation were developed in the absence of an overall national development framework and clear procurement guidelines. The process suffered from a lack of clear and comprehensive rules for procurement. Therefore, BAPPENAS argued that it was necessary to reform the regulation of road investment in Indonesia to create an environment that was more conducive to private sector participation in infrastructure investment.

The last problem of decentralization is the poor capacity on allocating the budget. After had greater responsibilities in decision making, financing, managing, and maintaining local road infrastructures, most local governments spent most of their money on social sectors and their administrations, rather than on providing public services delivery. Consequently, the budgets for infrastructures were quite small. And this problem led to the first problem, which was lack of financial resources that, in turn, also led to poor road infrastructures.

2.5 Conclusion

The implementations of Law Number 22/1999 and Law Number 25/1999 have profound implications for the road infrastructure in Indonesia. According to those Laws, the local governments, especially at the city and district levels, have the authority to develop their institution, initiate their own policies, and manage their own financial resources. The local governments can allocate their budgets based on their priority and preferences. Ideally, they will give priority to these projects that will lead to the welfare of the citizens in their jurisdictions. However, local governments often do not put road infrastructures as their

⁴ www.bappenas.go.id

priority for their projects. Most local governments spend their budgets on social sectors and their administrations, rather than on providing better road infrastructures. Most local governments only allocated 14% of their budgets to the public works sector in 2007. This is very low compared to neighboring countries such as Thailand, China, and Vietnam. As a result, the road infrastructure in Indonesia is very poor especially in the districts. Moreover, decentralization has also created disparity among regions. As we can see, the roads on the island of Java are much better than the other islands, especially Kalimantan and West Papua. It proves that several local governments were not ready for the responsibilities that followed decentralization.

Chapter 3: Data and Research Methodology

For my thesis, I rely on two main sources for the data analysis: (1) the Village Potential Statistics (*Potensi Desa* or PODES) that was conducted by Indonesia's Central Bureau of Statistics (BPS) and (2) the Local Economic Governance (LEG) Index that was conducted by the Asian Foundation and KPPOD. To develop an empirical evidence to verify the role of decentralization on public service delivery in Indonesia and the relationship between decentralization and local governments, I will state two research questions. Lastly, I will format an empirical model and explain all the variables that I have.

3.1 Data

The main data that I used for the empirical analysis is a survey called *Potensi Desa* or *Kelurahan Survey* (commonly referred to as Village Potential Statistics or here in after abbreviated as PODES). Conducted periodically by Indonesia's Central Bureau of Statistics (BPS) since 1980, this survey is in line with the implementation of population census, agriculture census and economic census and contains detailed information on the public infrastructure stock in surveyed villages. The sample consists of +/- 65,000 villages (including a wide variety of villages within the Indonesian archipelago) and covers characteristics such as geography and topography. The questionnaire is mainly divided into two categories: (a) *core data*, which is collected in every census; and (b) *module data*, which is collected in the implementation of agriculture census⁵. The respondents are *kepala desa* (the village head in rural areas) and *lurah* (the village head in urban areas)⁶.

⁵ See: <http://www.rand.org/labor/bps.data/webdocs/podes/podes.htm> for more informations about the data

⁶ Questionnaire of *Potensi Desa* or *Kelurahan Survey 2000*, See appendix III

For the research, I use two datasets, namely PODES 2000 and PODES 2008 that were aggregated into district level data.⁷ The reason for my selection is PODES 2000 can be a representative of the outcome of centralized system because the data collecting process took more than a year, which means that most of the interviews had been held before Law No. 22/1999 was implemented. Meanwhile, PODES 2008 can be a tool for measuring the impact of the decentralized system to see the improvement of the local infrastructures. The local governments are responsible for public service provisions, such as education, health, transportation and other services. However, for the purpose of the research, I chose road infrastructure as my primary variable because the outcome is tangible. Infrastructures are homogeneous within a particular type but heterogeneous across types (Chowdhury et al., 2009, p. 5). Therefore, to analyze the impact of decentralization on infrastructure, I can use only one type.

Using the data from 2000 and 2008, I analyze the impact of decentralization on road infrastructure as one of the public goods that local governments have to provide for their jurisdictions. I look at the effects of this system by comparing the road quality of 2000 (y_{t-1}) and the road quality of 2008 (y_t). Even though the data represents a quantity of units more than a quality of units, the materials used to build roads can nonetheless be treated as a quality. In addition, I calculate the data with the formula $(y_{t-1} - y_t)$ of the percentages of the paved roads in district i , then the categorical data obtained can be an indicator of the outcome of decentralization on road infrastructure. This categorical data consists of (1) *worse*, (2) *unchanged* and (3) *better*.⁸

⁷ McCulloch et al. published The Indonesian Sub-National Growth and Governance Dataset on 2008 for his research about local economic performance. They compiled a dataset, which draws together data on the economic characteristics and performance of Indonesia's districts (Kabupaten/Kota) between the years 2001 and 2007 along with data from 2007 survey by KPPOD/Asian Foundation. For further information see <http://www.ids.ac.uk/idspublication/the-indonesian-sub-national-growth-and-governance-dataset-documentation>

⁸ See appendix III and look 'Pre and Post Decentralization' for more information about the outcome of decentralization on road quality.

There are some issues that should be addressed regarding the PODES data. First, one of the challenges in constructing the data based on district level is the inconsistency between the number of districts and the number of villages after the introduction of the Law No. 22/1999. The inconsistency is the *pemekaran* system that allows a jurisdiction to have autonomy as a local autonomy area. Accordingly, it increases the number of districts. For example, 376 districts in 2002 became 438 in 2005 and, furthermore, 465 in 2008. Consequently, the number of samples between data from 2000 and from 2008 is different and as a result, there is many missing data (*NA*) in the dataset of PODES 2000. To solve this problem, I compare samples from 2000 and 2008 for the districts that were included in both surveys.

Second, the level of data analysis is not suitable for analyzing the impact of local autonomy in public provision. PODES data is village level and to see the performance of local governments in decentralized system on providing road infrastructure, I have to shift the level of analysis from village to district. To get the district level data, I use the data set from McCulloch et al. They aggregated the PODES data from the village level to the district level. The data has two categories: (i) the number of villages in the district where the main road surface is asphalt (or rock, or soils, or others); and (ii) the proportion of villages the district with asphalt roads (or rock roads, or soils roads, or others). They also calculated the average of road quality by considering road surfaces -- with 1 representing best quality (asphalt) to 4 representing worst (others). I argue that this information is credible for analyzing road quality for pre- and post-decentralization since the respondents were the village heads concerned with the maintenance of the roads in their villages and have better knowledge of the village road infrastructure than anyone else.

My second set of data is from the Local Economic Governance (LEG) Index, which was conducted by the Asian Foundation and KPPOD in 2007. The study was conducted in

260 regencies/municipalities located in 19 Indonesian provinces. The data collection process took more than two years and the data was gathered through direct interviews and analyses of local level regulations.⁹ The variables of LEG Index are grouped into the following nine aspects, which are: (1) land access; (2) local infrastructure; (3) business licensing; (4) local level regulations; (5) transaction cost sub-index; (6) regents/mayors' competence and integrity; (7) local government and business interaction; (8) business development programs; and (9) security and conflict resolution. However, for this research, I use data from only two sub-indexes, namely, regents/mayors' competence and integrity and local infrastructure. The indicators for regents/mayors' competence and integrity are (a) regents/mayors' understanding of the business community's problems; (b) local government officials' professionalism; (c) acts committed by regents/mayors for personal gains; (d) regents/mayors' resolve against corruption; (e) subordinates' opinion of regents/mayors' leadership ability; and (e) capacity and integrity of regents/mayors as obstacles to business performances (KPPOD, 2011, p. 63). I obtain this data from the Indonesian Sub-National Growth and Governance Dataset by McCulloch et al.

3.2 Research Questions and Methodology

To analyze the effect of decentralization of public service delivery in Indonesia, there are two research questions that I would like to answer in my thesis:

1. Does decentralization promote better road local infrastructure in Indonesia after the implementation of Law No. 22/1999?
2. Does local government quality affect the improvement of local road infrastructures in decentralized system in Indonesia?

⁹ For more information about the data: www.kppod.org or McCulloch et al 2011, pp. 6–9

I will use quantitative methods to get the empirical findings about decentralization impact on public service delivery in Indonesia. To answer the first question, I will use three statistical methods. The first method is descriptive statistic. I will calculate the means and standard deviation of two periods to see the improvement of the local road infrastructures. Second, I will use a contingency table to compare the change of local road infrastructures between districts. Third, I will use a paired sample t test to see the effects of decentralization on local road infrastructures.

To answer the second question, I will use two statistical methods. First, I will use correlation to see the relationship between my independent variables (explanatory variables and control variables). Second, a plain ordinary least squares (OLS) or linear least squares to see the relationship between the changes in local road infrastructures and the local government quality will be used. There will be two methods that include in my OLS regression: (1) the robust standard error method to avoid heteroskedasticity and (2) ordered probit for my estimation method.

3.3 The Empirical Model

For the empirical model, I follow the model of Chowdhury et al (2009) to overview the impacts of decentralization on public service delivery by focusing on the relationship between initial village resources preferences and the subsequent stock of local road infrastructure (Chowdhury et al., 2009, pp. 4–5). Regarding the model, they argue that the approach is appropriate to analyze the outcome of pre and post decentralization by looking the changes in local public infrastructures stocks between 2000 and 2008: *worse (1), unchanged (2), and better (3)*. The level of measurement is ordinal.

The function is:

$$\Delta INF_i = \alpha + \beta_1 \cdot Q_{1,0,i} + \beta_2 \cdot Q_{2,0,i} + \varphi \cdot INF_{0,i} + Z_i' \delta + \varepsilon_i$$

where:

- ΔINF_i = the changes of the road infrastructure stocks between the two periods in district i (response variables)
- $Q_{0,i}$ = the local government quality. This is dividing into Q_1 and Q_2 . I used two variables: Q_1 is the forming capacity and integrity of Regents/Mayors in district i , and Q_2 is the performance of the government on maintaining road infrastructure, where “0” means the initial period (explanatory variables). We expect that its coefficient, β , is equal to zero in a centralized regime and it will be positive under decentralized regime.
- $INF_{0,i}$ = the infrastructure stock for district i in period 0
- Z_i = control variables such as topography, population, location, real income.
- ε_i = a i.i.d error term

Under Law No. 22/1999, the local governments are responsible for financing and managing the local road infrastructures. Their capacity on allocating the budgets and their willingness to provide better public services are the keys to the success of public service delivery. Based on previous literature regarding the relationship between decentralization and good governance (Bardhan & Mookherjee, 2005; Robinson, 2003; Shah, 2005), local governments will be more responsive to citizens' needs and take their preferences into account when determining the types of services to be provided, the level of resources required and the optimal means of ensuring effective delivery (Robinson, 2007, p. 1). Therefore, I expect that districts which have good governance qualities such as an effective government, a low level

of corruption and a high level of competence, will more likely to provide better road infrastructure compared to districts which have poor governance. Due to the unavailability of the data for local government quality in Indonesia at the district level, I will use two variables that can measure the local government quality: (1) the forming capacity and integrity of Regents/Mayors in district i (Q_1) and (2) the performance of the government on maintaining road infrastructure (Q_2).

Several studies have shown that the leader of an institutions has an important role in creating an effective government (KPPOD, 2011; Svava, 1994). In this research, I assume that mayors who keep their promise of developing their districts will more likely provide better road infrastructure for their districts because they are more willing to promote public service delivery. The indicators of the variables, including the effort against corruption, professionalism, leadership, capacity and integrity in solving the economic problems are reflective of the quality of local government. However, I realize that I cannot generalize the local government quality only based on the characteristic of the mayors/regents, even though they have the most powerful voice on decision-making. I assume that the capacity of the officials in the government bureaus also plays a part in the success of decentralization for the improvement of local road infrastructures. Thus, my second explanatory variable is the performance of government on maintaining roads (Q_2). I argue that this variable, the speed of fixing the road, can be the measurement of the government performance on providing the local road infrastructure because the local governments have a responsibility to maintain infrastructure in their jurisdictions.

There are several important issues of estimating equation that might affect the quality of the statistic results. Many variables influence public service delivery besides the quality of government. For example, despite having a good government, a district may not be able to provide good road infrastructure if it is poor. Also, if the location of the districts is

strategic, the roads are more likely good. Therefore, I address this issue by taking lagged real income (GRDP) as a control variable. Moreover, I control some other variables as well, namely population size, location (“1” in Java Island and “0” not in Java Island), topography (“1” flatland, and “0” hill). To avoid endogeneity problems, I include the variable of share-paved roads as the infrastructure stock ($INF_{0,i}$) as control variable.¹⁰

¹⁰ This problem was addressed by Chowdhury et al (2009, pp. 4-5)

Chapter 4: Empirical Results and Discussion

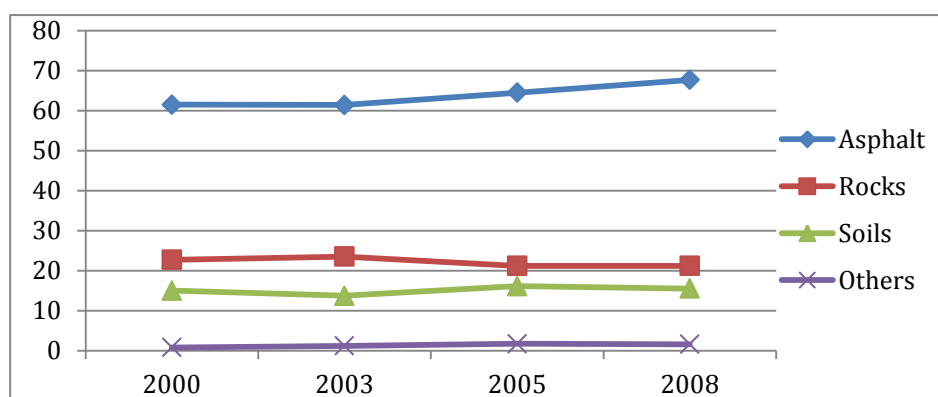
4.1 Does decentralization promote better local road infrastructure in Indonesia?

In this section, I will answer my first question: does decentralization promote better local road infrastructure in Indonesia? The methods that I will use are descriptive statistics, contingency table, and a paired t-test. I will compare the data of the road infrastructure stocks across districts between 2000 and 2008. If the districts have better percentages on the quality of the roads or have more paved roads in 2008 than in 2000, it means that the local road infrastructure has improved. On the other hand, if the percentages of paved roads decreased, it means that after decentralization was implemented, the local road infrastructures declined. To check the effect of decentralization, I will run a paired t-test. It will show the significance of the difference between the local road quality in 2000 and the local road quality in 2008.

4.1.1 Results: Descriptive Statistics

Table 6 presents Quality of the Local Road in 2000 and 2008 (see Appendix VI) and it was apparent that road infrastructures after decentralization were better than the road infrastructures before decentralization. The percentages of districts that had better road infrastructures after the implementation of Law No. 22/1999 were higher than that of the districts that had worse road infrastructures after the implementation of Law No. 22/1999. By using the measure of percentage of paved roads in districts, Figure 3 shows the improvement of road quality in the period of 2000 to 2008. Additionally, the Table 1 shows the improvement of the paved roads was from 60.9% in 2000 to 68.6% in 2008 and it was followed by the decrease of rock and soil roads.

Figure 3 Change of Local Road Infrastructure between 2000 and 2008



Source: PODES 2000 and 2008

Table 1 Descriptive Statistics of Local Road Quality

Materials	2000		2008	
	Mean	St. Dev	Mean	St. Dev
Asphalt	60.9%	26.6%	68.6%	26.7%
Rock	20.5%	16.6%	18.1%	16.1%
Soils	11.8%	13.7%	10.4%	14.9%
Others	0.3%	0.8%	0.3%	0.9%

Notes: Asphalt is better than rock, rock is better than soil, and so on. From PODES 2000 and 2008

The local road infrastructure stocks in major districts improved between 2000 and 2008, while the local road infrastructure in most cities remained unchanged. Based on the table VI (Appendix IV), I found 206 out of 311 districts had better roads in 2008 compared to their condition in 2000: 64.9 % of the district road quality is improved, 28.8% was worse and 6.3% is unchanged.¹¹ Meanwhile, most of the roads in cities did not show any differences between roads quality in 2000 and their quality in 2008. It has been argued that these cities already had paved roads since Dutch colonial era (KPPOD, 2011). Moreover, the size of the cities was smaller than the size of the districts and most of the cities had a flat landscape.

¹¹ To compare the average of the road quality across districts between PODES 2000 and PODES 2008, I divided my result into three categorizations: (i) better, (ii) unchanged and (iii) worse (see Appendix IV).

Building roads in large or hilly areas was more costly than building roads in small or flat areas.

Furthermore, the change of road infrastructure in districts in Indonesia after decentralization varies. There were many districts that improved in providing paved roads in their jurisdictions and there were also many districts that declined. By analyzing Table 6 (appendix IV), I argue that the characteristics of the districts influenced the change of local roads. Those characteristics were topography (hill, flat, forest, lake, coastal, river); the economy activities (industry or tourism), the location of the area (between big cities or remote areas); or the size of the area and population. For example (see Table 6 appendix IV), 77% of the roads in Kabupaten Kediri in Java were asphalt in 2000 and this figure increased to 87.5% in 2008. This district was located in a strategic area. It was between big cities, thus, the mobility in this district was high. Moreover, Kediri was one of high performing business districts that require good quality roads for mobility of the industries' transportation¹². On the other hand, only 16% of the roads in Kabupaten Nabire in Papua were asphalt in 2000 and this figure decreased to 15.7% in 2008. Kabupaten Nabire was a hilly area and the economic activities were very under developed. Therefore, building paved roads in this area would be very costly.

Besides the topography and industry activities, the location of the districts also affects the change of the local road infrastructure in Indonesia. Based on the contingency table (Table 2)¹³, the districts in Java had better conditions compared to the districts outside Java. According to the chi-squared test result, I had to reject the null hypothesis that there was no relationship between the district road quality and the district location. There was a significant, predictable relationship between the district road quality and the district location, where $\chi^2(2,$

¹² www.kedirikab.go.id

¹³ The data sources are from PODES 2000 and 2008. The dummy variables of the road quality are '0' for better; '1' for unchanged; and '2' for worse. The dummy variables of the district locations are '0' for not in Java Island and '1' for in Java Island. The sample was 342 districts with 111 districts in Java island and 231 districts not in Java Island.

N=342) = 29.7, $p < 0.001$. I found that 81% of the districts' road quality in Java improved and only 9.8% was deteriorated. Moreover, almost all districts that had worse road quality after decentralization are located outside Java Island. Papua and Kalimantan Tengah were the provinces with the highest percentages of poorer road quality.

Table 2 Contingencies between the Change of Road Quality and the Districts Location

The change of the quality of the road		Location of the district		
		Not in Java Island	In Java Island	Row Total
Better	Count	138	91	229
	Row%	60.2%	39.7%	66.9%
	Column %	59.7%	81.9%	
Unchanged	Count %	11	11	22
	Row %	50%	50%	6.4%
	Column	4.7%	9.9%	
Worse	Count	82	9	91
	Row %	90.1%	9.8%	26.6%
	Column %	35.4%	8.1%	
Column Total		231	111	342
Column %		67.5%	32.5%	
Chi Squared: 29.7 Df : 2 P-value < 0.001				

Source: PODES 2000 and PODES 2008

However, in some cases, topography, location, and economic industries did not correlate to the change of local road infrastructure. For example, there were many districts that have a flat landscape but they have poor road infrastructure such as Kabupaten Tabalon. There were also several districts, such as Kabupaten Tanah Karo and Kabupaten Aceh Selatan, were hilly and not located on Java Island but had improved the road quality after decentralization. For the economy factor, Kota Batam had high real income from the trading but their road infrastructure declined. On the other hand, Kabupaten Muara Jambi increased the percentages of their paved roads from 2000 to 2008 even though their real income

(GRDP) was not high. To sum up, in several districts, the factor of topography, location, and economic industry might affect the local road infrastructure but in several cases those factors did not have any significant effects. Therefore, I argue that there were other factors that influenced the change of local road infrastructure stocks after Law No. 22/1999 and Law No. 25/1999 were implemented. The influence of other factors will be explained in the second question.

In addition, to examine the difference between the local road infrastructures before and after Law Number 22/1999 and Law Number 25/1999 was implemented, I ran a paired sample t-test by comparing the means of two variables: the average paved roads in 2000 and the average paved roads in 2008. The null hypothesis was that there are no significant differences between the paved roads in 2000 and the paved roads in 2008.

Table 3 Paired t-test before and after the Implementation of Law No. 22/1999

		Paired Differences				t	df	Sig (2 tailed)
		Mean of the differences	Std. Dev	95% Confidence Interval of the Difference				
				Lower	Upper			
Pair	Pre Test Score (2000) – Post Test Score (2008)	0.084	0.42	0.0616	0.106	7.37	313	0.0001

Source: PODES 2000 and PODES 2008

As can be seen from Table 3, the mean difference between the average percentages of the paved road in 2000 and the average percentages of the paved road in 2008 is 0.084 and the standard deviation is 0.42. The interval difference is between 0.0616 and 0.106. The difference was significant at 99 % with the t value at 7.37, the df at 313, the significance at 0.0001 with two tailed. Therefore, I need to reject the null hypothesis. It means that there is a significant difference between the average paved roads of the road before and after decentralization. The quality of the roads in 2008 is significantly different since the percentage of paved roads is an indicator of the road quality.

4.1.2 Discussion

The problem with the result of the descriptive statistic is that it cannot answer whether the improvement of the roads is caused by decentralization or by other factors than decentralization. Those results only explain that the local road infrastructures are in better condition after the implementation of Law No. 22/1999 and Law No. 25/199 than before these laws were implemented. It is also difficult to prove that decentralization promotes effective and efficient road infrastructure based on the improvement between 2000 and 2008 without analyzing the condition of the road infrastructure provision before 2000.

However, based on a paired t-test between the average of paved roads in 2000 and the average of paved roads in 2008, there is a significant difference between them. I argue that the average paved roads are the outcome of characteristics of the systems of government. The average paved roads in 2000 are the result of the centralized system and the average paved roads in 2008 are the result of the decentralized system. Therefore, the paired t-test results show that there is a difference after decentralization and it means that decentralization has an influence on the change of the local road infrastructures. But, it is still not clear which effect of decentralization promotes public service delivery. The descriptive statistics and the paired t-test results only focus the changes of paved roads after decentralization, but it does not tell the direct effect of decentralization itself to the changes.

Furthermore, it is too early to conclude that decentralization has raised overall the improvement of the local road infrastructures. There might be other factors that affect the change of road infrastructure stocks. Compared to neighboring countries, the ratio of infrastructure investment to GDP is quite small. Most local governments only allocated 14% of their budgets to the public works sector in 2007 (KPPOD, 2011, p. 21), the rest of the budget went to social transfers or administrative expenditure such as office buildings, operational costs, and salaries of the officials. It means that the local governments did not consider road

infrastructures as one of their priority projects. However, this argument could be tested if the data on pre-decentralization road infrastructure expenditure at the districts level were available.

The financial crisis on 1997 may have influenced the local road infrastructures on 2000. As Meliala (2012) said, during the financial crisis, the investment in infrastructure sector in Indonesia decreased significantly. As a result, the impact of the financial crisis might effects the percentage of the local paved roads in 2000 due to fiscal budget's inability to support infrastructure development. The percentage of the local paved roads in 2000 is not just the outcome of a centralized system but also the outcome of a financial crisis. In the end, it is difficult to conclude that the improvement of the local roads between 2000 and 2008 is because the government system changed from centralized to decentralize.

4.2 Does the Local Government Quality affect the change of the Local Road Infrastructure Stocks in Decentralized System in Indonesia?

In this section, I will answer my second question whether the local government quality affect the local road infrastructure stocks after decentralization. The statistical methods that I use are correlations and OLS with robust standard error. My dependent variable is the change of local road stocks in i districts between 2000 and 2008 and is coded as: "0" worse, "1" unchanged, and "3" better. The estimation methods are ordered probit. The explanatory variables are (a) the forming capacity and integrity of Regents/Mayors in district i , and (b) the performance of the government on maintaining road infrastructure in district i . The control variables are topography, geography, dummy city, real income of districts, and population. The level of measurement is district level. After interpretation of the results, I discuss the findings and its problems.

4.2.1 The Results: Ordinary Least Squares (OLS)

According to OLS results (Table 4), there was a significantly positive relationship between the forming capacity and integrity of Regents/Mayors and the change of local road infrastructure stocks. Meanwhile, the relationship between the change of local road infrastructure stocks and the government performance on maintaining the road infrastructure was negative and this relationship was not significant. The multiple R squared was 0.1607, so the independent variables explain 16.07% of variance. I argue that this model was still good for looking at the relationship between the local government quality and the change of local roads due to many factors or variables that influence the change of local roads, such as accountability, the level of corruption, the investment rate, which was more related to fiscal decentralization and the political aspects. To determine the independency of my independent variables, I used Pearson's correlation (See Appendix X). The result shows that the independent variables were not very correlated, they were therefore independent.

**Table 4 OLS Regression Result
The Local Government Quality and the Changes of Local Road Infrastructure Stocks**

Road Change Infrastructure Stocks	OLS	
	Coef	t-stat
Mayor_Integrity	0.0151**	2.618
Government Performance on maintaining road infrastructure	-0.0063*	-2.043
Road_paved in (t-1) period equals 1, else 0	-1.222***	-3.958
Population in (t-1) period	0.0001	1.567
GRDP in (t-1) period	-0.0001	-4106
Topography, If the district is a flatland; yes 1, no 0	0.1085	0.551
Location, if the district is in java; yes 1, no 0	0.3363*	2.435
if the district is Kota (city) ; yes 1, no 0	0.5232**	2.843
Mult. R-squared	0.1607	F statistic: 4.402
Adj R-squared	0.1242	P-value: 0.0001

Notes: with robust standard errors, * Significant at 10 percent; ** significant at 5 percent; *** significant at 1 percent. GRDP: gross regional domestic product. Dependent variable is the change of road infrastructure stocks in the district *i*: (1) worse; (2) unchanged; and (3) better. Estimation method: ordered probit.

The analysis suggests that there was positive relationship between the forming capacity and integrity of Regents/Mayors and the change of local road infrastructure stocks. After accounting for impact of all other explanatory and control variables, results of the analysis indicate that for every score of the level integrity of regent/mayor was higher, the score change of the local road infrastructure stocks increased by 0.0145. With 95% confidence, this coefficient was significant in a population. These results show a significant dependency of the change of the local road infrastructure stocks on the forming capacity and integrity of Regents/Mayors. This means that districts that had regents and mayors with a strong attitude against corruption, professional local government official, and also a capacity on developing business sector, were more likely to experience improvement of their existing road infrastructure or provision of new local road. The theoretical framework predicted that effective governments influenced by a strong leader committed to provide public goods would increase the road quality due to the low level of corruption and good governance. The regression result of the relationship between the integrity of mayor and local good infrastructure supported this prediction.

But interestingly, even though there was a positive relationship between the integrity of mayor and local road infrastructure stocks, I found a negative relationship between the government performances on maintaining the roads with regard to the road fixing time and the local road infrastructures, even though the coefficients is not significant. My assumption was that the faster the local government fixed the damaged road infrastructure, the better the local government performance would be. I expected that the better local government performance would bring a positive impact to road infrastructure. However, the result was opposite. The better the performance of the local government on maintaining the roads, the more the change of the local road infrastructure stocks declined. However, it can be argued

that the local governments did not work independently to provide public good provision because they need third parties as providers to supply and maintain the public good provision technically¹⁴. Therefore, indicators of the road fixing time might be bias for reflecting the government performance of providing and maintaining public good provision.

Moreover, the OLS regression also shows that large population size affects the road quality. The reason was that a large population would increase the demand for better quality of roads. People needed paved roads due to the high mobility of the citizens. On the other hand, there was a negative relationship between real incomes (GRDP) of the districts and the improvements of the local road infrastructures. Surprisingly, this indicated that districts that had higher real income, the roads were worse after decentralization. In the case of Indonesia, there were many area that have rich mining industries such as in Kalimantan, Sumatera or Papua but the area were under-development due to reasons such as low educated population, low economic activities apart from mining industries, and poor local governance. However, based on the regression result, this coefficient is less significant.

Furthermore, the regression result supported the previous argument based on the descriptive statistic that districts located on Java Island appeared to have greater ability to build better quality roads. The coefficient of the dummy variable on Java Island (if the district in Java: '1' Yes and '0' No) was positive with 90% significance in all specifications. The reason was Java Island had a large population and the island was central between Sumatera and Bali that had high mobility of economy activities. Therefore, Java was a connection or hub to another islands that required this island to had good quality roads or maintained their quality roads. This supported the previous argument that having mountain area would be an obstacle to districts to have better road infrastructure. Though not always the case, districts that had a flat land surface would have more potential to build better road infrastructures

¹⁴ See Ahmad et al. 2005 to understand the framework of accountability relationship between national policymakers, local policymakers, providers, and poor people. Based on his framework that local policymakers do not work independently on providing public good but also some private providers.

because hilly regions were less likely to have paved roads since they cost more. Moreover, the level of technical difficulties to build better road infrastructure was lower in the areas that had flat landscape. The reason why the coefficient of the dummy variable of topography was less significant was because I also controlled the dummy variable of location (Java or not in Java), as because most of the districts were hilly regions with good local road infrastructures.

4.2.2 Discussion

There are some issues that I will discuss in this section. They are reverse causality, endogeneity and alternative measure of the local government quality. First, there is a possible explanation for the lack of strong association between the measures of the government local quality and the change of the local road infrastructure stocks. The data of the local government quality is from 2007. It is a different period of data than that of the local road infrastructure stocks, which were published in 2000 and 2008. This might be reserve causality. There is a positive causal effect of local government quality on the change of local road infrastructure stocks, but this is partially masked by a counteracting negative reverse causal effect running from the change of the local road infrastructure stocks to the local government quality. For example, better governance improves the efficiency of local road infrastructure development, but the development of local road infrastructures then leads to greater opportunities for corruption.

McCulloch (McCulloch & Malesky, 2011, p. 28) argues that one of the solutions to tackling the problems of reverse causality is to find instrumental variables which only effect the response variable, which in this case is the change of the local road infrastructure stocks between 2000 and 2008. However, finding such variables is typically difficult, since most of the variables that are likely to have a significant impact upon local government quality will also have some independent impact upon the change of the road infrastructure, such as accountability, responsiveness, and the level of corruption. Yet, I argue that the result of OLS

regression of the relationship between the change of the local road infrastructure stocks and the government quality is still meaningful. The direct election of mayors and regents in Indonesia started in 2005. Therefore, the data of the forming capacity and integrity of Regents/Mayors in district i refer to the mayors and regents who were elected in 2005. The change of the local roads infrastructure stocks between 2000 and 2008 was the outcome of decentralization and the variable of the capacity and integrity of Regents/Mayors was also the outcome of decentralization.

Second, I were concerned about the heteroskedasticity and endogeneity of the OLS regression results. By looking at the terms plot of the relationship between dependent and independent variables, I can say that there is a linear relationship between dependent and independent variables. I saw some outliers of my dataset, which can bias the coefficients. To address that problem, I deleted the outliers. I checked the homoskedasticity by looking at the plot of the residuals for each fitted value of dependent variable and the scale-location; the plot is not good as it is not roughly horizontal. However, robust standard errors were done so there is no need to worry too much about heteroskedasticity.

About endogeneity problems, theoretically, to avoid inconsistency of OLS, fixed effect and random effect in panel data analysis should be deployed (Aritenang, 2008, p. 7; Chowdhury et al., 2009, pp. 5–6). Fixed effect will help to solve the endogeneity problems and avoid the potential bias of the result. There was potential bias in the OLS result regarding the local government quality and the changes in the local road infrastructure stocks due to many factors that influence that relationship, for example the economic crisis in Indonesia that hashed a huge impact on the economic development in Indonesia since 1997 (Chowdhury et al., 2009, p. 5). Moreover, it is recommended to demonstrate Hausman test to see whether or not there is a significant difference in fixed effect estimation with OLS (Aritenang, 2008, p. 8). In this research, I only used OLS in this analysis. I argue that using only OLS was

appropriate since the p-value was less than 0.01. Therefore, it was not really necessary to use fixed effect. Yet, it is recommended to demonstrate the fixed effect test and Hausman test for the future research.

Finally, to determine the accuracy of the regression result, I suggest to find an alternative sources with better data. In this research, I use the two indicators to measures the local government quality: (1) the forming capacity and integrity of Regents/Mayors in district *i* and (2) the performance of the government on maintaining road infrastructure. It would have been better if the research included other indicators of the local government quality, such as voice and accountability; rule of law; political stability; government effectiveness; regulatory quality; and control variables¹⁵ at a district level. However, the data for good governance from the World Bank is only available for national level. Therefore, it needs other sources to find this dataset. Furthermore, the data from KPPOD is from a survey and the audience is firms and economics actors. This does not represent all the citizens in the districts especially those that are interested in other aspects of good governance. Therefore, using other data resources will improve the research.

¹⁵ The indicators of good governance according to the World Bank

Conclusion

After Law No. 22/1999 and Law No. 25/1999 were implemented, the local governments in Indonesia have devolved several responsibilities on public service delivery including financing and managing the local road infrastructures. The aim of the thesis was to develop empirical evidence to verify the role of decentralization on public service delivery, particularly road infrastructures, and the relationship between decentralization and the local government quality. The thesis set out to determine whether decentralization leads to effective public service delivery after the implementation of the Law No. 22/1999 in Indonesia and the local government quality affects the change of the local roads infrastructure stocks in decentralized system in Indonesia. This thesis contributes to the literature on the effect of decentralization of public service delivery in developing countries by presenting a case study and quantitative analysis.

First, I introduced the concept of decentralization and its problems. After that, point out previous empirical findings about decentralization and public service delivery. I also explain the relationship between decentralization and the local government quality. In, the second chapter, I explain the process of decentralization in Indonesia before and after Law No. 22/1999 and Law 25/1999 were implemented. I point out the condition of the road infrastructure in Indonesia and the challenges of decentralization on promoting better road infrastructure. In the third chapter, I introduced the data, the research questions, the variables and the model of the research. The last chapter, I reported and discussed the findings of the descriptive statistics, contingency table, and a paired t test to answer my first research question. I also reported and discussed the findings of OLS regression results of the change of the local roads infrastructures and the quality of governments.

The research has found that there was a significant difference between the average paved roads before decentralization and the average paved roads after decentralization. The descriptive statistics show that the road local road infrastructures after the implementation of the Law No. 22/1999 were better than the local road infrastructures before that law was implemented. Moreover, the local road infrastructures in major districts improved between 2000 and 2008, while the local road infrastructures in most of cities remained unchanged. According to OLS regression, there is a significantly positive relationship between the forming capacity and integrity of regents or mayors and the change of local road infrastructure. Interestingly, this positive relationship is followed by the negative relationship between the government performance on maintaining the road infrastructure and the change of the local roads infrastructure stocks. Furthermore, the regression result shows that the larger the size of the population of the area, the better is the local road quality is. Second, the districts that are located in Java Island appear to have greater ability to have better local roads quality. The relationship is 90% significant in all specifications. Additionally, there is a positive relationship between dummy flat land and the change of the local road infrastructure stocks. The flat areas appear to have better road quality compared to hilly areas. In contrast, there is a negative relationship between the real incomes (GRDP) of the district and the change of the local road infrastructure stocks: the richer the districts, the worse the road quality. However, this relationship is weak.

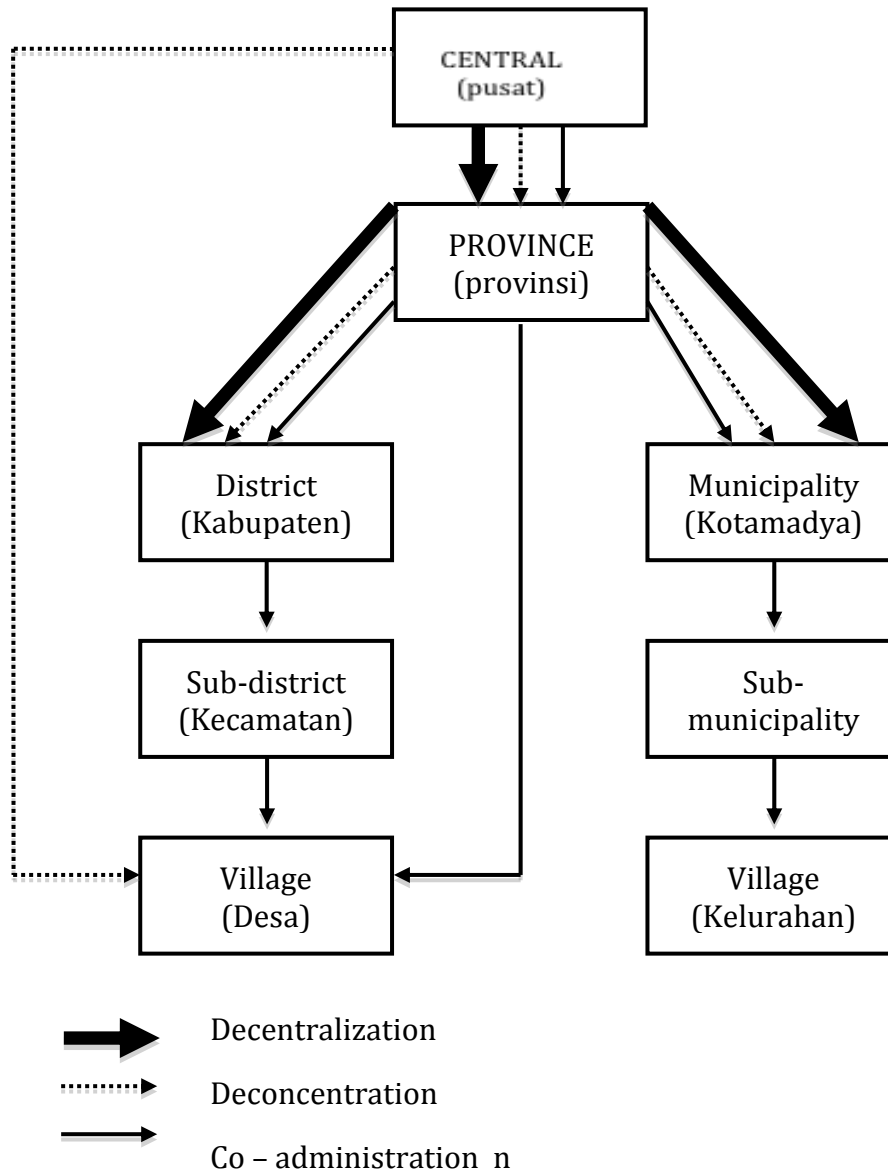
Several limitations to this thesis need to be acknowledged. First, the explanatory variables (the local government quality) only include the capacity and integrity of mayors to create good governance environment in bureaucracy and the government performance on fixing the damaged roads. They are not enough to measure the quality of government. The World Bank indicates that good governance should include: accountability, rule of law, government effectiveness, political stability, regulatory quality and control of corruption.

Second, the data of local government quality is from 2007, meanwhile the change of the road infrastructure stocks are from 2000 and 2008. Consequently, there might be a reverse causality. Moreover, the thesis does not analyze the other factors of the improvement of the change of the local roads infrastructure stocks than decentralization itself. Financial crisis in 1997 might have affected the road infrastructure provision in 2000. Finally, the thesis only ran simple regression. The thesis did not test the model with fixed effect that might solve the endogeneity problems and helped to avoid the potential bias of the result.

Further research might explore several matters. First, the future research should investigate a more encompassing data. The data of quality of government should include several indicators, such as responsiveness, accountability, control of corruption, political participation and other indicators of good governance. It would help to overcome the possible problems of measurement of the local government quality. Second, the data between the explanatory variables and response variable should be in the same periods to avoid reverse causality. Third, I suggest running OLS with Fixed Effect and Hausman test to avoid the potential bias of the result. Finally, regarding the complexity of the case, which is to see the effect of decentralization, there should be another variables that more representative to test the relationship between decentralization and the quality of government. The problem is that the concept of decentralization is still ambiguous as well as the measurement of decentralization. The more elaborate and detailed investigation to analyze the case, in longer study, can improve the study and overcome its weakness or even negate the expectations with any findings that were not considered here.

Appendix I

Figure 4 Framework of Government Hierarchy According to Law No. 22/1999



Source: Indonesia Law No. 22/1999

Appendix II

Table 5 Distributions of Functions across Level of Government

Function	Central	Province	Local
Foreign relations, defense, and security policy	Exclusively central	-	-
Judiciary and Law enforcement	Exclusively central	-	-
Monetary and Macroeconomic policies	Exclusively central	-	-
Religion Policy	Exclusively central	-	-
Subsidies	<ul style="list-style-type: none"> a. Rice Subsidy b. Fuel Subsidy c. Electric Subsidy d. Subsidies to national state enterprises 	Subsidies to provincial state enterprises	Subsidies to local state enterprises
Regulatory function	<ul style="list-style-type: none"> a. National laws and regulation b. Legal supremacy of national law over sub-national bylaws 	Provincial bylaws in the framework of national legal system	Local bylaws in the framework of national legal system
Natural resources management and environmental policy	<ul style="list-style-type: none"> a. Environmental policies and supervisions b. Sustainable management of natural resources and preservation of environment c. Financing reforestation programs through DAK grants 	Supervisory function and cross district coordination	<ul style="list-style-type: none"> a. Management of local natural resources b. Issuance of fishing and mining licenses c. Management of local reforestation program
Education	<ul style="list-style-type: none"> a. Educational policies and supervision b. Frame curricula for primary and secondary schools c. Final national examination for primary and secondary schools d. Minimum service standards for primary 	Supervisory function and cross-district coordination	<ul style="list-style-type: none"> a. Management and financing of public schools b. Administration and financing of teachers and school staff c. Financing and management of teacher qualification

	<ul style="list-style-type: none"> and secondary schools e. Financing infrastructure and school rehabilitation f. Exclusive responsibility for tertiary education and universities g. DAK grants 		d. Financing and management of education infrastructure
Health	<ul style="list-style-type: none"> a. National health policies b. Minimum service standards c. Social health programs including financing of free health services for the poor d. DAK grants 	Supervisory function and cross district coordination	<ul style="list-style-type: none"> a. Management and financing of health service providers b. Administration and financing of health sector staff c. Management and financing of health service infrastructure
Agriculture and irrigation	<ul style="list-style-type: none"> a. National programs, extension services, and training b. Infrastructure investments c. Price regulation and trade through Badan Urusan Logistik (Bureau of Logistics) d. DAK grants 	Provincial programs, extension services, and training infrastructure investments	Local programs, extension services and training infrastructure investments
Industry	<ul style="list-style-type: none"> a. National industrial policies b. Foreign investment approval c. Assignment of small and medium-size enterprises d. Microfinance schemes and finance programs for small and medium size enterprises e. Financing of research and development in areas of strategic national interest 	Supervisory function and cross district coordination	<ul style="list-style-type: none"> a. Local economic development b. Business licensing enterprise and cluster promotion c. Industrial zoning
Transportation	<ul style="list-style-type: none"> a. Financing and management of national infrastructure b. DAK grants 	Financing and management of provincial infrastructure	Financing and management of local infrastructure

Source: Law No. 22/1999 Government Regulation PP 25/2000, and Law 32/2004

Appendix III

Figure 5 Questionnaire of Road Quality in Villages

IX. TRANSPORTATION					
A. TRANSPORT					
1. Inter village/village unit road conditions					
a. The majority of inter village traffic through:					
Land -1 Sea/river -2 → to Q.2 Air -3 → to Q.2					
b. If the majority of traffic is through land (Q.1.a. coded "1")					
(1). Type of widest road					
Asphalt/Concrete/cone block -1 Soil -3					
Hardened (stone, pebble, etc) -2 Other -4					
(2) Can a 4 wheeled or more vehicle pass the road all year long?					
Yes -1 No -2					
2. Type of public transportation used by the community to go to the sub-district capital/closest city					
<u>Code</u>	<u>Type of transportation</u>				
01	Bicycle Ojek	Yes	-1	No	-2
02	Becak (Pedicab)	Yes	-3	No	-4
03	Gerobak/Pedati (horse-drawn cart)	Yes	-5	No	-6
04	Delman/Dokar/Bendi (horse-drawn buggy/carriage)	Yes	-7	No	-8
05	Motor cycle Ojek	Yes	-1	No	-2
06	3 wheeled motor vehicle	Yes	-3	No	-4
07	4 wheeled motor vehicle	Yes	-5	No	-6
08	Rowboat	Yes	-7	No	-8
09	Motor boat	Yes	-1	No	-2
10	Motor ship	Yes	-3	No	-4
11	Other	Yes	-5	No	-6
3. From all the transportation modes above (detail 2), which is the main one:(put the selected code from detail 2 into the box)					
4. a. Public motorized transportation terminal Yes -1 No -2					
b. Rail station Yes -3 No -4					
c. Seaport Yes -5 No -6					
d. River pier Yes -7 No -8					
e. Airport Yes -1 No -2					
5. Ease of which the majority of the population can reach the closest facilities below:					
Facility	Ease/difficulty				
a. Hospital	Very easy	-1	Easy	-2	Difficult -3 Very difficult -4
b. Puskesmas/other health facilities	Very easy	-1	Easy	-2	Difficult -3 Very difficult -4
c. Market with permanently building	Very easy	-1	Easy	-2	Difficult -3 Very difficult -4
d. Shopping complex	Very easy	-1	Easy	-2	Difficult -3 Very difficult -4

Notes: Translate from Indonesian. Data from PODES 2008

Appendix IV

Figure 6 Questionnaire of the Capacity and Integrity of Regents/Mayors

VI. KAPASITAS DAN INTEGRITAS BUPATI/WALIKOTA							
Q61	<p>SHOWCARD TANYAKAN SEMUA</p> <p>Berdasarkan pengetahuan dan pengalaman anda, mohon anda berikan penilaian terhadap pernyataan berikut yang berkaitan dengan integritas dan kapasitas Pimpinan daerah dalam hal ini Bupati/ Walikota</p> <p>Interviewer: - Jika responden terlihat ragu-ragu untuk memberikan jawaban yakinkan bahwa semua informasi yang diberikan akan dijaga kerahasiannya[SA]</p>						
		Sangat tidak setuju	Tidak setuju	Setuju	Sangat setuju	Tidak tahu	Menolak menjawab
(R1)	Pada kenyataannya bupati/walikota memiliki pemahaman yang baik mengenai persoalan yang dihadapi oleh para pelaku usaha	1 (6817)	2	3	4	6	9
(R2)	Pada kenyataannya penempatan pejabat di lingkungan birokrasi pemda yang terkait dunia bisnis berdasarkan pengalaman kerja yang sesuai dengan bidangnya	1 (6818)	2	3	4	6	9
(R3)	Pada kenyataannya bupati/walikota di tempat Anda melakukan kegiatan usaha bertindak tegas terhadap setiap tindakan korupsi yang dilakukan jajarannya	1 (6819)	2	3	4	6	9
(R4)	Pada kenyataannya bupati/walikota di tempat Anda melakukan perbuatan yang menguntungkan pribadinya (korupsi)	1 (6820)	2	3	4	6	9
(R5)	Pada kenyataannya bupati/walikota adalah figur pemimpin yang kuat	1 (6821)	2	3	4	6	9
Q62	<p>SHOWCARD Darimanakah anda atau perusahaan anda tahu tentang perilaku dari Bupati/ Walikota? [MA] <i>PROBE darimana lagi? darimana lagi?</i></p> <p style="text-align: center;">Perusahaan kami telah beberapa kali terlibat dalam proyek pemerintah</p> <p style="text-align: center;">Pimpinan perusahaan kami beberapa kali melakukan pertemuan dengan bupati/walikota</p> <p style="text-align: center;">Dari hasil interaksi dengan pengusaha lainnya</p> <p style="text-align: center;">Dari media masa lokal</p> <p style="text-align: center;">Dari asosiasi bisnis dimana perusahaan saya terdaftar</p> <p style="text-align: center;">Lainnya, sebutkan _____</p> <p style="text-align: center;">Menolak menjawab</p>					Code (6822)	Route
						01	
						02	
						03	
						04	
						05	
						06	
						99	

Q63	SHOWCARD SKALA Secara umum, seberapa besar hal-hal yang berkaitan dengan <u>kapasitas dan integritas bupati/walikota</u> yang menghambat kinerja perusahaan di tempat Anda bekerja pada tahun 2007?[SA]	Code	Route
		(6832)	
		Sangat besar	1
		Besar	2
		Kecil	3
		Sangat kecil	4
		Tidak tahu	6
		Tidak aplikatif/tidak relevan	7
		Menolak untuk menjawab	9

Q64 Jika ada, bisakah anda jelaskan secara detail kendala seperti apa yang sebenarnya pernah dihadapi oleh perusahaan anda dalam hal kapasitas dan integritas bupati/walikota pada tahun 2007?

Interviewer:
 Catat kode: 9996: Tidak tahu
 9997: Tidak aplikatif/tidak relevan
 9998: Tidak ada
 9999: Menolak menjawab

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

(6833-6836)

source: KPPOD and the Asian Foundation (Original Version - Indonesian)

Appendix V

Figure 7 Questionnaire of Government Performance on Maintaining Roads

IX. INFRASTRUKTUR										
Q78a	<p>TANYAKAN Q78A - Q78C KESAMPING TANYAKAN KEPADA SEMUA RESPONDEN SHOWCARD SKALA Bagaimanakah Anda menilai kondisi _____ (BACAKAN PILIHAN) di sekitar wilayah usaha Anda? [SA]</p>									
Q78b	<p>SHOWCARD Menurut pengetahuan dan pengalaman Anda, pada kenyataannya bagaimanakah Anda menilai peningkatan kualitas dari _____ (BACAKAN MASING-MASING INFRASTRUKTUR) di tahun 2007 dibandingkan tahun 2006? [SA]</p>									
Q78c	<p>Menurut pengetahuan dan pengalaman anda, jika pada tahun 2007 infrastruktur (yang berada di sekitar wilayah usaha anda) berikut ini mengalami kerusakan atau tidak berfungsi sebagaimana mestinya, berapa hari/rata-rata yang diperlukan untuk memperbaikinya? _____ [bacakan untuk masing-masing infrastruktur?]</p> <p><i>Interviewer:</i> Catat kode: 9996: Tidak tahu 9997: Tidak aplikatif/tidak relevan/pertanyaan skip 9999: Menolak menjawab</p>									
		Q78a				Q78b				Q78c
		Sangat buruk	Buruk	Baik	Sangat Baik	Tidak ada peningkatan	Ada peningkatan tetapi tidak signifikan	Peningkatan cukup signifikan	Peningkatan sangat signifikan	Lama perbaikan (dalam hari)
		(8617)			4	(8622)				(8627- 8629)
(R1)	Jalan kabupaten/kota	1 (8618)	2	3	4	1 (8623)	2	3	4	---- (8630- 8632)
(R2)	Lampu penerangan jalan	1 (8619)	2	3	4	1 (8624)	2	3	4	---- (8633- 8635)
(R3)	Air PDAM	1 (8620)	2	3	4	1 (8625)	2	3	4	---- (8636- 8638)
(R4)	Listrik	1 (8621)	2	3	4	1 (8626)	2	3	4	---- (8639- 8641)
(R5)	Telepon	1	2	3	4	1	2	3	4	----
Q79	Apakah perusahaan ini memiliki genset sendiri? [SA]							Code (8642)	Route	
								Ya		
								1		
								Tidak		
								2		
								Tidak tahu		
								6		
								Menolak menjawab		
								9		

source: KPPOD and the Asian Foundation (Original Version – Indonesian)

Appendix VI

Table 6 Percentage of Road Quality in Districts

No.	Districts	Province	The Percentage of Proportion of Materials of the Village Roads in the District								Pre and Post Decentralization
			Asphalt		Rocks		Soils		Others		
			2000	2008	2000	2008	2000	2008	2000	2008	
1	Kab. Aceh Barat	Prop. Nanggroe Aceh Darussalam	47.7	35.9	31.7	50.6	18.0	12.9	0.7	0.3	worse
2	Kab. Aceh Besar	Prop. Nanggroe Aceh Darussalam	60.5	46.2	35.6	49.5	3.2	4.0	0.2	0.2	worse
3	Kab. Aceh Selatan	Prop. Nanggroe Aceh Darussalam	86.4	68.2	8.0	25.0	3.5	6.1	0.5	0	worse
4	Kab. Aceh Tengah	Prop. Nanggroe Aceh Darussalam	61.6	64.4	21.7	17.9	15.8	17.5	0	0	better
5	Kab. Aceh Tenggara	Prop. Nanggroe Aceh Darussalam	77.2	74.3	16.8	15.7	6.0	10.0	0	0	worse
6	Kab. Aceh Timur	Prop. Nanggroe Aceh Darussalam	21.6	23.7	60.6	54.6	12.7	20.5	0.5	0.3	better
7	Kab. Aceh Utara	Prop. Nanggroe Aceh Darussalam	26.3	25.9	68.4	67.0	5.1	7.1	0.2	0.1	worse
8	Kab. Aceh Pidie	Prop. Nanggroe Aceh Darussalam	29.4	45.6	54.4	44.9	15.4	9.3	0.7	0.1	better
9	Kota Banda Aceh	Prop. Nanggroe Aceh Darussalam	93.3	95.6	5.6	2.2	1.1	2.2	0	0	better
10	Kab. Asahan	Prop. Sumatera Utara	33.7	28.6	34.6	44.2	27.6	27.2	0.4	0	worse
11	Kab. Dairy	Prop. Sumatera Utara	37.8	72.9	36.3	14.5	24.3	12.7	0.8	0	better
12	Kab. Deli Serdang	Prop. Sumatera Utara	36.1	46.8	31.9	29.2	31.9	23.9	0.2	0.2	better
13	Kab. Labuhan Batu	Prop. Sumatera Utara	40.0	33.1	27.3	34.7	28.0	31.8	0.3	0.4	worse
14	Kab. Langkat	Prop. Sumatera Utara	33.5	36.1	37.0	45.5	24.8	15.5	0	0.4	better
15	Kab. Nias	Prop. Sumatera Utara	33.9	32.0	32.3	33.3	25.1	29.4	1.8	1.5	worse
16	Kab. Simalungun	Prop. Sumatera Utara	37.3	29.6	25.1	41.9	36.9	27.9	0.4	0	worse

17	Kab. Tanah Karo	Prop. Sumatera Utara	67.1	69.5	26.7	27.1	6.2	3.4	0	0	better
18	Kab. Tapanuli Selatan	Prop. Sumatera Utara	52.8	46.5	24.5	32.5	21.9	20.9	0	0.1	better
19	Kab. Tapanuli Tengah	Prop. Sumatera Utara	71.4	76.3	11.6	11.6	16.3	10.4	0	0.6	better
20	Kab. Tapanuli Utara	Prop. Sumatera Utara	69.0	69.3	24.7	22.7	6.3	7.8	0	0.3	better
21	Kota Binjai	Prop. Sumatera Utara	94.6	94.6	5.4	5.4	0	0	0	0	unchanged
22	Kota Medan	Prop. Sumatera Utara	95.4	98.7	4.0	1.3	0.7	0	0	0	better
23	Kota Pematang Siantar	Prop. Sumatera Utara	93.0	97.7	7.0	2.3	0	0	0	0	better
24	Kota Tanjung Balai	Prop. Sumatera Utara	93.3	90.3	0	9.7	6.7	0	0	0	better
25	Kab. Agam	Prop. Sumatera Barat	47.8	78.0	41.1	14.6	10.6	7.3	0.6	0	better
26	Kab. Limapuluh Kota	Prop. Sumatera Barat	70.4	77.6	16.9	19.7	9.9	2.6	0.5	0	better
27	Kab. Padang Pariaman	Prop. Sumatera Barat	50.9	86.4	44.2	11.9	4.5	1.7	0.4	0	better
28	Kab. Pesisir Selatan	Prop. Sumatera Barat	66.4	76.3	22.7	21.1	9.8	2.6	0	0	better
29	Kab. Sawahlunto Sijunjung	Prop. Sumatera Barat	84.2	64.7	11.3	25.0	4.5	7.4	0	2.9	worse
30	Kab. Solok	Prop. Sumatera Barat	49.1	59.4	34.9	31.1	15.6	9.4	0.5	0	better
31	Kab. Tanah Datar	Prop. Sumatera Barat	57.1	94.7	26.5	4.0	3.2	1.3	0	0	better
32	Kota Bukittinggi	Prop. Sumatera Barat	100.0	100.0	0	0	0	0	0	0	unchanged
33	Kota Padang	Prop. Sumatera Barat	87.0	86.5	11.9	13.5	0.5	0	0	0	worse
34	Kota Padang Panjang	Prop. Sumatera Barat	93.8	100.0	6.3	0	0	0	0	0	better
35	Kota Payakumbuh	Prop. Sumatera Barat	95.9	100.0	4.1	0	0	0	0	0	better
36	Kota Sawahlunto	Prop. Sumatera Barat	97.3	94.6	2.7	5.4	0	0	0	0	worse
37	Kota Solok	Prop. Sumatera Barat	100.0	100.0	0	0	0	0	0	0	unchanged
38	Kab. Indragiri Hilir	Prop. Riau	29.2	13.0	8.9	28.5	19.6	38.9	0	2.6	worse
39	Kab. Indragiri Hulu	Prop. Riau	12.1	33.0	13.9	42.8	11.5	19.1	0	4.6	better
40	Kota Pekanbaru	Prop. Riau	91.7	96.6	6.3	1.7	2.1	1.7	0	0	better
41	Kab. Batanghari	Prop. Jambi	51.1	78.8	17.4	9.7	20.4	10.6	0	0	better
42	Kab. Kerinci	Prop. Jambi	82.5	80.6	13.9	13.7	2.8	3.2	0.8	2.5	worse
43	Kab. Merangin	Prop. Jambi	51.4	51.4	30.3	32.2	13.8	13.0	0.5	1.1	unchanged

44	Kota Jambi	Prop. Jambi	98.2	96.8	1.8	0	0	3.2	0	0	worse
45	Kab. Lahat	Prop. Sumatera Selatan	73.5	81.5	22.9	13.8	2.6	4.1	0.8	0.5	better
46	Kab. Muara Enim	Prop. Sumatera Selatan	50.2	75.3	34.7	17.5	11.2	4.9	0.4	0	better
47	Kab. Musi Banyuasin	Prop. Sumatera Selatan	22.5	32.2	14.7	14.5	42.6	47.7	0.2	0.4	better
48	Kab. Musi Rawas	Prop. Sumatera Selatan	48.6	62.8	27.9	26.7	12.5	9.3	1.4	0.9	better
49	Kab. Ogan Komeri ng Ilir	Prop. Sumatera Selatan	45.4	44.3	11.7	19.2	27.1	31.6	0	0.2	worse
50	Kab. Ogan Komeri ng Ulu	Prop. Sumatera Selatan	50.5	50.5	22.4	19.5	25.7	30.0	0.2	0	better
51	Kota Palembang	Prop. Sumatera Selatan	95.1	95.3	1.0	0	2.9	4.7	0	0	better
52	Kab. Bengkulu Selatan	Prop. Bengkulu	64.1	57.9	28.5	37.8	6.4	4.1	1.0	0	worse
53	Kab. Bengkulu Utara	Prop. Bengkulu	68.4	58.0	23.0	37.6	7.3	4.4	0.3	0	worse
54	Kab. Rejang Lebong	Prop. Bengkulu	94.4	84.1	4.6	12.2	1.0	3.5	0	0.3	worse
55	Kota Bengkulu	Prop. Bengkulu	96.4	97.0	1.8	3.0	1.8	0	0	0	better
56	Kab. Lampung Selatan	Prop. Lampung	54.0	61.5	26.0	15.6	18.6	22.1	0.3	0	better
57	Kab. Lampung Tengah	Prop. Lampung	49.3	42.5	27.8	38.5	22.9	18.9	0	0	worse
58	Kab. Lampung Utara	Prop. Lampung	38.5	57.5	37.6	35.2	22.4	7.3	1.5	0	better
59	Kab. Lampung Barat	Prop. Lampung	49.1	51.2	22.8	26.4	26.3	21.4	1.8	0	better
60	Kab. Tulang Bawang	Prop. Lampung	19.5	19.2	33.0	25.0	42.5	54.6	0	1.3	worse
61	Kab. Tanggamus	Prop. Lampung	53.0	54.1	28.1	28.8	15.7	17.2	0.3	0	better
62	Kota Bandar Lampung	Prop. Lampung	91.7	94.9	6.0	5.1	2.4	0	0	0	better
63	Kab. Bandung	Prop. Jawa Barat	60.1	82.2	35.0	16.5	4.4	1.3	0.2	0	better
64	Kab. Bekasi	Prop. Jawa Barat	65.2	64.2	20.3	26.2	14.4	9.6	0	0	worse
65	Kab. Bogor	Prop. Jawa Barat	70.5	70.8	26.4	27.3	3.1	1.9	0	0	better
66	Kab. Ciarnis	Prop. Jawa Barat	78.9	75.2	20.2	24.5	0.8	0.3	0	0	worse
67	Kab. Cianjur	Prop. Jawa Barat	46.0	64.4	42.8	28.2	11.1	7.5	0	0	better
68	Kab. Cirebon	Prop. Jawa Barat	74.8	83.3	23.3	14.6	1.7	1.9	0.2	0.2	better
69	Kab. Garut	Prop. Jawa Barat	65.2	62.0	29.9	37.0	4.9	0.9	0	0	worse
70	Kab. Indramayu	Prop. Jawa Barat	74.8	75.4	22.9	24.6	1.9	0	0	0	better

71	Kab. Karawang	Prop. Jawa Barat	68.3	67.3	28.4	30.1	3.3	2.6	0	0	worse
72	Kab. Kuningan	Prop. Jawa Barat	89.4	98.4	10.6	1.6	0	0	0	0	better
73	Kab. Majalengka	Prop. Jawa Barat	73.6	93.1	25.5	6.6	0.9	0.3	0	0	better
74	Kab. Purwakarta	Prop. Jawa Barat	83.3	76.0	15.1	24.0	1.0	0	0.5	0	worse
75	Kab. Subang	Prop. Jawa Barat	61.6	75.9	35.6	20.2	2.8	3.6	0	0.4	better
76	Kab. Sukabumi	Prop. Jawa Barat	59.2	64.6	30.2	29.4	10.4	6.0	0.3	0	better
77	Kab. Sumedang	Prop. Jawa Barat	75.8	92.1	21.6	7.2	1.9	0.4	0.7	0.4	better
78	Kab. Tasikmalaya	Prop. Jawa Barat	56.3	61.0	41.5	36.9	2.2	1.9	0	0.2	better
79	Kota Bandung	Prop. Jawa Barat	96.4	98.7	3.6	1.3	0	0	0	0	better
80	Kota Bekasi	Prop. Jawa Barat	86.5	100.0	11.5	0	1.9	0	0	0	better
81	Kota Bogor	Prop. Jawa Barat	92.6	100.0	7.4	0	0	0	0	0	better
82	Kota Cirebon	Prop. Jawa Barat	95.5	100.0	0	0	4.5	0	0	0	better
83	Kota Sukabumi	Prop. Jawa Barat	97.0	100.0	3.0	0	0	0	0	0	better
84	Kab. Banjarnegara	Prop. Jawa Tengah	57.6	83.8	38.5	15.1	4.0	1.1	0	0	better
85	Kab. Banyumas	Prop. Jawa Tengah	62.6	93.7	36.8	5.4	0.6	0.9	0	0	better
86	Kab. Batang	Prop. Jawa Tengah	59.3	94.8	38.6	5.2	1.7	0	0.4	0	better
87	Kab. Blora	Prop. Jawa Tengah	24.7	70.8	72.2	28.8	2.4	0.3	0.7	0	better
88	Kab. Boyolali	Prop. Jawa Tengah	67.0	91.8	23.2	8.2	9.4	0	0.4	0	better
89	Kab. Brebes	Prop. Jawa Tengah	59.6	80.8	36.0	18.9	4.4	0.3	0	0	better
90	Kab. Cilacap	Prop. Jawa Tengah	60.3	79.9	33.7	18.3	4.3	1.8	0.4	0	better
91	Kab. Demak	Prop. Jawa Tengah	49.8	57.4	47.0	40.6	2.8	1.6	0.4	0.4	better
92	Kab. Grobogan	Prop. Jawa Tengah	31.1	39.6	67.9	60.0	1.1	0.4	0	0	better
93	Kab. Jepara	Prop. Jawa Tengah	97.4	97.9	2.1	0	0	1.5	0	0	better
94	Kab. Karanganyar	Prop. Jawa Tengah	86.4	99.4	13.6	0.6	0	0	0	0	better
95	Kab. Kebumen	Prop. Jawa Tengah	19.6	58.0	72.2	40.2	7.4	1.7	0.9	0	better
96	Kab. Kendal	Prop. Jawa Tengah	69.5	88.1	29.5	11.6	1.1	0.4	0	0	better
97	Kab. Klaten	Prop. Jawa Tengah	77.1	93.0	14.7	4.5	8.2	2.5	0	0	better
98	Kab. Kudus	Prop. Jawa Tengah	97.7	88.6	2.3	11.4	0	0	0	0	worse
99	Kab. Magelang	Prop. Jawa Tengah	34.4	66.9	51.8	32.3	13.8	0.8	0	0	better
100	Kab. Pati	Prop. Jawa Tengah	69.6	92.6	29.4	6.9	0.7	0.5	0.2	0	better
101	Kab. Pekalongan	Prop. Jawa Tengah	52.1	93.3	45.4	6.7	2.5	0	0	0	better

102	Kab. Pemalang	Prop. Jawa Tengah	77.0	88.7	21.2	9.0	1.8	2.3	0	0	better
103	Kab. Purbalingga	Prop. Jawa Tengah	54.0	91.6	43.9	8.4	2.1	0	0	0	better
104	Kab. Purworejo	Prop. Jawa Tengah	43.1	67.8	54.3	30.6	2.4	1.6	0.2	0	better
105	Kab. Rembang	Prop. Jawa Tengah	78.6	94.9	20.4	5.1	1.0	0	0	0	better
106	Kab. Semarang	Prop. Jawa Tengah	78.3	100.0	20.4	0	1.3	0	0	0	better
107	Kab. Sragen	Prop. Jawa Tengah	81.2	70.7	18.4	27.9	0.5	1.4	0	0	worse
108	Kab. Sukoharjo	Prop. Jawa Tengah	86.2	95.8	13.2	3.0	0.6	1.2	0	0	better
109	Kab. Tegal	Prop. Jawa Tengah	72.5	93.0	26.5	6.6	0.7	0.3	0.3	0	better
110	Kab. Temanggung	Prop. Jawa Tengah	36.5	42.9	63.2	57.1	0.3	0	0	0	better
111	Kab. Wonogiri	Prop. Jawa Tengah	28.6	52.7	70.7	46.6	0.7	0.7	0	0	better
112	Kab. Wonosobo	Prop. Jawa Tengah	52.7	64.9	47.3	34.7	0	0.4	0	0	better
113	Kota Magelang	Prop. Jawa Tengah	100.0	100.0	0	0	0	0	0	0	unchanged
114	Kota Pekalongan	Prop. Jawa Tengah	97.8	100.0	2.2	0	0	0	0	0	better
115	Kota Salatiga	Prop. Jawa Tengah	100.0	100.0	0	0	0	0	0	0	unchanged
116	Kota Semarang	Prop. Jawa Tengah	93.2	98.3	5.6	1.7	1.1	0	0	0	better
117	Kota Surakarta	Prop. Jawa Tengah	100.0	100.0	0	0	0	0	0	0	unchanged
118	Kota Tegal	Prop. Jawa Tengah	100.0	100.0	0	0	0	0	0	0	unchanged
119	Kab. Bantul	Prop. D I Yogyakarta	84.0	98.7	13.3	1.3	2.7	0	0	0	better
120	Kab. Gunung Kidul	Prop. D I Yogyakarta	45.8	70.1	54.2	29.2	0	0.7	0	0	better
121	Kab. Kulon Progo	Prop. D I Yogyakarta	79.5	100.0	20.5	0	0	0	0	0	better
122	Kab. Sleman	Prop. D I Yogyakarta	93.0	91.9	0	8.1	7.0	0	0	0	better
123	Kota Yogyakarta	Prop. D I Yogyakarta	100.0	100.0	0	0	0	0	0	0	unchanged
124	Kab. Bangkalan	Prop. Jawa Timur	43.4	77.2	44.1	15.3	12.1	7.5	0.4	0	better
125	Kab. Banyuwangi	Prop. Jawa Timur	74.0	90.3	24.0	6.0	1.9	3.7	0	0	better
126	Kab. Blitar	Prop. Jawa Timur	69.4	86.3	11.3	5.6	19.4	8.1	0	0	better
127	Kab. Bojonegoro	Prop. Jawa Timur	34.2	38.1	57.9	61.6	7.9	0.2	0	0	better
128	Kab. Bondowoso	Prop. Jawa Timur	64.1	67.6	18.5	16.9	17.4	15.5	0	0	better
129	Kab. Gresik	Prop. Jawa Timur	53.9	80.1	45.2	19.7	0.6	0.3	0.3	0	better
130	Kab. Jember	Prop. Jawa Timur	55.1	57.9	31.6	34.4	13.4	7.7	0	0	better
131	Kab. Jombang	Prop. Jawa Timur	35.0	86.6	24.5	7.8	40.5	5.6	0	0	better
132	Kab. Kediri	Prop. Jawa Timur	77.9	87.5	4.7	4.9	17.4	7.6	0	0	better

133	Kab. Lamongan	Prop. Jawa Timur	26.2	64.8	67.1	35.2	5.5	0	0.4	0	better
134	Kab. Lumajang	Prop. Jawa Timur	64.7	77.1	22.9	19.0	12.4	3.9	0	0	better
135	Kab. Madiun	Prop. Jawa Timur	54.9	83.0	37.9	17.0	7.3	0	0	0	better
136	Kab. Magetan	Prop. Jawa Timur	44.7	94.0	38.7	4.7	16.2	1.3	0.4	0	better
137	Kab. Malang	Prop. Jawa Timur	57.3	85.7	40.0	14.3	2.7	0	0	0	better
138	Kab. Mojokerto	Prop. Jawa Timur	64.5	86.5	27.6	8.6	7.6	4.9	0.3	0	better
139	Kab. Nganjuk	Prop. Jawa Timur	51.6	86.6	35.5	11.6	12.9	1.8	0	0	better
140	Kab. Ngawi	Prop. Jawa Timur	51.6	43.3	45.6	54.8	2.8	1.8	0	0	worse
141	Kab. Pacitan	Prop. Jawa Timur	65.2	84.2	29.9	15.8	4.9	0	0	0	better
142	Kab. Pamekasan	Prop. Jawa Timur	30.2	68.3	57.1	25.9	12.7	5.8	0	0	better
143	Kab. Pasuruan	Prop. Jawa Timur	55.6	96.4	34.0	2.2	10.4	1.4	0	0	better
144	Kab. Ponorogo	Prop. Jawa Timur	35.3	63.6	53.1	33.8	11.6	2.6	0	0	better
145	Kab. Probolinggo	Prop. Jawa Timur	47.6	76.7	41.2	17.6	10.9	5.5	0	0	better
146	Kab. Sampang	Prop. Jawa Timur	36.6	51.1	38.7	41.4	23.1	5.9	0	0	better
147	Kab. Sidoarjo	Prop. Jawa Timur	83.6	98.6	10.2	0.8	5.9	0.6	0.3	0	better
148	Kab. Situbondo	Prop. Jawa Timur	72.8	94.9	22.1	5.1	5.1	0	0	0	better
149	Kab. Sumenep	Prop. Jawa Timur	52.1	63.3	35.8	20.8	7.5	12.0	0.6	0	better
150	Kab. Trenggalek	Prop. Jawa Timur	64.3	87.3	33.8	12.1	1.9	0.6	0	0	better
151	Kab. Tuban	Prop. Jawa Timur	50.3	100.0	44.8	0	4.9	0	0	0	better
152	Kab. Tulungagung	Prop. Jawa Timur	46.1	79.7	49.1	18.5	4.4	1.8	0.4	0	better
153	Kota Blitar	Prop. Jawa Timur	100.0	100.0	0	0	0	0	0	0	unchanged
154	Kota Kediri	Prop. Jawa Timur	84.8	100.0	0	0	15.2	0	0	0	better
155	Kota Madiun	Prop. Jawa Timur	100.0	100.0	0	0	0	0	0	0	unchanged
156	Kota Malang	Prop. Jawa Timur	98.2	100.0	1.8	0	0	0	0	0	better
157	Kota Mojokerto	Prop. Jawa Timur	100.0	100.0	0	0	0	0	0	0	unchanged
158	Kota Pasuruan	Prop. Jawa Timur	100.0	100.0	0	0	0	0	0	0	unchanged
159	Kota Probolinggo	Prop. Jawa Timur	96.6	100.0	3.4	0	0	0	0	0	better
160	Kota Surabaya	Prop. Jawa Timur	99.4	98.8	0.6	1.2	0	0	0	0	worse
161	Kab. Kapuas Hulu	Prop. Kalimantan Barat	18.6	26.2	7.6	24.3	36.6	28.0	0	5.6	better
162	Kab. Ketapang	Prop. Kalimantan Barat	25.8	20.8	19.5	12.5	35.2	60.6	0.6	0	worse
163	Kab. Pontianak	Prop. Kalimantan Barat	36.3	50.9	6.4	4.0	17.8	39.3	0	0	better

164	Kab. Sambas	Prop. Kalimantan Barat	48.6	54.3	10.2	14.7	24.3	25.5	0.6	4.9	better
165	Kab. Sanggau	Prop. Kalimantan Barat	19.9	26.9	14.9	21.5	48.1	47.1	1.2	1.2	better
166	Kab. Sintang	Prop. Kalimantan Barat	14.8	14.2	8.9	13.2	34.6	55.7	0	0.8	worse
167	Kota Pontianak	Prop. Kalimantan Barat	100.0	100.0	0	0	0	0	0	0	unchanged
168	Kab. Barito Selatan	Prop. Kalimantan Tengah	38.5	39.9	17.3	27.6	12.8	18.4	0	0	better
169	Kab. Barito Utara	Prop. Kalimantan Tengah	12.7	22.0	10.0	14.1	15.5	33.9	0.5	0	worse
170	Kab. Kapuas	Prop. Kalimantan Tengah	4.8	16.3	14.9	16.3	16.9	54.6	0	1.7	better
171	Kab. Kotawaringin Barat	Prop. Kalimantan Tengah	16.3	25.5	17.4	21.0	21.6	39.5	0.5	5.0	better
172	Kab. Kotawaringin Timur	Prop. Kalimantan Tengah	8.4	14.9	5.5	21.5	12.1	30.3	0	1.2	better
173	Kota Palangkaraya	Prop. Kalimantan Tengah	76.2	60.0	0	3.3	0	26.7	0	3.3	worse
174	Kab. Banjar	Prop. Kalimantan Selatan	51.6	59.0	14.6	21.9	26.1	16.3	0	0.3	better
175	Kab. Barito Kuala	Prop. Kalimantan Selatan	24.2	40.5	17.2	40.5	26.8	16.5	0	0	better
176	Kab. Hulu Sungai Selatan	Prop. Kalimantan Selatan	76.4	79.1	12.4	11.5	6.2	6.8	0	0	better
177	Kab. Hulu Sungai Tengah	Prop. Kalimantan Selatan	77.4	91.1	12.4	4.1	9.6	4.7	0	0	better
178	Kab. Hulu Sungai Utara	Prop. Kalimantan Selatan	64.6	70.4	14.8	14.0	15.9	10.2	1.1	4.3	better
179	Kab. Kota Baru	Prop. Kalimantan Selatan	28.4	27.4	37.4	46.1	19.8	22.3	1.0	0.9	worse
180	Kab. Tabalong	Prop. Kalimantan Selatan	79.7	75.6	12.8	17.6	7.0	6.9	0	0	worse
181	Kab. Tanah Laut	Prop. Kalimantan Selatan	51.9	70.9	31.1	26.1	16.3	3.0	0.7	0	better
182	Kab. Tapin	Prop. Kalimantan Selatan	66.4	80.2	18.3	13.0	3.1	3.8	0	0	better
183	Kota Banjarmasin	Prop. Kalimantan Selatan	86.0	98.0	12.0	2.0	0	0	0	0	better

184	Kab. Kutai Kartanegara	Prop. Kalimantan Timur	14.3	47.6	29.6	27.3	10.2	13.7	3.1	3.5	better
185	Kab. Pasir	Prop. Kalimantan Timur	25.0	33.1	37.2	45.3	17.3	18.0	0.6	0	better
186	Kota Balikpapan	Prop. Kalimantan Timur	88.9	100.0	3.7	0	3.7	0	0	0	better
187	Kota Samarinda	Prop. Kalimantan Timur	85.7	96.2	11.9	3.8	2.4	0	0	0	better
188	Kota Tarakan	Prop. Kalimantan Timur	88.9	95.0	5.6	0	5.6	5.0	0	0	better
189	Kab. Bolaang Mongondow	Prop. Sulawesi Utara	71.9	76.5	19.5	21.1	5.5	1.6	0.4	0.3	better
190	Kab. Minahasa	Prop. Sulawesi Utara	59.4	69.2	7.9	22.4	13.8	8.2	0	0	better
191	Kota Bitung	Prop. Sulawesi Utara	72.7	78.3	2.3	11.6	2.3	10.1	0	0	better
192	Kota Manado	Prop. Sulawesi Utara	94.1	96.6	0	3.4	0	0	0	0	better
193	Kab. Banggai	Prop. Sulawesi Tengah	47.9	73.9	25.1	23.0	12.9	0.8	0.2	0	better
194	Kab. Poso	Prop. Sulawesi Tengah	57.2	56.0	23.9	18.1	11.3	18.8	0	0	worse
195	Kota Palu	Prop. Sulawesi Tengah	95.3	97.7	4.7	2.3	0	0	0	0	better
196	Kab. Bantaeng	Prop. Sulawesi Selatan	77.3	89.6	19.7	7.5	3.0	3.0	0	0	better
197	Kab. Barru	Prop. Sulawesi Selatan	85.2	87.0	1.9	5.6	13.0	7.4	0	0	better
198	Kab. Bone	Prop. Sulawesi Selatan	35.8	47.6	44.6	41.1	18.0	10.5	0	0	better
199	Kab. Bulukumba	Prop. Sulawesi Selatan	39.8	61.1	25.2	33.3	35.0	5.6	0	0	better
200	Kab. Enrekang	Prop. Sulawesi Selatan	38.0	66.7	20.4	27.9	38.9	4.7	0	0	better
201	Kab. Gowa	Prop. Sulawesi Selatan	50.0	65.3	21.5	28.1	27.7	6.6	0.8	0	better
202	Kab. Jeneponto	Prop. Sulawesi Selatan	72.1	95.6	18.0	4.4	9.9	0	0	0	better
203	Kab. Luwu	Prop. Sulawesi Selatan	40.7	46.2	27.8	32.0	30.6	21.8	0.9	0	better
204	Kab. Majene	Prop. Sulawesi Barat	85.7	77.5	5.7	17.5	8.6	5.0	0	0	worse
205	Kab. Mamuju	Prop. Sulawesi Barat	18.9	27.4	62.1	54.3	13.6	16.7	0.8	0.5	better
206	Kab. Maros	Prop. Sulawesi Selatan	53.4	49.5	32.0	46.6	13.6	3.9	1.0	0	better
207	Kab. Pangkajene Kepulauan	Prop. Sulawesi Selatan	68.0	60.8	2.1	8.8	0	0	0	0	worse
208	Kab. Pinrang	Prop. Sulawesi Selatan	82.5	78.8	6.8	14.4	10.7	6.7	0	0	better
209	Kab. Polewali	Prop. Sulawesi Barat	53.2	31.9	6.5	19.7	40.3	47.7	0	0.6	worse

	Mandar										
210	Kab. Selayar	Prop. Sulawesi Selatan	50.0	59.5	6.9	13.5	22.2	8.1	0	0	better
211	Kab. Sidenreng Rappang	Prop. Sulawesi Selatan	70.0	68.6	25.5	24.8	4.5	6.7	0	0	worse
212	Kab. Sinjai	Prop. Sulawesi Selatan	38.2	40.0	30.9	45.0	29.4	10.0	0	0	better
213	Kab. Soppeng	Prop. Sulawesi Selatan	87.9	77.1	10.6	8.6	1.5	14.3	0	0	worse
214	Kab. Takalar	Prop. Sulawesi Selatan	64.4	87.0	27.4	10.4	5.5	0	0	0	better
215	Kab. Tana Toraja	Prop. Sulawesi Selatan	22.5	28.4	31.4	40.3	45.4	31.3	0.7	0	better
216	Kab. Wajo	Prop. Sulawesi Selatan	52.3	45.5	33.5	50.6	13.1	4.0	1.1	0	worse
217	Kota Pare-Pare	Prop. Sulawesi Selatan	100.0	100.0	0	0	0	0	0	0	unchanged
218	Kota Makassar	Prop. Sulawesi Selatan	93.0	95.8	3.5	0.7	0	0	0.7	0.7	better
219	Kab. Buton	Prop. Sulawesi Tenggara	44.4	57.9	30.7	23.6	12.9	15.4	3.7	1.4	better
220	Kab. Konawe	Prop. Sulawesi Tenggara	29.8	34.4	35.9	42.6	25.2	21.0	0.2	0.5	better
221	Kab. Kolaka	Prop. Sulawesi Tenggara	48.9	31.1	30.0	49.5	18.1	18.4	0	0.9	worse
222	Kab. Muna	Prop. Sulawesi Tenggara	45.2	41.9	31.1	39.6	12.7	10.1	0	0.7	worse
223	Kota Kendari	Prop. Sulawesi Tenggara	84.6	84.4	9.6	9.4	0	6.3	0	0	worse
224	Kab. Badung	Prop. Bali	98.4	100.0	1.6	0	0	0	0	0	better
225	Kab. Bangli	Prop. Bali	98.6	97.2	0	0	0	2.8	0	0	worse
226	Kab. Buleleng	Prop. Bali	100.0	98.6	0	1.4	0	0	0	0	worse
227	Kab. Gianyar	Prop. Bali	100.0	100.0	0	0	0	0	0	0	unchanged
228	Kab. Jembrana	Prop. Bali	98.0	100.0	2.0	0	0	0	0	0	better
229	Kab. Karang Asem	Prop. Bali	97.1	94.9	2.9	0	0	5.1	0	0	worse
230	Kab. Klungkung	Prop. Bali	96.6	100.0	0	0	0	0	0	0	unchanged
231	Kab. Tabanan	Prop. Bali	89.4	97.7	7.1	1.6	3.5	0.8	0	0	better
232	Kota Denpasar	Prop. Bali	95.3	100.0	2.3	0	0	0	2.3	0	better
233	Kab. Bima	Prop. Nusa Tenggara Barat	76.9	85.6	12.8	8.8	5.1	5.1	0	0.5	better
234	Kab. Dompu	Prop. Nusa Tenggara	87.7	95.7	12.3	2.9	0	1.4	0	0	better

		Barat									
235	Kab. Lombok Barat	Prop. Nusa Tenggara Barat	58.6	86.0	16.2	5.8	23.2	7.4	1.0	0	better
236	Kab. Lombok Tengah	Prop. Nusa Tenggara Barat	58.8	63.7	26.9	25.8	14.3	10.5	0	0	better
237	Kab. Lombok Timur	Prop. Nusa Tenggara Barat	82.6	84.0	7.3	2.5	10.1	13.4	0	0	worse
238	Kab. Sumbawa	Prop. Nusa Tenggara Barat	62.9	57.9	19.3	30.8	14.3	9.8	0	1.4	worse
239	Kota Mataram	Prop. Nusa Tenggara Barat	100.0	100.0	0	0	0	0	0	0	unchanged
240	Kab. Alor	Prop. Nusa Tenggara Timur	36.6	43.4	14.3	9.7	42.3	45.1	0	0.6	better
241	Kab. Belu	Prop. Nusa Tenggara Timur	42.5	28.4	41.9	49.0	15.0	22.6	0.6	0	worse
242	Kab. Ende	Prop. Nusa Tenggara Timur	43.9	50.2	13.9	25.8	38.7	22.5	1.7	0.5	better
243	Kab. Flores Timur	Prop. Nusa Tenggara Timur	61.6	59.3	10.9	17.7	23.2	21.7	0	1.3	worse
244	Kab. Kupang	Prop. Nusa Tenggara Timur	29.7	18.4	24.8	52.2	44.7	29.1	0	0	better
245	Kab. Ngada	Prop. Nusa Tenggara Timur	25.6	48.7	24.8	18.7	45.9	32.6	0.8	0	better
246	Kab. Sikka	Prop. Nusa Tenggara Timur	54.1	65.6	14.0	10.0	30.2	21.3	0	0	better
247	Kab. Sumba Barat	Prop. Nusa Tenggara Timur	58.9	38.0	22.9	52.1	18.2	9.9	0	0	worse
248	Kab. Sumba Timur	Prop. Nusa Tenggara Timur	48.0	53.2	25.2	33.3	24.4	12.8	0.8	0	better
249	Kab. Timor Tengah Selatan	Prop. Nusa Tenggara Timur	36.5	31.7	16.5	36.7	47.0	31.7	0	0	worse
250	Kab. Timor Tengah Utara	Prop. Nusa Tenggara Timur	44.0	30.6	47.2	38.7	8.8	30.6	0	0	worse
251	Kota Kupang	Prop. Nusa Tenggara Timur	91.1	100.0	6.7	0	2.2	0	0	0	better
252	Kab. Maluku Tengah	Prop. Maluku	37.4	46.6	12.5	18.8	22.5	31.8	2.1	0	worse

253	Kab. Maluku Tenggara	Prop. Maluku	24.3	37.4	5.1	6.0	18.9	19.6	0	0.4	better
254	Kota Ambon	Prop. Maluku	96.0	98.0	0	0	4.0	2.0	0	0	better
255	Kab. Biak Numfor	Prop. Papua	61.4	72.9	9.8	9.3	2.6	6.2	0	0.4	worse
256	Kab. Fak-Fak	Prop. Papua Barat	18.7	29.2	2.6	6.7	10.3	12.3	0	0.5	better
257	Kab. Jayapura	Prop. Papua	16.5	21.8	28.9	35.0	28.1	28.8	7.9	3.1	better
258	Kab. Jayawijaya	Prop. Papua	4.7	2.0	6.4	2.2	87.7	95.3	0.7	0.1	worse
259	Kab. Manokwari	Prop. Papua Barat	24.1	23.7	6.4	13.8	44.5	53.2	6.0	1.9	worse
260	Kab. Merauke	Prop. Papua	11.0	9.8	4.2	4.1	17.1	35.0	3.6	3.4	worse
261	Kab. Nabire	Prop. Papua	16.5	18.1	15.7	10.0	52.2	60.0	0	0	worse
262	Kab. Paniai	Prop. Papua	2.2	0	0.7	4.4	94.1	95.6	0.7	0	worse
263	Kab. Yapen Waropen	Prop. Papua	19.1	24.8	15.4	19.0	10.5	27.0	0	1.5	worse
264	Kota Jayapura	Prop. Papua	66.7	89.7	22.2	5.1	0	0	0	5.1	better
265	Kab. Sorong	Prop. Papua Barat	13.6	16.9	8.4	16.6	26.9	33.5	5.2	5.9	worse
266	Kab. Halmahera Barat	Prop. Maluku Utara	38.3	34.0	3.3	9.3	18.0	29.6	1.3	0.6	worse
267	Kab. Halmahera Tengah	Prop. Maluku Utara	46.6	58.7	8.5	20.1	11.0	11.2	0	1.1	beter
268	Kab. Lebak	Prop. Banten	27.0	35.6	52.7	54.1	20.0	10.3	0.3	0	better
269	Kab. Pandeglang	Prop. Banten	59.7	46.3	26.0	46.3	14.3	7.5	0	0	worse
270	Kab. Serang	Prop. Banten	49.6	53.2	45.5	43.9	4.3	2.4	0	0	better
271	Kab. Tangerang	Prop. Banten	76.6	85.7	20.9	13.1	2.5	0.9	0	0.3	better
272	Kota Tangerang	Prop. Banten	93.3	99.0	5.8	1.0	1.0	0	0	0	better
273	Kab. Bangka	Prop. Kepulauan Bangka Belitung	79.6	90.7	14.4	6.8	5.5	1.7	0	0	better
274	Kab. Belitung	Prop. Kepulauan Bangka Belitung	87.0	95.8	0	0	5.8	1.4	0	0	better
275	Kota Pangkal Pinang	Prop. Kepulauan Bangka Belitung	100.0	100.0	0	0	0	0	0	0	unchanged
276	Kab. Gorontalo	Prop. Gorontalo	81.5	70.0	12.1	21.8	5.7	7.2	0	0.5	worse
277	Kota Gorontalo	Prop. Gorontalo	97.8	98.0	2.2	2.0	0	0	0	0	better
278	Kab. Simeulue	Prop. Nanggroe Aceh Darussalam	9.3	24.6	37.3	58.7	42.7	11.6	0	0.7	better

279	Kab. Aceh Singkil	Prop. Nanggroe Aceh Darussalam	31.3	40.3	27.1	32.5	9.0	20.4	0.7	1.6	better
280	Kab. Bireuen	Prop. Nanggroe Aceh Darussalam	43.6	36.7	34.1	35.2	22.1	28.0	0.2	0.2	worse
281	Kab. Mandailing Natal	Prop. Sumatera Utara	70.0	54.9	14.7	23.5	12.8	20.3	0	0	worse
282	Kab. Toba Samosir	Prop. Sumatera Utara	43.2	49.8	34.1	34.0	21.8	14.6	0	1.3	better
283	Kab. Kepulauan Mentawai	Prop. Sumatera Barat	63.9	30.2	29.8	20.9	4.7	14.0	0	0	worse
284	Kab. Kuantan Singingi	Prop. Riau	39.4	58.4	33.5	36.8	19.2	3.8	2.0	1.0	better
285	Kab. Pelalawan	Prop. Riau	27.2	16.9	42.3	33.1	23.0	44.1	0.3	0	worse
286	Kab. Siak	Prop. Riau	31.0	40.7	21.3	42.5	28.0	14.2	0.9	0	better
287	Kota Batam	Prop. Kepulauan Riau	68.2	65.6	4.5	7.8	2.3	4.7	0	0	worse
288	Kota Dumai	Prop. Riau	50.0	75.0	4.5	12.5	40.9	9.4	0	3.1	better
289	Kab. Sarolangun	Prop. Jambi	56.3	58.8	21.9	25.2	17.2	16.0	1.1	0	better
290	Kab. Muaro Jambi	Prop. Jambi	28.7	51.1	13.1	11.3	29.5	35.3	0	0	better
291	Kab. Lampung Timur	Prop. Lampung	45.3	29.2	21.6	53.3	33.2	17.1	0	0.4	worse
292	Kab. Way Kanan	Prop. Lampung	26.0	20.0	53.6	56.7	19.8	23.3	0.5	0	worse
293	Kota Metro	Prop. Lampung	41.7	100.0	33.3	0	25.0	0	0	0	better
294	Kota Depok	Prop. Jawa Barat	92.1	96.8	7.9	3.2	0	0	0	0	better
295	Kota Cilegon	Prop. Banten	83.7	95.3	16.3	2.3	0	2.3	0	0	better
296	Kab. Lembata	Prop. Nusa Tenggara Timur	37.6	38.8	32.4	31.0	28.8	30.2	0.3	0	better
297	Kab. Bengkayang	Prop. Kalimantan Barat	51.4	43.3	18.9	22.0	20.7	32.7	0	0	worse
298	Kab. Landak	Prop. Kalimantan Barat	39.4	40.4	8.1	11.5	45.6	47.4	0	0	better
299	Kab. Kutai Barat	Prop. Kalimantan Timur	14.5	24.2	16.5	28.3	24.7	29.1	0.8	2.7	better
300	Kab. Kutai Timur	Prop. Kalimantan Timur	6.7	11.9	8.0	26.7	12.0	57.0	2.7	0	better
301	Kab. Banggai Kepulauan	Prop. Sulawesi Tengah	49.5	67.9	30.4	17.6	13.4	7.8	0	0	better
302	Kab. Morowali	Prop. Sulawesi Tengah	70.8	43.3	8.6	37.5	20.3	9.2	0	0	worse

303	Kab. Buol	Prop. Sulawesi Tengah	0	54.6	0	39.8	0	5.6	0	0	better
304	Kab. Luwu Utara	Prop. Sulawesi Selatan	20.2	45.1	43.8	35.0	32.7	18.8	0.4	0.4	better
305	Kab. Boalemo	Prop. Gorontalo	63.6	65.8	20.8	22.8	10.1	10.1	1.8	0.6	better
306	Kab. Mimika	Prop. Papua	20.6	22.4	13.2	16.5	22.1	41.2	4.4	0	better
307	Kota Jakarta Selatan	Prop. DKI Jakarta	100.0	100.0	0	0	0	0	0	0	unchanged
308	Kota Jakarta Timur	Prop. DKI Jakarta	95.4	100.0	4.6	0	0	0	0	0	better
309	Kota Jakarta Pusat	Prop. DKI Jakarta	100.0	100.0	0	0	0	0	0	0	unchanged
310	Kota Jakarta Barat	Prop. DKI Jakarta	100.0	96.4	0	3.6	0	0	0	0	worse
311	Kota Jakarta Utara	Prop. DKI Jakarta	100	100	0	0	0	0	0	0.3	better

Source: PODES 2000 and PODES 2008

Appendix VII

Table 7 Percentage of Road Quality in Provinces

Name of Provinces	The Condition of the Road Pre and Post Decentralization And The number of The districts			Total Districts of Samples
	Better	Unchanged	Worse	
Prop. Bali	44.4% / 4	22.2% / 2	33.4% / 3	9
Prop. Banten	83.3% / 5	0 / 0	16.7% / 1	6
Prop. Bengkulu	25% / 1	0 / 0	75% / 3	4
Prop. D I Yogyakarta	80% / 4	20% / 1	0 / 0	5
Prop. DKI Jakarta	40% / 2	40% / 2	17% / 1	5
Prop. Gorontalo	66% / 2	0 / 0	33 % / 1	3
Prop. Jambi	50%/3	0 / 0	50% / 3	6
Prop. Jawa Barat	90.9%/20	0 / 0	9% / 2	22
Prop. Jawa Tengah	80%/28	11.5/ 4	8.5% / 3	35
Prop. Jawa Timur	83.7%/31	10.8%/4	5.4%/2	37
Prop. Kalimantan Barat	33.3%/3	11.1%/1	55.6%/5	9
Prop. Kalimantan Selatan	80%/8	0 / 0	20%/2	10
Prop. Kalimantan Tengah	0%/0	0 / 0	100%/6	6
Prop. Kalimantan Timur	85.7%/6	0 / 0	14.2%/1	7
Prop. Kepulauan Bangka Belitung	66.6%/2	33.3% / 1	0/0	3
Prop. Kepulauan Riau	0/0	0 / 0	100%/1	1
Prop. Lampung	50%/5	0 / 0	50%/5	10
Prop. Maluku	3.3%/1	0 / 0	6.7%/2	3
Prop. Maluku Utara	0%/1	0 / 0	100%/2	2
Prop. Nanggroe Aceh Darussalam	41.6%/5	0 / 0	58.3%/7	12
Prop. Nusa Tenggara Barat	57.1%/4	14.2% / 1	28.5%/2	7
Prop. Nusa Tenggara Timur	69.2%/9	0 / 0	30.7%/4	13
Prop. Papua	11.1%/1	0 / 0	88%/8	9
Prop. Papua Barat	0/0	0 / 0	100%/3	3
Prop. Riau	71.4%/5	0 / 0	28.5%/2	7
Prop. Sulawesi Barat	33.3%/1	0 / 0	66.6%/3	3
Prop. Sulawesi	80.9%/17	4.8%/1	14.3%/2	21

Selatan				
Prop. Sulawesi Tengah	66.6%/4	0 / 0	33.3%/2	6
Prop. Sulawesi Tenggara	40%/2	0 / 0	60%/3	5
Prop. Sulawesi Utara	50%/2	0 / 0	50%/2	4
Prop. Sumatera Barat	57%/8	14.2%/2	28.5%/4	14
Prop. Sumatera Selatan	71.1%/5	0 / 0	28.5%/2	7
Prop. Sumatera Utara	70.5%/12	6%/1	23.5%/4	17
Total	64.9%/206	6.3%/20	28.8%/91	311

Notes: The condition of the road pre and post decentralization based on the the average of the score of the quality of data (1 Best and 4 Worst) on 2000 and 2008. The formula is the average of the score of the quality of data 2008 - the average of the score of the quality of data 2000. If the result < 0, it means the road is better than before decentralization. If the result > 0, it means the road is worse than before decentralization and if the result = 0, it means that there is no difference between after and before decentralization. Source: PODES 2000 and PODES 2008.

Appendix VIII

Table 8 Contingencies between Road Quality and Population Size

The change of the quality of the road		The number of the population		
		Less	More	Row Total
Better	Count	121	109	230
	Row%	52.6%	47.3%	67%
	Column %	58.4%	80.1%	
Unchanged	Count	20	2	22
	Row %	90.9%	9.9%	6.4%
	Column	9.6%	1.4%	
Worse	Count	66	25	91
	Row %	72.5%	27.4%	26.5%
	Column	31.8%	18.3%	
Column Total		207	136	343
Coloumn %		60.3%	39.6%	
Chi Squared 19.98 Df: 2 p-value <0.01				

Source: PODES 2000 and PODES 2008

Appendix IX

Table 9 Descriptive Statistics of the Regression Variables

<i>Variable Name</i>	<i>Variable Description</i>	<i>Resource</i>	<i>Level</i>	<i>Mean</i>	<i>Std. Deviation</i>
Road_Change	Change in village road between (t-1) and t periods. The results are: (1) worse; (2) unchanged; (3) better	PODDDES	Sub-District (aggregated into district by McCulloch et al.)	2.34	0.89
Road_paved	If type of village road was paved in (t-1) period equals 1, else 0	PODES	Sub-District (aggregated into district by McCulloch et al.)	0.61	0.26
Cy	Real Income, GRDP (the market value of all final goods and services within a region during a given period of time)	BPS	District (aggregated into district by McCulloch et al.)	3,768,930,237,837.4	6,800,407,688,331.5
Population	The Size of village population in (t-1) period	Population Census/BPS	District	60,0810.1	571,332.7
Topography	If the village is a flatland; yes 1, no 0		Sub-District (aggregated into district by McCulloch et al.)	0.81	0.38
Mayor_Integrity	overall score for the forming capacity and integrity of Regents/Mayors Sub-Index of the on 2007	KPPOD	District	56.83	10.71
Government Performance	Time Needed to Repair Damaged Road Infrastructure on 2007	KPPOD	District	57.04	18.33

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Appendix X

Table 10 Correlations between Independent Variables

	Mayor Integrity	Performance on road fixing time	GRDP	Population	Road paved	Dummy Kota	Dummy Java	Dummy Flatland
Mayor Integrity	1							
Performance on road fixing time	-0.04975	1						
GRDP	-0.1825	0.07331	1					
Population	-0.245	-0.245	0.5363	1				
Road paved	0.03914	-0.346	0.174	0.06701	1			
Dummy Kota (cities)	-0.07529	-0.1483	0.2525	-0.0694	0.6209	1		
Dummy Java	-0.05889	-0.1231	0.2785	0.5738	0.2964	0.05063	1	
Dummy Flatland	-0.06774	-0.02187	-0.02187	0.3025	0.2281	0.1058	0.32	1

Source: KPPOD 2007, PODES 2000, and PODES 2008

Appendix XI

Figure 8 OLS Regression from Deducer Program

The Local Government Quality and the Changes of Local Road Infrastructure Stocks

```

Response: dummy_dependent
              Df      F    Pr(>F)
cy2001         1  0.1686 0.6818297
TZ_integrity   1  6.8551 0.0095751 **
tz_RoadFixingTime  1  4.1743 0.0424676 *
SH_road_asphalt00  1 15.6696 0.0001077 ***
as.factor(dummy_kota)  1  8.0870 0.0049629 **
pop2001        1  2.4570 0.1187170
as.factor(Djawa)  1  5.9311 0.0158295 *
as.factor(dummy_flatland)  1  0.3037 0.5822602
Residuals      184
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> summary(model.lm2,white.adjust='hc3')
$`Summary Table`
              Estimate      Std..Error    t.value      p.value
(Intercept)  2.329653184509436592009  0.492788814724580082  4.7274880 0.000004507494
cy2001       -0.0000000000000008334745  0.000000000000020298 -0.4106189 0.681829746763
TZ_integrity  0.015145148647273024012  0.005784509972414068  2.6182250 0.009575110309
tz_RoadFixingTime -0.006393338277910229697  0.003129220419681130 -2.0431090 0.042467643960
SH_road_asphalt00 -1.222303717998454164473  0.308780576321546818 -3.9584864 0.000107654837
as.factor(dummy_kota)1  0.523222645665379459956  0.183989467920065791  2.8437641 0.004962868261
pop2001       0.000000219542109547719  0.000000140059129847  1.5674959 0.118716967760
as.factor(Djawa)1  0.336307524850648131842  0.138092155960670759  2.4353847 0.015829520953
as.factor(dummy_flatland)1  0.108567450380800498144  0.197015225336746480  0.5510612 0.582260211833

> rm('model.lm2')

```

Notes: with robust standard errors

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