

Essays on decentralisation, public services and well-being in Indonesia

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Abstract

Decentralisation has been viewed as one means for promoting citizen well-being by bringing public goods and services closer to local needs. Yet empirical evidence across developing countries shows mixed results. This study aims to examine the association between decentralisation, public services and well-being in decentralised Indonesia. It argues that decentralisation enhances citizen well-being through improved local government capacity better able to deliver public goods and services. With lack of local government capacity and accountability, decentralisation decreases well-being.

This study contributes to existing research on decentralisation and well-being in three ways. First, while most studies discuss decentralisation and well-being in a cross-country context, this examines the relationship in a cross-local government context, and specifically within a developing country. Second, while most decentralisation studies focus on objective measures of well-being, this study uses both a subjective measure (i.e. happiness and citizen satisfaction with public services) and an objective measure (i.e. child health and healthcare demand). Third, while most studies use either aggregate or individual analyses to examine the effect of decentralisation on well-being, this study uses multilevel analysis to examine the effect of local government determinants on individual well-being.

This study uses unique datasets which combine individual and household level data and local government data. Individual and household level data is taken from the Governance and Decentralisation Survey (GDS) 2006, the Indonesian Family Life Survey (IFLS) 2007, and the Indonesia socio-economic survey (Susenas) 2009. Local government level data comes from the national village census (Podes) 2006-2008, the national election database 2004-2007, the national health database 2009, local development budget and expenditure information 2004-2008, and the consumer prices indices 2004-2009.

The main findings show that well-being among Indonesians varies across local governments, and that disparities in both public services and well-being appear between more developed and less developed regions. Well-being is not only associated with individual and household determinants, but also with local government determinants. The results are consistent, namely, that variation in well-being is associated with the capacity of local governments to deliver public goods and services. Citizens report being happier and more satisfied when local governments are able to provide better public goods and services for them (i.e. able to spend more of their budget on providing public services). In contrast, well-being decreases in the face of local corruption and of weak capacity to govern. These findings suggest that improving local government capacity to provide effective policies and good public services is vital to improve citizen well-being in decentralised Indonesia.

Declaration

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

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Abbreviations and Glossary

AIC	Akaike Information Criterion.
<i>arisan or binda</i>	a form of rotating savings and credit association in Indonesian culture.
<i>Askes</i>	(<i>Asuransi kesehatan</i>) health insurance for Indonesian civil servant.
<i>Askeskin</i>	(<i>Asuransi kesehatan masyarakat miskin</i>) health insurance for poor people in Indonesia.
BIC	Bayesian Information Criterion.
BPS	(<i>Badan Pusat Statistik</i>) The Indonesian government's Central Bureau of Statistics.
<i>Bupati/walikota</i>	mayor or head of local government in Indonesia.
CFI	Comparative Fix Index.
CPI	Consumer Price Index.
DPDR	(<i>Dewan Perwakilan Rakyat Daerah</i>) local government parliament body in Indonesia.
GDP	Gross Domestic Product.
GDS	Governance Decentralisation Survey.
GLLAMM	generalised linear latent and mixed models.
<i>Golkar</i>	(<i>Golongan Karya</i>) the ruling political party during Suharto's autocratic regime.
<i>Gotong royong</i>	Generalised reciprocity both in rural and urban areas.
ICC	Intra Class Correlation.
IDR	Indonesia Rupiah.
IFLS	Indonesian Family Life Survey.
IRT	Item Response Theory.
<i>Jamkesmas</i>	(<i>Jaminan kesehatan masyarakat</i>) Community health protection scheme in Indonesia.
<i>Kabupaten/kota</i>	district or local government in Indonesia's term.
<i>Karangtaruna</i>	youth group organisation in Indonesia culture.
<i>Kelompok pengajian</i>	muslim religious group in Indonesia culture.
<i>Kelompok kebaktian</i>	christian/catholic religious group in Indonesia culture.
<i>Kelompok wanita</i>	women groups in Indonesia.
<i>Kerja bakti</i>	a form of voluntary labour in Indonesia culture.
<i>Koperasi</i>	a form of business organisation which is organised based on common interest within communities.

MIMIC	Multiple Indicators Multiple Causes.
MoH	The Ministry of Health.
<i>Musyawarah</i>	a form of discussions and sharing of ideas or opinions among community members to solve problems within community.
<i>Ndihma Ekonomike</i>	the name of Albania's poverty-alleviation program in the early 1990s.
OECD	Organisation for Economic Co-operation and Development.
<i>Orde Baru</i>	New Order regime in Indonesia from 1965 to 1998.
<i>Panchayats</i>	the oldest system of local government in the Indian subcontinent. The word <i>panchayat</i> literally means assembly (<i>ayat</i>) of five (<i>panch</i>) wise and respected elders chosen and accepted by the local community.
<i>PDI</i>	(<i>Partai Demokrasi Indonesia Perjuangan</i>) Indonesia Democratic Party.
<i>PPP</i>	(<i>Partai Persatuan Pembangunan</i>) Indonesia United Development Party.
<i>PKK</i>	(<i>Pendidikan Kesejahteraan Keluarga</i>) a group of women in Indonesia, guided by the idea that improving family welfare by providing village women with improved basic skills builds the foundation for a better society.
<i>Persatuan kematian</i>	funeral group in Indonesia culture.
<i>Pilkadal</i>	(<i>Pemilihan kepala daerah langsung</i>) direct local government election in Indonesia.
<i>Podes</i>	(<i>Potensi Desa</i>) Village Potential Census.
<i>Propinsi</i>	Province in Indonesia government structure.
<i>PT Askes</i>	Indonsia state owned enterprise engaged in health insurance.
<i>Puskesmas</i>	(<i>Pusat kesehatan masyarakat</i>) Community health centre.
RMSEA	Root-Mean Square Error of Approximation.
<i>rukun warga</i>	neighbourhood association in Indonesia culture.
<i>SIKD</i>	(<i>Sistem Informasi Keuangan Daerah</i>) Indonesian development budget and expenditure information system.
<i>Susenas</i>	Indonesian Socio Economic Survey.
UNDP	United Nation Development Programme.
USD	United State Dollars.
WHO-CDC	World Health Organisation, Centers for Disease Control and Prevention.
WLSV	weighted least-square with mean and variance adjustment.

Chapter 1

Introduction

In her book ‘Going local: decentralisation, democratisation, and the promise of good governance’ (2007), Merilee S. Grindle writes that in the early twenty-first century the quality of local governments presents new relevance to the well-being of people across developing countries. Although having long played some role in the management of local affairs, they have now been given many new responsibilities, provided with increased resources, and allowed greater autonomy to decide local policies and services aimed at promoting citizen well-being. Decentralisation of fiscal, administrative, and political responsibilities has transformed local government into the central actor in delivering local public services and enhancing citizen well-being. Bardhan and Mookherjee (2006) explain that this phenomenon is geographically widespread, from Latin America, Africa, and Asia to Eastern Europe. The earliest changes were initiated in the 1970s, picked up momentum in the 1980s, and accelerated after the 1990s (World Bank, 2008a).

Focusing on this increasing role of local government, this study aims to examine the consequences of decentralisation reform on public services and citizen well-being, and to find answers to the following: When local governments are charged with new responsibilities and provided with new resources, to what extent can they promote public services and citizen well-being? Why are some local governments more effective than others in promoting well-being? What are the implications of decentralisation

reform for local public service performance and citizen well-being? To answer these questions, I refer to the decentralisation experience of Indonesia.

Throughout this study, ‘decentralisation’ refers to the formal and informal mechanisms and rules that allocate political authority and resources downward to the various levels of government (Grindle, 2007). My main focus is the decentralisation of political authority and resources to local governments below state or provincial level. ‘Local government’ thus refers to district level government. This distinction is meaningful in countries such as Indonesia which are of a large enough size that provincial governments form an intermediate tier between national and local governments¹. This distinguishes this enquiry from prior studies which provide a comparative perspective of how administrative decentralisation affects states or provinces within federated systems across developed and developing countries (see for instance Rodden et al., 2003). In such contexts, my main interest is the devolution of responsibilities and resources from central to local government².

1.1 Decentralisation in Indonesia: from centralistic government to radical decentralisation

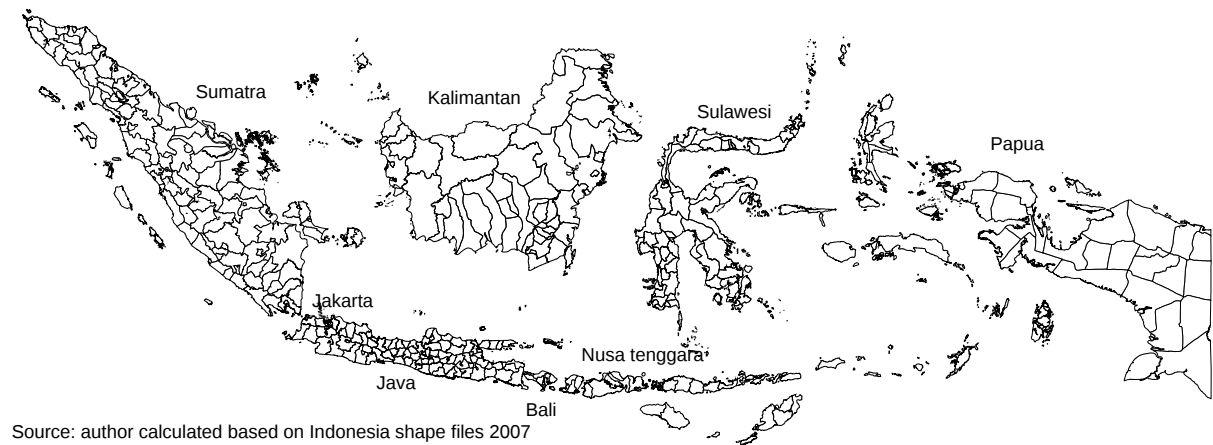
Made up of over 13,000 islands covering 8.8 million square kilometres (a distance roughly equal to that between London and Baghdad), Indonesia is home to over 228 million people. The largest islands are Sumatra, Java (the most populous), Bali, Kalimantan

¹As in China and India, a typical province in Indonesia is larger (in terms of size of population) than most countries in the world, and so decentralisation in the sense of devolution of power to the provincial state government may still keep power over people somewhat centralised.

²In countries with a long history of centralised control such as Russia, China or India, by ‘decentralisation’ public administrators often mean the dispersion of some responsibilities to regional branch offices at the local level. For the purpose of this study, I distinguish decentralisation in the sense of devolution of political decision-making power from such mere administrative delegation of functions of central government to their local branches.

(Indonesia's part of Borneo), Sulawesi (Celebes), the Nusa Tenggara islands, and Papua, the western part of New Guinea. Its neighbour to the north is Malaysia and to the east is Papua New Guinea.

Figure 1.1 : Map of Indonesia 2009



Indonesia is a unitary state with a presidential system. As such, provincial and local governments are the creation of central government. Hence, local governments generally act based on authority delegated to them by legislation or by the directives of central government. From 1965 until 1998, the country was under a centralised government. During this period, local governments were controlled by the highly centralistic government of the New Order. They had little right and no authority to decide local laws and preferences, as all policy were decided by central government agencies. Any notion of local development was non-existent, since all development initiatives came from central government in Jakarta. This centralistic political order resulted in not only a lack of democracy but also a high dependency of local governments on central government³.

³See Ricklefs (2001) for elaboration of the history and historiography of the New Order regime in Indonesia. See Turner et al. (2003) for an elaboration on political system and decentralisation in Indonesia before and after 1999.

A number of attempts were made by Indonesian government since its independence to enhance local government autonomy, but these efforts were often side-tracked by political considerations⁴. However, the economic and political crisis in Indonesia in 1998 triggered radical decentralisation reform in 1999⁵. This reform has changed Indonesia's political system from one of highly centralised to highly decentralised government, a radical reform which has devolved all central government functions to local government level, except for national defence, international relations, justice, police, monetary policy, development planning, religion, and finance, which are retained at the centre. Local governments are now obliged to perform a set of key functions. These include the provision of health, education, environmental and infrastructure services, and are designed to perform any functions not explicitly reserved for either the centre or the provinces (World Bank, 2003).

This radical decentralisation also brings substantial resources to local governments. The bill on intergovernmental fiscal transfer set out a revised framework for the country (Kaiser and Hofman, 2003; World Bank, 2003). This replaces the old system of earmarked grants and centralised control over local finances with one in which a general allocation fund or *dana alokasi umum* and shared taxes provide the bulk of local revenue⁶. Figure 1.2 describes government spending trends in Indonesia between 2001

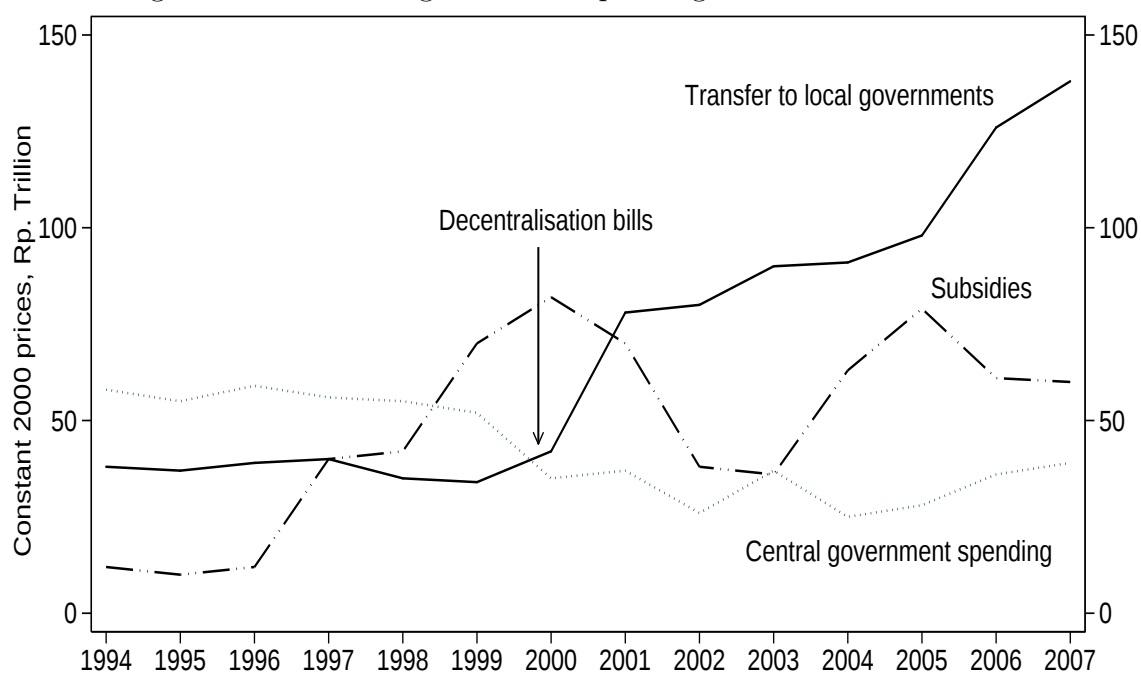
⁴See Devas (1989), Kaiser and Hofman (2003) and Turner (2003) for further discussion of these issues.

⁵The Asian financial crisis that began to affect Indonesia in mid-1997 became an economic and political crisis. Its effects were severe: by November 1997, rapid currency depreciation had seen public debt reach USD\$60 billion, imposing a severe strain on the government's budget. In 1998, actual GDP contracted by 13.7%. The economy reached its lowest point in mid-1999 and actual GDP growth for the year was 0.3%. Inflation reached 77% in 1998 but slowed to 2% in 1999. The rupiah, which had been in the range of IDR2,600 to USD1 at the start of August 1997 fell to IDR11,000 to USD1 by January 1998, with spot rates around IDR15,000 for brief periods during the first half of 1998. It returned to around IDR8,000 to USD1 at the end of 1998 and has generally traded in the IDR8,000-10,000 to USD1 range ever since, with fluctuations that are relatively predictable and gradual (World Bank, 2003). This economic crisis de-legitimised the regime. Widespread social unrest erupted, and after the regime fell in May 1998, a number of fundamental changes in the Indonesian political and administration system took place. One of the most fundamental was the radical decentralisation formulated in 1999.

⁶The general allocation fund or *dana alokasi umum* is a grant through which equalisation payments are made, and is designed to ensure that local governments have adequate and similar capacities. By

and 2007. Decentralisation almost doubled the regional share of government spending, from about 17% in 1994 to over 30% of total government expenditure after 2001. By 2007, this share had grown to over 40% (Figure 1.2).

Figure 1.2 : Trend of government spending in Indonesia 1994-2007

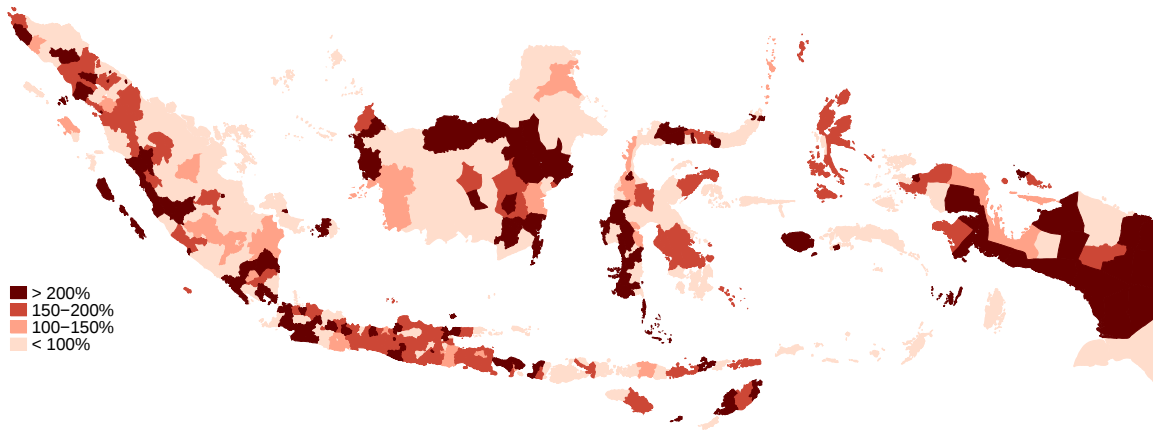


Source: author calculated based on World Bank (2008c)

The distribution of intergovernmental transfer since decentralisation has also significantly increased. Most local governments have received more than double since the beginning of decentralisation. Some local governments (Papua and Aceh) received an even larger transfer in 2009, about triple that received in 2001 (Figure 1.3).

law, at least 26% of net domestic revenue has to be transferred to local governments through this fund (Ministry of Finance, 2009). The general allocation fund is the most important tool of the transfer system, financing more than 80% of local government expenditure (World Bank, 2008). The scheme has substantially contributed to closing fiscal gaps in Indonesia's poorer regions.

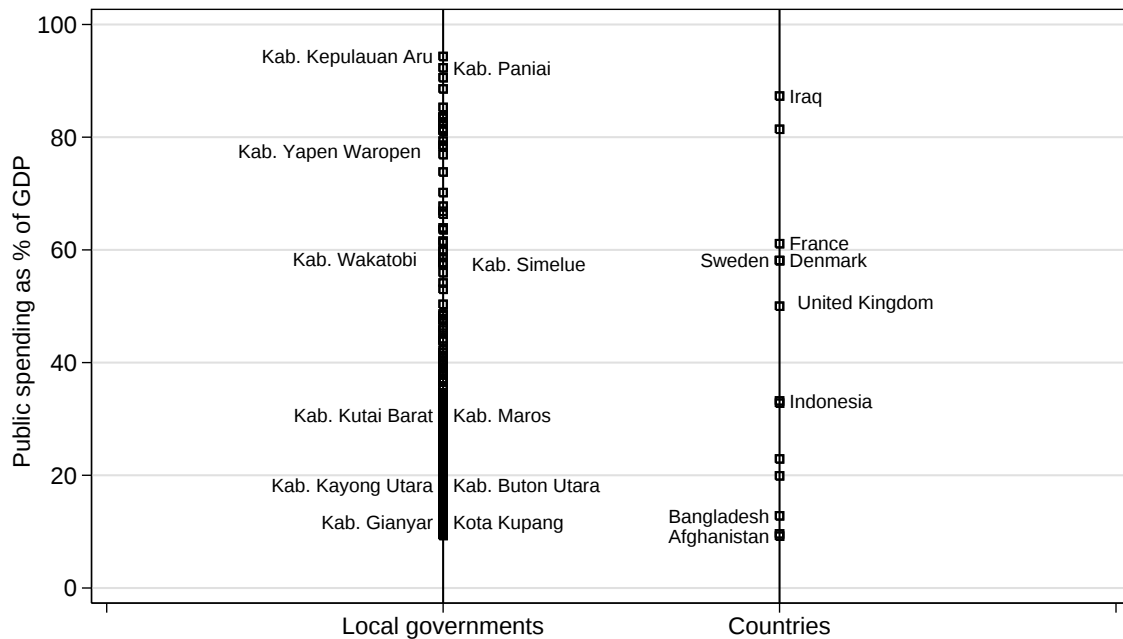
Figure 1.3 : Distribution of intergovernmental fiscal transfer in Indonesia between
2001 and 2009



Source: author calculated based on Indonesian local government development budget and expenditure information (SIKD) 2001–2009 data

Decentralisation also encourages local governments to increase their public spending. In 1998, the national public spending average was about 23% of GDP, increasing to about 35% of GDP in 2008. This increase is mainly due to the significant growth in public spending at local government level. Figure 1.4 presents the share of public spending in terms of GDP for a selected range of local governments in 2008 (World Bank, 2008c). For example, the local governments of *Kepulauan Aru* and *Paniai* (in Papua province) allocated about 90% of GDP for public spending in 2008, a proportion higher than that of the United Kingdom, France, Denmark and Sweden. However, there is also evidence that some local governments are lagging behind in their spending. For example, the local government of *Kupang* in Nusa Tenggara Timur province has spent below 20% of its GDP for public spending, a proportion comparable to Bangladesh and Afghanistan over the same period.

Figure 1.4 : Percentage of GDP allocated to public spending, 2008



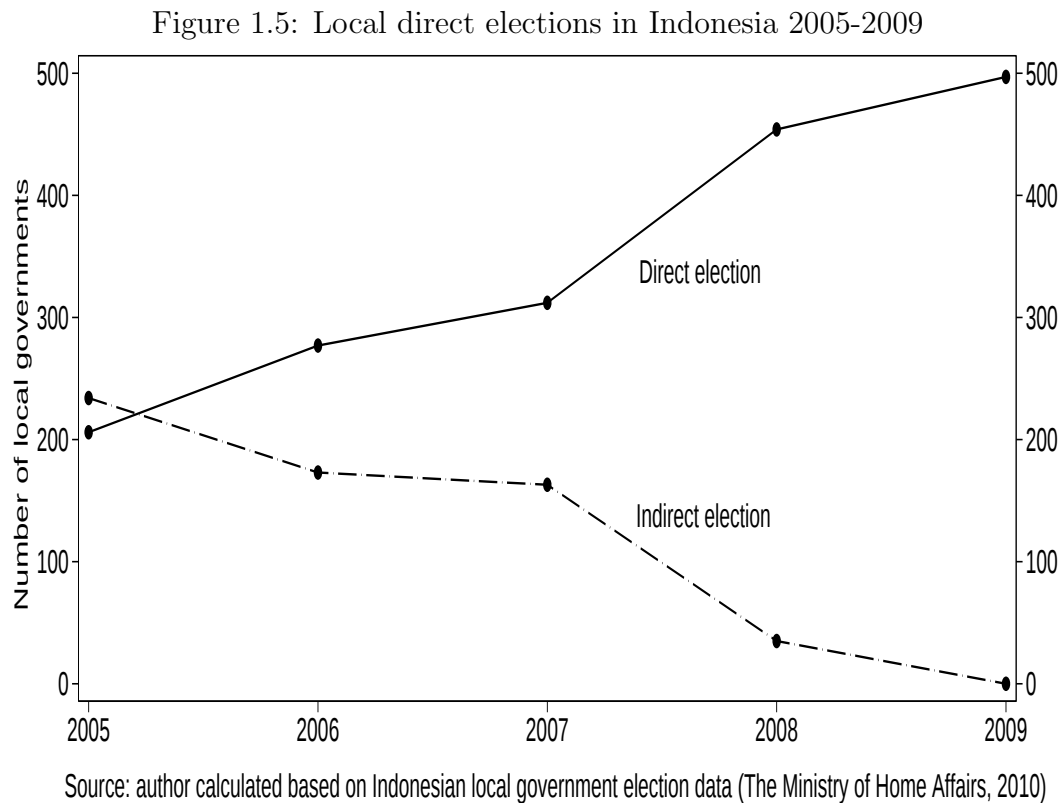
Source: author calculated based on SIKD 2008 and World Development Indicators 2008

Decentralisation not only brings change to the fiscal transfer system but also to the local political system, shifting the balance from a largely top-down form of government to one of local political accountability (Erb and Sulistiyanto, 2009). Between 1999 and 2004, local parliaments were directly elected. However, mayors or *bupati/walikota* were indirectly elected. Under this system, local parliaments elect mayors, and can dismiss them through rejection of their annual accountability speech. Further powers rested in the local parliaments or *Dewan Perwakilan Rakyat Daerah* include approval of the annual local budget and of local laws and regulations.

Concerns around indirect political accountability triggered a second wave of local government electoral reform in terms of direct elections or *pilkada langsung* (Erb and Sulistiyanto, 2009). Starting in 2005, mayors were elected along direct (and more presidential) rather than parliamentary lines. This reform made the mayor more directly accountable to the people. Legislation regarding local government elections also stipulated that the mayor should (1) manage their jurisdiction along guidelines laid down

by local parliament, (2) implement local laws, including budget law, (3) present annual accountability reports to the local parliament and central government, and (4) provide information to citizens on the government's performance.

Based on the local government election bill or *pilkada* amendment, central government decided to conduct the first batch of direct local government elections in June 2005 in those local governments where the local parliament speakers had come to the end of their tenure. By 2009 all local governments had directly elected mayors (Figure 1.5).



Radical decentralisation reform in Indonesia has unique characteristics compared to that which has taken place in Africa, Asia and South America countries. Bardhan and Mookherjee (2006) for example identify three forms of decentralisation in several countries across these continents (including Indonesia); they base their classification

on motive for decentralisation, and the nature of each country’s political and economic decentralisation. Table 1.1 presents these categories and the countries within each.

Table 1.1: Decentralisation in Indonesia and other developing countries

Countries	Motives		Nature of political decentralisation			Nature of economic decentralisation		
	1	2	3	4	5	6	7	8
Indonesia (2001)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Malaysia	No	No	No	Yes	No	No	No	No
Philippines	Yes	No	No	Yes	Yes	Yes	No	Yes
China (1978)	No	No	No	Yes	No	Yes	No	No
India (1994)	No	No	No	No	Yes	No	No	No
Pakistan (2000)	No	No	Yes	Yes	No	No	No	No
Brazil (1988)	Yes	Yes	No	No	Yes	Yes	No	Yes
Uganda (1987-2004)	No	No	No	No	Yes	No	No	No
South Africa (2000)	Yes	Yes	No	Yes	Yes	Yes	Yes	No

Note: 1: transition to democracy, 2: change in political party power, 3: radical approach, 4: uniform, 5: direct election, 6: financial autonomy, 7: size of fiscal transfer >30%, 8: responsibility of most public functions

In 2001, Indonesia embarked on a programme of comprehensive decentralisation that was implemented simultaneously throughout the entire country within a short period of time. The reform was introduced as part of the transition to democracy following the collapse of the autocratic regime and subsequent weakening of central government power in the face of strengthening regional interests. The previous centralised regime had been associated with high levels of inequality in terms of interregional allocation of funds, poor service delivery, and high levels of corruption. External pressures (such as international donor agenda and ideological considerations) played a relatively small role in the transition (Kaiser and Hofman, 2003; Kaiser et al., 2006; Kruse et al., 2012; Erb and Sulistiyanto, 2009; World Bank, 2003). This motivation behind decentralisation is noticeably different from that of other countries, such as China, Malaysia, India, Pakistan and Uganda. China and Malaysia for example are characterised by a long tradition of centralised political power monopolised by a single ruler or one party. Decentral-

isation in these countries represents more a combination of more extensive economic decentralisation with the near absence of local democracy (Bardhan and Mookherjee, 2006). Pakistan represents a different extreme, where state bureaucrats have become subordinate to elected district officials, at least at the *de jure* level. China represents the other extreme, with unelected local government officials subordinate to those at more central level.

Decentralisation in Indonesia was both political and economic in nature. Local governments were provided with political authority independent of the centre, regular direct local mayoral and parliamentary elections were conducted, and responsibility over most local social services (including primary education, health, infrastructure, and welfare) was devolved from the centre. This mode of decentralisation and the degree of public function transfer differ from those which occurred in Malaysia and China (where there is no regular direct election for mayors and parliaments) and Malaysia and India (where local governments have no jurisdiction over the administration of basic services, such as primary education and health). The common feature of decentralisation in these countries is that local governments remain essentially subordinate to the dominant power at national level, are elected (if at all) in a partyless election, have no independent (or at least limited) constitutional authority or protection, and can be dismissed or neutralised by higher levels of government. As a consequent, local governments typically have limited authority to formulate and to implement policies or programmes related to most public functions (Bardhan and Mookherjee, 2006). In Malaysia and China for example local governments have little authority over the personnel they hire, especially with respect to pay and service conditions (and salaries represent a significant part of local government costs).

Also in contrast to many other decentralised developing countries, the size of fiscal decentralisation in Indonesia is specific in terms of devolution of fiscal resources and

generation of revenue power. Local governments here have received substantial fund transfers - more than thirty per cent of central government budget (World Bank, 2008), substantially more than other Asian countries such as Philippines and Malaysia (where it is less than twenty per cent) and certain countries in South America. Furthermore, intergovernmental transfers in Indonesia are largely formula-bound, greatly reducing the scope for interference at upper levels of government (Kaiser et al., 2006). Local governments thus are able to exercise relatively strong power and have the freedom to generate local, own-source revenue from taxes. In most other developing countries, spending mandates have not been comfortably covered by devolved funds, giving rise to considerable fiscal strain. In Malaysia for example, local governments have no right to generate taxes.

It is widely agreed that radical decentralisation in Indonesia has provided local governments with increased authority to devise their own policies and programmes (see for example Kaiser and Hofman (2003); Kaiser et al. (2006); Kruse et al. (2012); Erb and Sulistiyanto (2009); World Bank (2003)). This has widely increased their role in managing public services for the benefit of local citizens. Local governments also have better access to sources of revenue. However, although research has discussed the consequences of decentralisation in Indonesia in terms of various development outcomes, relatively few studies have examined the relationship between this decentralisation and the well-being of its citizens. The next section reviews the literature on decentralisation in developing countries and outlines the research gaps which this study attempts to address.

1.2 Assessing decentralisation literature on developing countries

This section outlines some of the attempts that have been made to empirically evaluate the impact of decentralisation on the delivery of public services and on well-being in developing countries. Even though decentralisation is continuing to be implemented in many of these countries, quantitative evidence on its impact is rather scarce. There are a number of scattered studies that I will try to arrange in terms of the nature of empirical methodology followed. Overall, the conclusions are mixed and the relationship they attempt to establish is at times elusive. Table 1.2 provides a summary of some of the prominent studies in this area from the last two decades which show positive, negative and inconclusive relationships between decentralisation and public services and various measures of well-being across developing countries.

Table 1.2: Summary of decentralisation studies in developing countries

Unit of analysis (location)	method	important observations/considerations	strengths and weakness of the study
1. Positive association One municipality, Brazil	Qualitative study	Decentralisation improved participatory budgeting and planning in public services (Santos, 1998)	Rich analysis on the history of participatory budgeting and planning in public services. However, the results is very limited for generalisation.
Municipalities, Bolivia	Principal component analysis	Decentralisation improved consistency of public services with local preferences and quality of access (Faguet, 2001)	Use various measure of public services performance, but the study only informs association rather than causal effect.
Households, Albania	Tobit regression with fixed effect	Modest gains in targeting efficiency and cost-effectiveness following decentralisation (Alderman, 1998)	Use many years of data and controlled for unobserved heterogeneities in local government level. However, the study do not inform potential of elite capture in the programme.
234 villages, India	Fixed effect with IV regression	An increase in the demographic weight of the landless households in a village under democratic decentralisation has a positive effect on allocation of public resources to road construction and a negative effect on that to irrigation facilities (Foster and Rosenzweig, 2001)	Use panel data and inform causal effect, but this study do not inform data capturing elite capture on the programme.
83 villages, India	Tobit regression	Decentralised management through <i>Panchayat</i> advanced poverty alleviation goals in West Bengal (Bardhan and Mookherjee, 2003)	Use specific case of decentralisation in <i>Panchayat</i> system across Indian villages. However, the study do not have data about the distribution of program benefits across socio-economic groups and geography.
Communities, Bangladesh	Tobit regression	Decentralised food for education program in Bangladesh was mildly pro-poor (Galasso and Ravallion, 2001)	Based on small scale areas (communities) to evaluate the impact of decentralisation in particular program. The study however do not capture consist data which inform potential elite capture within the program.
Schools, Argentina	IV regression	Decentralisation of education led to improvement in school achievement scores (Eskeland and Filmer, 2002)	Using strong statistical methodology to establish causal effect within specific programme. However, this study only use small number of schools.
Schools, Nicaragua	Fixed effect regression	Decentralised management of schools led to improvement in achievement of better performance (King and Ozler, 1998)	This study evaluate the effect of decentralisation within specific program. But, it only use small number of schools in the analysis.
Two countries, India and South Korea	Qualitative study	Over-centralised top down management accompanied weak monitoring contributed to corruption and poor delivery performance for canal irrigation in India (Wade, 1997)	This study provides rich information on the history and process of decentralisation in these countries. However, the limited cases mean that this study cannot be generalised to other countries.
16 municipalities, Colombia	Qualitative study	Competition for political office increases responsibility and facilitates leadership innovation (Fiszbein, 1997)	This study provides rich information about the role of political competition and leadership within decentralisation in Colombia. However, it is limited only for small number of municipalities.
1,808 firms, Indonesia	IV Regression	Administrative decentralisation led to lower corruption as firms relocated to areas with lower bribes (Henderson and Kuncoro, 2004)	Use large number of firms and sophisticated statistical methodology. However, it only used cross sectional data.
207 municipalities, Indonesia	IV Regression	Positive effect of decentralised health spending for health care use of poor people (Kruse et al., 2012)	Use local governments as unit of analysis and sophisticated methodology, but it used cross sectional data.

Unit of analysis (location)	method	important observations/considerations	strengths and weakness of the study
Health centres and hospital, Zambia	Time series	Decentralisation in health sector with local control of resources could be an alternative to the traditional vertical disease programmes approach for priority interventions (Blas and Limbambala, 2001)	This study examines decentralisation within specific programme and use time series of data. However, it only provides in-depth analysis on the impact of the programme.
Municipality, Brazil	Qualitative study	Decentralisation reform through participatory budgeting process can increase welfare of local citizens (Baiocchi, 2001)	This study provides rich information about participatory budgeting process in some municipalities. However, the results are limited to be generalised for other places.
26 provinces, China	panel data analysis	More decentralised provinces perform better with respect to health outcomes if a functioning transfer system established between the province and county levels and county governments' own fiscal capacity strengthened (Uchimura and Jütting, 2007)	Use panel data and control unobserved heterogeneities, but it is limited on indicator to measure fiscal decentralisation.
20 countries	Panel data analysis	A significant positive effect of expenditure decentralisation on per capita infrastructure deliveries (Estache and Sinha, 1995)	Use panel data analysis, but only use limited number of countries.
42 countries	OLS	Decentralised road maintenance improved road conditions (World Bank, 1994).	This study examines the effect of decentralisation on specific programme. It also uses relatively large number of countries. However, it does not establish causal effect on the decentralisation programme.
80 countries	IV regression	Decentralisation contributed to improve delivery of public goods and services (Huther and Shah, 1995)	Use large number of countries and use robust statistical method to establish causal effect. However, this study is limited with it cross sectional design.
4 developing countries	Qualitative study	Decentralisation led to enhanced transparency and reduced incidence of corruption (Crook and Manor, 2000)	This study provides rich information about potentials as well as challenges of decentralisation as a mean for improving transparency and corruption in these countries. However, it limits for generalisation to other contexts.
78 countries	IV Regression	Tax decentralisation was positively associated with improved quality of governance (De Mello and Barenstein, 2001)	This study uses large number of countries and robust statistical methodology, but it limits on the measure of quality of governance take into account.
59 countries	IV Regression	A significant negative association between expenditure decentralisation and corruption measures (Fisman and Gatti, 2002)	This study uses large number of countries using robust statistical methodology. However, it limits on the measure of corruption used.
30 countries	OLS	Decentralisation supports greater accountability in the public sector and reduced corruption (Gurgur and Shah, 2002)	This provides specific analysis on political decentralisation and the role of accountability. However, it is only based on cross sectional data and limited number of countries and statistical methodology.
43 developing countries	IV Regression	Public spending matters for increasing health outcomes and primary education attainment in countries with good governance (Rajkumar and Swaroop, 2007)	This study examines the specific link between public spending and health outcomes and education performance. It is based on panel data and used robust statistical method.
66 countries	OLS	More spending or revenue decentralisation raises well-being (Bjørnskov et al., 2008).	This study uses large number of countries and examine specific measure of well-being. However, it only informs the association and based on cross sectional design.
29 European countries	OLS	Positive relation between decentralisation and individual happiness (Diaz-Serrano and Rodriguez-Pose, 2012)	This study examines the effect of decentralisation and happiness in European countries. However, it limits on its cross sectional design.

Unit of analysis (location)	method	important observations/considerations	strengths and weakness of the study
2. Negative association Provinces, Argentina	OLS	Poorer provinces are less successful as decentralisation generated substantial inequality in public spending (Galasso and Ravallion, 1998)	This study examines specific effect of decentralisation and inequality in public spending. However, it limits on provincial level and statistical methodology.
Counties, China	Descriptive analysis	Decentralisation resulted in lower level of public services in poorer regions (West and Wong, 1995)	This study examine the effect of decentralisation on public services in counties level. The weakness of this study is that it is based on limited number of counties and statistical methodology.
Municipalities, Indonesia	Qualitative study	Increased disparities in spending between curative and preventive health services (Soerojo and Wilson, 2001)	This study provides rich and deep analysis on the association between decentralisation and curative/preventive health services. However, it is only based on small number of municipalities.
Six municipalities, Mexico	Qualitative study	Public services can suffer as a result of decentralisation (Grindle, 2007)	This study provides rich understanding about the process and determinant of decentralisation in Mexico using mixed methodology. The main weakness of this study is that it is only based on six municipalities.
Municipalities, South Africa	Qualitative study	No inherent reason why decentralised governments should be any more democratic than centralised governments (Heller, 2001)	This study provides rich analysis on the current decentralisation reform in South Africa, but it is limited only on several cases.
28 provinces, China	OLS	Fiscal decentralisation contributed to lower provincial growth (Zhang and Zou, 1998)	This study examines the effect of fiscal decentralisation on provincial growth in China. The main weakness of this study is that it is based on cross sectional data and the method do not control for unobserved heterogeneities bias.
Countries, Brazil and Argentina	Time series	Decentralisation could lead to increased fiscal deficits and imperil macroeconomic stability (Dillinger and Webb, 1999)	This study examines the effect of decentralisation on fiscal capacity and macroeconomic stability, but it is only based on two countries.
Municipalities, Uganda	Qualitative study	Decentralisation lead to social, political, and economic conflicts (Green, 2008)	This study provides rich analysis on decentralisation and the incidence of various conflict in Uganda. However, it is do not explain quite depth about the history of conflicts before decentralisation in the country.
Countries, Latin America	Qualitative study	Instead of increasing the robustness of local taxation, local governments have increased their demands on central government for more revenue sharing (Wibbels, 2005)	This study provides rich analysis on the process of decentralisation and its impact of local government behaviour in Latin America countries. As a qualitative study the main weakness of this analysis is not provide depth understanding on the characteristic of society on each case study.
Countries, 85 countries	OLS	Decentralised countries have higher perceived corruption and poorer service delivery performance in public health services (Treisman, 2000)	This study examines the relationship between decentralisation and corruption using large number of countries. However, the method do not establish causal effect on both variables.

Unit of analysis (location)	method	important observations/considerations	strengths and weakness of the study
Countries, Eastern and Central Europe	Descriptive analysis	Public services can suffer as a result of decentralisation (Litvack et al., 1998)	This study only provides descriptive analysis on the relationship between decentralisation and public service performance across Eastern and Central Europe.
Countries, 3 developing countries	Qualitative study	Decentralisation in Colombia, West Bengal and Brazil has achieved little in improving service delivery (Crook and Sverrisson, 1999)	Rich story of decentralisation in three different countries is examined, but it only captures the process and history of decentralisation in few places.
Countries, 30 countries	OLS	Coordination failures in intergovernmental relations were likely to result in a deficit bias in decentralised policy-making (De Mello, 2000)	The effect of decentralisation on intergovernmental transfer is examined, without robust statistical approach.
Countries, 46 countries	Panel data analysis	Decentralisation was associated with slower economic growth (Davoodi and Zou, 1998)	The effect of decentralisation and economic growth is examined using panel data, but it is unable to capture unobserved heterogeneities across country that may result in weak affect of decentralisation.
Countries, 6 countries	OLS	A negative impact of decentralisation on economic growth for Mexico and the United States but no impact for Germany, India, Italy and Spain (Rodriguez-Pose and Bwire, 2003)	The impact of decentralisation and economic growth is examined by comparing developed and developing countries, but the model is unable to control bias resulted from unobserved heterogeneities within country.
3. Inconclusive findings Schools, Chile	OLS	Though education decentralisation improved the efficiency of provision, a decline was experienced in cognitive tests scores (Winkler and Rounds, 1996)	This study used OLS to examine the effect of decentralisation on education performance. The limitation of the method used is that it is unable to control for unobserved heterogeneities bias at schools and community level that may affect education performance.
Local governments, Uganda	OLS	Did not find any positive impacts of decentralisation on efficiency and equity of local public services (Azfar et al., 2000)	This study uses OLS to examine the impact of decentralisation and local public service performance. In this analysis, it used perceived performance rather than objective performance of public services. Bias estimates may occur on the estimation.
Municipalities, Indonesia	OLS	Decentralised health spending is not significantly associated with improve health care use and health outcomes (World Bank, 2008b)	This study uses large number of districts in Indonesia. However, the statistical methodology is unable to capture the variation of healthcare demand across districts and individuals.
Low and middle income countries, 140 countries	OLS	While decentralisation improved the immunization coverage in low income countries, opposite results were obtained for middle income countries (Khaleghian, 2003)	This study examines the relationship between decentralisation and immunisation coverage using large number of countries. Its methodology however unable to control unobserved heterogeneities bias in the country level which may affect on both variables.
Developing countries, 19 countries	Descriptive analysis	The impact of decentralisation on poverty reduction is mixed (Jütting et al., 2004)	This study provides rich analysis on the effect of decentralisation on poverty reduction in some countries. It provides simple framework to understand channels for effective or ineffective decentralisation for poverty reduction.
Countries, 20 less developed and 17 developed countries	Panel data analysis	No relationship between fiscal decentralisation and economic growth in sample of less developed countries (Phillips and Woller, 1997)	This study examines the relationship between fiscal decentralisation and economic growth using panel data analysis. However, it only uses small number of countries.
Countries, OECD and 4 less developed countries	Cross sectional regression	No relationship between economic performance of high-income OECD countries and reliance of sub-national governments on own revenue sources to finance their expenditures (Thieben, 2003)	This study examines between decentralisation and economic performance by comparing between OECD countries and less developing countries. The analysis however suffers from unobserved heterogeneities bias that potentially affect on the relationship of both variables.

1.2.1 Positive associations

A number of studies have found the effect of decentralisation on public services to be positive. Two case studies - Porto Alegre in Brazil, and Bolivia - are success stories which have become well-known worldwide. Santos (1998) states that between 1989 and 1996, decentralisation in Porto Alegre resulted in substantial impact on the pattern of resource allocation across localities, particularly poorer ones, and in the lessening of the misappropriation of resources compared both to the past and to other areas in Brazil⁷. Faguet (2001) reports that in 1994, after decentralisation in Bolivia, public investment in education, clean water and sanitation rose significantly in three-quarters of all municipalities, and that investments responded to measures of local need. For example, the expansion in public education spending was larger on average in municipalities with a lower literacy rate or with fewer private schools⁸. In the studies of Porto Alegre and Bolivia, little information is available on the allocation of resources within a community across households belonging to different socio-economic classes. This means that issues such as the cost-effectiveness of programmes, targeting performance or the extent of capture of local governments cannot be addressed. Without household level data on access to public services these crucial aspects of the impact of decentralisation cannot be properly assessed.

⁷Santos (1998) also reports that across Porto Alegre, where local citizens and neighbourhood associations instigated regular meetings to discuss investment priorities, review accounts and elect representatives to a citywide council, impressive results followed. The citywide council allocates available resources across councils, and between 1989 and 1996 access to sanitation (clean water and sewage disposal) nearly doubled, as did enrollment in elementary or secondary schools, while at the same time revenue collection increased by 48%. Although it is difficult from this study to isolate the impact of participatory budgeting reforms from those of other ongoing changes, it seems that there has been a substantial impact on the pattern of resource allocation across localities, particularly poorer ones, and in the lessening of the misappropriation of resources compared to the past and to other areas in Brazil.

⁸As reported by Faguet (2001), in Bolivia in 1994 the number of municipalities (as well as the share of national tax revenue allocated to municipalities) doubled, along with devolution to the municipalities of administrative authority, investment responsibility and local infrastructural facilities. This has been associated with a massive shift of public resources in favour of the smaller and poorer municipalities and from large-scale production to social sectors.

Similar findings are also presented from Albania, where Alderman (1998) found that there were modest gains in efficiency and cost-effectiveness following decentralisation, that local authorities use some additional information in allocating programme benefits among households, but that the central allocation of social assistance funds to local authorities is ad hoc and not strongly correlated with the level of poverty in the local communities⁹.

In India, Foster and Rosenzweig (2001) use a panel dataset of villages across India to examine the consequences of democratisation and fiscal decentralisation. They find that an increase in the demographic weight of the landless households in a village under democratic decentralisation has a positive effect on allocation of public resources to road construction and a negative effect on that to irrigation facilities. However, their dataset does not reveal the many severe institutional lapses in the implementation of decentralisation across India¹⁰. Bardhan and Mookherjee (2003) find that decentralised management through the *panchayat* advanced poverty alleviation goals in West Bengal¹¹. The same results were confirmed by Galasso and Ravallion (2001) for Bangladesh. They find that a decentralised food-for-education programme in Bangladesh was mildly pro-poor (i.e. taking all villages involved into account, a somewhat larger fraction of the poor received benefits from the programme than the non-poor)¹². In Argentina,

⁹Alderman (1998), on the basis of a household survey conducted in 1996, examines a targeted social assistance programme (*Ndihma Ekonomike*) in Albania that was decentralised in 1995. This research also finds no evidence that the decentralisation initiative led to the benefits of the programme being captured by better-off members of the community.

¹⁰In particular, these are in terms of the manipulation of the local electoral process and in the limited range of authority and finances devolved to local governments, making democratic decentralisation not yet a reality in most parts of India.

¹¹The experience of West Bengal with respect to the *panchayats* has been unusual in many respects relative to many other Indian states. The advent of the left-dominated state government in 1977 led to the institution in 1978 of a functioning three-level *panchayat* system with mandated elections every five years. Significant responsibilities which had previously been in the domain of the state bureaucracies were devolved to these *de facto panchayats*. These included responsibility for implementing land reforms, identifying beneficiaries eligible for land transfers, loans, agricultural extension programmes, employment programmes, housing and other welfare programmes, raising local revenues (both from taxes and non-tax sources), and administering local infrastructure projects.

¹²Galasso and Ravallion use data from a 1995-96 Household Expenditure Survey to assess the target-

Eskeland and Filmer (2002) find that the decentralisation of education led to an improvement in school achievement scores: school autonomy and parent participation raise student test scores for a given level of inputs in a multiplicative way. Autonomy has a direct effect on learning (but not when levels of parent participation are very low), while participation affects learning only when it is implemented concurrently with school autonomy. In Nicaragua, King and Ozler (1998) also observe that decentralised management of schools led to improvement in achievement scores¹³.

The positive association of decentralisation and the improvement of public services is also shown in a number of cross-country analyses. For example, Estache and Sinha (1995) study 20 countries over the period 1970-92 and find a significant positive effect of expenditure decentralisation on per capita infrastructure delivery. They also find that the effect is stronger in developing countries compared with developed countries, and is weaker when local governments rely more on central funds than on their own revenues. The World Development Report 1994 on Infrastructure cited several cases of quality improvement and cost savings in infrastructure projects after decentralisation. A World Bank review examining 42 developing countries finds that where road maintenance was decentralised, backlogs were lower and the condition of roads better. Data pertaining to water projects in a group of developing countries revealed that the per capita cost of water in World Bank-funded water projects was four times higher in centralised than in fully decentralised systems. Naryan (1995) study of 121 completed rural water supply projects, financed by various agencies, showed that those with a greater degree

ing performance of the programme. Alongside their findings that the programme was mildly pro-poor, they also report some evidence of local capture. For example, within the set of participating villages, targeting performance was worse in communities with larger land inequality or in remote locations. The targeting improved however as the programme expanded, suggesting that it was successful in shifting the balance of power in favour of the poor.

¹³In the 1990s, Nicaragua started a programme of transferring key management tasks in public schools from central authorities to local councils and at the same time involving parents. An evaluation of this programme by King and Ozler (1998) on the basis of school and household surveys and student achievement tests suggests that *de facto* autonomy has not yet been given to many of the councils, but where it has there is a significant positive effect on student performance.

of beneficiary participation in project selection and design were much more likely to result in a well-maintained water supply than those where decision-making was more centralised. Huther and Shah (1995) assembled a diverse set of indexes for 80 countries. These indexes cover a wide variety of measures of economic and political structures and performance: quality of governance, political freedom, political stability, debt-to-gross domestic product ratios, measures of income, the degree of equality of the distribution of income, and many more. They find in nearly every case a statistically significant association between increased decentralisation and improved performance.

Scholars also find there to be benefits of decentralisation in terms of controlling corruption and quality of governance. Crook and Manor (2000) examine the process of political decentralisation in India, Bangladesh, Cote d'Ivoire and Ghana and find that decentralisation led to enhanced transparency and reduced incidence of corruption. They conclude that decentralisation reduces grand theft but increases petty corruption in the short run but in the long run, both may go down. Wade (1997) reports that over-centralised top-down management accompanied by weak monitoring contributed to corruption and poor delivery performance of canal irrigation in India. Fiszbein (1997), based on a review of political decentralisation in Colombia, concluded that competition for political office opened the door for responsible and innovative leadership that in turn became the driving force behind capacity building, improved service delivery and reduced corruption at local level. In Indonesia, Henderson and Kuncoro (2004) reporting on a survey of 1,808 firms in 2001-2 found that administrative decentralisation led to reduced corruption as firms relocated to areas where the prerequisite bribes tended to be lower.

De Mello and Barenstein (2001) examine cross-country data and conclude that tax decentralisation is positively associated with improved quality of governance. By applying instrumental variable regression, Fisman and Gatti (2002) examine the relation

between the same measure of expenditure decentralisation and measures of corruption (on the basis of subjective perceptions of businesspeople and investors) across 59 countries for the period 1980-1995. They find a significant negative effect between expenditure decentralisation and corruption measures. Gurgur and Shah (2002) identify major drivers of corruption in order to isolate the effect of decentralisation. For a non-industrial country, these are lack of service orientation in the public sector, weak democratic institutions and a closed economy. They concluded that decentralisation supports greater accountability in the public sector and reduces corruption.

Prior studies also show the beneficial impact of decentralisation on well-being. Using local government panel data, Kruse et al. (2012) for example find a positive effect of decentralised health spending on improving healthcare use by the poor in Indonesia. Blas and Limbambala (2001) show that decentralisation in the health sector leading to increased local control of resources could be an alternative to the traditional vertical disease programmes approach for priority interventions in Zambia. Baiocchi (2001) shows how decentralisation reform through a participatory budgeting process has increased the welfare of local citizens in Porto Alegre, Brazil. Bardhan and Mookherjee (2003) find that decentralisation of the delivery system promotes cost-effectiveness and improves intra-regional targeting. Using annual cross-country data from 1900, 1997 and 2003, Rajkumar and Swaroop (2007) find that public spending matters for increasing health outcomes and primary education attainment in countries with good governance. Bjornskov et al. (2008), using cross-country analysis, find that more spending or revenue decentralisation raises well-being, while greater local autonomy is beneficial only via government consumption spending. Likewise, Diaz-Serrano and Rodriguez-Pose (2012) use cross-country data to show the positive relation between decentralisation and individual happiness in 29 European countries.

1.2.2 Negative associations and inconclusive findings

However, the negative effect of decentralisation on public services and well-being is also shown in several studies. Galasso and Ravallion (1998) find that in Argentina decentralisation generated substantial inequality in public spending in poor areas and that this deepened poverty in those areas¹⁴. In China, West and Wong (1995) also report that decentralisation is associated with reduced public services in poor regions. Soerojo and Wilson (2001) show that decentralisation increased disparities in spending between curative and preventive health services in Indonesia. Litvack et al. (1998) present evidence from Eastern and Central Europe and suggest that public services can suffer as a result of decentralisation. Long bereft of authority and resources by highly centralised political systems, localities throughout Eastern and Central Europe grappled with how to take on responsibilities for routine administration, public service provision and economic development. Decentralisation in itself is not guaranteed to result in improved public services and well-being.

Crook and Sverrisson (1999) have provided evidence that despite extensive strides in the devolution of authority and resources to democratically elected local governments, decentralisation in Colombia has achieved little in improving service delivery. Crook (2003) concludes that decentralisation is unlikely to lead to more pro-poor outcomes unless it is accompanied by a serious effort to strengthen and broaden accountability mechanisms at both local and national levels. Based on case studies from six municipalities in Mexico, Grindle (2007) found that public services can suffer as a result of decentralisation. Combining quantitative and qualitative methods, this study examines

¹⁴They find that provincial ability at reaching poor areas was a more important factor in overall success. There was diverse, but largely explicable, performance across provinces. Local programme history mattered. Controlling for this, poorer provinces were less effective at targeting their poor areas. This was mitigated by spending at the centre. However, the latter did not provide adequate incentives to ensure provincial targeting effort. Decentralisation thus generated substantial horizontal inequality in public spending on poor areas.

data based on a random sample of Mexican municipalities, and discovers that decentralisation not only allows public leaders to make significant reforms quickly, but that at the same time institutional weaknesses undermine the durability of change, and that the legacies of the past can continue to affect how effectively public problems are addressed. Citizens participate, but they are more successful at extracting resources from government than in holding local officials and agencies accountable for their actions¹⁵.

A number of scholars find that decentralisation can risk a rise in corruption and local conflict. Treisman (2000), from an analysis of cross-country data, concludes that decentralised countries have higher perceived corruption and poorer service delivery performance in public health services. Heller (2001), in his study of decentralisation in South Africa, shows that there was no inherent reason why decentralised governments should be any more democratic than centralised ones or any a priori reason why local elections should guarantee the emergence of more effective leadership¹⁶. Elliot (2008) demonstrates that local governments in several developing countries often reflected the social, political, and economic conflicts that divided local communities after decentralisation. In Uganda for example, decentralisation, while helping to reduce national-level conflict, has nonetheless replaced it with local-level conflict due to struggles over district leadership positions and altering relations between local ethnic groups.

The negative effect of decentralisation on regional equality, macro-economic stability and national growth is reported in some studies. Using data from 2000, Baiocchi (2006b) reports that fiscal decentralisation is associated with increased regional inequality in Brazil. De Mello (2000), using a sample of 30 countries, found that coordination failures in intergovernmental relations were likely to result in a deficit bias in decentralised

¹⁵The benefits of decentralisation regularly predicted by economists, political scientists, and management specialists are not inevitable, she argues. Rather, they are strongly influenced by the quality of local leadership and politics.

¹⁶As reported by Heller, in the case of South Africa, a once-strong social movement sector has been marginalised by the African National Congress political hegemony, with the result that organised participation has atrophied and given way to a bureaucratic logic of local government reform.

policy-making. Burki et al. (1999) show that decentralisation can lead to increased fiscal deficit and imperil macroeconomic stability. In some cases, rather than increasing the robustness of local taxation, local governments have increased their demands on central government for more revenue (Wibbels, 2005). Davoodi and Zou (1998) and Xie et al. (1999), using various data sets for developing countries, developed countries, and time series data from the United States, discovered that decentralisation was associated with slower growth. Rodriguez-Pose and Bwire (2003) found a negative impact of decentralisation on economic growth for Mexico and the United States but no impact for Germany, India, Italy and Spain. Zhang and Zou (1998) found that fiscal decentralisation in China contributed to lower provincial growth. According to Davoodi and Zou (1998) and Zhang and Zou (1998), this negative association may indicate that in practice local governments may not be responsive to the preferences and needs of citizens at local level.

Some studies found associations with decentralisation to be inconclusive. In Uganda, for example, Azfar et al. (2000) found no positive associations with efficiency and equity of local public service provision. Based on review of 19 developing countries, Jütting et al. (2004) show mixed impact of decentralisation on poverty reduction. Decentralisation reduce poverty through either participation, decline in vulnerability or improved access to services. However, no positive impact could be identified in the majority of the countries. On the contrary, in some poorest countries with lacks of institutional capacity and post-conflict situations decentralisation has had negative impacts. Khaleghian (2003), referring to data for 140 countries, found that while decentralisation improved the coverage of immunisation in low income countries, opposite results were obtained for middle income countries. Winkler and Rounds (1996) reviewed Chile's experience of education decentralisation and concluded that it resulted in improvement to efficiency of provision but also led to a decline in cognitive test scores. World Bank (2008b)

did not find any positive association of the effect of decentralised health spending with health outcomes and healthcare demand in Indonesia. Phillips and Woller (1997) and Martinez-Vazquez and McNab (2003) examined a cross-section of countries, and could not find a statistically significant relationship between fiscal decentralisation and economic growth.

1.2.3 Why does decentralisation work and not work?

All these mixed findings raise the question: Why does decentralisation work and not work? Bardhan (2006) explains that decentralisation of public services is typically compared with the alternative: public provision by a centralised governance structure. Extensive literature debates the advantages and disadvantages of both. The advantages of centralisation include the ability of a national government to control for interregional externalities, to realise economies of scale for certain types of public goods and to better provide redistributive goods. One of the most significant disadvantages is the tendency of centralised systems to provide a single universal standard without the capacity to adjust to diverse local needs and conditions (Oates, 1972)¹⁷. Early on in this debate, researchers questioned the supposed inherent superiority of decentralised decision-making (Hayek, 1948; Wildavsky, 1976). Researchers also have questioned why centralised delivery systems cannot simply incorporate local information, enabling them to adjust policies to local needs. Bardhan and Mookherjee (2000) suggest that there are more fundamental reasons for the failure of central governments to respond to local needs than failing to match service to demand. They believe the underlying problem is rather the difficulty in creating the specific institutional arrangements and incentive

¹⁷The conventional wisdom in the fiscal federalism literature, as propounded by Oates (1972), is that decentralisation is to be preferred when public goods and services are heterogeneous and there are no spillovers across jurisdictions. With no spillovers and no heterogeneity a central government providing a common level of public goods and services for all localities is more efficient; with spillovers decentralisation leads to underprovision of local public goods and services.

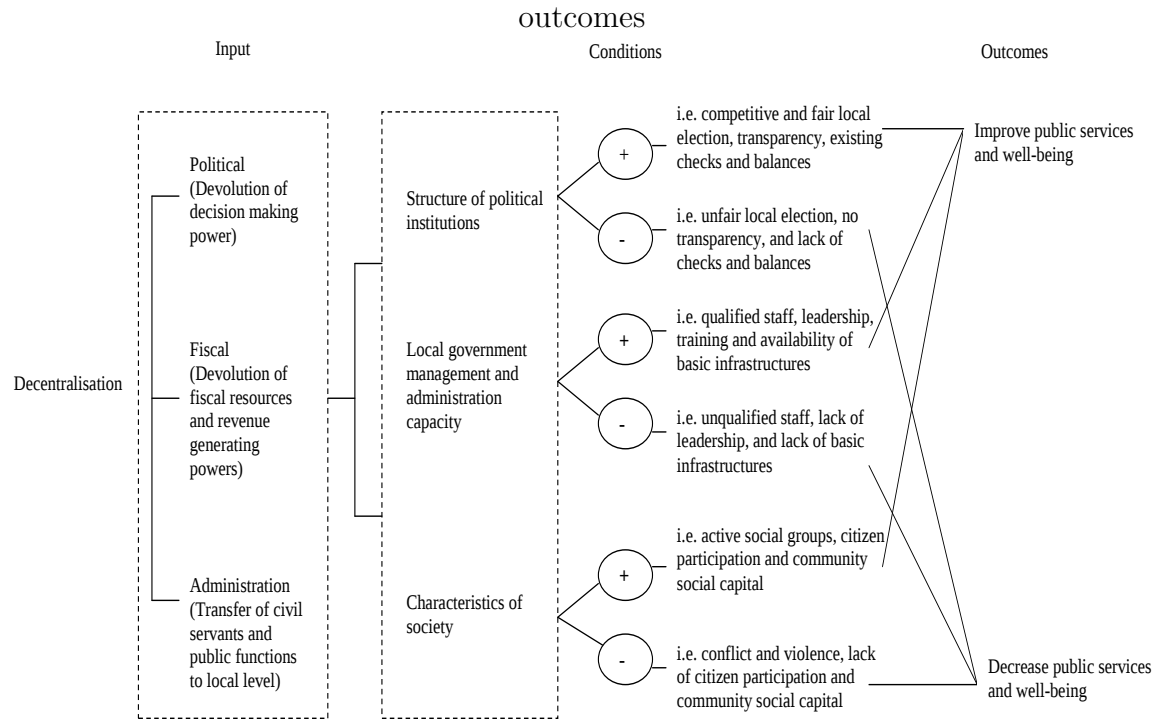
structures that oblige political units to be accountable to their citizens. Bardhan and Mookherjee (2002) argue that centralised delivery systems are prone to bureaucratic corruption due to problems in monitoring performance, whereas local decision-makers who are closer to the people may be more easily monitored.

The main argument in favour of decentralisation is that it brings decision-making closer to local people. Tiebout (1956), Coase (1960), and Oates (1972) argued that decentralisation would increase allocative efficiency by subjecting public spending priorities to local demand. They indicated that because information regarding the performance of government institutions is more readily available to citizens in decentralised systems, this puts them in the best position to make demands for effective services and to reward and punish local politicians. Information on local preferences also becomes more readily available to decision-makers under decentralisation because their sphere of activity is coterminous with that of the citizens they represent. Moreover, taxing citizens for local services creates the incentive for them to insist on good quality, and to hold officials and service providers accountable for their actions.

However, theoretical literature also puts forward a number of reasons why decentralisation can degrade the provision of public services. Oates (1972) explains that decentralisation forfeits certain economies of scale available in central provision, while Smith (1985) argues that decentralisation may worsen outcomes when local governments are less technically able than central government to administer the delivery of public services. Bardhan and Mookherjee (2005) examine the possibility of capture and misallocation of public resources by local elites to their preferred uses, and also argue that capture by locally strong interest groups is easier under decentralisation. In cases such as these, the non-elite have little voice in local decisions and their preferences and needs go unfulfilled. For example, if local elites do not use the public schools in their area, they are likely to lobby for public resources to be used differently.

Studies have identified some channels or mechanisms determining effective or ineffective decentralisation for improving public services and well-being. These channels or mechanisms can be divided into three theoretical streams. First, they who are focused on the structure of political institutions as condition for effective decentralisation. This stream is particularly dominated by the work of political scientists. They suggest that for decentralisation to work it requires the existence of democratically-functioning local governments and institutional constraints that hold politicians to account (Agrawal and Ribot, 2000; Ostrom, 2000; Anderson, 2003; Rodden et al., 2003). Second, they who are stressed the capacity of local government's management and administration to respond to demands as condition of effective decentralisation. This is particularly dominated by the public administration scholars and economists (Rondinelli, 1989; Crook and Manor 1998a, 1998b; Ribot, 2002; Grindle, 2007). Third, they who believe that the success of decentralisation is determined by the structure of society itself, and the action of citizens rather than political and administrative structures. According to this view, social groups in a community exert pressure on the public sector to provide better services or more opportunities for participating in the policy-making process (Putnam, 1993; Heller, 2001; Faquet, 2001). Figure 1.6 illustrates a framework highlighting the linkages between decentralisation, its conditions and outcomes.

Figure 1.6: A framework of the linkages between decentralisation, its conditions and



Source: author's construct based on literature review

Some researchers have focused on structure of political institutions to understand condition of effective or ineffective decentralisation for improving local public services and well-being. Those who stress the significance of formal political institutions for understanding the impact of decentralisation reforms on public services have tended to emphasise many of the same institutional arrangements that are more broadly associated with democratisation (Crook and Manor, 1998a; Ribot, 2002). According to these scholars, for decentralisation to work it requires the existence of democratically-functioning local governments and institutional constraints that hold politicians to account (Agrawal and Ribot, 2000; Ostrom, 2000; Anderson, 2003; Rodden et al., 2003). Thus, in a well-functioning democratic system residents are able to exert pressure on local, elected representatives to provide essential goods. With dysfunctional local governments, the fundamental prerequisites of a democratic institution are often missing

(Crook and Manor, 1998a; Bardhan and Mookherjee, 2000). Such a lack of degree of accountability can lead to disproportionate elite influence, as discussed earlier; this can (according to Seabright, 1996; Bardhan and Mookherjee, 2003) increase local rent-seeking (Seabright, 1996; Bardhan and Mookherjee, 2003)¹⁸. A system of accountability is clearly essential to enable communities to monitor local government performance effectively and to react appropriately to that performance. Such a system also provides politicians and local officials with the incentive to be responsive.

The political institution that would seem the one most obvious to guarantee accountability is that of the local election, and the link between electoral politics and local government is suggested in Riker (1964). According to this view, where local elections are competitive and opposition party members have a real opportunity to win positions of authority, incumbents will be motivated to prove their competence in the management of public affairs and will seek to find new ways of addressing real problems. Subsequent authors have also pointed to the importance of competitive and contestable local elections as an institutional mechanism to counter corruption and to prevent the capture of local politics by elites (Rondinelli et al., 1989; Manor, 1999; Rose-Ackerman, 2000). They suggest that decentralisation reforms without accompanying change at local level, designed to ensure effective functioning democratic governance, will simply increase the power of local political elites rather than improving local service delivery and strengthening democracy (Prud'homme, 1995; Crook and Manor, 1998a; Crook and Manor, 1998b; Manor, 1999). Empirical investigation on the relationship between

¹⁸Seabright (1996) takes a theoretical approach to the problem of political accountability, discussing it in terms of the allocation of control rights in the context of incomplete contracts, where breaches of contract are observable (though not verifiable) in administrative or judicial review and are subject to periodic electoral review. In his model, which contains both central and local elected officials, centralisation allows for benefits from policy coordination, especially important if there are spillovers across jurisdictions. He does also find that centralisation has costs in terms of diminished accountability, in the sense of reduced probability that the welfare of a given locality can determine the re-election of the government. Elections are, of course, extremely blunt instruments of political accountability, and other institutional devices and unelected community organisations (such as non-government organisations) may be deployed to strengthen local accountability.

structure of political institution, public services and well-being however is very limited.

Another body of research has focused not on the structure of political institutions, but on the degree of institutional authority or local administrative capacity. A number of researchers have suggested that the reason some public services are not delivered well by local governments is that decentralisation is rarely complete (Rondinelli et al., 1989). They suggest that any decentralisation framework must link, at the margin, the local financing and fiscal authority to the service provision responsibilities and functions of the local government, so that local politicians can deliver on their promises and bear the costs of their decisions. However, in many cases, responsibility is given to local governments without the accompanying fiscal authority either to raise revenue or to exercise discretionary power over spending decisions (Dillinger, 1995; Seabright, 1996; Agrawal and Ribot, 1999). The link between decentralisation, and fiscal responsibility and efficiency relies on a complex array of financing, spending and resource allocation relationships between central and local governments.

Others have stressed that it is not institutional authority that matters, but rather the capacity of local governments to respond to demands. In many cases staff, training and basic administrative infrastructure is severely lacking and even if given the authority, the resources available do not allow for effective response to citizens' needs (Larson, 2002; Deininger and Mpuga, 2005). Some scholars emphasise local leadership capacity as an important determinant for effective decentralisation (see for example Wallis (1999) and Grindle (2007)). In their view, the state, in the guise of reform leaders and their teams, identifies particular problems and promotes policies, programmes and organisational solutions to local government. In Mexico, Grindle (2007) finds that ideas, leadership skills, and the strategic choices made to promote a reform agenda and acquire resources play a central role in effective decentralisation and improving well-being.

Other researchers attempting to explain the success of decentralisation have focused on the structure of society itself, and the action of citizens rather than political and administrative structures. According to this view, social groups in a community exert pressure on the public sector to provide better services or more opportunities for participating in the policy-making process. These groups not only demand good performance, they can also provide models of how improvements can be made, participate in decision-making and implementation activities, and take an active role in monitoring the performance of elected and administrative officials. Localities without active civil societies are less likely to take on the difficult task of providing better services, to be innovating in their activities, or to be responsive to local needs. The most well-known is Putnam's analysis of Italy's local government and the impact of civil society and social capital (Putnam, 1993). Putnam posits that the degree to which devolution of authority leads to better local government is concomitant with the level of organisation of civil society and the extent to which civil actors are able to monitor and hold local officials accountable. The success of decentralisation in Porto Alegre, Brazil and Illave, Peru also shows the important role which civil society engagement plays in ensuring the positive impact of decentralisation (see for example Heller (2001); Faguet (2001)). This bottom-up approach places agency not with politicians, but rather with citizens themselves and their ability to organise and interact with the formal political structure. The impact of the organisation of civil society on a broad array of democratic reforms and public services is supported in subsequent empirical research (Booth and Richard, 1998; Woolcock, 1998; Bowles and Gintis, 2002).

Following prior research, this study uses determinants associated with both effective and ineffective decentralisation to ascertain the variation in local public services and well-being in decentralised Indonesia. Because decentralisation is a process that proceeds at different paces in different countries, among different policy sectors, and across

local governments with different competencies, this study sheds light on the conditions under which some of those determinants provide more robust explanations than others. The next section presents three research gaps which this study addresses.

1.3 Current decentralisation studies: three research gaps

Given the mixed findings regarding the consequences of decentralisation for public services and well-being, studies in this field remain an open area of active research. This section briefly explains three research gaps arising from previous studies on decentralisation, public services and well-being that this study aims to improve: (1) the limitations of cross-country analysis and the few studies based on local government reform, (2) the insufficient analysis of the consequences of decentralisation on subjective well-being, and (3) the limited analysis of the contextual effects of decentralisation on well-being. Table 1.3 presents these gaps in more detail.

Table 1.3: Research gaps

Country/author	gap 1	gap 2	gap 3
Decentralisation and local public service performance	local government as unit of analysis	subjective measure of service performance	multilevel analysis
South Africa, Myburg et al (2005)	No	Yes	No
Africa, Bratton (2007)	No	Yes	No
India, Deichman and Lall (2003)	No	Yes	No
Indonesia, Pattinasarany and Lewis (2009)	No	Yes	No
Indonesia, Eckardt (2008)	Yes	Yes	No
India, Bennet (1999)	No	Yes	No
Decentralisation and happiness	local government as unit of analysis	include both fiscal political decentralisation	multilevel analysis
20 European countries, Diaz-Serrano and Rodriguez-Pose (2012)	No	No	No
10 Central and Eastern European, Rodriguez-Pose and Maslauskaitė (2012)	No	No	No
12 European countries, Hessami (2010)	No	No	No
Countries in the world, Bjornskov et al (2008)	No	No	No
OECD countries, Di Tella and MacCulloch (2005)	No	No	No
Countris in the world, Veenhoven (2000)	No	No	No
Swiss, Frey and Stutzer (2000)	Yes	No	No
Decentralised health spending and health care demand	local government as unit of analysis	use conditional and unconditional being ill	multilevel analysis
51 countries, Saksena et al (2010)	No	No	No
31 countries, Hopkins (2010)	No	No	No
India, Sigh and Ladusingh (2010)	No	No	No
Indonesia, Kruse et al (2012)	Yes	No	No
Indonesia, Hidayat (2008)	No	Yes	No
Indonesia, Rokx et al (2009)	No	No	No
Mother social capital and child health	focuses on child health	individual and community social capital	examine reverse causality
US, Kawachi et al (1999)	No	No	No
South Africa, Carter and Maluccio (2003)	Yes	No	No
Vietnam, Tuan et al. (2006)	Yes	No	No
Peru, Ethiopia, Vietnam andd India, De Silva an Harpham (2007)	Yes	No	No
Brazil, Surkan et al. 2007)	Yes	No	No
Indonesia, Nobles and Frankenberg (2009)	Yes	No	Yes

1.3.1 The limitations of cross-country analysis and a few studies based on local government reform

Prior studies on decentralisation, public services and well-being have often been based on cross-country analysis (see for example Estache and Sinha (1995); Huther and Shah (1995); Enikolopov and Zhuravskaya (2007); Treisman (2000); Khalleghian (2003); Bjorskov (2008)). Other enquiry is based on provinces or state governments (see for instance Zhang and Zou (1998))¹⁹. Some studies used small-scale areas (such as villages or urban neighbourhoods) as units of analysis (see for example Bardhan and Mookherjee (2003); Galasso and Ravallion (2001); Foster and Rosenzweig (2001)). A few studies are based on a small number of local governments or municipalities and specific programmes (see for instance Santos (1998); Heller (2001); Grindle (2007)).

Although such cross-country studies provide a large sample of countries and a relatively long timespan, this approach has become open to criticism. Scholars increasingly recognise the presence of significant unobserved heterogeneities (such as the difference of cultures and overall institutional settings between countries) and that these may lead to bias estimates of the relationship between decentralisation and its outcomes (Nabeshima, 2003; Kruse et al., 2012; Maddala, 1999; and Helliwell and Huang, 2008). Nabeshima (2003) notes that production functions that transform various inputs in public service provision into outputs may differ substantially across countries, complicating estimation and interpretation. Furthermore, Kruse et al. (2012) explain that any conclusion regarding the determinants and effectiveness of decentralised public spending based on cross-country analysis may demonstrate bias due to country-specific, unobserved historic and institutional factors. Moreover, the locus of decentralisation reform

¹⁹Bardhan (2002) for example explains that data below provincial government level is often very scarce, and that most quantitative studies of decentralisation (for example, those based on the share of the central government total expenditure or revenues) do not address issues at local community level (even apart from the fact that the share of expenditure or revenues is not a good index of decision-making authority).

in many developing countries is generally found at local government or district administration level, below the level of provincial government. Using a province or village as the unit of analysis is likely to be less relevant to national policy, since such analyses are unable to capture the dynamics of reform within local governments in which decentralisation is actually implemented. Furthermore, despite the depth of analysis of some studies using a small number of local governments, these types of study are limited by the fact that the results are less generalised.

1.3.2 Insufficient analysis of the consequences of decentralisation for subjective well-being

A large body of literature has been examined in this study to determine whether decentralisation leads to greater economic growth and prosperity (Davoodi and Zou, 1998; Wibbels, 2000; Iimi, 2005). Several studies discuss the effect of decentralisation on macro-economic stability and national growth (De Mello, 2000; Burki et al., 1999; Wibbels, 2005; Davoodi and Zou, 1998; Xie et al., 1999; Rodriguez-Pose and Bwire, 2003; Phillips and Woller, 1997; Martinez-Vazquez and McNab, 2003). Researchers have also extended their study to examine the consequences of decentralisation on economic efficiency and regional inequality (Ezcurra and Pascual, 2008; Lessmann, 2008). A few investigate the contribution of decentralisation to the alleviation of poverty and interpersonal inequality (Tselios et al., 2011; Sepulveda and Martinez-Vazquez, 2011). These studies have justified both the potential benefits as well as the detrimental effects of decentralisation on economic development and welfare across developed and developing countries.

A number of scholars have begun to examine the implications of decentralisation for non-economic indicators of development outcomes, such as subjective well-being or happiness (Fleurbaey, 2009). This growing interest has emerged as the limitation of

economic indicators is recognised, particularly that of gross domestic product as a measure of development outcomes²⁰. This emerging body of literature embraces subjective well-being (which can be expressed in terms of happiness and life satisfaction) as an important indicator of quality of life. However, only one study has been found which looks for the consequences of decentralisation on subjective well-being in a local government context. Frey and Stutzer (2000) examine the association of direct democracy and local autonomy on individual happiness in Switzerland and find a strong correlation between both determinants.

The majority of studies in this area are based on cross-country data. For example, Diaz-Serrano and Rodriguez-Pose (2012) examine the relationship between decentralisation and happiness in twenty European countries. They show that people living in more decentralised countries are happier than those in countries that are less decentralised. Rodriguez-Pose and Maslauskaitė (2012) examine the association between decentralisation, governance and happiness in ten Central and Eastern European countries. They find that greater political and fiscal decentralisation increases life satisfaction, while corruption within decentralised countries decreases life satisfaction. Hessami (2010) using the Eurobarometer Survey Series 1990 and 2000, shows that the quality of institutions (as measured by levels of corruption and expenditure decentralisation) has significant effect on subjective well-being. Bjornskov et al. (2008) analyse the World Value Survey from 1997-2007 and find that fiscal decentralisation increases life satisfaction, while political decentralisation does so only when it is accompanied by an increase in government spending on public services. Furthermore, they also show that life satisfaction decreases with government consumption. However, Di-Tella and Mac-

²⁰Well-being has received renewed attention from social scientists dissatisfied with income measures of welfare (Lane, 2000; Diener and Seligman, 2004; Frey and Stutzer, 2002; Deaton, 2008; Graham, 2009; Layard, 2005; Frey, 2008). Fleurbaey (2009) surveys the literature on alternative measures and concludes that three alternatives are possible. Chief among these three is well-being (which is the focus of this study); the others are capabilities and synthetic indicators e.g. the Human Development Index.

Culloch (2005) find a positive but insignificant effect of government consumption on life satisfaction in a panel analysis of ten OECD countries. Clearly then, the existing literature presents mixed findings with regard to the relation between decentralisation and subjective well-being.

1.3.3 A limited analysis of the contextual effects of decentralisation on well-being

Numerous decentralisation studies examining the association between local government characteristics and well-being tend to be based mostly on either aggregate analysis (Eckardt, 2008; Kruse et al., 2012; Saksena et al., 2010; Xu et al., 2003) or individual analyses (Kaiser et al., 2006; Frey and Stutzer, 2000; Pattinasarany and Lewis, 2009; Björnskov et al., 2008; Rodriguez-Pose and Maslauskaitė, 2012; Hidayat, 2008; Rokx et al., 2009). For example, Eckardt (2008) uses aggregate citizen satisfaction with local public services to examine the association between political institutions, accountability and local government performance in Indonesia. Saksena et al. (2010) use aggregate individual and household data to examine the impact of public health expenditure and healthcare access across developed and developing countries. Kruse et al. (2012) do the same to examine the impact of decentralised public spending on healthcare access in Indonesia. It is well-known that such aggregate analyses risk the invalid transfer of results observed at aggregate level to the individual level (Robinson, 1950; Susser, 1994). Robinson (1950) noted that this risk may lead to bias inference due to a significant loss of information when using ecological correlations as a substitute for individual correlations²¹.

At the same time, individual analyses of decentralisation, public services and well-

²¹For discussion of ecological correlations see Robinson (1950) and more recently Subramanian et al. (2009).

being take less into account the socio-economic context within which individuals experience differential levels of well-being. For example, Pattinasarany and Lewis (2009) examine the relation between decentralisation and citizen satisfaction with local public performance in Indonesia but do not however account for the nested structure of decentralisation reform and local government performance. Frey and Stutzer (2002), Bjornskov et al. (2008) and Diaz-Serrano and Rodriguez (2012) examine the relation between decentralisation and happiness, but neither study accounts for the nested structure of decentralisation reform and happiness. Hidayat (2008) and Rokx (2009) examine individual demand for healthcare in Indonesia, but these analyses do not account for the nature of decentralised healthcare reform in the country.

1.4 Research contribution

This study makes a contribution to the existing literature on decentralisation and well-being by addressing these three research gaps. First, it takes as its unit of analysis a large number of local governments within a single country, since their decentralisation performance is embedded in the broader political, institutional, economic and social context of that country (Rondinelli et al., 1989; Litvack et al., 1998; Manor, 1999). Local government studies have the advantage since such contexts are considerably more similar within the boundaries of a single country than they are across countries. The effect of political decentralisation on well-being measures (e.g. individual happiness and health status) may thus be more salient than when we use cross-country data to test the hypothesis. Furthermore, by examining a large number of local governments, this study is able to assess to what extent findings from the vast cross-country-based literature in this field are also found within a single country. This analysis may also capture the extent of the social, political, and economical dynamics when decentralisation reform

is implemented in local governments. The results may thus prove more relevant to discussion of decentralisation policy than when cross-country or provincial governments are used as the unit of analysis.

Second, this study adds to existing decentralisation literature on well-being by examining the consequences of decentralisation reform on both an objective measure of well-being (i.e. healthcare demand and child health) and a subjective measure of well-being (i.e. individual happiness and citizen satisfaction with public services). By using both measures, this analysis provides a more comprehensive picture of the consequences of decentralisation reform for well-being. Moreover, by focusing on the experience of a single decentralised developing country, I can provide a contrast with recent studies on decentralisation and well-being that base their analysis on cross-country data and more advanced democratic countries.

Third, this study adds to existing decentralisation studies on public services and well-being by ascertaining individual as well as local government determinants in the analysis. By accounting for the multilevel structure of the relationship between decentralisation and well-being, I can investigate whether the effect of local government conditions on individual well-being varies between local governments. The effect of decentralisation reforms on well-being measures (such as health status and happiness) can thus be tested appropriately. Moreover, by combining both contextual and individual determinants, I am able to examine the effect of local government social, fiscal and political capacity in promoting well-being in Indonesia.

1.5 Research aims and questions

The aim of this research is to investigate the association of decentralisation reform, local public services, and well-being from a cross-local government perspective in Indonesia.

In doing so, I take into account socio-economic determinants at both individual and local government level. By using this approach, I address the three limitations of earlier studies. I also answer the following research questions.

1. When local governments are charged with new responsibilities and are equipped with more resources, to what extent they can enhance their public service performance? Why are some local governments more effective than others in delivering public services? What role do political institutions and incentives play in shaping local public service performance in Indonesia? What are the implications of Indonesia's political decentralisation for better local public services? These questions are aimed at identifying the distribution of public service performance across local governments and to examine the association between political decentralisation and local public service performance in decentralised Indonesia.
2. To what extent is political and fiscal decentralisation associated with citizen happiness in Indonesia? How is citizen happiness affected by local government characteristics (after controlling for individual determinants related to happiness)? What are the implications of decentralisation reform in Indonesia for citizen happiness? These questions are aimed at describing the distribution of self-rated happiness and at examining the association between fiscal and political decentralisation and happiness in decentralised Indonesia.
3. What is the relationship between decentralisation, social capital and child health in Indonesia? To what extent social capital is associated with child health? What are the implications of social capital for enhancing decentralisation outcomes (i.e. child health) in Indonesia? These questions are aimed at describing the relationship between decentralisation, social capital and outcome of decentralisation in the form of child health in Indonesia.

4. To what extent is decentralised health spending in Indonesia associated with healthcare demand? Taking into account individual socio-demographic and local government determinants related to healthcare demand, how is healthcare demand affected by decentralised health spending? What are the implications of health sector decentralisation in Indonesia for enhancing healthcare demand? These questions aim to describe the distribution of healthcare demand and to examine the association between decentralised health spending and healthcare demand in decentralised Indonesia.

1.6 Data, measures and methods

To answer the questions presented above I assemble data from a variety of sources, making sure that the analytic sample possesses a nested structure (citizens in local governments) to conform as closely as possible to the research questions. After all, it is the association between local government determinants and citizen well-being that is the focus of this study. Table 1.4 presents the datasets used in this study.

Table 1.4: Data sources and sample used in the study

Data sources	N individuals/households	N local governments/cities
<i>Individual</i>		
Governance Decentralisation Survey 2006	8,320 households	120 local governments
Indonesian Family Life Survey 2007	29,060 individuals	262 local governments
Indonesian Social Economic Survey 2009	1,142,675 individuals	471 local governments
<i>Local government</i>		
Village Potential Census 2006		438 local governments
Village Potential Census 2008		466 local governments
Consumer Price Indexes 2005		44 cities
Consumer Price Indexes 2006		66 cities
Consumer Price Indexes 2007		66 cities
Consumer Price Indexes 2008		66 cities
Consumer Price Indexes 2009		66 cities
Local government finance system information 2005		370 local governments
Local government finance system information 2006		436 local governments
Local government finance system information 2008		451 local governments
National election data base 2004		367 local governments
National election data base 2006		438 local governments
National election data base 2007		469 local governments
National health data base 2009		471 local governments

1.6.1 Survey data and official statistics

I use individual and household level data from three surveys: the Indonesian Governance Decentralisation Survey (GDS) 2006, the Indonesian Family Life Survey (IFLS) 2007, and the Indonesian Social Economic Survey (Susenas) 2009. GDS data is one of the main sources of information referred to by decentralisation and local governance studies in Indonesia (Pattinasarany and Lewis, 2008; Hofman et al., 2006; Kaiser et al., 2006). Gathered from a national survey, its purpose is to evaluate the performance of local service providers, the satisfaction of service customers, and the condition of local governance in decentralised Indonesia. The survey is conducted by the World Bank Indonesia in conjunction with the Centre of Public Policies Study, University of Gadjah Mada. Two waves have been fielded, in 2002 and 2006; I use the GDS 2006, which consists of detailed information about the quality of public services and the workings of various political processes, political transparency, and political participation. The GDS 2006 consists of a randomised sample of 134 local governments representing all

regions of Indonesia. In this study, I selected adult respondents (aged 17 and older) for analysis. This yields a sample of 8,320 households living under 120 local governments.

The IFLS is an ongoing longitudinal survey that began in Indonesia in 1993. It represents 83% of Indonesia's population living in 13 provinces and 262 local governments (Frankenberg and Karoly, 1995; Frankenberg and Thomas, 2000), and brings together a rich set of information on individuals and households, the communities they live in, and the facilities that are available to them. Households (defined as a group of people who reside together and 'eat from the same cooking pot') were randomly selected from within the communities. Four waves have been fielded so far, in 1993, 1997, 2000 and 2007. The survey has successfully re-interviewed over 86.5-91.5% of households in the original sample (Frankenberg and Thomas, 2000; Strauss et al., 2004; Thomas et al., 2011). This low attrition is exceptional compared to surveys carried out by other countries, including a United States longitudinal household economic survey (Thomas et al., 2011). Because of the high quality and richness of its data, the IFLS is considered an established and reliable source of information about family and community life in Indonesia, covering a range of topics from social capital (Miller et al, 2006), health and education (Cameron and William, 2009; Fitzsimons, 2007) to decentralisation and development (Beard, 2005). In this study, I use the fourth wave of IFLS, as this added new sets of questionnaire modules which asked about happiness and child health, and which included detailed questions related to social capital and local governance. In total, the IFLS 2007 covers 29,060 adults in 12,688 households and 262 local governments.

Susenas is one of the oldest and most well-regarded national representative household surveys among developing countries (Ravallion and Lokshin, 2007). Earlier studies have used Susenas data to examine poverty (Pradhan et al., 2001; Ravallion and Lokshin, 2007), health access (Rokx et al., 2009), and inequality and regional development in Indonesia (Balisacan et al. 2003). Its data is also used by the Indonesian govern-

ment as its main source when making decisions and formulating policy. The survey is implemented by the government's Central Bureau of Statistics (*Biro Pusat Statistik*, BPS); since 1993 it has been fielded yearly and is representative at local government level. Each survey has a sample size of about 250,000 households (close to 1,200,000 individuals) (BPS, 2007). The survey instrument contains a core questionnaire which collects information regarding the socio-demographic characteristics of household members, their education, labour market activities, and access to various services. In this study I use the 2009 Susenas wave, as it contains detailed questions on inpatient length of stay in hospitals, the findings of which I found relevant.

The individual data taken from the survey was linked with census and official statistical data at local government level, including the Indonesian village potential census (Podes) 2006-2008, the local government finance information system data 2005-2008, the local and national election database 2004, and the Ministry of Health's national health database 2009. Podes is a national census at the lowest administrative tier of local government (BPS Indonesia, 2006) and, like Susenas, is conducted by the government's Central Bureau of Statistics. It collects various socio-economic indicators from every Indonesian village and urban neighbourhood, ranging from infrastructure to village governance, and consists of 75,410 villages and urban neighbourhoods nested within more than 400 local governments. Aggregate villages and urban neighbourhoods are constructed to measure the distribution of public services facilities, social groups, and local governance within a local government.

The Indonesian Ministry of Finance has compiled local government development budget and expenditure information annually since 1994. These official statistics comprise the local government finance information system, and provide detailed local government fiscal information ranging from individual local government own source revenue, balancing and general allocation funds, local taxes and levies, to sectoral de-

velopment expenditure (The Indonesian Ministry of Finance, 2008). In this study, I use local government spending data taken the year before the GDS, IFLS and Susenas survey were conducted (local government development spending in the Indonesian government budgeting system takes at least one year to take effect). Since the price level of consumer goods and services in Indonesia varies across regions (Strauss et al., 2004), I deflate the amount of local government spending with the consumer price index for urban and rural regions. Following Thomas and Frankenberg (2007) and Resosudharmo and Jotzo (2009), rural inflation is taken to be 5% higher than urban inflation. This calculation produces real spending adjusted with regional inflation. The consumer prices index data is retrieved from the Indonesian Government Central Bureau of Statistics (BPS).

The local and national election database 2004-2007 is available from the Indonesian Ministry of Home Affairs and the National Election Commission, and includes information on the 2004 national election results for legislative and executive leaders. It also reports on which local governments have already conducted direct mayoral elections. Although decentralisation in Indonesia was implemented in 2001, the position of mayor initially continued to be decided indirectly, following selection by the local legislatures. From 2005, mayors were selected via direct election; by 2007, around 70% of local governments had undergone direct elections, while the rest continued to be elected by the previous regime. I also use the national health database 2009 which includes information regarding certain measures of hospital performance (such as bed occupation ratio, often used as a proxy to measure hospital efficiency). In the next section, I discuss further the measurements of decentralisation and decentralisation outcomes used in this study.

1.6.2 Decentralisation and well-being measures

Decentralisation can be put into effect in various ways: through devolution, delegation, or deconcentration (Rondinelli et al., 1983; Conyers, 1983; Cheema and Rondinelli, 2007, Grindle, 2007; World Bank, 2008a) ²². It can also be put in several dimensions: political decentralisation, fiscal decentralisation and administrative decentralisation (Schneider, 2003; Cheema and Rondinelli, 2007; World Bank, 2008a) ²³ While distinctions between various forms and dimensions of decentralisation are important to note in defining the relationship of the centre to the periphery, and for the management of particular programmes and functions, most local governments experience all three types of decentralisation at the same time (World Bank, 2008a). In this study, I refer to the definition of decentralisation put forward by Grindle (2007), as the formal and informal mechanisms and rules that allocate authority and resources downward among different levels of government. My main focus is on the decentralisation of political authority and resources to local governments. Following Schneider (2003), I use existing direct local elections as a proxy indicator of political decentralisation. To measure fiscal decentralisation, this study uses the degree of fiscal transfer from central government to local government, local government spending on public services, and local government

²²see Rondinelli et al. (1983), Cheema and Rondinelli (2007), Grindle (2007), World Bank (2008a) for discussion about the definition of decentralisation. World Bank (2008a) for example defines deconcentration as the least ambitious level of decentralisation, where responsibilities are transferred to an administrative unit of the central government that is spatially closer to the population where service is to be provided, usually a field or regional office. Delegation is defined as an intermediate level of decentralisation, where some authority and responsibilities are transferred to a lower level of government, but there is a principal-agent relationship between the central and sub-national government in question, with the agent remaining accountable to the principal. Finally, devolution is the most ambitious form of decentralisation, where the central government devolves responsibility, authority, and accountability to subnational governments with some degree of political autonomy

²³World Bank (2008a) defines administrative decentralisation as the process of redistributing authority and responsibility for providing public services from the central or national level of government to a subnational and/or local level. Fiscal decentralisation is the decentralisation of government expenditure and revenue-sharing authority to subnational government structure in line with their allocated functional responsibilities. Political decentralisation means a process whereby the voice of citizens is integrated into policy decisions at subnational level and civil society can hold the associated authorities and official accountable.

health spending.

Decentralisation outcomes are measured by objective and subjective indicators of individual well-being. Well-being in this study is defined as a feature that captures quality of life (Sen, 1993). Literature of well-being divides this term into two features: objective well-being and subjective well-being (Diener et al., 1999; Frey and Stutzer, 2002; Kahneman et al., 2004). Objective well-being is often measured by income or consumption, while subjective well-being is usually measured by happiness and life satisfaction. Diener et al. (1999) propose subjective formula: subjective well-being = positive affect (life satisfaction + happiness) - negative affect (anxiety and depression).²⁴ While economic measures (such as gross domestic product, poverty, and inequality) have been widely examined by earlier decentralisation studies, relatively little research accounts for other measures of decentralisation outcomes, such as happiness, citizen satisfaction with public services, child health, and healthcare demand. Yet scholars have been interested in subjective measures like these as a complement to objective measures of well-being and public service performance (Fleurbaey, 2009)²⁵. In addition,

²⁴‘Well-being’ encompasses a wide range of possible domains; it is essential to properly define which aspects to be investigated and how they are related. The growing literature on and interest in well-being can be partly explained by a change in thinking about what constitutes wealth. While growth was usually seen as encompassing the very narrow domain of wealth production, mainly GDP, scholars and international institutions now tend to define well-being more broadly than relating to wealth alone (Stiglitz et al., 2009; UNDP, 2010; Frey and Stutzer, 2002; Kahneman et al., 2004). Furthermore, scholars argue that well-being does not only depend on the individual, but the environment also plays a significant role (Sampson, 2003; Stiglitz et al., 2009). Nussbaum and Sen (1993) and Haas (1999) explain that this broader approach to wealth, comprising both objective and subjective individual indicators on the one hand and collective indicators on the other, frames a ‘quality of life’. In a nutshell, quality of life encompasses the ability to function effectively physically, emotionally and socially, while maintaining a sense of well-being (Levine, 1987).

²⁵Subjective well-being consists of both the individual’s emotional state and satisfaction with life in general and specific domains (Diener et al., 1999). Moods and emotions (termed positive and negative affect) reflect subjective well-being in the short term, while life and domain satisfaction result from a longer term evaluation of well-being. Happiness - or its more cognitive counterpart, life satisfaction, or subjective well-being - can be regarded as a paramount striving throughout human life. On a collective level, democratic political systems ideally try to achieve the highest level of life satisfaction for most citizens. One of the rationales behind the welfare state is that by supporting citizens to achieve a minimum level of income and resources, their well-being is enhanced significantly, and avoidable suffering is reduced. On an individual level, people achieve happiness or satisfaction through self-realisation in a number of life domains, such as work, family and social life. In a novel approach, Sen

other measures (such as child health and healthcare demand) are increasingly becoming a part of human and social development indicators in many developing countries (see for example Filmer and Pritchett, 1999; De Onis and Blossner, 2003).

In addition, some local government determinants associated with decentralisation performance are included in the models. These include public services capacity, community social capital, local leadership, local bureaucracy capacity, local corruption, economic development and local government geographic areas. These determinants are particularly important to explain the variation of decentralisation outcomes between local governments. Table 1.5 presents the detailed measures used in this study.

(1999) reconceptualises the thinking about what it means to be happy, stating in a nutshell that it is the opportunity to live a good life rather than the accumulation of resources that matters most for well-being. This means that well-being depends not only on individual abilities, or social position, but also on the context, on the ‘goodness of others’, as Nussbaum (2001) phrased it.

Table 1.5: Decentralisation and well-being measures

	Determinants	measures
Decentralisation	political decentralisation fiscal decentralisation	local direct democracy fiscal transfer from central government to local government local government public service spending
Decentralisation outcomes	objective well-being subjective well-being	health care demand child health happiness satisfaction on local public services
Local government characteristics	leadership local bureaucracy capacity conflict and violence incidence public services facilities access to public services human resources community social capital proxy for local corruption economic development area	mayor comes from new political party proportion of public managers with graduate education the distribution of physicians per 1,000 proportion of villages with conflict and violences the distribution of hospital care average transportation cost to nearest hospital proportion of adult literacy proportion of active social groups within local government share of population vote majors because large campaign fund and same ethnicity perceived local corruption gross domestic products area in kilometre squares
Individual and household characteristics	health status political participation individual social capital location socio demographic determinants	poor health status participate in local and national election participation in community programmes trust to neighbors living in urban, remote islands or eastern Indonesia age, female, employment, education, marital status, childlessness, household expenditure, household size

Public services capacity is measured by some indicators capturing human resources and basic infrastructure facilities such as distribution of physicians as well as availability of public hospital across local governments. I also include indicator capturing local bureaucracy capacity which is measured by proportion of public managers with graduate education or above. These measures are particularly important to test the hypothesis

whether local government administration and management capacity is related to public services improvement and well-being (Grindle, 2007).

The nature of political institution is measured through some indicators such as exiting direct election, local leadership, local corruption, and political competition or fragmentation. Districts resulting from direct local elections are almost certain to have more autonomy in decision-making than those created by the former centralised regime. Again, it must be remembered that this study is unique in that it examines a state in transition. By 2007, more than half (69%) of Indonesia's districts had a directly-elected mayor; the remaining districts continued to be led by a mayor elected under the previous regime who had started their term before the direct election bill came into effect. This unusual political condition provides the opportunity to examine the effect on happiness of two different systems of local government running concurrently. Local corruption is measured by perceived corruption on public services and mayors accountability reports as well as a proxy measure indicating nepotism and 'money politics' during mayoral elections. Earlier studies (Kaiser and Hofman, 2003; Choi, 2004; Nordholt and Van-Klinken, 2007) have found that direct local elections in Indonesia give rise to two concerns regarding corruption in local politics, which we measure by the perceived degree of nepotism and 'money politics' operating specifically in mayoral elections. Firstly, the increasing issue of a mayoral candidate being deemed to be a *putra daerah* ('son of the region') has proved to be the embryo of the rise of primordialism and nepotism (Kaiser and Hofman, 2003). Secondly, the issue of politik uang (or 'money politics') gained prominence following the inception of direct local elections; today, this is generally accepted to be endemic particularly during the local election process. Local governments with higher incidence of primordialism, nepotism and money politics are, not surprisingly, more corrupt, with clear evidence of the mayor, bureaucrats and local parliament officials tending to misuse public money in their own interests (Choi, 2004;

Nordholt and Van-Klinken, 2005). Furthermore, the nature of political competition is measure by the ratio between elected members of the winning party and their opponents: a lower ratio means that the composition of political parties in the given local government is more fragmented.

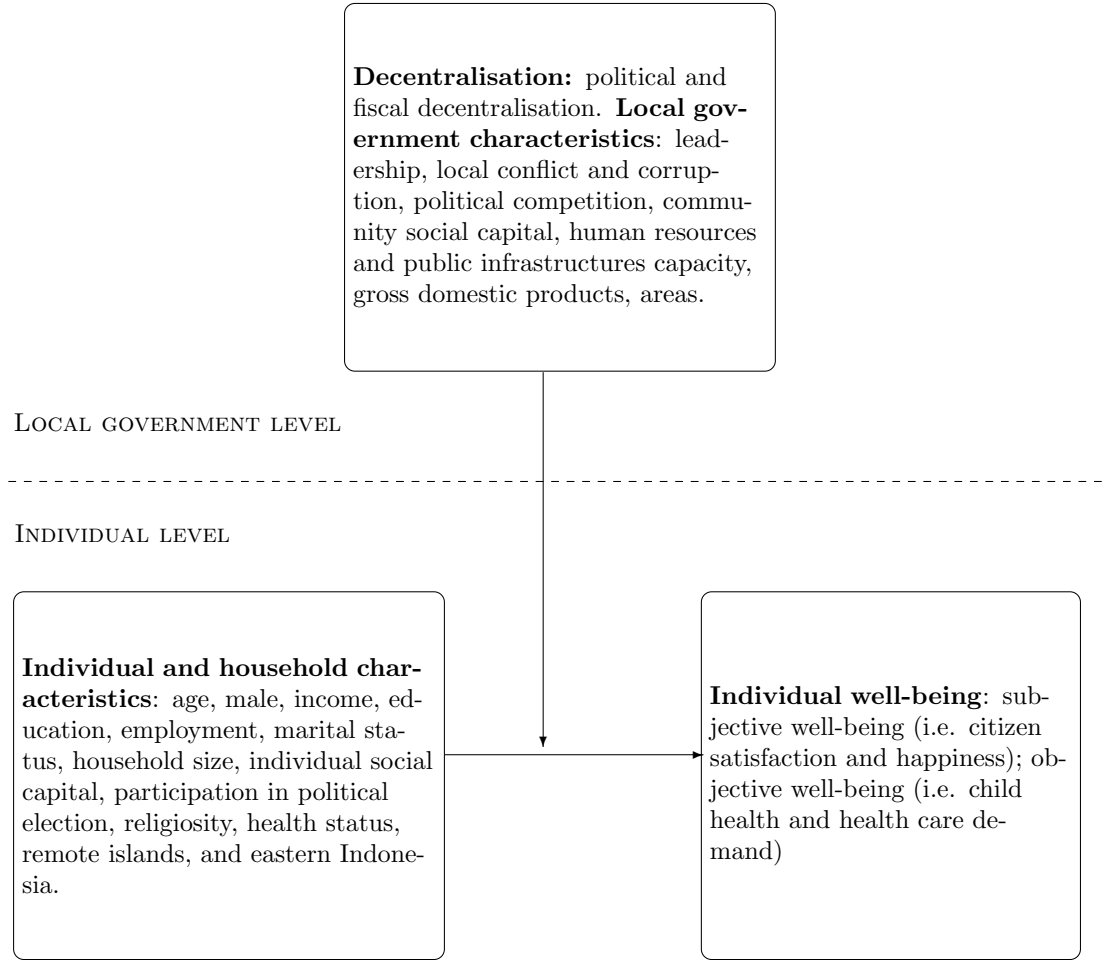
The characteristics of society are measured by existing conflict and violence as well as social capital. Nordholt and Van-Klinken (2005) report that decentralisation in Indonesia was followed by an increasing amount of local conflict and violence, and indicate the inability of local democracy to guarantee effective local leadership. In addition, Nordholt and Van-Klinken (2007) demonstrates in some cases the weak capacity of the newly-created district authority to manage both their responsibilities and resources. In this study, social capital is defined in terms of individual and community social capital. Recent studies have conceptualised this concept as the property of individuals and communities. Portes (1998) believes social capital as “the capacity of individuals to command scarce resources by virtue of their membership in networks or broader social structures”. In contrast, Putnam (1995) conceives social capital as a community-level resource and a distinctly social feature that is reflected in the structure of social relationships. He defines social capital as: “features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit”. Following this literature, this study examines both type of social capita. Community social capital is measured by the existing social group within community, while individual social capital is measured by individual participation or networks within community programmes such as community meetings, village cooperatives, voluntary labour, village upkeep, and women’s associations. These community programmes is widely adopted across local governments in Indonesia and become an important part of community development during decentralisation (World Bank, 2003).

1.6.3 Multilevel analyses and instrumental variables method

Multilevel analyses are considered the most appropriate for this study. Using ordinary regression analyses would be inappropriate, given the nested structure of decentralisation reforms and local public service performance addressed in this analysis: individuals/citizens are hierarchically clustered within local governments. This nesting of individuals within large local government units may lead to an underestimation of standard errors regarding the effects of local government characteristics if non-hierarchical methods are employed. As a result, in ordinary regression analyses the significance of such effects are overestimated²⁶. Multilevel analyses are able to account for this clustering of individuals within local governments by separating individual variance in citizen well-being from local government variance. Hypotheses regarding the effect of local government characteristics can thus be tested appropriately using these analyses. Multilevel analyses are becoming increasingly popular in public policy research (Goldstein, 1987; Leyland and Groenewegen, 2003; Wenglinsky, 2002), and in studies related to the effect of contextual characteristics on various aspects of individual well-being and health (Subramanian et al., 2001a; Subramanian et al., 2001b; Subramanian and Kawachi, 2006; Ballas and Tranmer, 2010). Detailed technical information on multilevel analyses can be found in Snijders and Bosker (1999) as well as Skrondal and Rabe-Hesketh (2012). Figure 1.7 presents a schematic research framework for this study.

²⁶Ordinary regression analysis often denote with $Y_i = \beta + \beta_1 X_i + e_i, e_i \sim N(0, \sigma_e^2)$. When we have clustered data this analysis treats the units of analysis as independent observations. One consequence of failing to recognise hierarchical structures is that standard errors of regression coefficients will be underestimated, leading to an overstatement of statistical significance. Standard errors for the coefficients of higher-level predictor variables will be the most affected when grouping is ignored. Multilevel analyses combine the regression and the variance component models to account for the nested structure of the data. The variance component models can be written with $Y_{ij} = \beta_0 + u_j + e_{ij}, e_{ij} \sim N(0, \sigma_e^2), u_j \sim N(0, \sigma_u^2)$. For example, assume we have data in J groups or contexts, and a different number of individuals N_j in each group. At individual level we have the dependent determinant Y_{ij} and the explanatory determinant X_{ij} . The random intercept model or multilevel model can thus be written with $Y_{ij} = \beta_0 + \beta_1 X_{ij} + u_j + e_{ij}, e_{ij} \sim N(0, \sigma_e^2), u_j \sim N(0, \sigma_u^2)$.

Figure 1.7: Schematic research framework for this study



I perform different types of analyses to answer each research question. In chapter 2, multilevel multiple indicators multiple causes analyses were performed to account for unobserved or latent determinants of citizen satisfaction with local public service performance. In chapter 3, I use the generalised linear latent and mixed models to examine the relation between decentralisation and individual self-rated happiness. In chapter 5, I apply multilevel finite mixture analyses to account for the nature of decentralisation of healthcare and the unobserved heterogeneity of healthcare demand in Indonesia. In chapter 4, I use an instrumental variable method to examine the causal effect between mothers' social capital and their children health, a method which rules

out reverse causality in the relationship between the two. Previous studies demonstrate that, with suitable instruments, this estimator performs better compared with ordinary least squares and propensity score matching techniques (Heckman, 1997; Stukel et al., 2007; Lindenauer et al., 2010)²⁷. In addition, in each chapter I include a geographical map of dependent determinants. These maps are important to illustrate the geographical variation of public services and well-being across local governments in Indonesia. All multilevel analyses were performed with Stata 11 and MPlus 6. The maps are drawn using the *spmap* command in Stata (Pisati, 2008).

1.7 Description of chapters

Having provided an overview of the research background and identified the research questions, this section describes the structure of the study. Chapter 2 discusses the association between political decentralisation and local public service performance. Using data from the Governance Decentralisation Survey 2006, I examine whether political decentralisation is associated with local public service performance. The findings show that effective local political institutions, better informed citizens and transparency, citizen political participation via community programmes, and the presence of social groups in the community have a significant and positive association with improved local public service.

Chapter 3 contributes to existing decentralisation literature on subjective well-being.

Using data from the Indonesian Family Life Survey 2007, I examine the association

²⁷Following Stock and Watson (2008) the general IV regression model notation is $Y_i = \beta_0 + \beta_i X_{1i} + \dots + \beta_k X_{ki} + \beta_{k+1} W_{1i} + \dots + \beta_{k+r} W_{ri} + e_i, i = 1, \dots, n$ where Y_i is the dependent determinant; e_i is the error term, which represents measurement error and/or omitted factors; $X_{1i}, \dots, X_{ki}$ are the endogenous regressors, which are potentially correlated with μ_i , $W_{1i}, \dots, W_{ri}$ are the included exogenous determinants or included exogenous regressors which are uncorrelated with μ_i , $\beta_0, \beta_1, \dots, \beta_{k+r}$ are the unknown regression coefficients, and $z_{1i}, \dots, z_{mi}$ are the m instrumental variables or the excluded exogenous determinants.

between political and fiscal decentralisation and happiness. The findings show that fiscal decentralisation is significantly associated with citizen happiness while political decentralisation is not, robust across a wide range of individual and local government determinants related to happiness. The findings also suggest that decentralisation increases the happiness of citizens through the improved capacity of local governments to deliver public services, rather than through the improved opportunities of citizens to be involved in direct political participation.

Social capital has been hypothesised as a determinant of effective decentralisation, and chapter 4 examines the effect specifically of mothers' social capital on their children health in decentralised Indonesia. Findings from the analysis of instrumental variable estimators provide strong evidence for a causal flow running from the mother's social capital to her child health. All instruments are highly correlated with mother's social capital but uncorrelated with child health, and tests of the instruments' strength and relevance reveal their usefulness in identifying the effects of mothers' social capital. The findings are robust to individual and community determinants associated with child health, and suggest that enhancing mothers' social capital through enlarging community activities that facilitate their access to health programmes and to health information relevant to them may provide a channel for reducing disparities of child health and well-being in decentralised Indonesia.

Chapter 5 examines the association between public health spending and healthcare demand in the context of decentralised health reform in Indonesia. It contributes to existing healthcare demand literature by accounting for two features of health reform in the Indonesian context: heterogeneous demand for healthcare and decentralised health services. Using data from the 2009 Indonesian national socio-economic survey, the findings show that decentralised health spending decreases healthcare demand. Low efficiency in local healthcare services indicates the weak links between health spend-

ing and improved healthcare demand. Instead of an association with decentralised health spending, healthcare demand in decentralised Indonesia is significantly associated with universal health insurance coverage, transportation costs to healthcare, inter-government fiscal transfer, health status and household expenditure. The findings suggest that to increase healthcare demand, policy-makers should improve efficiency in local health services and spend more to finance policies that directly target the enlarging of healthcare access, particularly for citizens living in remote and rural regions.

Finally, having presented four empirical chapters, I end this thesis with Chapter 6, which presents a summary of the most important conclusions of this study, addresses a number of its limitations that I was unable to deal with, and offers some directions for future research. In this chapter, I also reflect on what my findings imply for the ongoing decentralisation in Indonesia, given the current process of raising demand for quality public services, welfare and well-being.

Chapter 2

Political decentralisation and public service performance in Indonesia: Multilevel multiple indicators multiple causes (MIMIC) analysis

Summary: The promise of political decentralisation to improve local public services is widely believed, but in practice continues to be debated. This chapter contributes to that debate by examining the association between political decentralisation and local public service performance in the context of decentralisation reform in Indonesia. The hypothesis is that improving local public service performance in tandem with political decentralisation is associated with effective local political institutions and accountable local government. The hypothesis is tested using the Indonesian GDS 2006 which covers 8,320 households living in 120 local government areas. Local government public service performance is measured by the perceived improvement of three basic public services: primary education, health and general administration services. Multilevel multiple indicators multiple causes (MIMIC) analyses are used to examine the association between political decentralisation and this perceived improvement. They show effective local political institutions, better informed citizens and transparency, the political participation of citizens via community programmes, and social groups active in the community are significant for the improvement of local public service performance. These analyses suggest that improved local public service performance requires well-functioning local political institutions, better informed citizens and transparent local government, and effective channels for political participation¹.

¹A slightly different version of this chapter is published in *Journal of Public Administration and Governance*, Vol. 23, No. 3(2012).

2.1 Introduction

The debate on the merits of decentralisation has frequently been the focal point of studies of politics, economics and public administration. Earlier debate has focused on the provision of a greater variety of public goods that may result from decentralisation (Rondinelli, 1982; Conyers, 1983). More recently, the emphasis has been on issues with the institutional process from a political economy perspective and the degree to which accountability is impacted by political decentralisation (Rodriguez-Pose and Gill, 2003; Fung and Wright, 2003; Bardhan and Mookherjee, 2006; World Bank, 2008a). These reforms differ substantially from those of a purely administrative and fiscal decentralisation, evoking something more than a downward delegation of resources and authority to local government. This recent decentralisation emphasises the working of political accountability through local political institutions to pursue better local government and public services (Fung and Wright, 2003; Grindle, 2007; Bardhan and Mookherjee, 2006; World Bank, 2008a). Proponents of political decentralisation argue that bringing citizens closer to government and allowing them to hold elected officials accountable is an important basis for achieving better local government and public services (Grindle, 2007). When local government is brought closer to the recipients of its services, its beneficiaries actively begin to demand quality, and are more motivated to demand improvements if this quality decreases. At the same time, the increased potential for complaints from dissatisfied citizens (and possible public disruption) provides an incentive for civil servants to orient their behaviour toward good service provision.

However, despite these promises of accountable local government and better quality of public services, practice suggests that these do not necessarily happen. Instead of a consistent pattern of more responsive local governments, studies reveal a wide variability in terms of democratic practice and local public service performance. For example, researchers discovered that the incentive structure of local institutions is not necessarily

aligned with pressures to improve performance (Grindle, 2007). Indeed, some studies indicated that local governments were not motivated to perform any better than their central counterpart had done prior to decentralisation (Treisman, 2000). On the contrary, after decentralisation, some local governments were more subject to capture by vested interests than national ones (Baiocchi, 2006a; Lessmann and Markwardt, 2010). Bardhan and Mookherjee (2006) explain some of the basic trade-offs involved in the delegation of decision-making to local government, where “decisions are made on the basis of better [local] information, but they are made by an agent whose incentives differ from those of the principal, thus leading to a loss of control or an abuse of power (p. 164)”. Using cross-country analyses, Treisman (2000) found that countries with more tiers of government tend to experience higher perceived corruption and are less effective in providing public services. This finding is supported by a number of other cross-country studies which show that public services can suffer as a result of decentralisation (Litvack et al., 1998; Lessmann and Markwardt, 2010).

In recent decades, the gap between the theory and practice of decentralisation reform in developing countries has been assessed by political, economic, and public administration scholars. However, most of the existing theoretical and empirical research deals with the impact of intergovernmental administrative and fiscal relations on the performance of the governance system as a whole (Tabellini, 1992; De Mello and Barenstein, 2001; Fisman and Gatti, 2002). Insufficient attention has been paid to the varying patterns in the adjustment of local accountability systems to the new political institutional setting created by political decentralisation reform. For example, very little research has examined the transformation of accountability relationships and their impact upon local government performance and public service delivery. Some empirical studies have explored the relationship between political decentralisation and local public service performance in developing countries. However, most use either countries or

provinces as the unit of analysis (Crook and Manor, 1998b; Goldsmith, 1999; Fisman and Gatti, 2002; Gong, 2006; Treisman, 2000; Blanchard and Shleifer, 2000; Bardhan and Mookherjee, 2006).

While cross-country study provides a large sample of countries and a relatively long timespan, this approach is becoming increasingly open to criticism. Significant unobserved heterogeneities exist between countries (such as the difference of cultures, and the overall institutional setting) which may affect local political accountability and public service performance and lead to bias estimates of the relation between the two (Maddala, 1999; Nabeshima, 2003; Kruse et al., 2012). Nabeshima (2003) notes that production functions that transform various inputs in public service provision into outputs may differ substantially across countries, complicating both estimation and interpretation. Several studies use provincial or village administration as a unit of analysis. However, the locus of decentralisation reform in many countries is centred on local government or district administration, and as these are below the level of provincial administration, such analyses are unable to capture accurately the dynamics of decentralisation reform.

This study contributes to existing research on political decentralisation and public service performance by analysing local governments using a single country as the unit of analysis, and by ascertaining the effect of local government contexts using multi-level analyses. This provides a number of benefits. First, the decision to use local government in one country as the unit of analysis was driven by the ability to control for a number of determinants that can lead to bias estimates of the effects of political accountability on local government performance. Previous cross-country studies show that accountability is embedded in the broader political, institutional, economic and social context of a country (Rondinelli et al., 1989; Litvack et al., 1998; Manor, 1999). Local government studies have the advantage since such contexts are considerably more

similar within the boundaries of a single country than they are across countries. The effect of political decentralisation on public service performance may thus be more salient than when cross-country analysis is used to test the hypothesis. In addition, by using a large number of local governments within a single country, this study is able to assess to what extent findings from the vast literature based on cross-country studies also apply to a single country. Second, multilevel analyses offer the advantage of being able to take into account the nested structure of decentralisation reform at local government. These analyses allow us to investigate whether the effect of local government characteristics on local public service performance varies between these governments, thus allowing the effect of local political accountability on local government performance to be tested appropriately. Previous studies have examined associations between political decentralisation and local government performance in Indonesia (Kaiser et al., 2006; Eckardt, 2008; Pattinasarany and Lewis, 2009), but have not however accounted for the nested structure of decentralisation reform and local government performance.

Indonesia constitutes a particularly interesting case, not only because of the size of the country and its regional political and economic significance, but also because of its remarkable progress in creating a decentralised system of government in the past twenty years. The local government political system in Indonesia has changed from being one of highly centralised to decentralised government. This has devolved responsibilities from central to local government in all government administrative sectors (except for security and defence, foreign policy, monetary and fiscal matters, justice, and religious affairs). Significant public expenditure (amounting to around 30% of total national expenditure) has also been devolved to all local governments. Decentralisation has also prompted a major reorganisation of political accountability chains in the country. First, it eliminates the hierarchical relationship between central, provincial, and local governments. Citizens now have the freedom to elect their local parliament and its

leaders through direct election. The local government heads and local government officials are responsible to the locally elected assembly (*Dewan Perwakilan Rakyat Daerah (DPRD)*). Second, in terms of locally assigned responsibility, branches of district-level ministries are placed under the jurisdiction of local governments. Indonesia's decentralisation therefore neatly reflects the concept of political decentralisation.

In sum, the research questions to be answered in this chapter are: When local governments are charged with new responsibilities and are equipped with more resources, to what extent they can enhance their public service performance? Why are some local governments more effective than others in delivering public services? What role do political institutions and incentives play in shaping local public service performance? What are the implications of political decentralisation for better local public services?

2.2 Political decentralisation and local public service performance

The functioning of democratic local government through decentralisation has long merited attention in political, economic, and public administration studies. Political decentralisation entails the devolution of political authority, responsibilities and public resources to local governments (Rondinelli, 1982; Conyers, 1983). The recent wave of decentralisation in developing countries over the past three decades is believed by political analysts to be an effective means of reforming local government in developing countries. As Andrews and Shah (2005) point out, such local governments are numerous, and are increasingly required to play a significant role in providing services, alleviating poverty, and facilitating development. They find that decentralisation has been vital for improving local government performance and citizen well-being in these countries.

Existing literature offers a number of compelling arguments in favour of decentralisation. Most importantly, it indicates that decentralisation is expected to enhance the responsiveness, effectiveness and efficiency of local public services. From this perspective, it is seen as a way to overcome informational constraints and align incentives in the political system. First, the empowerment of local governments should make each authority more accountable, bringing it closer to its citizens and increasing the responsiveness of its public services to their demands and needs (Oates, 1993). Second, decentralisation is assumed to enhance competition among jurisdictions through, for example, tax policies, expenditure, public services and regulatory policies for mobile firms and individuals. Competition between local governments creates ‘market-like incentives’ designed to provide an attractive combination of public services and policies at competitive local tax rates (Tiebout, 1956). Third, in addition to economic benefits, the drive towards decentralisation is motivated by general political objectives. Fuhr (1999) argues that the worldwide wave of political decentralisation which started in the 1970s can be seen as a response to the declining political legitimacy of centralistic government and fiscal policies. Increasing the political accountability of the public sector is therefore the preferred political agenda in many areas where decentralisation policies are pursued today.

While there is an array of theoretical reasons why decentralisation should be expected to improve local government performance, empirical evidence across decentralised developing countries has not been as supportive, showing a wide variation in outcomes. Litvack et al. (1998) present evidence from Eastern and Central Europe and suggest that public services can in fact suffer as a result of decentralisation. Crook and Sverrisson (1999) have also provided evidence which shows that, despite extensive strides towards the devolution of authority and resources to democratically elected local governments, decentralisation in Colombia, West Bengal and Brazil has achieved little

in improving service delivery. Focusing on local governments in urban areas of developing countries, Mitlin (2000) comes to the conclusion that most local governments fail to meet many of their responsibilities in regard to large sections of the population within their jurisdiction.

Nevertheless, a contrasting picture of decentralisation outcomes also exists. Heller (2001) shows how decentralisation reforms in Kerala and Porto Alegre increased the scope of local participation and strengthened local democratic institutions and planning capacity. Blair (2000) explores the extent to which local democracy promoted participation and accountability in several countries. Stoner-Weiss (1997) identifies certain contextual factors that explain why some regional governments in Russia performed better than others in the wake of decentralisation. From such work, we are beginning to understand the divergence between the promise of decentralisation and its empirical consequences.

Why does the response of various local governments to new opportunities provided by political decentralisation differ? Some studies suggest that a number of preconditions are necessary for effective political decentralisation: the existence of local political institutions already fostering local accountability, the effective management of local government officials' political incentives, and the extent of demand for accountability by local, mobilised citizens.

First, a number of studies suggest that the outcome of political decentralisation reform crucially depends on the proper functioning of democratic institutions, ensuring that local citizens can exert some degree of control over local government affairs. Without local democratic institutions, political accountability is incomplete (Prud'homme, 1995; Crook and Manor, 1998b; Bardhan and Mookherjee, 2000), and where this is the case decentralisation will provide an incentive for vested interests to capture the political process and divert public resources to match their own interests (Bardhan

and Mookherjee, 2000). Riker (1964) suggests that the political institution with the most obvious potential for ensuring local accountability is that of the local election. Subsequent authors qualify this, pointing out that local elections as an institutional mechanism must be competitive and contestable in order to counter local corruption and to ensure local accountability (Rondinelli et al., 1989; Manor, 1999). They argue that where local elections are competitive and opposition parties have real opportunities to win positions of authority, incumbents will be motivated to prove their competence in the management of public affairs. In contrast, where partisan political pressures exist, they will accommodate local vested interests rather than the needs of local citizens. At the same time, Ward and Rodriguez (1999) presented the impact of political competition on the management of a city in Mexico and found the effects to be positive.

Second, some studies focus on the management of local government official political incentives as a prerequisite for effective decentralisation. A number examine accountability in the trade-off between centralised versus decentralised provision of public goods. Seabright (1996) argues that accountability is *a priori* higher at local level, since citizens are likely to be better informed about government performance and more able to monitor and evaluate public managers directly. Besley and Burgess (2001) show how information flows and participation affect a local government's decision to respond to its citizens' needs. Testing their hypothesis on panel data from Indian states, they find empirical evidence to support their model. They suggest that both transparency and participation increase the political cost of not responding to such needs, thus creating incentives for increased responsiveness.

Transparency ensures that information is available that can be used to measure an authority performance and to guard against any possibility misuse of power. An active mass media may improve government transparency by informing voters about the actions of incumbents which they might otherwise be unaware of and which might

be considered to impact on their ability to carry out their work in the interests of the people they represent (Besley et al., 2002). Some scholars have found a direct link between transparency in public administration decision-making and the performance of public services (Brinkerhoff and Goldsmith, 2003; McGee and Gaventa, 2011). These studies suggest that when public administrative bodies include explicit mechanisms which enable citizens to scrutinise the process, both participants and the information involved in public policy decision-making are likely to be efficient custodians of public funds.

A third strain of literature explains that the extent to which local citizens are mobilised to participate and demand accountability has an impact on and can determine decentralisation outcomes. These studies state that social groups active in the local community exert pressure on the public sector to provide better services or increased opportunities for participation in policy-making. The most well-known is Putnam's analysis of Italy's local government revealing the impact of social groups and social capital (Putnam, 1993). Putnam posits that the degree to which devolution of authority leads to better local government is based on existing social groups and the extent to which these groups are able to monitor officials and hold them accountable. The impact of community participation on a broad array of democratic reforms and public services is supported in subsequent empirical research (Booth and Richard, 1998; Woolcock, 1998; Heller, 2001; Bowles and Gintis, 2002). These studies suggest that community participation can demand better local governance. Social groups can also provide models of how improvements can be made, participate in decision-making and implementation activities, and take an active role in monitoring the performance of elected and administrative officials.

Following previous studies, I formulate three hypotheses. First, according to the incomplete accountability hypothesis it is expected that in terms of ensuring account-

ability, ineffective local political institutions lead to reduced public service performance. Second, the management political incentives hypothesis leads us to expect that local government transparency and the degree to which citizens are kept informed are positively associated with local public service performance. Third, based on the action of citizens and the structure of society hypothesis it is expected that the participation in local government of citizens and the existing active social groups lead to better local public service performance. Whereas some of these hypotheses have been tested in (and supported by) earlier cross-country research, this study will do so using local government as a unit of analysis.

2.3 The political accountability system and decentralisation in Indonesia

Indonesia's decentralisation resulted in a significant increase in the importance of the role of autonomous local government in service delivery. The failure of earlier attempts to decentralise combined with the 1998 political crisis provided fertile ground for a far-reaching approach to decentralisation. As part of the 1999 decentralisation, new legislation was enacted, and in 2001 it was implemented, changing Indonesia from a highly centralised to a decentralised state. In particular, the regional government bill prompted a major reorganisation of political accountability chains, eliminating the hierarchical relationship between central, provincial, and local government. In a break from the past, local government officials were responsible to the locally elected assembly. In addition, when it came to locally assigned responsibilities, branches of district-level ministries were placed under local government jurisdiction. With these new responsibilities, local governments were now obliged to perform a set of key functions, including the provision of health, education, environmental and infrastructure services.

In 2004, concerns regarding the ineffectiveness of indirect political accountability triggered further local government electoral reform of direct elections (*pilkada langsung*) (Erb and Sulistiyanto, 2009). This made the office of mayor more directly accountable to local citizens by stipulating that she or he would be directly elected by citizens. It also provided a clearer definition of the leaders' political function. The law stipulated that the mayor should: (1) manage the jurisdiction along guidelines laid down by local parliament, (2) implement local laws, including the budget, (3) present accountability reports to local parliament and central government, and (4) provide information to citizens on government performance. The local parliament (or *Dewan Perwakilan Rakyat Daerah*) had greater control over local government heads, which under central government had previously been controlled by the Ministry of Home Affairs. Under the new bills, local parliament had the right to impeach local heads (thereby prematurely ending their term of office), if it considered their delivery of an annual accountability speech to be unsatisfactory.

It was believed that this democratic reform would make local government heads more accountable to their constituencies (Kaiser et al., 2006). Based on the new amendment, central government decided to conduct the first batch of direct elections in June 2005 in those local governments where the parliament head was coming to the end of their tenure. By 2006, more than half of all mayors had thus been appointed through direct election. Until the end of 2009, the rest continued to be produced by the previous system under the autocratic regime, by which time all local governments had been subject to direct elections (see figure 1.5 in chapter one).

Decentralisation in Indonesia also diverts substantial resources to local governments, to which more than a third of the national budget has now been transferred (see figure 1.2 in chapter one). Fiscal transfer from central to local government has more than doubled compared to central government spending (World Bank, 2008c). Central gov-

ernment and donors have also continuously increased the pool of resources transferred to local government, both in relative and absolute terms. This fiscal reform has been followed by the reassignment of more than 2.5 million civil servants, giving local governments the authority and responsibility to manage their human resources while at the same time enhancing their human resource capacity (World Bank, 2008c). With these changes, local governments have greater independence to mobilise resources, promote local interests, and initiate their own policies.

Five years on, the performance of local governments was found to vary increasingly, depending on the extent to which they took advantage of the benefits that decentralisation offered. World Bank (2006) found a significant number of local governments had forged ahead with reform and become the locus for an innovative form of government and better public services. For example, the measures taken by *Jembrana* local government have been nationally recognised as constituting a prime example of health and education service innovation (World Bank, 2006). More recently, *Surakarta* local government under the leadership of Joko Widodo has become a national example of good governance innovation (Patunru et al., 2012; Majeed, 2012)². Elsewhere however, the local political context became charged with lack of accountability and failure to respond to local needs (Asia Foundation, 2002). Some evidence suggests that key political accountability mechanism has developed only in some of the newly-empowered local governments (Kaiser and Hofman, 2003; Malley, 2003; World Bank, 2003). Local parliaments tended to over-reach their powers, blurring an effective balance of governance between executive and legislative agencies. Local politics centered on local

²Joko Widodo was directly elected and served as mayor of Surakarta from July 2005 to September 2012. Later, he was elected as Governor of Jakarta. During his time in Surakarta, he succeeded in turning a crime-ridden city into a regional centre for culture and the arts (Majeed, 2012), and Surakarta started to attract international tourists. His mayoral anti-corruption campaign also put Surakarta forward as a national example of good local governance (Patunru et al., 2012; Majeed, 2012). In 2012, Widodo came third in the World Mayor project (www.worldmayor.com/contest2012/comments-surakarta.html).

parliaments were seen as becoming increasingly vulnerable to money politics, and local corruption occurred in several local governments (World Bank, 2003). This suggests that the impact of decentralisation on the capacity of local government tends not to be uniform, but rather leads to a differentiated process with regard to both performance and level of accountability across localities. This study aims to understand how these different outcomes are brought about, and to what extent the incentives provided by the new political structure and resources from decentralisation reform are associated with improved local public service performance.

2.4 Data, determinants and method

To test the hypotheses presented above I assemble data from the GDS 2006, the national village census (Podes) 2006, the national socio-economic survey (Susenas) 2006, the national election database 2004, local development budgets and expenditure information 2005, and data taken from the consumer prices index 2005/2006. The assembled data possess nested structure (citizens in local governments) to conform the hypotheses.

2.4.1 The Governance Decentralisation Survey 2006 and official statistics

The Indonesian Governance Decentralisation Survey (GDS) 2006 was fielded by the World Bank Indonesia in conjunction with the Centre of Public Policy at Gadjah Mada University, five years after radical decentralisation. This data has been used by earlier studies to examine the decentralisation of public services in Indonesia (Kaiser et al., 2006; Eckardt, 2008; Pattinasarany and Lewis, 2009). The GDS 2006 consists of a randomised sample of 134 local governments. In each of the sample local governments, structured questionnaires were used to interview about 90 households, designed to in-

dicating their perceptions of various issues relevant to local governance and public service performance. In particular, the questionnaire addressed perceptions of the quality of public services, the workings of various political processes, transparency, and participation. This study restricts itself to respondents who had the right to vote in the national election (that is, those aged 17 or older). This yields a sample of 12,860 households living in 134 local government areas. However, due to data on perceived performance being missing, the total sample used for analysis is 8,320 households living in 120 local government areas.

The GDS 2006 survey also collected information from local public service managers (e.g. the heads of public schools, hospitals, health centres, and local education and health bureaus). More than 3,000 were asked about their educational background and the implementation of decentralisation in their institutions. The former is used as a proxy to measure local government bureaucracy capacity.

The GDS 2006 survey was linked to other surveys and independent official statistics datasets using local government codes. First, the survey is linked to socio-economic data from the national village census (Podes) 2006. The Podes dataset consists of detailed information about the number of active social groups in all villages and urban neighbourhoods within a local government area, the aggregate of which is calculated. Second, it is linked to the national socio-economic survey (Susenas) 2006 fielded by the government's Central Bureau of Statistics (*Biro Pusat Statistik* or BPS) to identify the distribution of adult literacy across local governments. Third, the survey is linked with the 2004 national election results to identify the distribution of political factions in local government areas, and the proportion of national election voters across local governments. The database consists of information about those local governments which had already held direct elections up to 2009. More than half of local government mayors (60%) were chosen through direct election in 2006; the remainder had been

appointed under the previous regime before direct elections were implemented, which allowed them to finish their term in office. Lastly, I included local government fiscal data from the Ministry of Finance in the dataset. I use data from 2005 (one year before the GDS survey), as local government development spending allocated by the government budgeting system takes at least one year to take effect. I also deflate the amount of local government spending with the consumer price index for both urban and rural regions since the price level of consumer goods and services in Indonesia varies across regions (Strauss et al., 2004). Following Thomas and Frankenberg (2007) and Resosudharmo and Jotzo (2009), rural inflation is taken to be 5% higher than urban inflation. This calculation produces real spending adjusted with regional inflation. The consumer prices index 2005 data is retrieved from the government Central Bureau of Statistics (BPS).

These links with other data aim to enhance the accuracy (or at least reduce any measurement error) of this study. The use of independent, official statistic datasets also alleviates concerns arising from the use of the same surveys in calculating both aggregate and individual determinants, known as common source bias (Deaton, 2001).

2.4.2 Local government performance measure

This study uses the response of citizens to public service improvement as a proxy to measure local public service performance. Previous studies show that this measure correlates with objective performance measures and is often used in business and public administration literature as a relatively easy and effective means to evaluate service performance (see among others (Brown and Coulter, 1983; Parks, 1984; De Hoog et al., 1990; Erevelles and Leavitt, 1992; Bennet, 1999; Swindell and Kelly, 2000; Deichmann and Lall, 2003; Andrew and Shah, 2005; Myburgh et al., 2005; Bratton, 2007; Andaleeb et al., 2007)). This is increasingly used as an alternative measure in subjective well-

being and public health literature (Frey and Stutzer, 2002; Lane, 2000; Graham, 2009; Oswald and Wu, 2011).

The study focuses on changes in three particular areas where local government provides front-end services that are directly consumed by citizens: public health, public education, and general public services (including water management and cleaning services, and the issuance of permits, identity cards and various licenses). These service areas were chosen as they represent the bulk of local public expenditure (taken together, they account for between 40% and 50% (World Bank, 2003)). These services are also crucial to human development and they allow for a representative and plausible appraisal of government performance. In the survey, respondents are asked “In your opinion, how is the quality [of services] in the districts, compared to two years ago (the beginning of decentralisation)?” Table 2.1 presents the determinants used to create the index. The overwhelming majority of respondents perceived public services to either have remained the same or to have improved as compared to the period before decentralisation. The highest rankings occurred in the health and education sector. Only a small fraction of respondents perceived any deterioration in the quality of public services.

Table 2.1: Description of perceived local public service performance determinants

Performance	education	health	general administration
Worst	12.25%	3.37%	9.06%
No change	3.37%	22.32%	27.08%
Better	84.38%	74.31%	63.86%

Source: GDS 2006 survey

The perceived local public service performance index is calculated using confirmatory factor analysis for three types of services: public health, public education, and general public services. When the observed determinants are categorical, confirmatory factor analysis is also used as item response theory (IRT) analysis (Baker and Kim

2004 cited by Muthen and Muthen, 2010). Table 2.2 presents summary statistics of the analytic sample.

Table 2.2: Summary statistics of analytic sample

	Mean, mode or %	s.d.	min	max
Health services	1.71	0.52	0	2
Education services	1.71	0.68	0	2
General administration services	1.54	0.66	0	2
<i>Household</i>				
Age of household head	45	13	18	90
Female household head	8%	27%	0%	100%
Household head education	junior high school	1.26	no schooling	post graduate
Household expenditure (IDR1,000)	1,090	1,120	294	3,210
Unemployed household head	8%	28%	0%	100%
Eastern part Indonesia	44%	50%	0%	100%
Remote islands	4%	20%	0%	100%
Participation in community programmes	50%	50%	0%	100%
Knowledge about village budget	17%	38%	0%	100%
Perceived corruption	29%	45%	0%	100%
Knowledge conflict related	9%	28%	0%	100%
local and national election				
Participate in local election	47%	50%	0%	100%
Have access to newspaper, radio,tv,and Internet	84%	36%	0%	100%
<i>Local governments</i>				
Proportion of adult literacy	90%	6%	55%	98%
Proportion of active social groups	26%	18%	0%	80%
Political fragmentation	81%	39%	0%	100%
Direct democracy	60%	49%	0%	100%
Shared of public service spending on total development spending	88%	5%	74%	98%
Proportion public managers with graduate education	21%	10%	8%	48%
Mayor from new political party	44%	50%	0%	100%
N Households	8,320			
N Local governments	120			

Source: GDS 2006 survey & official statistics

2.4.3 Local government and household determinants

Consistent with the general hypothesis, I include a number of determinants that measure variation in the effectiveness of local political institutions. Dummy direct local election is used to capture direct democracy as a mean of creating electoral accountability. To measure the effectiveness of local elections, I use local conflict incidence

related to both local and national elections. Perceived local corruption is used to measure interest group capture in local governments. To capture the nature of political competition across local governments, I use local council political party fragmentation based on the outcomes of the 2004 legislative elections. Political competition or fragmentation is measured according to the ratio between elected members of the winning party and their opponents: a lower ratio means that the composition of political parties in the given local government is more fragmented. The direction of the causal effect is difficult to predict since higher party fragmentation could result in stiffer competition (positive effect) or paralysis and dispersion of accountability (negative effect).

The degree to which citizens can be considered to be informed is measured by the proportion of adult literacy within local government as well as respondent access to mass media (such as newspapers, radio, television, and the internet). Local government transparency is measured by the extent to which local government disseminates its development budget to the public. The existence of informed citizens and transparency are often assumed to reduce information problems related to government activities. In turn, both create forceful incentives for elected officials and civil servants to reduce opportunistic behaviour. I therefore expect that a better-informed local citizenship and local government transparency will be found to be positively associated with local public service performance.

Citizen political participation is measured by three determinants. First, respondent participation in local elections is used to measure formal citizen political participation. Second, informal citizen political participation is measured by respondent participation in community programmes (such as community work, community health services, and irrigation). Third, the proportion of active social groups at local government level is used to examine the association between the density of these groups and local public service performance. Since greater citizen political participation in local government

affairs and the density of active social groups should increase political accountability, the relationship between these determinants and local public service performance should be positive.

A number of determinants capturing fiscal and local bureaucracy conditions are included to measure the effect of fiscal decentralisation and local bureaucracy capacity on local public service performance. The model controls for share of total public spending on government administration, education and health. The proportion of local public service managers with educated to graduate level or above is included to control whether local bureaucracy capacity affects service performance. Mayors or *bupati* representing new political parties are included to control whether new local leadership matters for performance.

In addition, to control for bias on perceived performance I include both individual and household socio-demographic and geographic determinants. These include household head age, gender, education, employment status and household expenditure. I create dummy determinants to represent respondents living on remote islands and in the eastern, less developed part of Indonesia to capture the effect of geographic location and regional development on local government performance. This is essential since the stages of development in Indonesia vary from region to region (Lanjouw et al., 2001). Respondents living in more developed areas (which we take to mean “the mainland and the west of the country”) are used as reference groups.

2.4.4 Multilevel analyses

The locus of political decentralisation reform in this study is local government. In this regard, any analysis needs to recognise the nested structure of decentralisation reforms and local public service performance at local government. Multilevel analyses are more appropriate for this. However, existing studies in this area are based either on aggregate

data (Eckardt, 2008) or on individual data (Bennet, 1999; Bratton, 2007; Pattinasarany and Lewis, 2009) using ordinary regression analyses. Such analyses ignore the nested structure of data in which individuals are hierarchically clustered within local governments, which may lead to an underestimation of standard errors of the effects of local government characteristics. As a result, in ordinary regression analyses the significance of local government effects are overestimated. Multilevel regression analyses are able to account for this clustering of individuals within local governments by separating individual variance in perceived service performance from local government variance. Hypotheses on the effects of local government characteristics can thus be tested appropriately using this analysis. For detailed technical information on multilevel analysis I refer to Skrondal and Rabe-Hesketh (2012).

This research uses multilevel multiple indicators multiple causes (MIMIC), as local public service performance is an unobserved or latent determinant of three basic services (health, education, and general administration services). This latent determinant is tested using logistic item response theory models, in which factors with ordered categorical indicators are referred to as Samejima's graded response model (Muthen, L. and Muthen, B., 2010). The MPlus package makes it possible to carry out the analysis by reference to the logistic item response theory model, while other statistical packages (such as Lisrel and Amos) are usually used in factor analysis for continuous indicators. To test the robustness of the results I also estimate the model using factor analysis; the results do not differ substantially from those obtained from using the MIMIC model (see appendix A.1.1).

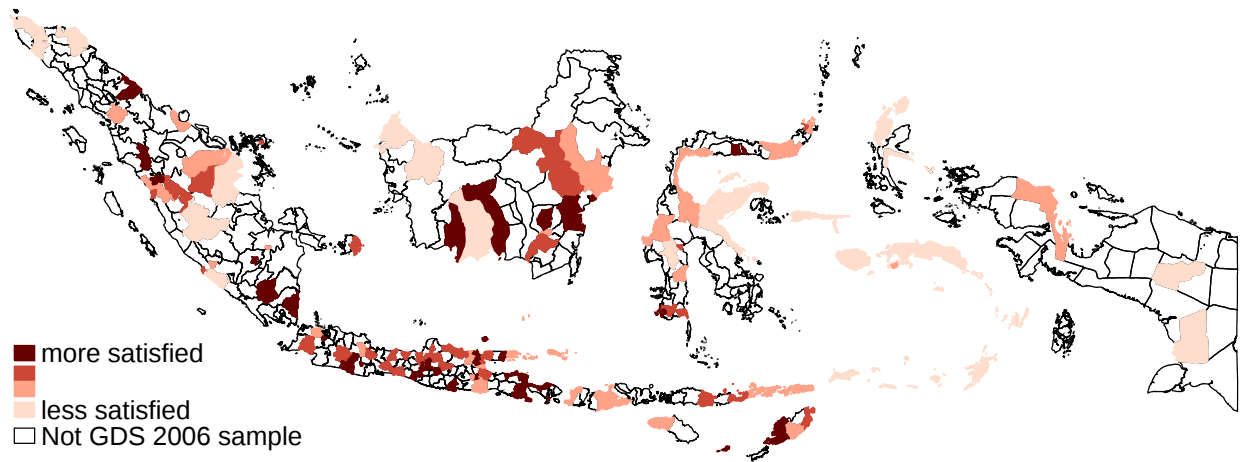
The analyses include variance at household and local government. In this analysis, I perform MIMIC analyses of household and local government determinants. For each of these models, I report the estimated regression coefficient, standard errors, household and local government variances, the Comparative Fix Index (CFI) and Root-Mean

Square Error of Approximation (RMSEA) as an indicator of model fit (Steiger, 1990). The CFI falls strictly between the values of 0 and 1. A CFI value of 0.95 or bigger is often considered to indicate good fit, although a modest value of 0.90 is also accepted in some cases (Hu and Bentler, 1999). The RMSEA provides a test of the extent to which the target model as fitted to the sample data ‘approximates’ to the population model. A RMSEA value of <0.05 is taken to indicate close fit (Browne and Cudeck, 1993; Hu and Bentler, 1999), who recommended 0.06 as an upper boundary. Weighted least-square with mean and variance adjustment (WLSMV) estimator is used, as Muthen et al. (1997) suggest that this is the optimal choice for categorical indicators.

2.5 Results

A sense of the importance of area association with local government performance can be gained from the maps. Figure 2.1 shows the aggregate citizen response to local public service performance across local governments. The map highlights the geographical variations in local government performance across local governments. An attempt at a summary is given in table 2.3. (showing central-local correlation and mainland-remote island correlation). Both the map and table hint at central-local gradients and mainland-remote island gradients. For instance, simple correlations between new centroids and the local public service index show that as one moves outside the centre (Indonesia’s capital, Jakarta), local government performance is reported to decrease (-0.083); likewise, as one moves towards remote islands, the local public service index is also reported to decrease (-0.092). These geographical correlations thus show disparities in public service performance between central and local as well as between mainland and remote islands.

Figure 2.1: Distribution of perceived local public service performance across 120 local governments

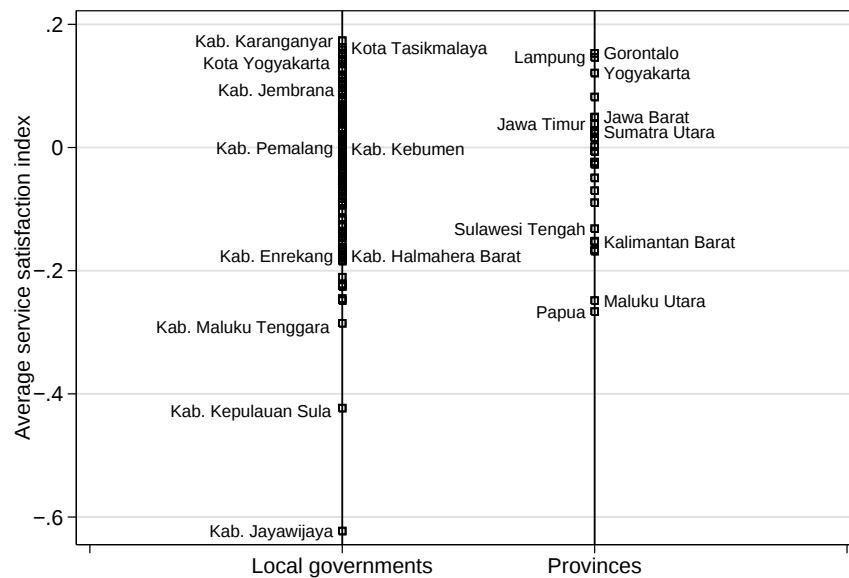


Source: author calculated based on GDS 2006 data

Table 2.3: Centroids correlation with local public service index

New centroid	Central-Local government	Mainland-Remote
Service satisfaction index	-0.083 [†]	-0.092 [‡]
Significance: [†] :5% [‡] ≤ 1%		

Figure 2.2: Distribution of highest and lowest perceived service performance



Source: author calculated based on GDS 2006 data

Figure 2.2 presents the highest and lowest ranks of perceived local public service performance across local governments and provinces, and shows a stark contrast between some, both in more- and less-developed regions. For example, *Kota Yogyakarta* is recognised as one of the most developed capital cities in central Java province, renowned as a centre of education and culture. Yogya province, along with East Java (Jawa Barat) and West Java (Jawa Timur) provinces are among those with the highest human development indexes in Indonesia. About a third of education and health facilities in Indonesia are concentrated across these provinces (BPS, 2007). Meanwhile, *Kabupaten Jembrana* is nationally recognised as an example of local government innovation in health and education services (World Bank, 2006). The *Jaminan Kesehatan Jembrana* (Jembrana Health Insurance) scheme, begun by Jembrana local government, Bali province in March 2003 provides free primary healthcare to all members; free secondary and tertiary care is also provided for poor members. The schemes have improved the access of both poor and non-poor citizens to healthcare and education services (World Bank, 2006).

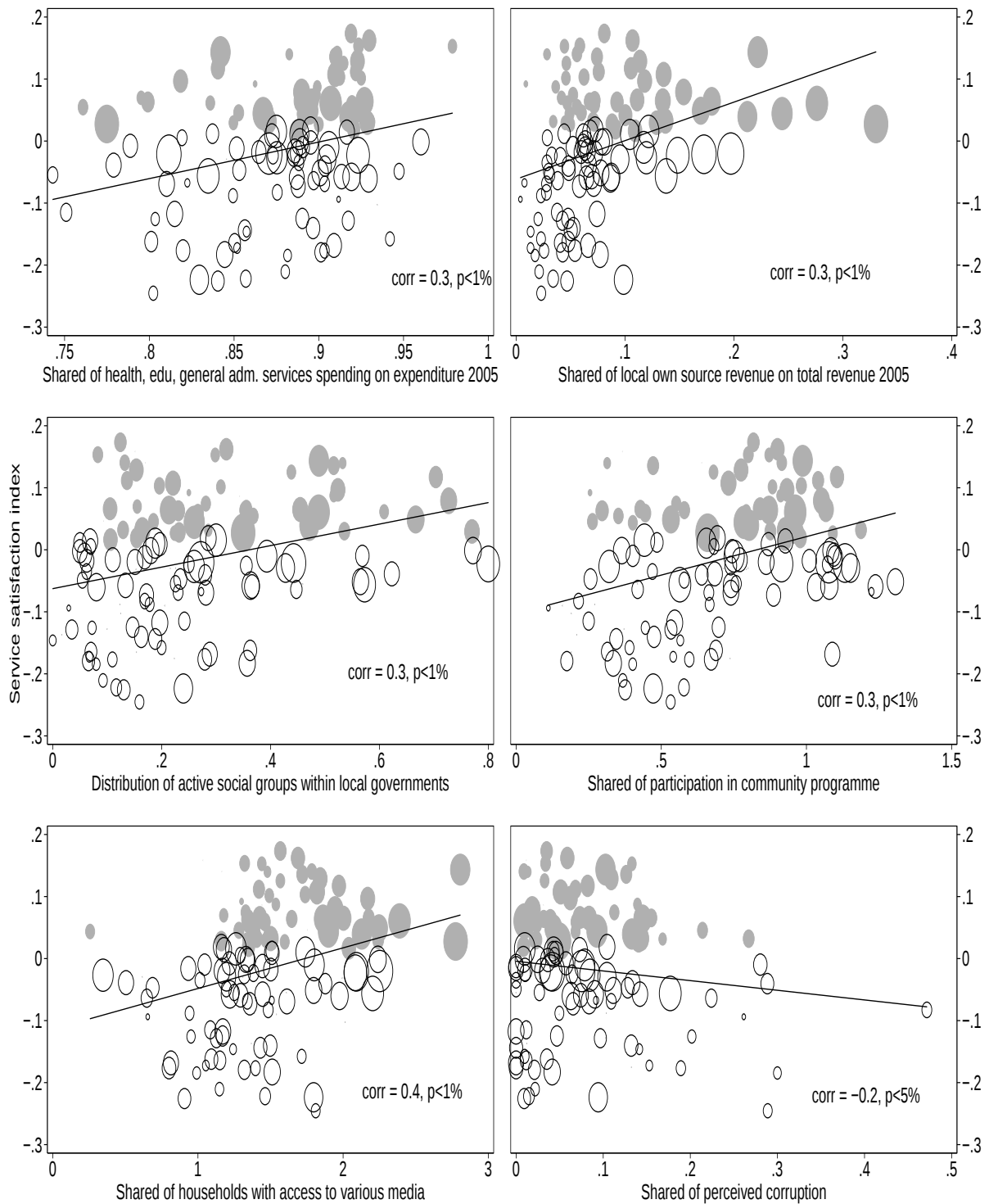
In contrast, *Jayawijaya* is a remote place in Papua province, accessible only by plane. Papua province has one of the worst economies in Indonesia, with 41.8% of its population living below the poverty line (BPS, 2007). In fact, Papua is not only the economically poorest region, but also has one of the lowest human development indexes in the country. With a population of 2.3 million, Papua's rate of access to health services and participation in formal education are among the lowest in Indonesia (BPS, 2007). Meanwhile, *Kepulauan Sula* (the Sula islands) is a newly-created local government in the remote North Maluku province, Maluku Island, where a high rate of conflict and incidents of violence occurred from 1999 to 2002. Conflict and violence across the Maluku islands not only resulted in many deaths but also destroyed economic development in the region. About a third of the population of Maluku province was

displaced by the conflict. Infant mortality, morbidity and general health problems all increased as a result of the conflict. Educational drop-out rates also increased, particularly among the displaced population (in some areas, it is estimated to have been over 40%). Maluku's gross domestic product per capita shrank by almost a quarter and remained in negative growth until 2002. Maluku has one of the highest poverty rates in the country, with more than a third of the population below the poverty line (see, for example, UNDP (2002); Van-Klinken (2007)).

The condition of other local governments in the lowest rank is almost similar, as all of them are located in remote islands with poor basic health and education services. These findings support results from the geographical correlation above.

Do differences in local conditions relate to differences in the performance of local governments? Figure 2.3 presents a simple bivariate correlation between selected local government determinants and perceived local public service performance index. The dark marker circles are more developed regions, while the bright circles show less developed regions. The larger the circles indicate the greater local government financial capacity as measured by local government own source revenue.

Figure 2.3: Bivariate correlation of selected local government determinants



Source: author calculated based on GDS 2006 data

Disparities on local public service performance between more developed and less developed region is shown from the figure. Local governments located in more developed regions have better public service performance than those located in less developed regions. Likewise, local governments with greater financial capacity also tend to have better performance. Some local government determinants also seem to be associated with local public service performance. For example, local government spending on health, education and general administration services is positively related with performance, as are the density of social groups, community participation and access to mass media. In contrast, perceived corruption has a negative relation to local public service performance.

Table 2.4 presents the regression results of multilevel regression analyses before and after local government control determinants are included in the model. Model A shows regression results before local government control determinants are included in the model. All factors loading are significant at individual level except for education services (0.419, $p < 1\%$ for health services, 0.035, $p > 10\%$ for education services, and 0.732, $p < 1\%$ for general administration services). The results at local government level show that all factors loading are significant (0.792, $p < 1\%$ for health services, 0.257, $p < 10\%$ for education services, and 0.848, $p < 1\%$ for general administration services).

Table 2.4: Results of multilevel regression of local public service performance

	Model A		Model B	
	coef.	(s.e)	coef.	(s.e.)
<i>Factor loading of observed local public services</i>				
<i>Household</i>				
Health services	0.419‡	0.028	0.404‡	0.032
Education services	0.035	0.022	0.052*	0.027
General administration services	0.732‡	0.042	0.745‡	0.052
<i>Local government</i>				
Health services	0.792‡	0.109	1.000‡	0.097
Education services	0.257‡	0.117	0.372‡	0.133
General administration services	0.848‡	0.110	1.460‡	0.093
<i>Determinants</i>				
<i>Household</i>				
Age of household head	0.037‡	0.019	0.040*	0.021
Female household head	0.026	0.017	0.031*	0.018
Household head education	0.019	0.020	0.027	0.021
Log household expenditure	0.004	0.023	0.017	0.025
Unemployed household head	-0.022	0.019	-0.026	0.022
Eastern part Indonesia	-0.154‡	0.046	-0.130‡	0.051
Remote islands	-0.111‡	0.035	-0.069	0.048
Participate in community programme	0.058‡	0.018	0.058‡	0.020
Knowledge about village development budget	0.076‡	0.017	0.061‡	0.018
Perceived corruption in local government	-0.266‡	0.019	-0.263‡	0.021
Knowledge conflict related to local and national election	-0.031*	0.016	-0.040‡	0.018
Participate in local election	-0.007	0.025	0.005	0.029
Have access to newspapers,radio,tv and Internet	0.058‡	0.021	0.055‡	0.022
<i>Local government</i>				
Direct democracy	0.170	0.114	0.055	0.139
Proportion of adult literacy	0.014	0.121	0.253	0.135
Proportion of active social groups	0.396‡	0.124	0.497‡	0.127
Political fragmentation	-0.257‡	0.130	-0.149*	0.144
Shared of public services spending on total development spending			0.001	0.122
Proportion of public managers with graduate education			0.042	0.130
Mayor from new political party			-0.004	0.141
Variances:				
Household	0.275‡	0.010	0.280‡	0.019
Local government	0.026‡	0.020	0.029‡	0.023
CFI	0.939		0.941	
RMSEA	0.011		0.010	
Significance: * :10% ‡:5% ‡≤ 1%				

Most of the main determinants appear to be significant in terms of local public service performance. Local corruption and perceived incidence of conflict at election time are negatively associated with service improvement (-0.266 , $p < 1\%$, -0.031 , $p < 10\%$ respectively). Citizen participation in various community programmes improves performance (0.058 , $p < 1\%$). Local government transparency as indicated by respondents' knowledge and public dissemination of the development budget makes better service outcomes more likely (0.076 , $p < 1\%$). The degree to which citizens are informed (as measured by their access to mass media) also has a positive impact on local public service performance (0.050 , $p < 5\%$), as does the density of active social groups (0.396 , $p < 1\%$). In contrast, political fragmentation is negatively associated with service performance (-0.257 , $p < 5\%$). Null findings are found for the remaining local government determinants.

Model B presents regression results after all control determinants are included in the model. The correlation between unobserved (or latent) local public service performance and all factors loading becomes all-significant. The association of all main determinants with local public service performance does not change. Controlling for individual and local government determinants, perceived corruption and conflict related to local and national elections decrease service performance (-0.263 , $p < 1\%$ and -0.040 , $p < 5\%$ respectively). Political fragmentation remains negatively associated with service performance (-0.149 , $p < 10\%$), which may indicate that instead of encouraging stiffer political competition, party fragmentation results in paralysis and dispersion of accountability. Direct local democracy as a means for enhancing electoral accountability is positively associated with performance, but the association appears not to be significant.

Respondents' degree of knowledge of public dissemination of the development budget remains positively associated with service performance (0.061 , $p < 1\%$), as are better-

informed citizens (as indicated by adult literacy and higher access to various mass media). However, significant association is only shown in terms of access to mass media (0.055, $p < 5\%$). Citizen participation in community programmes increases perceived service performance (0.058, $p < 1\%$), while participation in local elections does not (0.005, $p > 10\%$). The density of social groups remains significant for service performance (0.497, $p < 1\%$); households living where there is a higher density of active social groups perceive better performance of services. In addition, null findings are shown in regards to the association of public spending, local bureaucracy capacity and leadership with local public service performance.

Household control determinants show expected results. Older household heads tend to perceive better performance. Female household heads perceive better performance than male household heads. Those living in the eastern part of Indonesia perceive reduced performance. Other individual socio-demographic determinants are not significantly associated with perceived performance.

Local government variance - a finding which indicates that perceived public services performance varies between local governments - is significant. The estimation of variance at local government level goes some way to ensuring that the rest of the estimates (from age to mayor from new political party) are robust against unobserved local government heterogeneities. Furthermore, the two models display good model fit indicators with $CFI \geq 0.90$, and $RMSEA \leq 0.049$ (CFI for model A = 0.939 while for model B = 0.941; $RMSEA$ for model A = 0.011, while for model B = 0.010).

2.6 Discussion

This chapter examines whether the transfer of responsibilities and resources through decentralisation reform is associated with an increase in local public service performance.

This performance is measured by citizens' perception of three basic public service sectors: primary education, health and general administration services. Three hypotheses are proposed to answer the research questions: incomplete accountability hypothesis, management political incentives hypothesis, and action of citizens and structure of society hypothesis.

In its analysis, this study improves a number of methodological steps. First, it uses local governments as a unit of analysis. The advantage of this is that such contexts are considerably more similar within the boundaries of a single country than they are across countries, which may mean the effect of decentralisation on public service performance may be more salient than when we use countries or provinces as units of analysis. Second, while previous studies have used individual or aggregate data using ordinary linear regression, this study uses multilevel analyses to address the nested structure of decentralisation reforms and local public service performance. These analyses are able to control for unobserved heterogeneities between local governments that potentially affect the association between political decentralisation and local government performance. In addition, using MIMIC analyses I can examine unobserved local public service performance.

The results confirm that ineffectiveness of local political institutions at ensuring local political accountability leads to reduced public service performance, which decreases along with the perception of local conflict incidence related to both local and national elections, local corruption, and political fragmentation. Local direct democracy as a means for creating political accountability is also not associated with local public performance. Reflecting decentralisation experiences across newly decentralised developing countries, these results indicate that poorly performing local government occurs when channels for ensuring political accountability are not available at local government level. In such situations, political and fiscal decentralisation increases local

corruption rather than strengthening democracy and improving local public services (Prud'homme, 1995; Litvack et al., 1998; Crook and Manor, 1998b; Goldsmith, 1999; Treisman, 2000; Fisman and Gatti, 2002). While prior studies have found evidence of this across developing countries, the findings of this research show that the negative association between ineffective local political institutions and local public service performance holds throughout local governments within a single country.

The results show that the degree to which citizens are informed and the transparency of local government are positively associated with local public service performance. This positive association may signal that in the lowest structure of government, citizens can better oversee the way local agencies use public funds and deliver services in daily life. Here, informed citizens and information dissemination can be understood to be channels for improving citizen political awareness. By providing information about how government spends its money, local citizens - particularly those with greater access to mass media - will have more opportunities to monitor and to evaluate local government activities. As Bestley et al. (2002) explain, mass media can play a key role in enabling citizens to monitor the actions of incumbents by producing and disseminating information related to government activities. This can lead to a government being more accountable and responsive to its citizens' needs. Whether or not we can define this effort as a causal chain (showing the link between participation and transparency to more accountable local governments and therefore improved services) can be contested: the results may be driven by other factors. For instance, information dissemination might by itself change respondents' perceptions of services, simply by providing more information about changes and improvements in service delivery. The causation between these determinants is beyond the scope of this study, but constitutes an important future area of research.

The results confirm some parts of the third hypothesis. Informal citizen political

participation and active social groups in local government authorities improve local public service performance. In contrast, formal citizen political participation in local elections is not significantly associated with performance. These findings may indicate that within less effective local elections, participation in community programmes is likely to be more effective at articulating local citizen voices in policy-making, leading to improved performance. The effectiveness of community participation is also supported by the positive association of social groups and performance. This study shows that respondents living in denser active social groups perceive better performance than those living in less dense social groups.

There is a well-established body of literature which examines the beneficial effects of individual and community social capital on development outcomes. Getting citizens involved directly in various community programmes can improve the capacity of local government to provide services. Community participation can affect this capacity by, for example, providing direct material benefits or helping to target material resources most efficiently within a community (Fox and Aranda, 1996; Blair, 2000). Meanwhile, social groups not only can exert pressure on local governments to provide better services, but can also provide models of the most appropriate kind of services and how improvements can be made in accordance with local concerns (Heller, 2001). In the Indonesian context, the positive association of community participation and social groups with development has been documented in previous studies (Shiffman, 2002; Grootaert and Van-Bastelaer, 2002; Sullivan, 1992; World Bank, 2004). These show that the involvement of local community volunteers and various social organisations have become a hallmark of the country's socioeconomic development. In many instances, these organisations began as grassroots initiatives and were subsequently adopted by higher levels of government as regional and national programmes (Shiffman, 2002; World Bank, 2004). The results thus confirm that the benefits of individual and community social capital not only

extend to improving outcomes of such community programmes, but also to improving local public service performance.

This study hopes any limitations it may have can be dealt with by future research. For example, although previous studies present citizens' responses as a measure of local government performance, this survey considers they may suffer from social desirability bias. For instance, respondents may be tactful when providing answers to questions about their level of satisfaction, rather than expressing more accurate but negative views. They may also have low expectations of service delivery, resulting in relatively high levels of satisfaction when compared to actual quality of service. Moreover, perceived measures of service delivery are often affected by determinants unrelated to decentralisation performance such as age, gender, education, income, ethnicity, attitudes and predisposition towards particular political beliefs or past experiences. I control for this bias by including socio-demographic determinants in each model; nevertheless, these issues may still affect the findings. Future data collection and analysis is anticipated, and is needed to improve measurement for individual localities. This would also provide more rigorous controls for potential bias regarding individual satisfaction as a measure of public service delivery quality (including peer group/expectations effects), as well as actual associations with objective measures. Furthermore, rather than treating different accountability mechanisms as equally effective regardless of prevailing local service delivery conditions, this study suggests that such mechanisms (e.g. bottom-up versus top-down, or an information/participation versus sanctions-based mechanism) may be more effective in particular contexts. Increased evidence of the general as well as location-specific efficacy of different accountability mechanisms for public service delivery represents a critical input into the ongoing policy debate about decentralisation and service in Indonesia.

While interpretation of the results should be viewed in light of certain limitations,

the findings nevertheless have important implications both for the literature and practice of decentralisation and development in developing countries. First, this research shows local governments continue to vary in terms both of their service performance and the extent to which they take advantage of the opportunities offered by decentralisation. While most prior studies show that this variation is shown across developing countries or provinces within a country, this study finds it revealed across local governments within a country. It suggests that the consequence of decentralisation reform on local government performance is more relevant if we use local governments as a unit of analysis.

Second, the benefits predicted by proponents of decentralisation as a consequence of decentralisation provide a palette of possibilities, not of realities. Indeed, this study indicates that the promises of political decentralisation are likely to be realised only when channels ensuring political accountability exist in local governments. The empirical evidence shows that the likelihood of citizens being satisfied with public service delivery is associated with effective local political institutions, better informed citizens, transparent local governments, and the political participation of citizens. These findings must surely constitute a conclusion of which local politicians and service providers might usefully take note.

2.7 Conclusion

The general hypothesis tested in this chapter is that the variation in local public service performance within decentralised local government is to a significant extent determined by effective local political institutions and accountable local government. The results are broadly consistent with the predictions of the hypothesis. More effective local political institutions, better informed citizens and transparency, citizen political participation

via community programmes, and the presence of active social groups in communities are all associated with higher performance. These effects remain statistically robust across all regression specifications. While we should be cautious in interpreting the results as evidence of causality in its strictest sense, they still provide a significant pattern that needs to be addressed in further empirical analysis.

The poor performance of local public services is often deeply rooted in their political and social contexts. Local governments often fail to provide better public service when political accountability is absent due to weak checks and balances, lack of transparency, and weak electoral incentives. If political accountability is incomplete, decentralisation is likely to create powerful incentives for political and bureaucrat agents to capture local political processes and misallocate public resources. Conversely, better performing local public services are consistent with increased citizen political participation and active social groups within the community which tend to compel local government to be responsive and to deliver efficient services. Higher accountability increases the political cost of inefficient and inadequate public decisions, meaning that public service performance is likely to improve. This requires a politically active community that is able to participate in the examination of accountability.

Chapter 3

Decentralisation and citizen happiness: Multilevel analysis of self-rated happiness in Indonesia

Summary: Cross-country association between decentralisation and happiness has been widely investigated, yet the association across local governments within a developing country context remains under-investigated. This chapter examines the association between decentralisation reform and citizen happiness in Indonesia. Data is taken from the Indonesian Family Life Survey (IFLS) 2007, comprising 29,024 individuals living in 262 local governments. Multilevel analyses are used to examine the association between fiscal and political decentralisation reform and citizen happiness. The analyses show that fiscal decentralisation is significantly associated with citizen happiness, while political decentralisation is not, and are robust to a wide range of individual and local government determinants related to happiness. The analyses suggest that decentralisation increases the happiness of citizens through the improved capacity of local governments to deliver public services, rather than through the improved opportunities of citizens to engage in direct political participation¹.

3.1 Introduction

Over the last decade, the relation between government decentralisation reform and various development outcomes has attracted an increasing amount of both academic and political attention. This attention has focused largely on objective measures of

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social welfare such as economic growth, income inequality and poverty. For example, a large body of literature examines whether decentralisation leads to the growth of local and national gross domestic product (Davoodi and Zou, 1998; Wibbels, 2000; Iimi, 2005). Some researchers study the consequences of decentralisation on national and regional income inequality (Ezcurra and Pascual, 2008; Lessmann, 2008). A few of them investigate its impact on poverty alleviation (Tselios et al., 2011; Sepulveda and Martinez-Vazquez, 2011). All these studies reveal the benefits as well as the detrimental effects of decentralisation on economic development both in developed and developing countries.

More recently, scholars have turned to examining the relation between decentralisation and subjective measures of social welfare or well-being, such as life satisfaction and happiness. Diaz-Serrano and Rodriguez-Pose (2012) examine the relationship between decentralisation and happiness in 20 European countries, and show that people living in more decentralised countries are happier than those living in less decentralised ones. Rodriguez-Pose and Maslauskaitė (2012) examine the association between decentralisation, governance and happiness in ten Central and Eastern European countries, finding that greater political and fiscal decentralisation increases life satisfaction, while corruption within decentralised countries decreases life satisfaction. Hessami (2010), using the Eurobarometer Survey Series 1990 and 2000 shows the quality of institutions measured by levels of corruption and decentralised public expenditure has significant effect on subjective well-being given current sizes of governments in the European Union. Bjornskov et al. (2008) analyse the World Value Survey from 1997-2007 and find that fiscal decentralisation increases life satisfaction, while political decentralisation does so only when it is accompanied by an increase in government spending on public services. Furthermore, they show that life satisfaction decreases with government consumption. However, Di Tella and MacCulloch (2005) find a positive but insignificant effect of gov-

ernment consumption on life satisfaction in a panel analysis for ten OECD countries. The existing literature is thus a mixed bag of findings.

Although there are advantages to cross-country analyses on decentralisation and subjective well-being (such as the use of a large sample of countries and a relatively long time span), they also have limitations. First, scholars note that results from such analyses may suffer from unobserved heterogeneities, such as cultural differences between countries, and differing history of their institutional development (Maddala, 1999; Frey and Stutzer, 2002; Helliwell and Huang, 2008). These may result in bias estimates on the effect of decentralisation on subjective well-being. Second, existing cross-country analyses often use ordinary regression to examine the association between decentralisation and subjective well-being (Björnskov et al., 2008; Rodriguez-Pose and Maslauskaite, 2012). These analyses generally combine individual and country level data without taking into account that individuals are nested within a country. Snijders and Bosker (1999) shows that ignoring this nested structure of individuals within countries may result in underestimation of standard errors of the effect of national characteristics, which could lead to an overstatement of statistical significance of the effect of decentralisation on subjective well-being. Third, decentralisation in many countries is often implemented within sub-national or local governments. Cross-country analyses are often unable to capture the dynamic of decentralisation reform in such governments, which reduces their relevance to national policy.

This study contributes to existing decentralisation literature on subjective well-being in terms of its sample size: it analyses the relation between decentralisation and citizen happiness based on a large sample of local governments within a single country. Using local government as unit of analysis enables us to control for unobserved heterogeneity contexts that may lead to bias estimates. Previous studies show that decentralisation performance is embedded in the political, institutional, economic and

social context of a country (Rondinelli et al., 1989; Litvack et al., 1998; Manor, 1999). Local government studies thus have the advantage since such contexts are considerably more similar within a single country than across countries. Furthermore, multilevel analysis used in this study is able to account for the clustering of individuals within local government areas by separating citizen variance of happiness from local government variance of happiness. Hypotheses on the effects of local government characteristics on citizen happiness can thus be tested appropriately using this analysis. In addition, by focusing on decentralisation experiences in a single decentralised developing country, this study provides a contrast with recent literature that is based on cross-country study and on more advanced democratic countries.

The implementation of far-reaching decentralisation in Indonesia in 2001 makes it an interesting case. It has changed the political and fiscal system as a result, from a highly centralised to a decentralised form of government. Decentralisation brings political freedom to local governments by giving local citizens the right to elect their mayor and parliament through direct election. Local governments also have greater authority in decision-making and in delivering public services, as most of the responsibility to manage public services have been handed over to them. These new responsibilities are supported by substantial financial transfer. Significant public expenditure has been devolved to local governments, amounting to around 30% of total national expenditure (World Bank, 2008c). With these changes, local governments are more independent in promoting their own interests and initiating policies to meet the demand of local citizens. No empirical research, however, has examined the implication of this reform on citizen happiness.

In summary, the research questions addressed in this chapter are as follows: To what extent is political and fiscal decentralisation in Indonesia associated with the happiness of its citizens? How is each citizen's happiness affected by local government

characteristics (after controlling for individual determinants related to happiness)? and What are the implications of decentralisation reform in Indonesia for citizen happiness?

3.2 Decentralisation and happiness

For the last two decades, scholars of both psychology and economy have contributed to explanations regarding what makes human beings happy and unhappy. Most focus on personal, socio-demographic and economic determinants to explain individual happiness (see for example Layard (2005); Diener and Biswar-Diener (2008); Graham (2009)). A very limited number examine the impact of government policies and reforms such as decentralisation. Of those studies which do examine the association between decentralisation and happiness, most use cross-country as the unit of analysis (see for example Veenhoven (2000); Radcliff (2001); Björnskov et al. (2008, 2010); Diaz-Serrano and Rodriguez-Pose (2012); Rodriguez-Pose and Maslauskaitė (2012)). Only one study investigates the relationship between decentralisation and happiness within a single country context: that of Frey and Stutzer (2000), who examine how it applies to 6,000 individuals in 26 Swiss cantons. They find that decentralisation in the form of local autonomy and local direct democracy increases happiness, and suggest that this positive effect can be attributed to two factors: local citizens feeling more closely connected to political outcomes, and the benefits of political participation.

The findings of cross-country studies on decentralisation and subjective well-being show mixed results. Björnskov et al. (2008) examine the relationship between decentralisation and the life satisfaction of 60,000 individuals from 66 countries using the World Values Survey, 1997-2007. They find that a country with greater revenue and decentralised spending is likely to be happier than one with less. However, political decentralisation (in the form of political autonomy) increases life satisfaction only when

governments spend more on public services. This finding suggests that political decentralisation enhances citizen happiness through the capacity of government to delivering public services. Rodriguez-Pose and Maslauskaitė (2012) compare the data from the 1999 and 2000 European Values Studies to examine the association between decentralisation, governance and happiness in ten Central and Eastern European countries. The data shows that people living in a country with greater political and fiscal decentralisation are likely to be more satisfied with life than those who experience less. They also found that corruption within a decentralised country is detrimental to the life satisfaction of its citizens. This is also found by Hessami (2010). Referring to twelve European Union countries from the European Barometer Survey from 1990 to 2000, he finds that the effect of government size on well-being follows an inverse U-shape, while the effect of public sector size on well-being depends positively on the extent of decentralisation and negatively on the level of corruption.

Other studies report that the degree of significance of decentralisation depends on the particular characteristics of the country concerned. Veenhoven (2000) for example finds that political and private freedoms exert a positive influence on life satisfaction only in countries with well-established democracies. Using the World Value Survey 2004, Bjornskov et al. (2008) find that the higher performance of better economic and judicial institutions has a greater influence on happiness in low income countries, while political institutions affect happiness in medium and high income countries. Other studies (such as Pacek and Radcliff, 2008), go slightly further to uncover a positive relationship between a number of features of the welfare state and subjective well-being.

Bjornskov et al. (2008) explain the mechanisms by which decentralisation leads to happiness. First, they find that it encourages local governments to provide the public goods and services that local citizens need. It entails a shift in political decision-making from central to local government, one which implies that local government

has a greater potential to tailor its specific policies to the demands of local citizens. Such improved matching of public goods and service delivery to local needs necessarily leads to the happiness of citizens. Second, decentralisation provides political freedom which encourages more participation in and more accountable government, providing citizens with increased opportunities to supply information about the goods and services they need to those that have the power to provide them. It also facilitates citizens taking a more active role in monitoring the performance of elected and administrative officials. Furthermore, when government is brought closer to the citizens who receive its services, the latter are more likely to start demanding that they are of high quality, and more motivated to demand improvements if that quality declines or if services fail. Because of this increased potential for public complaint, civil servants also have an enhanced incentive to orient their behaviour towards providing good service. All of these contribute to local governments being more accountable and responsive. Consequently, satisfaction with government output is reflected in a higher level of overall happiness.

In some circumstances however, decentralisation can decrease happiness. Bjornskov et al. (2008) explain two ways by which this might actually happen. First, decentralisation often leads to loss of economic scale, particularly in regard to the provision of basic infrastructure and services, the need for which is universal and unlikely to change across territories. Local governments, compared to national governments, may thus find themselves at a disadvantage: lacking the economies of scale, their capacity to address basic needs adequately may be weak. Second, decentralisation does not guarantee the eradication of corruption and conflict, particularly when the mechanism to ensure local political accountability is weak. Local corruption within decentralised government could be as invidious as central corruption. There is also the potential for local conflict and violence to become accentuated as power and economic resources are distributed to local citizens (Heller, 2001). In such conditions, local governments often reflect social,

political, and economic conflicts that divide local communities, which may be detrimental for happiness. The negative effect on happiness of corruption and civil conflict in decentralised countries has been found in earlier cross-country studies (see for example Welsch (2008) and Rodriguez-Pose and Maslauskaitė (2012)). However, their effect on happiness within a country remains under-investigated.

Whether decentralisation leads to happiness therefore depends on local conditions. Decentralisation appears to facilitate increased political freedom, creating increased opportunities for citizens to participate in the local political process, with the possible result that local government becomes more responsive to local needs and concerns. However, when decentralisation is attended or followed by local conflict and violence, unhappiness is likely to ensue. Second, decentralisation is also likely to lead to happiness when the newly-acquired resources of a local government match local needs; the provision of public goods and services required and requested by its citizens is likely to increase their happiness. However, when decentralisation is followed by corruption, happiness is likely to decrease. Whereas some of these hypotheses have been tested and supported in cross-country research, this study will examine them using a number of local governments within one newly-decentralised country.

3.3 Democracy and political transition in the contemporary Indonesia

Indonesia is a unitary state, meaning that provincial and local governments are the creation of the central government. Up to the point of decentralisation, a highly centralised government had controlled local government for over 32 years (Smoke and Lewis, 1996). During this period, local government had limited authority to decide local policies and little ability to respond to local preferences. Local democracy and citizen participation

in politics were restricted, as political parties and local leaderships were controlled by the authoritarian, centralised regime. It appointed mayors with no consideration to local aspirations; most were career bureaucrats or retired army members who were also members of the ruling party. As a result, their political responsibility was orientated largely towards the regime.

Economic and political crisis in 1998 triggered political reform in Indonesia. Dissatisfaction with the regime forced it from power, and the first free and fair national election of the parliament and president was held in 1999. In this election, more than forty new political parties participated. This direct election, coupled with new media openness, supported the burgeoning freedom of democracy across the country. Since then, citizens have had more freedom to make their voice heard through the press, over which the government has continued to relax its control. In the last few years, Freedom House, an international organisation monitoring democracy, has called Indonesia a liberal democracy (Aspinall and Mietzner, 2010; Freedom House, 2009)².

Democracy and local political life in Indonesia have fundamentally changed since 2001. The implementation of far-reaching decentralisation has transformed the country's political system from one of a highly centralised to decentralised government. Autonomy was given to local governments to perform key functions, including the provision of health, education, environmental and infrastructure services. Other than that, local governments could perform any function not explicitly reserved for the centre or the provinces. This significant increase in autonomy was supported by a substantial transfer of financial resources: more than a third of the national budget is now in the

²In 2009, Freedom House classified 119 out of 193 countries as electoral democracies. It is important to note, however, that there is a significant difference between an 'electoral democracy' and a 'liberal democracy'. In electoral democracies, reasonably open elections can coexist with serious defects in the implementation of individual rights, the rule of law and other preconditions crucial for a free society. Liberal democracies, by contrast, enjoy free, fair and competitive elections, but also a large catalogue of civil liberties. According to Freedom House, only 89 of the 119 electoral democracies were liberal democracies in 2009. Interestingly, this list included Indonesia.

control of local governments (World Bank, 2008c). This fiscal reform was accompanied by the reassignment of more than 2.5 million civil servants to local government (World Bank, 2003). These changes mean that local governments are more independent in mobilising resources, promoting their own interests, and initiating local policies to meet local citizen demand.

Further reforms in 2005 meant that citizens could elect their own mayor and parliament through direct local election. Since the beginning of June 2005, 166 local governments have conducted direct elections and voted in seven governors and 159 mayors. By the end of 2006, more than a half of all local governments were conducting direct elections (see Figure 1.5 in chapter one). This is a highly significant step forward for the Indonesian local political system, giving the freedom and responsibility to local citizens to elect their own leaders that represent their aspirations.

Under the reforms, proponents of decentralisation promised to bring government closer to the people, and that this would result in better governance and improved performance of local government. Local governments were expected to tailor public goods and services to the particular wishes and circumstances of their constituencies, thereby increasing community welfare and happiness. However, after five years of decentralisation, many people began to perceive that although it meant enhanced welfare and thus increased happiness, it also had a number of negative effects on local political life and thus on well-being. In many instances, the local political context has been charged with being responsible for a new lack of accountability and failure to respond to local needs (Asia Foundation, 2002). Some scholars have questioned the depth of democratic participation in Indonesian elections. Observers of these elections have echoed a much wider body of comparative literature located in a southeast Asian context, which notes the influence of political elites, patronage and ‘money politics’ in local elections (Aspinall and Mietzner, 2010). There is also some evidence to suggest that the political

accountability mechanisms of some local governments are weak (Kaiser and Hofman, 2003; Malley, 2003; World Bank, 2003). In addition, local corruption, violence and ethnic conflict have been widespread across local governments following decentralisation (World Bank, 2003). Decentralisation has thus brought not only freedom but also problems for local citizens, and these may reduce their welfare and result in unhappiness. This study aims to understand whether and to what extent these local political and financial changes are associated with citizen happiness.

3.4 Data, determinants and method

I assembled individual and local government data to answer the questions. The individual data come from the Indonesian Family Life Survey (IFLS) 2007, while local government data come from the national village census (Podes) 2006, the national socioeconomic survey (Susenas) 2007, the national election database 2004, the local development budget and expenditure information 2006, and the consumer prices index 2006 data. The assembled data possesses a multilevel structure in which individuals are nested within local governments.

3.4.1 The Indonesian Family Life Survey (IFLS) 2007 and official statistics

The data comes from the fourth wave of the Indonesian Family Life Survey 2007 (Frankenberg and Karoly, 1995; Frankenberg and Thomas, 2000). Although IFLS has a panel structure, the happiness, social trust and local governance modules were introduced only in its fourth wave. This study thus uses the cross sectional structure of the data and does not employ its panel structure. The data is representative for the non-institutionalised adult population in Indonesia (Frankenberg and Karoly, 1995;

Frankenberg and Thomas, 2000). Questions on happiness, social trust and local governance are put to all respondents aged 15 years or older. This sample consists of 29,060 respondents living under 262 local governments. On average, each local government consists of 100-200 respondents. All respondents who migrate to other local governments are included in the analysis.

The IFLS dataset was linked to other surveys and official statistics datasets using local government codes. First, it was linked with socio-economic data from the village potential census (Podes) 2006. The Podes dataset consists of detailed information about the incidence of local conflict and violence and the number of social groups active within local governments, calculating aggregates at village and urban neighbourhood level to measure their distribution. Second, the IFLS dataset was linked with the local and national election database from the Ministry of Home Affairs. This consists of information about local governments which had already implemented direct elections up to 2007. More than half had elected mayors and parliaments through direct election in 2007. Other local governments continued to be led by mayors elected under the previous regime who had started their term before the direct election bill came into effect. This unique political condition provides the opportunity to examine the effect of different systems of local government running concurrently on happiness.

The IFLS dataset was linked to local government fiscal data collected by the Ministry of Finance. This dataset provides detailed local government fiscal information ranging from local government own revenue source, balancing funds and general allocation funds from central government, local taxes and levies, to sectoral development expenditures (The Indonesian Ministry of Finance, 2008). Fiscal data from 2006 (one year before the IFLS survey) is used, as local government development spending in the Indonesian budgeting system takes at least one year to take effect. Since the price levels of consumer goods and services in Indonesia vary across rural and urban regions

(Strauss et al., 2004), the amount of local government spending was deflated with the consumer price index for urban and rural regions. Rural inflation is taken to be 5% higher than urban inflation (Thomas and Frankenberg, 2007; Resosudharmo and Jotzo, 2009). This calculation produces real spending adjusted with urban and rural inflation. The Consumer Prices Index 2006 data are retrieved from the government Central Bureau of Statistics.

3.4.2 Happiness and decentralisation measures

Happiness is defined as the degree to which an individual judges the overall quality of his/her life favourably (Veenhoven, 1984), measured by a self-rated happiness scale from one to four (four being the highest degree attainable). In the IFLS survey respondents were asked: “Taken all together, how would you say things are these days: would you say that you are ‘very happy’, ‘pretty happy’, ‘not too happy’ or ‘very unhappy’?” The data is coded 0 for very unhappy to 3 for very happy. The majority of respondents fell into one of the ‘happy’ categories (85%).

This subjective measure has been widely used by previous studies (Frey and Stutzer, 2002; Krueger and Schkade, 2008; Oswald and Wu, 2011). For example, Frey and Stutzer (2002) summarise a number of ways to validate happiness data, and demonstrate that self-rated happiness is strongly correlated with objective well-being. Stable well-being numbers are found over time (Krueger and Schkade, 2008), and a strong match has been found between subjective and objective well-being (across the United States, by Oswald and Wu, 2011).

Decentralisation is defined in terms of degree of political and fiscal autonomy. The first measures the discretionary power in political decision-making awarded to local government, while the second refers to fiscal self-reliance and spending power (Schneider, 2003; Rodriguez-Pose and Maslauskaitė, 2012). Following Schneider (2003), direct local

election is used as a proxy to measure political decentralisation, while the share of central government transfer of total local government revenue and total local government spending for public services are used to measure fiscal decentralisation. Local governments resulting from direct local elections are considered to have more autonomy in decision-making than those elected by the prior centralised regime: in Indonesia, more than a half of local governments directly elected their mayor in 2007 (69%).

The bigger share of central government transfer will not necessarily lead to well-being if the allocation of the transfer is not efficient. For example, some local governments may have a small amount of local revenue, thus their share of central government subsidy will be large despite being not at all sufficient. The efficiency of local budget allocation may thus matter for citizen well-being, since it reflects the financial capacity of local government in the delivery of services. Following Heywood and Harahap (2009) and World Bank (2008b), this study uses the proportion of total spending for civil service salary of total local government development expenditure to measure the efficiency of the latter. I found that most local governments in Indonesia are not only reliant on central government funds but also less efficient in managing their development expenditure. The average share of balancing fund of total revenue and the proportion of total spending for civil services salaries of total development expenditure are quite large (86% and 48% respectively).

Table 3.1 presents summary statistics of the analytic sample. To avoid confounding determinants, I include in the model local government and individual control determinants associated with happiness. I describe each of these control determinants in more detail in the following.

Table 3.1: Summary statistics of analytic sample

	Mean,mode or %	s.d.	min	max
Self-rated happiness	happy			
<i>Local government</i>				
Log total public service spending	32.35	0.46	31.30	34.26
Shared of balancing fund on total revenue	86%	9%	44%	98%
Proportion of civil service salary on total development expenditure	48%	10%	16%	69%
Direct election	70%	46%	0%	100%
Shared of population vote majors because large campaign fund and same ethnicity	23%	27%	0%	100%
Conflict and violence incidence	75%	40%	0%	100%
Mayor from new political party	13%	34%	0%	100%
Proportion of village head with graduate and higher education	30%	26%	10%	80%
Proportion of active social groups	30%	20%	0%	89%
Log gross domestic product	15.92	1.25	13.34	18.80
Geographic areas (1,000 km ²)	258.7	352.4	1.1	2010.0
<i>Individual</i>				
Age	37	17	14	90
Female	52%	50%	0%	100%
Years schooling	8 years	5	0	18
Unemployed	3%	17%	0%	100%
Divorced	2%	15%	0%	100%
Widowed	6%	23%	0%	100%
Pray every day	daily			
Poor health	14%	50%	0%	100%
Help neighbors	99%	38%	0%	100%
Living separately from spouse	5%	21%	0%	100%
No child	17%	24%	0%	100%
Household size	4	2	1	22
Household expenditure (IDR1,000)	624	630	28	1,360
Remote islands	5%	7%	0%	100%
Migration	14%	35%	0%	100%
N individuals	29,024			
N local governments	262			

Source: IFLS 2007 & official statistics

3.4.3 Local government determinants

Earlier studies found that direct local elections in Indonesia resulted in two concerns regarding corruption in local politics (Kaiser and Hofman, 2003; Choi, 2004; Nordholt and Van-Klinken, 2007). First, the increasing issue of *putra daerah* ('son of the region') has become the embryo of the rise of primordialism and nepotism during decentralisation (Kaiser and Hofman, 2003). Second, the issue of corruption gained prominence

following direct local elections. Usually referred to as *politik uang* (‘money politics’) in Indonesia, this is generally accepted to be endemic during the local election process (Choi, 2004; Nordholt and Van-Klinken, 2005). I use these two determinants as a proxy of local corruption. In the IFLS survey, respondents are asked, “What factors do you consider in electing a *bupati* (mayor)?” The respondent has ten choices: appearance, popularity, quality of the mayoral programme, political affiliation, faith/religion, ethnicity, experience in government, gender, and the amount of money given to the respondent during the mayoral campaign. An aggregate of respondents’ answers is constructed for each local government. Local governments with a higher share of respondents who chose their leader because they are of the same ethnicity and give more money during their campaign are considered to be more corrupt. The average respondent voting for a candidate on this basis is 23%.

Earlier studies also show that decentralisation in Indonesia was followed by an increasing amount of local conflict and violence (Nordholt and Van-Klinken, 2005). In some cases, this reflects the weak capacity of local government in managing new responsibilities and resources (Van-Klinken, 2007). It also indicates the ineffectiveness of local democracy in which local direct election is unable to guarantee effective local leadership (Nordholt and Van-Klinken, 2005). To address whether local conflict and violence during decentralisation are detrimental for happiness, a dummy determinant was constructed, indicating the pre-existing local conflict and violence within local government. The percentage of incidence of conflict and violence is very high with 75% of local governments reporting incidents in 2006.

The happiness of citizens may also be affected by the new type of leadership brought about by direct local elections. To capture whether new leadership brings happiness, I construct a dummy determinant indicating mayors or *bupati* from the new political parties. Mayors elected from political parties other than the three parties of the

prior regime (*Golkar*, *Partai Persatuan Pembangunan*, and *Partai Demokrasi Indonesia Perjuangan*) are considered to constitute a new type of local leadership. I find 13% of mayors elected since 2006 are representatives of new political parties. Happiness may also relate to the capacity of local bureaucracy in delivering services. Since village and urban neighbourhoods are at the end of local public services in the Indonesian administration system, I use the proportion of village and urban neighbourhood heads with graduate education and above - 30% - as a proxy to measure the capacity of local bureaucracy.

Other important determinants which may affect citizen happiness are economic development and community social capital (Easterlin, 1974; Diener et al., 1993; Blanchflower and Oswald, 2004; Putnam, 1993; Bjørnskov, 2003). A number of earlier studies use gross domestic product (GDP) as a standard determinant to capture economic development (Easterlin, 1974; Diener et al., 1993), debating the positive and negative effects of GDP on happiness both within and between developed countries (Easterlin, 1974; Diener et al., 1993; Blanchflower and Oswald, 2004). To examine whether local government economic development also matters to happiness in developing country contexts, I include real local government GDP 2007 from the National Bureau of Statistics (BPS) (the average local GDP in Indonesia in 2007 was about IDR6 billion).

Earlier studies show the benefit of community social capital for individual happiness (Putnam, 1995; Bjørnskov, 2003). Putnam (1995) explains that social capital provides a channel for the personal and social support that increase individual happiness. I use the density of active social groups in local government to measure community social capital, using data retrieved from Podes 2006, where each village/neighbourhood head was asked about the various active social groups within their village/neighbourhood. These include *kelompok pengajian dan kelompok kebaktian* (religious groups), *karangtaruna* (youth groups), *persatuan kematian* (funeral groups), *kelompok wanita* (women's

groups), and others. The aggregate number of villages/neighbourhoods was calculated for each active social group within local government. The distribution within local government was found to be relatively low at 30%. In addition, the geographical size of each local government is included in the model to address whether geographic coverage of local public services affects the happiness of citizens. As an archipelago country (see Map 1.1 in chapter one), this geographic coverage plays an important role in determining citizens access to public services, as well as the capacity of government to deliver such services.

Key determinants in local government in this analysis are derived from administrative reference data rather than the survey, which enhances accuracy or at least reduces measurement error. The use of independent administrative data also alleviates concerns arising from the use of the same surveys in calculating both aggregate and individual determinants in the estimation (Deaton, 2001). Only the proxy for local government corruption is calculated from the same survey. To reduce measurement error, I excluded the respondents from calculation when constructing the aggregate for local government corruption.

3.4.4 Individual determinants

A wide range of individual and household socio-demographic determinants, widely used in single-level studies, are included in the model as controls. For example, age is included to determine whether individual happiness differs across age. Blanchflower and Oswald (1999) found that age has a U-shape relation with happiness, with happiness at its minimum in middle age. Most respondents were middle aged, with the average age being 37 years. Gender, being a parent or not, and marital status are included: being male, not having children and being divorced and widowed are often negatively related to happiness (Lane, 2000; Argyle, 2001; Diener and Biswar-Diener, 2008; Graham, 2009).

Half of respondents were women, of which 6% of them were widowed and 2% of them are divorced.

A dummy determinant of employment status was constructed to address the issue of whether being unemployed has a detrimental effect on happiness (Clark and Oswald, 1994; Clark, 2003). The proportion of unemployed in the IFLS 2007 is low (3%). Health status is used as a control to determine whether respondents at the lower end of distribution of self-rated health are less likely to be happy. All respondents in the IFLS sample report on self-rated health, which predicts chronic disease in many settings, including Indonesia (Frankenberg and Jones 2004). The survey provides information on self-rated health elicited by the question, “In general, would you say that your health is ‘very healthy’, ‘sufficiently healthy’, ‘less than healthy’, or ‘unhealthy’?” I find 14% of respondents report having poor health.

Social ties and religiosity are also factored in, as earlier studies found these to be a determinant of individual happiness (Helliwell, 2003, 2006; Abdel-Khalek, 2006; Lim and Putnam, 2010). Helliwell (2006) found that social ties are one of the main factors of subjective well-being. In this study, I use individual willingness to help neighbours and household size as a proxy to measure social ties. In the survey, respondents are presented with the statement, “I am willing to help people in this village if they need it”, and with the possible responses, ‘strongly agree’, ‘agree’, ‘disagree’, and ‘strongly disagree’. Prior studies also found that people who are religiously devout tend to enjoy not only better mental health but also happiness (Abdel-Khalek, 2006). To address whether religiosity matters to happiness, I construct a determinant which indicates whether daily prayer is carried out by respondents. The majority of respondents report that they pray every day.

The other personal determinant that strongly affects happiness is loneliness. Lane (2001) find that loneliness has a depressing effect on happiness. I construct a dummy

determinant indicating that the respondents' spouse is living away from home to control for the effect of loneliness on happiness. In the IFLS survey, respondents are asked, "Has your spouse lived away from home during this last year?" I find 5% of respondents report in the affirmative. Previous studies also show that education may contribute to happiness by enabling individuals to better adapt to changing environments (Clark and Oswald, 2004). Education also tends to raise aspiration levels which may, if unmet, decrease happiness (Graham, 2009). To address this issue, I construct the number of years a respondent was in school as a measure of respondents' education. Most are educated up to secondary high school level in the Indonesian education system (representing nine years in school).

Household expenditure is included to address the issue of whether household income is associated with happiness (household and individual income are consistent predictors of subjective well-being) (Lane, 2000; Blanchflower and Oswald, 2004). Household expenditure is used as a proxy of income, information about which is biased and difficult to assess in many developing countries, particularly in subsistence farming households. Income data is also typically prone to under-reporting and measurement error, with the contribution of own production and in-kind transfers often overlooked. Household expenditure however is a more accurate measure of household economic resources, both in developing and developed countries (Deaton and Zaidi, 2002; Jorgensen, 2002), and this study refers to household expenditure adjusted with the 2007 consumer price index data for urban and rural areas. The log of household expenditure is taken to correct for skewed distribution. The average real household expenditure in 2007 was IDR575,000.

Migration is included to control whether this makes respondents less happy than those who are settled under one local government. About 14% of respondents report having migrated to another region since they were 12 years old. To address the effect of geography, a dummy determinant representing respondents living in remote islands is

constructed, with respondents living on the mainland (a more developed region) used as a reference group. I find 0.5% of respondents live on remote islands.

3.4.5 Multilevel analyses

If earlier research on decentralisation and subjective well-being tends to take the form of ecological studies, more recent ones tend to be individual studies. Multilevel analyses are more appropriate in keeping these hypotheses (Rice and Jones, 1997; Subramanian, 2004; Ballas and Tranmer, 2010). The use of ordinary regression by aggregating data at individual level (Frey and Stutzer, 2002) or ignoring the nested structure of data (Björnskov et al., 2008) would be inappropriate. This nesting of individuals within large local government units may lead to the underestimation of standard errors of the effect of local government characteristics (Snijders and Bosker, 1999). As a result, in ordinary regression analyses the significance of local government level effects tends to be overestimated. Multilevel regression analyses are able to account for this clustering of individuals by separating individual variance in happiness from that of local government variance in happiness. Hence, hypotheses on the effects of local governments characteristics on individual happiness can be tested appropriately using multilevel analyses. For more detailed technical information on multilevel analyses I refer to Skrondal and Rabe-Hesketh (2012).

Multilevel analyses were carried out with generalised linear latent and mixed models-command using Stata 11.2. Rabe-Hesketh et al. (2004) explain that GLLAMMs are a class of multilevel latent variable models for (multivariate) responses of mixed type, including continuous responses, counts, duration/survival data, dichotomous, ordered and unordered categorical responses and rankings. In this analysis, I used GLLAMM with an ordinal probit link, as the dependent determinant (self-rated happiness) is ordinal. To test robustness of the results I also estimate the model using the mixed-effect

linear regression command (xtmixed). The results of xtmixed do not differ substantially from those of GLLAMM (appendix A.2.1).

I specify the model in terms of individuals and local governments. The local government's residuals (often called local government's effects) represent unobserved local government characteristics that affect citizens' happiness. It is these unobserved heterogeneities which lead to a correlation between the happiness of individuals from the same local government. For each of the models, the estimated regression coefficient, standard errors, local government and individual variances, intra-class correlation and log likelihood as an indicator of model fit are reported. All models were estimated according to maximum likelihood estimation.

3.5 Results

The map shows the area association with happiness across local governments in the IFLS sample (Figure 3.1), highlighting geographical variations in happiness. An attempt at a summary is given in table 3.2 (showing central-local and mainland-remote islands correlations). The map and table hint at central-local gradients and mainland-remote islands gradients. Simple correlations between new centroids and happiness show that as one moves outside the centre (the capital of Indonesia), happiness is reported to decrease (-0.086), which also occurs as one moves to remote islands (-0.032). These geographical correlations show happiness disparities between central and local as well as between mainland and remote islands.

Figure 3.1: Distribution of average self-rated happiness across 262 local governments

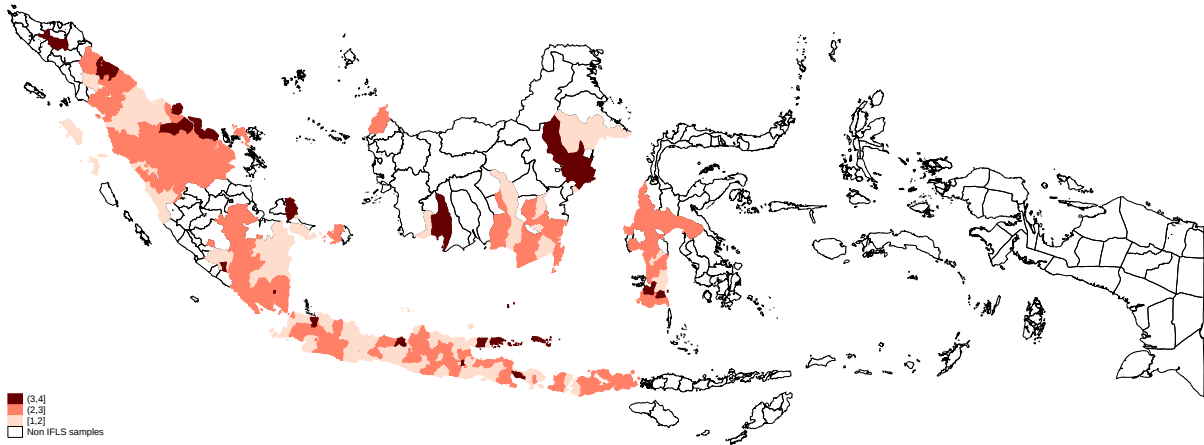
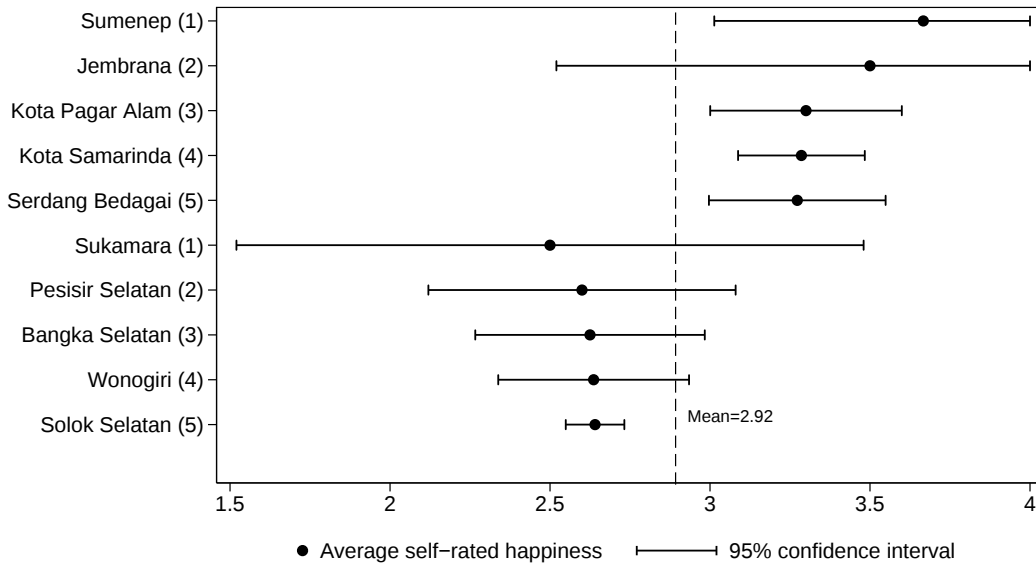


Table 3.2: Centroid correlation with happiness

New centroid	central-local government	mainland-remote
Average self-rated happiness	-0.086 [†]	-0.032
Significance: [†] :5% [‡] ≤ 1%		

Figure 3.2: Five highest and lowest ranks of aggregate happiness



Aggregate individual happiness for each local government is constructed to identify the happiness level of local governments. Figure 3.2 presents the five highest and lowest ranks of aggregate happiness, with the top five containing several local governments often cited by government and international donors as examples of good practice of local public service performance (World Bank, 2006). For example, Jembrana is nationally

recognised as an example of local government innovative in health and education services. The *Jaminan Kesehatan Jembrana* (Jembrana Health Insurance) scheme begun in March 2003 provides free primary healthcare to all members; free secondary and tertiary care is also provided for poor members. The scheme has improved the access of both poor and non-poor citizens to healthcare. World Bank (2006) reports that before *Jaminan Kesehatan Jembrana* started, only 17% of local citizens were covered by any kind of health insurance; in 2004, 63% of them are covered. The percentage of ill people who sought treatment in Jembrana more than doubled from 40% in 2003 to 90% in 2004 (for the poor, the increase was from 29% to 80%). Increased access of the poor to free public services in this local government may enhance citizen well-being.

On the other hand, citizens living in poor and remote local governments report lower levels of happiness. For example, Wonogiri lies in a dry, upland area of Central Java, and is recognised as one of its most deprived areas. Based on the 2004 National Socio-Economic Survey, the number of the people living below the poverty lines was 272,795 people - one in four, much higher than the national level of 16%. Other indicators of the high level of poverty in the region are the high level of illiteracy (5.3%), child-mortality rate (14.6 in 1,000), and a high rate of undernourished people (4.8%). The high unemployment rate in Wonogiri encouraged the migration of adult males to large cities such as Jakarta, leaving a disproportionate number of women and older people in the region (see for example Puspitawati and Sarma, 2010).

Three of the bottom five local governments (Sukamara, Bangka Selatan and Solok Selatan) are newly established, and generally have poor public infrastructure and services. Local governments were established here in 2003 and 2005; they are located on the remote islands of South Borneo and Sumatra, which generally report poor public services and lower well-being.

Table 3.3 presents the regression results of the logit and multilevel analyses, and shows the standard error for the logit coefficient is lower than the multilevel regression coefficient. Standard errors for the district variables are the most affected in the logit which is to be expected as, as discussed, it ignores the nested structure of the data.

Table 3.3: Results of multilevel regression of self-rated happiness

	Logit		Model A		Model B	
	coef	se	coef.	se	coef.	se
<i>Local government</i>						
Log total public services spending	0.350‡	0.052	0.320‡	0.081	0.384‡	0.092
Shared of balancing fund on total revenue	0.014‡	0.002	0.008‡	0.003	0.014‡	0.003
Proportion of civil service salary on total development expenditure	-0.252‡	0.010	-0.167‡	0.062	-0.100‡	0.013
Direct election	0.022	0.063	0.039	0.038	0.015	0.043
Shared of population vote majors because large campaign fund and same ethnicity	-0.230‡	0.051	-0.287‡	0.072	-0.200‡	0.083
Conflict and violence incidence	-0.112‡	0.031	-0.101‡	0.046	-0.127‡	0.052
Mayor comes from new political party	-0.007	0.030	-0.085	0.050	-0.031	0.055
Proportion of village head with graduate education or above	0.181	0.076	0.156	0.113	0.167	0.128
Proportion of active social groups	0.229‡	0.078	0.416‡	0.114	0.248‡	0.130
Log gross domestic product	-0.055‡	0.0231	-0.079‡	0.036	-0.082‡	0.041
Geographic areas (in 1,000 km ²)	0.023	0.051	-0.023	0.073	0.001	0.082
<i>Individual</i>						
Age	-0.011‡	0.001			-0.006‡	0.001
Age ²	-0.000	0.011			-0.000	0.011
Female	0.056‡	0.023			0.058‡	0.023
Years schooling	0.023‡	0.003			0.031‡	0.003
Unemployed	-0.281‡	0.083			-0.262‡	0.082
Divorced	-0.650‡	0.067			-0.685‡	0.067
Widowed	-0.198‡	0.050			-0.241‡	0.050
Praying every day	0.144‡	0.029			0.123‡	0.029
Poor health	-0.249‡	0.021			-0.247‡	0.021
Help neighbours	0.108‡	0.028			0.123‡	0.028
Living separately from spouse	-0.237‡	0.050			-0.234‡	0.050
No child	-0.271‡	0.053			-0.271‡	0.053
Household size	0.011‡	0.006			0.011‡	0.006
Log household expenditure	0.225‡	0.019			0.222‡	0.019
Remote areas	-0.036	0.263			-0.037	0.253
Migration	-0.038	0.031			-0.035	0.031
κ_1	6.457‡	.806	1.739‡	1.035	6.897‡	1.242
κ_2	7.898‡	.806	3.142‡	1.034	8.370‡	1.242
κ_3	11.030‡	.808	6.120‡	1.035	11.538‡	1.244
Variances :						
Individual			0.028‡	0.004	0.033‡	0.000
Local government			0.005‡	0.000	0.006‡	0.000
ICC			15%		16%	
Log likelihood	-9053.41		-12859.772		-9010.140	
Significance: ‡:5% ‡ ≤ 1%						

To examine the degree of variance in self-rated happiness at individual and local government levels, before regressing self-rated happiness on any predictors I computed an empty model (which includes only variance components; not reported in the tables). This revealed that the individual variance in self-reported happiness to be explained is 0.049, and the unexplained local government variance amounts to 0.007. Thus the intra-class correlation (ICC) is $0.007/(0.007+0.049) = 0.125$, which means that 12.5% of the variation is located in local government. This indicates that substantial variation occurs between local government units, which when ignored in the models which omit the nested structure can lead to inefficient and biased estimates.

Model A presents regression results before individual control determinants are included. Fiscal decentralisation is positively associated with happiness, as indicated by the significant association of local government spending with public services and central government balancing funds with happiness (0.320, $p < 1\%$ and 0.008, $p < 1\%$ respectively). In contrast, political decentralisation is not. The association between local direct elections and happiness appears not to be significant (0.039, $p > 5\%$).

Inefficiency in local government budgeting (as indicated by the high proportion of civil service salary compared to total development budget) is negatively related to happiness (-0.167, $p < 1\%$). The higher capacity of local bureaucracy (as indicated by the education level attained by village/neighbourhood heads) increases citizen happiness, but the association is not significant (0.156, $p > 5\%$). Local corruption is detrimental to happiness: those living in local governments with a higher tendency to nepotism and ‘money politics’ during mayoral election are likely to be less happy (-0.287, $p < 1\%$). Living within regions of conflict and violence make citizens less happy than living in those which are more peaceful and safe (-0.101, $p < 5\%$). The ineffectiveness of new mayoral leadership in enhancing happiness is shown by the insignificant effect of this determinant (-0.085, $p > 10\%$).

Model B presents regression results when both individual and local government controls are included, showing the magnitude association of local government spending on public services and central government balancing funds with happiness increases and remains significant (0.384, $p < 1\%$ and 0.014, $p < 1\%$ respectively). The association between direct election and happiness also appears not significant (0.015, $p > 5\%$). Local corruption, budget allocation inefficiency, and local conflict and violence remain detrimental to happiness.

Model C presented in table 3.4 shows regression results for cross level interactions. Higher local government spending on public services is significant for the happiness of the unemployed: as local governments increase their budget for public services, the happiness of unemployed people is likely to increase (0.427, $p < 5\%$). Likewise, individuals in poor health under local governments that spend more on public services are likely to be happier than those living under those that spend less. However, this is not significant (0.017, $p > 5\%$). The association of other local government determinants remains unchanged. Both measures of fiscal decentralisation remain significant for happiness. Direct local election also remains not significant for happiness (0.015, $p > 5\%$).

Table 3.4: Results of multilevel regression for cross level interactions

	Model C	
	coef.	se
<i>Local government</i>		
Log total public services spending	0.369‡	0.096
Shared of balancing fund on total revenue	0.014‡	0.003
Proportion of civil service salary on total development expenditure	-0.101†	0.016
Direct election	0.015	0.730
Shared of population vote majors because large campaign fund and same ethnicity	-0.201†	0.020
Conflict and violence incidence	-0.125†	0.052
Mayor comes from new political party	-0.033	0.055
Proportion of village head with graduate education or above	0.162	0.129
Proportion of active social groups	0.245†	0.131
Log gross domestic product	-0.082†	0.041
Geographic areas (in 1,000 km ²)	0.002	0.083
<i>Individual</i>		
Age	-0.006‡	0.001
Age ²	-0.000	0.012
Female	0.058‡	0.023
Years schooling	0.031‡	0.003
Unemployed	-0.366‡	0.094
Divorced	-0.685‡	0.067
Widowed	-0.240‡	0.050
Praying every day	0.123‡	0.029
Poor health	-0.250‡	0.022
Help neighbours	0.123‡	0.028
Living separately from spouse	-0.235‡	0.050
No child	-0.271‡	0.053
Household size	0.011‡	0.006
Log household expenditure	0.222‡	0.019
Remote areas	-0.039	0.253
Migration	-0.034	0.031
<i>Cross level interaction</i>		
Spending for public services x poor health	0.017	0.053
Spending for public services x unemployed	0.427†	0.191
κ_1	6.646‡	1.340
κ_2	8.120‡	1.340
κ_3	11.289‡	1.342
Constant	0.182‡	0.018
Variances :		
Individual	0.033‡	0.000
Local government	0.006‡	0.000
ICC	16%	
Log likelihood	-9007.539	
Significance: †:5% ‡ ≤ 1%		

In all models, local government GDP is negatively associated with happiness. Those living under richer local governments are less happy than those living under those that are less rich. However, community social capital is positively associated with happiness. I find that a higher number of active social groups within local government areas increases citizen happiness. Geographical area seems not matter for the happiness of local citizens.

The bottom part of the panel shows individual coefficients. Happiness is likely to decrease with age, and all models show that women tend to be happier than men. Family and social ties are shown to be important determinants for happiness. All models show these to have a positive and significant association. Being divorced and widowed are associated with being less happy (as opposed to being married and being single). Likewise, being separated and childlessness are likely to decrease happiness.

More education and more household expenditure mean being happier. The significance of both determinants is shown in all models. As might be expected, being unemployed has a depressing effect. Not surprisingly, poor health harms happiness. Religiosity (indicated by daily prayer) and social ties (indicated by willingness to help ones neighbours) are likely to increase happiness. Living in remote islands and migrating at a young age are likely to decrease happiness, but the associations found are not significant.

The variances at local government level are significant in all specifications. Their estimation goes some way to ensuring that remaining estimates (from local government spending on public services to cross level interaction between high spending and unemployed status) are robust against unobserved local government heterogeneities. Those single level studies which ignore unobserved heterogeneities at either local government or higher geographical levels may not be as robust. This is worth bearing in mind when comparing these results with those in current literature.

3.6 Discussion

The question of which conditions contribute to individual happiness has long been of interest to social scientists in developed countries. However, this question is rarely explored in the context of developing countries. Using the case of political and fiscal decentralisation reform in Indonesia, this study extends the literature on the relation between decentralisation and subjective well-being in developed countries by asking to what extent such reform in Indonesia is associated with citizen happiness. Political decentralisation measures the discretionary power in political decision-making awarded to local government, while fiscal decentralisation refers to local government's fiscal self-reliance and spending power (Schneider, 2003; Rodriguez-Pose and Maslauskaitė, 2012).

This study improves a number of methodological points in the literature. First, prior studies examining the association between decentralisation and subjective well-being are mostly based on cross-country data (see for example, Bjørnskov et al. (2008); Hessami (2010); Diaz-Serrano and Rodriguez-Pose (2012); Rodriguez-Pose and Maslauskaitė (2012)). In this study, local government is the unit of analysis. This has advantages, since such contexts are considerably more similar within the boundaries of a single country than they are across countries. The relation between decentralisation and happiness may thus be more salient when we use local government as a unit of analysis rather than countries or provinces. Second, while existing analyses use ordinary linear regression with individual or aggregate data, this study uses multilevel analyses to address the nested structure of decentralisation reforms and happiness (see for example, Frey and Stutzer (2000); Bjørnskov et al. (2008); Hessami (2010); Diaz-Serrano and Rodriguez-Pose (2012); Rodriguez-Pose and Maslauskaitė (2012)). Multilevel analyses are able to control unobserved heterogeneities between local governments that potentially affect the association between decentralisation and happiness.

The main results show that fiscal decentralisation is significantly associated with

happiness, while political decentralisation is not. In all specifications, the share of central government balancing funds and local government spending allotted to public services have significant association with happiness. In contrast, null findings are found on the association of direct local election on happiness.

The contrast association of political and fiscal decentralisation on happiness may signal that decentralisation in Indonesia increases citizen happiness through the better capacity of local government to deliver public services, rather than through better opportunities for direct political participation. The determinants reflecting local government capacity in delivering public goods and services support this finding. Capacity of local bureaucrats as indicated from education of village/neighbourhood heads has a positive association with happiness. Cross-level interaction of high local spending for public services on unemployed status and poor health also show positive association with happiness. In contrast, local government corruption and budget allocation inefficiency are detrimental to happiness.

Both the positive relation of fiscal decentralisation and the negative relation of local corruption to happiness confirm the findings of Bjornskov et al. (2008) and Rodriguez-Pose and Maslauskaitė (2012). However, these studies found a significant association between fiscal decentralisation and happiness at cross-country level. This study establishes the same association in cross-local government within a developing country. Hence, the findings show that fiscal decentralisation and corruption matter for citizen happiness not only between countries but also within a country.

Moreover, the null result of the relation between direct local elections and happiness contradicts Frey and Stutzer (2000), whose findings show the positive effect of direct election on happiness in well-established democratic countries. Different results may however merely signal the extent to which the conditions of direct democracy vary between a newly-decentralised and a well-established democratic country. Decentral-

isation in Indonesia has been accompanied by an increasing amount of local conflict and instances of violence, which have not only rendered local democracy less effective (Van-Klinken, 2007), but also are detrimental to happiness. Under these conditions, the widening participation of political parties and local direct elections may not guarantee an effective local leadership which can provide better local policies and services to improve citizen well-being. The impact of the ineffectiveness of new local leadership on citizen happiness is shown in this study.

3.6.1 Local government economic growth, community social capital and happiness

The negative association between local government GDP and happiness is in contrast with a number of cross-country analysis findings (Di Tella et al., 2003; Clark and Senik, 2011), and needs further investigation. For example, recent studies on Indonesian economic development indicate that despite the high economic growth in Indonesia from 2005 to 2011, economic inequality deepened. Asian Development Bank (2012) and Euromonitor (2012) report that Indonesia saw the highest increases in income inequality levels worldwide, from a Gini coefficient of 0.33 in 2005 to 0.47 in 2011. Local governments with the highest GDP (e.g. *Kutai Kartanegara*) are also reported as having the highest economic inequality (World Bank, 2012a). Future research may need to examine the link between local GDP, economic inequality, and well-being. Available data on local government economic inequality may thus yield a better understanding of the negative relationship between local GDP and citizen happiness.

The positive link between community social capital and happiness shows that the benefits of this capital do not only belong to developed countries but also to developing countries. Putnam (1993) explains that community social capital channels well-being through social support and networks. Given the prominent role of this type of social

groups within village/neighbourhood programme in this study, this finding may indicate that these social groups also facilitate their members to participate and to access benefits provided by the programme. In fact, the benefit of such social groups to various development outcomes ((e.g. poverty reduction, child health, mental and physical health) in Indonesia has been widely documented in previous studies (see, among others, Bowen (1986), Grootaert (1999), Shiffman (2002), World Bank (2003), Miller et al. (2006)). The finding shows that the benefit of community social capital not only pertains to such development outcomes but also to subjective well-being.

3.6.2 Individual determinants of happiness

Individual socio-demographic determinants show an expected association with happiness. The benefits of being married and the detrimental effect of being widowed or divorced on well-being have been well-established by previous studies (Lane, 2000; Diener and Biswar-Diener, 2008; Graham, 2009). Social ties formed with neighbours, children and extended family increase happiness by lifting individuals out of loneliness and depression (Lane, 2000; Layard, 2005). Happiness studies show that strong and positive social relations provide ties of affection, support, and feelings of belonging and identity (Diener and Diener, 2008), and that individual happiness is increased not only by receiving these but also by giving them (Diener and Diener, 2004).

In contrast, lack of social relationships, such as living separately from ones spouse, has a depressing effect. Lane (2000) shows that having no relationship or being in bad relationship has a strong negative impact on happiness. Religiosity however increases happiness, as Lim and Putnam (2010) found in their study of impacts on life satisfaction in developed countries. Their explanation is that religion offers personal networks and social supports, resulting in a higher level of happiness. The fact that religiosity matters for happiness in Indonesia may indicate that the richness of religious activities across

this country matter for subjective well-being.

Confirming previous studies, higher household economic status has a positive association on happiness. As some, notably Blanchflower and Oswald (2003), have insisted, money buys happiness though more money buys less of it. Education contributes to happiness. This is particularly evident when most people within a developing country such as Indonesia enjoy little or none of it. Unemployment and poor health are detrimental to happiness. Clarks and Oswald (1994) explain that being unemployed has severe and long-lasting negative impacts on well-being, which cannot be interpreted only in terms of loss of income: there are significant non-pecuniary effects as well. Frey and Stutzer (2002) suggest a mechanism which explains the detrimental effect of poor health on subjective well-being: people with neurotic symptoms seem to have more symptoms of bad health and a lower level of happiness than those without the symptoms.

This study leaves a number of limitations which need to be addressed. Firstly, because of its cross-sectional design we have to be cautious about the possible causality of associations. The estimated coefficient should be viewed as a measure of association, rather than of causation. Almost every variable in our model could be considered endogenous, as happiness affects almost all aspects of social, political, and economic life, for both individuals and institutions (Graham 2009; Frey 2010). Moreover, I am also unable to control for all unobservable features of individuals as well as local governments that might simultaneously affect citizen happiness. This is something which future research, using available panel data on subjective wellbeing, future research should establish. The causal effect of decentralisation and happiness is something which future research, using available panel data on subjective well-being and the most appropriate method, should seek to establish. Secondly, due to the lack of availability of district corruption data, this study uses respondents' answers as proxy of corruption rather

than examining specific corruption data from a separate source. We tried to minimise measurement error by excluding respondents from calculations when constructing the aggregate for the proxy data. Nevertheless, additional data collection and analysis are needed to ensure a more reliable measure of district corruption. Kaufmann et al. (2006) for example propose objective measures of corruption, such as the audit of district budgets; this could reveal information about administrative malfeasance at district level. Thirdly, self-rated happiness (which this study uses) is only one measure of subjective wellbeing; Diener (1999) identifies a number of others - level of life satisfaction, positive affect (i.e. satisfaction with past and current life) and negative affect (i.e. anxiety and depression) - and future study may also examine the effect of decentralisation on these. In addition, single item self-report scales used in this study may also limit the interpretation of results and the reliability of the measures used. Stock et al. (1982), for example, explain that single-item scales tend to be less reliable over time than multi-item scales (although we note that the temporal reliability of single-item measures has been moderately high).

3.7 Conclusion

This chapter shows that analysing happiness within local government contexts provides a more comprehensive picture than merely examining the concept of happiness based on single level analyses. It highlights theoretical explanations linking happiness beyond the mechanism at individual level, by considering the social and political contexts of decentralisation reform within a developing country. The main findings show that fiscal decentralisation in Indonesia is significantly associated with happiness, while political decentralisation is not. Happiness decreases in the face of local corruption and weak capacity of local government. The results are revealed after controlling the model

with a wide range of individual and local government determinants of happiness. This study suggests that decentralisation increases happiness through the better capacity of local governments to deliver policies and services, rather than because of the improved opportunities of citizens to get involved in direct political participation.

Chapter 4

Decentralisation, social capital and child health in Indonesia: Instrumental variables estimation method

Summary: Social capital has been hypothesised as being associated with effective decentralisation and health outcomes, yet few studies have explored the link between decentralisation, mother's social capital and child health. This study examines the relation between mothers' access to social capital (via participation in community activities) and child health in decentralised Indonesia. Instrumental variables method is used to deal with reverse causality; data come from the Indonesian Family Life Surveys (IFLS) of 2007, and I find evidence of an association between a mother's social capital and her children's health. Findings from the instrumental variables method provide strong evidence for the causal flow running from a mother's social capital to her children's health. All instruments are highly correlated with mothers' social capital but uncorrelated with child health. The findings are also robust to individual and community determinants associated with child health, and suggest that support for enlarging mothers' social capital through various community activities is a particularly relevant intervention for reducing child health disparities in Indonesia¹.

¹A slightly different version of this chapter is published at Social Science & Medicine, Sujarwoto, S. & Tampubolon, G., Mother's social capital and child health in Indonesia, *Social Science Medicine* (2013), doi: 10.1016/j.socscimed.2013.04.032.

4.1 Introduction

The relationship between decentralisation, social capital and local government performance has been of interest to policymakers and social researchers for several decades. Social capital in the form of community social capital has been argued as channel for effective decentralisation and local government performance. The most well-known study examining this relationship was conducted by Putnam in Italy in 1993. Putnam posits that the degree to which devolution of authority leads to better local government is dependent on existing social groups and the extent to which these groups are able to monitor officials and hold them accountable (Putnam, 1993). The impact of community social capital on a broad array of democratic reforms and public services is supported in subsequent empirical research (Booth and Richard, 1998; Woolcock, 1998; Heller, 2001; Bowles and Gintis, 2002). These studies suggest that community social capital can enhance better local governance. Social groups can also provide models of how improvements can be made, participate in decision-making and implementation activities, and take an active role in monitoring the performance of elected and administrative officials.

In this chapter, I specifically focused on the relationship between social capital and health outcomes in decentralised Indonesia. A hallmark of socioeconomic development in Indonesia has been the involvement of social capital that draws on the time and energy of local organisation and community volunteers. In many instances, such social capital began as a grassroots initiative and was subsequently adopted by government in the form of a regional or national programme. In fact, Indonesia is often cited by donor organisations as a success story because of the development of such community programmes (World Bank, 2003). The goals of the various community programmes differ, but include improving healthcare, education, sanitation, security, and village upkeep. Such community programmes have played a significant role during decentralisation, as

many have been adopted by local government as a part of community development and the promotion of well-being (Beard, 2005; 2007).

This chapter address two gaps in the literature on decentralisation, social capital and health. First, most focuses on adult health in developed countries (for reviews, see Kawachi et al. (1997); Subramanian et al. (2002); Macinko and Starfield (2001); Almedom (2005)). However, given that the effect of social capital is hypothesised to vary by sub-groups and contexts (Cutrona and Russell, 2000; Grootaert and Bastelaar, 2002; Locher et al., 2005; De Silva and Harpham, 2007), it is important to study the effect of social capital on child health in developing countries. This study provides this focus, and is thus a contrast with the far more extensive work on social capital and adult health that draws on data from developed countries, mainly the United States and Western Europe. Indonesia is particularly suitable for this study, not only because of the government concern to improve child health status, but also because many regions of the country boast a long-standing indigenous tradition of community involvement (or social capital) (Grootaert, 1999; Beard, 2005, 2007; Miller et al., 2006). Relatively little research however has examined the implications of this tradition for social capital and child health.

Second, several empirical studies examining the relationship between mothers' social capital and child health do not take into account the reverse causality issue which compromises the relationship (see for example Macinko and Starfield (2001); Tuan et al. (2006); De Silva and Harpham (2007); Surkan et al. (2007). The characteristics that promote mothers' social capital are likely to be influenced by their children's health. For example, a sick child may prevent the mother from participating in community activities, hence a reduction in social capital (Tuan et al., 2006). Failure to take this into account will lead to bias estimate of the relationship between mother's social capital and child health. This chapter uses an instrumental variables method to rule out the reverse

causality thus implied. Previous studies demonstrate that, with suitable instruments, this estimator performed better compared with ordinary least squares and propensity score matching techniques (Heckman, 1997; Stukel et al., 2007; Lindenauer et al., 2010).

This chapter aims to answer the following questions: what determinants are associated with the mother's social capital in decentralised Indonesia? Does the mother's social capital affect decentralisation outcomes in the form of children's health? How is child health affected by the social capital of her mother, after controlling for individual and community determinants related to her child's health? and what are the implications of social capital for improving decentralisation outcomes in Indonesia?

4.2 Social capital and health outcomes

Social capital is a crystallisation of the ideas that have been around since researchers began to systematically examine the relationship between society and individual health. Literature on social capital often presents this concept as the property of individuals and communities. Portes (1998), for instance, believes that social capital is the property of individuals. He defines social capital as “the capacity of individuals to command scarce resources by virtue of their membership in networks or broader social structures” (p.12). In contrast, Putnam (1995) conceives of social capital as a community-level resource and a distinctly social feature that is reflected in the structure of social relationships. He defines social capital as: “features of social organisation such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit” (p. 67). For the purpose of this study, I conceive social capital as a community-level resource accessed by individuals, specifically mothers. Child health is affected by mothers' access to networks via their participation in community activities. In these networks, information about health (among) others circulates. Mothers' access to networks may

differentially depend on the extent to which they participate in community activities and the availability of such networks.

The theoretical link between social capital and health is supported by studies in the field of social epidemiology, which conclude that social connections are of key importance to health (Seeman, 1996; Lindau et al., 2003; Kunitz, 2004; Helliwell, 2003; Subramanian et al., 2002; Kawachi et al., 1997; Kennedy et al., 1998; Yip et al., 2007). This body of research documents the association between the presence of individual networks and mortality (Seeman, 1996), the ability to rebound after illness (Lindau et al., 2003), and mental health status (Kunitz, 2004). With the growing recognition of the importance of the social environment for health, researchers began to examine the effect of community social capital on health outcomes. They find that higher community social capital is associated with higher levels of general health and well-being (Helliwell, 2003; Subramanian et al., 2002), lower cardiovascular and cancer mortality (Kawachi et al., 1997), lower suicide rates (Helliwell, 2003), and lower violent crime rates (Kennedy et al., 1998). With a few notable exceptions (Yip et al., 2007), the vast majority of this work is set in developed countries.

Berkman and Kawachi (2000) describe the mechanisms by which community social capital affect health. First, social capital provides channels for the distribution of knowledge and information related to health. Health promotion can be distributed more rapidly through social networks, channels which again are found to be especially important in developing countries. Second, social capital can serve as a mechanism for maintaining healthy behaviour norms (e.g. regular physical exercise) and exerting social control over detrimental health behaviour (e.g. smoking and drinking). Third, social capital allows for the promotion of access to services and amenities, as more cohesive neighbourhoods are better equipped to mobilise collective action to champion the development of and access to health-related services. Fourth, social capital serves

as a conduit for psycho-social processes, including the development of social support and mutual respect. Such norms can translate into easier child-rearing, improved self-government, and the maintenance of a healthy social environment. In addition, the Marmot review (2010) notes that social capital also enables communities to be responsive to the national and local initiatives, including those instigated by government or health organisations.

More specifically, the mechanisms linking mothers' social capital and their children's health are channelled via improvements in mothers' knowledge, that in turn affects their parenting behaviour (De Silva and Harpham, 2007; Anderson and Damio, 2004; Martin and Rogers, 2004). De Silva and Harpham (2007) suggest that social networks, through their participation in them, enable mothers to know more due to knowledge transfer (e.g. where to obtain additional cheap sources of food), to think differently due to attitude influences (e.g. attitudes towards hygiene practices), and to do things differently (e.g. breastfeed for longer). These mechanisms are illustrated by research from the United States, which shows that women with more social capital have increased odds of breastfeeding their child for longer (Anderson and Damio, 2004). Other research shows that both household and community-level social capital is associated with reduced odds of household hunger (Martin and Rogers, 2004). In a setting such as Indonesia, where most adult females have only attained a primary level of education, social networks may provide mothers with information they have not obtained through schooling (Wibisana et al., 1999). This information ranges from the benefits of oral rehydration therapy to the location of preventive care providers.

Several empirical studies find evidence of the links between social capital and child health. Using data from the Project on Human Development in Chicago Neighborhoods, Morenoff (2003) finds that reciprocated exchange among community members and voluntary participation in local groups are positively associated with birth weight

of children. Carter and Maluccio (2003) uses height-for-age data to measure the degree to which families cope in South Africa, and finds that the presence of community ties significantly boosts a household's ability to manage economic shock to the extent that adequate nutrition can still be provided to children. Surkan et al. (2007) examines the correlates of children's growth in Brazil, and finds that children of mothers who have more friends and family, who engage in leisure activities with others, and who have more affectionate support, have higher weight-for-height scores than do children of mothers who have fewer social ties and less support. Using the Young Lives study data from Peru, Ethiopia, Vietnam and Andhra Pradesh, De Silva and Harpham (2007) shows that individuals and cognitive social capital (e.g. trust, social harmony) are positively associated with child nutritional status. In Indonesia, Nobles and Frankenberg (2009) finds that children from families with relatively low levels of human and financial capital fare better with respect to health status when their mothers are more active participants in community programmes. Nobles and Frankenberg use the Indonesian Family Life Survey (IFLS) waves 2 and 3 and measures mothers' social capital by the number of community programmes in which they participate.

Much of the previous research has produced interesting and informative results, but in only a few cases can one conclude that mothers' social capital causes better children's health. This is because the studies do not take into account the reverse causality, which may explain the relationship between the two. Tuan et al. (2006) explore the association between mothers' social capital and children's physical and mental health in Vietnam. Although this finds a positive association between the two, it also recognises that sick children may cause mothers to report lower levels of social capital. Using cross-country data, De Silva and Harpham (2007) find mixed results on the relation between mothers' social capital and child nutritional status in Peru, Ethiopia, Vietnam and India (Andhra Pradesh). They admit that the results can suffer from an endogeneity problem, since

the analyses are unable to address reverse causality between mothers' social capital and child nutritional status. Surkan et al. (2007) study the link between mothers' social support and depression to child physical growth outcomes in Teresina, Northeast Brazil. While they account for random effect, they do not address reverse causality, which plausibly exists between the two. Using IFLS waves 2 and 3, Nobles and Frankenberg (2009) examine the causal relationship between mothers' social capital and child health by exploiting the temporal ordering of longitudinal data. The causal factor precedes the effect by three years. However, this method may risk contamination, since it fails to capture factors affecting child health during those three years. For instance, other detrimental or beneficial factors, (such as natural hazards during the elapsed period) may have cancelled the positive or negative effect of mothers' social capital.

This study uses an instrumental variables method to establish the direction of causal effect between a mother's social capital and her child's health. Instrumental variable estimation is increasingly gaining ground, even among biomedical researchers who study, among others, chronic obstructive pulmonary disease (Lindenauer et al., 2010), prostate cancer (Lu Yao et al., 2008), and acute myocardial infarction (McClellan et al., 1994; Stukel et al., 2007). Pitted against the gold standard of randomised clinical trials, instrumental variable estimation performs creditably. For instance, Stukel et al. (2007) report that it showed an effect of 16% reduction in mortality, whereas randomised clinical trials showed a reduction of between 8% and 21%. Ordinary least squares and propensity score matching techniques performed less well in comparison. Previous studies show that this method performs well in ruling out reverse causality, from social capital to various determinants such as welfare (Narayan and Pritchett, 1999), poverty and welfare (Grootaert, 1999), employment (Bayer et al., 2005), violent crime (Lederman et al., 2002), and health (d'Hombres et al., 2010; Folland, 2007; Tampubolon, 2009). Because this approach in part reflects the aspects of the Indonesian setting, we

turn to a discussion of contexts and then describe the data and methods employed.

4.3 Community development and health in Indonesia

Indonesia's economic growth has been robust since the financial crisis of 1998, and appears well positioned with an average of 4 to 6% since 2002 (World Bank, 2008c). Mother and child health status in the country also improved after the crisis; the mother mortality ratio decreased sharply from 340 per 100,000 live births in 2000 to 220 per 10,000 live births in 2010. Malnutrition, measured using both height for age and weight for age, also decreases during this period (from 42.4% and 24.8% in 2000 to 35.6% and 17.5% in 2010 respectively). Female and male life expectancy at birth increased from 67.29 years and 64.08 years in 2000 to 70.58 years and 67.28 years in 2010 respectively (World Development Indicators, 2012b).

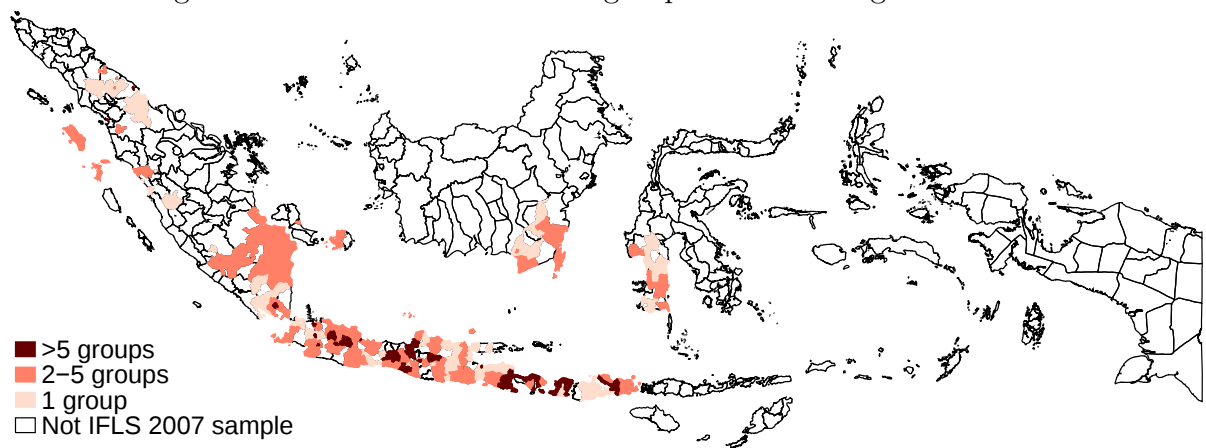
The tradition of community involvement of women and men plays an important role in the history of socio-economic development in Indonesia. Many regions of Indonesia have been known for their indigenous tradition of community involvement (or social capital) (Geertz, 1962; Bowen, 1986; Putnam, 1993; Grootaert, 1999; Beard, 2005, 2007). This tradition is often recognised with a set of key Indonesian terms: *gotong royong* (Koentjaraningrat, 1961; Bowen, 1986), *arisan* or *binda* (Geertz, 1962), *koperasi* (Bowen, 1986), *rukun* and *musyawarah* (Bowen, 1986), and *kerja bakti* (Beard, 2005)². In many instances, this tradition of community involvement leads to the formation of grassroots organisations, which government subsequently adopts as part of its regional

²In Indonesia the generalised reciprocity aspect of social capital is best illustrated by the sociocultural ethic of *gotong royong* (Bowen, 1986; Koentjaraningrat, 1961) (meaning generalised reciprocity) both in rural and urban areas; this remains a strong social norm in Indonesia as well as a powerful determinant of social capital

and national programmes. These programmes have often been cited by donor organisations as an example of community development success stories (Shiffman, 2002). Their goals differ, but include improving healthcare, education, sanitation, security and village upkeep (Wibisana et al., 1999).

Programmes that involve active participation on the part of community members are found across the country. Figure 4.1 shows the distribution of such programmes, which varies across local governments. Most local governments in Central Java and Bali (from where the *gotong royong* tradition originates) have a denser number than other regions in Indonesia, in particular Kalimantan and Sulawesi.

Figure 4.1: Distribution of social groups across local governments



Source: author calculated based on IFLS 2007 data

At least one type of volunteer programme was existed in each of the 309 communities included in the 2007 Indonesia Family Life Survey. In this study, I focus on the involvement of mothers in five specific programmes: community meetings, village cooperatives, voluntary labour, village upkeep, and women’s associations³.

³Community meetings are regular meetings that often attended by members of a kinship organisation or *rukun warga* and village leaders to discuss village or neighbourhood collective activities such as community labour. Voluntary labour or *kerja bakti*, often referred to as *gotong royong* in the broad sense, are typical activities which fall into this category, i.e., economic activities for public purposes. Village members work together carrying out minor public works in the community under the control of the village authorities. Activities are designed by political leaders “to be consistent with tradi-

Table 4.1 draws on the data and presents descriptive statistics of mothers volunteering in these programmes. Forty-three percent of mothers report getting involved in at least one programme in the year prior to interview. In addition, among those who participated, about one-third was involved in more than one programme. With respect to the type of activity in which the women were involved, participation is highest for voluntary labour, community meetings and the women's association.

Table 4.1: Distribution of mothers' social capital

Type of community programme	percentage participating
Mother participation in any program	43%
Mother participation at least in one program	27%
Women association	10%
Community meeting	11%
Cooperatives	3%
Voluntary labor	12%
Village upkeep	8%
Source: IFLS 2007	

None of these five programmes are specifically geared towards improving children's health, a feature which is essential to the interpretation of the results. If the programmes in which mothers participate did target child health, a positive association between mothers' social capital and child health would be likely to reveal the effect of the programme and not necessarily the social capital of mothers generated by participating in that programme.

Several empirical studies show the positive effect of the tradition of community involvement and activities on development outcomes in Indonesia. Grootaert (1999) investigates the various Indonesian community activities in detail in three out of 27

tional norms and to appeal to villagers for cooperation on the grounds of traditional moral principles" for mutual help. There are many cooperatives, including village cooperatives, farmers' cooperatives, and saving/borrowing cooperatives. They engage in credit-related activities, and sometimes run local shops. The Village Women Association *Pendidikan Kesejahteraan Keluarga* was founded in 1967 by a group of women, guided by the idea that improving family welfare by providing village women with improved basic skills builds the foundation for a better society. As participation in this association grew, the association took on larger projects and is now found in nearly every Indonesian village (Prawiro, 1998).

Indonesian provinces. He demonstrates that social capital as measured by six aspects of local associations has a significant effect on household welfare. Households with higher social capital have higher household expenditure per capita, more assets and better access to credit, and are more likely to have increased their savings in the past year. Using IFLS waves 1 and 2, Miller et al. (2006) explore the association of various types of community activities and adult health in Indonesia. They find that an increase in community activities is associated with a decrease in poor physical health, as measured by difficulties in performing instrumental tasks, fatigue, and bodily pains. Nobles and Frankenberg (2009) show that the extent of mothers' participation in voluntary community programmes is positively associated with children health (as indicated by height-for-age) but only for children whose mothers have low education attainment, and for children from poorer households.

4.4 Data, measures and method

4.4.1 The Indonesian Family Life Survey (IFLS) 2007

This study uses IFLS 2007 data, applying its cross-sectional structure rather than its panel structure. The time interval between IFLS 1993 and IFLS 2007 is almost ten years. During this long interval, most of the children who measured in 1993 have entered puberty in 2007 (age above ten years). Literature on child growth and organ development shows a marked difference in growth curves of child height and weight before and during puberty (Buckler, 1997). During puberty, factors which affect child height and weight are more complex. These factors are not only nutritional status, but also other factors, especially sex characteristics (Rogol et al., 2000). Since this study is aimed at examining child nutritional status, using panel regression ignoring this long period is inappropriate. Parameter constancy during childhood and during puberty is

likely to be violated; such an assumption is necessary for estimation (Hendry, 1995).

IFLS 2007 consists of two main sources information: household information books and community facilities information books (Frankenberg and Karoly, 1995; Frankenberg and Thomas, 2000). Information on mother and child health comes from the first books. In this study, we restricted the sample to children of whom there is complete information on height and weight, and mothers of whom there is complete information on social capital. This yields a sample of 4,612 children with 3,450 mothers living in 309 communities. Respondents who migrate to other regions are excluded from the analysis (about 9.2% of mothers move to other regions between 1993 and 2007). Community facilities information books consist of extensive information about community in which households are sampled. Information was collected from community leaders and from staff at schools and health facilities available to community residents. In total 309 communities representing 13 provinces were surveyed in the survey. Information about community social capital and instrumental variables are taken from this book (Frankenberg and Karoly, 1995; Frankenberg and Thomas, 2000).

4.4.2 Measures

Table 4.2 presents summary statistics for the key measures used in the analysis. A more detailed description of each of these measures follows.

Child height-for-age and weight-for-age

Child health is measured by child height and weight-for-age (Martorell and Habicht, 1986; Fogel, 1994; Foster, 1995). Child weight is widely thought to be a more responsive measure of child health to shock in the very short-run (Foster, 1995). Meanwhile, child height has been viewed as a very useful summary indicator of child health which reflects all health events since birth (Martorell and Habicht, 1986). Child height will

be strongly related to final adult height, which has been increasingly used as a useful summary indicator of health of a population (Fogel, 1994).

Table 4.2: Summary statistics of analytic sample

	Mean, median or %	sd	min	max
Mother's social capital	0.50	0.84	0	5
<i>Children characteristics:</i>				
Height-for-age z score (median)				
Boys	-1.60	1.32	-4.99	4.25
Girls	-1.70	1.39	-4.79	4.97
Weight-for-age z score (median)				
Boys	-1.47	1.36	-4.96	4.98
Girls	-1.41	1.33	-4.93	4.47
Age	5.9	2.5	2	10
A boy	52%	50%	0%	100%
Birth weight (kg)	3.18	0.32	1.00	5.50
<i>Mothers characteristics:</i>				
Height (in cm)	151	5	133	169
Age	33	7	17	60
Primary education or less	44%	50%	0%	100%
Poor health	3%	5%	0%	100%
Interact with her mothers often	45%	50%	0%	100%
<i>Household characteristics:</i>				
Household size	5	2	2	14
Household below median expenditure	49%	50%	0%	100%
<i>Community characteristics:</i>				
Number active groups in community	5	2	0	10
Village head with graduate education or above	41%	49%	0%	100%
Average community expenditure (IDR)	428,000	1,810,000	155,000	2,000,000
Total community population	11,419	16,444	260	206,000
Received underdeveloped programme	18%	38%	0%	100%
Urban areas	47%	50%	0%	100%
<i>Instrumental variables:</i>				
Program dissemination	74%	55%	0%	100%
Number of neighbourhood association	9	13	0	297
Number of save and borrow institution	1	1	0	6
Presence of kinship organisation	8%	28%	0%	100%
Ethnic similarity	87%	17%	0%	100%
N children	4,612			
N mothers	3,450			
N communities	309			

Source: IFLS 2007

The IFLS used data on height and weight measures for all household members collected by trained nurses⁴. Since height and weight vary systematically with age and gender,

⁴Height was taken by trained nurses, two per field team, using wood child/adult height boards made by Irwin Shorr. Standard field procedures were followed; recumbent length was measured for children under 24 months and standing height for all those older. Weight was measured using electronic mother/child scales, model 881, made by Seca. Height was measured to the nearest millimetre and weight to the nearest tenth of a kilogramme.

I standardise children height and weight relative to sex- and age-specific height and weight medians of children in the United States. This follows previous studies which used this standardised method to measure child nutrition status in Indonesia (see, for example, Strauss et al. (2004) and Nobles and Frankenberg (2009)⁵. For each child, a z score is computed that expresses the child's height-for-age and weight-for-age as the number of standard deviations above or below the median for a child of that sex and age in the United States. As most Indonesian children are shorter and less heavy than the American children, the median z score for Indonesian children is negative. The median z score for height is -1.70 for females and -1.60 for males, while the median z score for weight is -1.41 for females and -1.47 for males⁶.

Mothers' social capital

Mothers' social capital is measured through their links in five key community activities: community meetings, cooperatives, voluntary labour, village upkeep, and women's associations. These community activities are commonly found in both urban and rural communities in Indonesia; their goals vary, and include improving healthcare, education, sanitation, financial support and community upkeep. Higher mothers' social capital is related to more access to the resources that reside in network ties in those activities.

The IFLS asks respondents about their participation in these activities in the 12 months prior to the interview. Interviewers asked respondents: "During the last 12 months did you participate in or use these activities?" A list of activities is presented

⁵A z -score for height subtracts from a child's height, the median height in the reference population, for a child of the same gender and age in months. A population is also for a child of the same gender and age in months. A weight-for-age z -score is defined in an analogous manner, except that the standardisation is done using the reference population median and standard deviation of weight for children of a given gender and height. The WHO-CDC standards use a US reference population.

⁶I omit infants under three months because measurement error is usually higher for them; for example, it is difficult to completely straighten their leg.

to respondents. I create a continuous score that takes on a value between zero and five, which measures the number of activities in which mothers participate. Mothers' social capital is modest with about a half of mothers reporting that they participate at least in one programme in the last year.

Socio-economic and demographic characteristics

The study examines individual characteristics of the mothers surveyed, including education, age, kinship ties, height and general health. To measure their level of education a dummy determinant indicating 'mother completing primary education or less' is constructed; this accounted for about 44% of the sample. I also create an indicator of whether mothers report having frequent person-to-person contact with their own mothers: around a half say that they do.

Mothers' height and child birth weight are included as indicators for health endowment. A mother's height captures many aspects of her background, including health behaviours and genetic predisposition that may be related to child health (Kuh and Wadsworth, 1989). Child birth weight captures the health condition of the child during pregnancy, which has been shown to have a strong relationship with a child's physical development (Conley et al., 2003). The mean of the mothers' height and the children's birth weight is 151 cm and 3.2 kg respectively. I also include a control for whether mothers are in the lower end of the distribution of self-rated health, which in this sample means average or below average health. All respondents in the sample report on self-rated health, which predicts chronic disease in many settings, including Indonesia (Frankenberg and Jones, 2004). This information is elicited by the question: "In general, would you say that your health is very healthy, sufficiently healthy, less than healthy, and unhealthy?" (I combined the last two categories because less than one percent of respondents chose the unhealthy category). I find that 3% of mothers report

having poor health.

Household controls include household size and monthly expenditure. Household size is included to address the issue that women with more household members may have less time to participate in community programmes or otherwise acquire social capital. Household size is relatively large, with an average of five to six members per household. I prefer to use monthly per capita household expenditure rather than income to capture household financial resources: in developing countries such as Indonesia, it is not income but expenditure measured from consumption that more accurately captures levels of long-term economic resources. As Deaton and Zaidi (2002) write: “consumption will tell us a great deal more about annual or even longer period ?” living standards than will a similar observation on income”. Moreover, formal employment is less common in Indonesia, many households have multiple and continually changing sources of income, and home production is more widespread. In these contexts, it is generally income data is less accurate than consumption data (Deaton and Zaidi, 2002). Since the price levels of consumer goods and services in Indonesia vary across rural and urban regions (Strauss et al., 2004), the household expenditure figures were deflated with the consumer price index for urban and rural regions. Rural inflation is taken to be 5% higher than urban inflation ((Thomas and Frankenberg, 2007; Resosudarmo and Jotzo, 2009). This calculation produces real spending adjusted with urban and rural inflation. The Consumer Prices Index 2006 data are retrieved from the government central bureau of statistics. The household expenditures is logged to correct for a skewed distribution; the average real household expenditure in 2007 was IDR575,000.

Community covariates include the number of community activities, community per capita expenditure, community leadership, community receipt of underdeveloped village funds, community population and urban status. The number of community activities is included to address whether the density of community social capital within communities

affects child health. Berkman and Kawachi (2000) show the strong effect of community social capital on adult health. I examine whether this relationship also exists for child health in developing countries. Information about the number of community activities is taken from IFLS community books which are separated with questions for mothers' participation (Frankenberg and Karoly, 1995; Frankenberg and Thomas, 2000). This section provides information about various community activities, i.e. village cooperatives, youth groups, religious activities, family groups and neighbourhood security groups, which were conducted on a routine basis. The average number of available community activities was five in each community. To control for the effect of community wealth I include community per capita expenditure, the average being IDR428,000. "Village heads with graduate education and above" (that is, about a third of those surveyed) is included to examine the effect of village leadership capacity on child health. The level of community receipt of undeveloped village funds captures many aspects of village social, economic and political conditions in Indonesia including poverty and low institutional capacity (Akita and Szeto, 2000). The model also includes population and urban/rural status; the proportion of respondents living in rural and urban areas was relatively balanced.

Instruments for mothers' social capital

Instruments are elicited not from the mothers but from independent informants in community facilities information books (Frankenberg and Thomas, 2000). This enhances accuracy or at least reduces measurement error. The use of instrumental variables data from separated sources also alleviates concerns arising from the use of aggregate of individual and household determinants using same sources in the estimation (Deaton, 2001). Four instruments are used in the analysis. First, social and financial associations that facilitate social interaction feature prominently in the day-to-day activities of In-

Indonesians (Geertz, 1962; Grootaert, 1999; Beard, 2005). They include neighbourhood associations, self-help groups, and saving and borrowing institutions. In Indonesia, they are more than mere economic institutions. These institutions also function to strengthen the solidarity of the community (Grootaert, 1999; Beard, 2005). Likewise, neighbourhood associations and self-help groups (*rukun warga*) facilitate people within the neighbourhood to carry out such cooperation and joint activities. The function of *rukun warga* in the daily life of Indonesians is important as the present media for meeting together and for strengthening solidarity among neighbourhood members, including mothers (Koentjaraningrat, 1961). Thus we expect that mother's social capital is likely to increase in communities which have more of these kinds of financial and social institutions. The presence of these associations, however, is not affected directly by child health, nor do they affect child health directly except through mother's social capital.

Second, we turn to dissemination of information about community activities. Lack of access to information is well-documented as an important factor causing low participation of women and men in community programmes across developing countries (World Bank, 2004). This is important, particularly in rural Indonesia, since women in those areas often lack access to information about community programmes. Hence whether local community volunteers inform mothers about the programmes is likely to motivate them to attend and to engage within such activities. For example, mother participation in community women association (*perkumpulan wanita*) is higher when local community volunteers regularly disseminate information about the programmes (Wibisana et al., 1999). Likewise, mothers are likely to engage within cooperatives when they are informed the benefits of such activities for improving their family well-being (i.e. provide cheap financial credit). There is also no reason to assume that dissemination of information about community programmes will directly affect children's health,

except through mothers participating.

Third, ethnic similarity and presence of kinship groups are assumed directly correlated with mothers' social capital. Indonesia consists of various ethnic groups with different languages and customs (Koentjaraningrat, 1961). Individuals within the same ethnic groups may be more likely to interact in social settings, due to similarities of language or custom. These relationships can create bonding social capital which reinforces reciprocity and strengthens solidarity (Putnam, 1995). At the same time, the possibility for mothers to join and be active in community programmes may increase due to higher ethnic similarity and the presence of kinship groups: mothers living in communities that have both are likely to participate more or have more social capital. We have no reason to assume that ethnic similarity and the presence of kinship groups have a direct effect on child health except through mothers' participation.

4.4.3 Instrumental variables estimation method

In this study, reverse causality is a potential threat to inference: children's poor health status may cause mother's social capital to be relatively low, rather than the reverse. This is ruled out by instrumental variables estimation, which uses the correlation between mothers' social capital and the instruments to estimate the effect of exogenous shift in mothers' social capital on child health. The instruments must be highly correlated with mothers' social capital but not with child health. This eliminates the difficulty created by the potentially simultaneous determination of the two. With suitable instruments, the effect of social interaction facilitating mothers' social capital on child health can be estimated. The following estimation strategy is based on the Heckman sample selection model that used to address endogeneity problems from mothers' social capital and child health.

First, I estimate the probability that mother participates in community programmes

by the probit model. In the first stage, the dependent variable is whether a mother participates $M_i = 1$ in community programmes. This is estimated by the equation:

$$\begin{aligned} Pr\{M_i = 1|X_i\} &= \phi(h(X_i)) \\ &= \phi(h(Ins_i, Ch_i, Mh_i, Cm_i)) \\ &= X_i\beta + v_i \end{aligned} \tag{4.1}$$

Where Ins_i is instruments, Ch_i is children characteristics, Mh_i is mothers characteristics and Cm_i is community characteristics where mothers and their children live. After controlling the first stage regression, I estimate z score for height and weight for age in the second stage:

$$Z_i = h_i(Ch_i, Mh_i, Cm_i) \tag{4.2}$$

Here Ch_i is children's characteristics, Mh_i is mothers' characteristics (including mothers' social capital) and Cm_i is community characteristics where mothers and their children live. We assume that Z_i in equation (4.2) is observed only if $M_i=1$ in equation (4.1), where:

$$M_i = 1 \text{ if } M_i^* > 0$$

and

$$M_i^* = y_i\gamma + \epsilon_i \tag{4.3}$$

M^* is the unobserved latent variable $\epsilon_i \sim N(0,1)$. In the first step, I estimate the probit model for the selection rule (4.3) to produce the maximum likelihood estimates

of γ . For each observation in the selected sample, the inverse Mills ratio is computed:

$$\hat{\lambda}_i = \varphi(y_i \hat{\gamma}) / \phi(y_i \hat{\gamma})$$

In the second step, I simply estimate the regression equation:

$$E_i[Z_i | M_i = 1] = X_i \beta' + \beta_\lambda \hat{\lambda}_i + v_i \quad (4.4)$$

Instrumental variable estimation mitigates bias which arises if unobserved mother's characteristics affect both her social capital and her child health. For instance, some evidence suggests that people who participate in voluntary community programmes are advantaged with respect to otherwise unobserved socio-economic status (Schady, 2001; Thoits and Hewitt, 2001). If we fail to control for these factors and they are also positively related to child health, as is almost certainly the case, regression results will bias the contribution of social capital. To address this issue, I identify determinants related to mothers' social capital and control for these in the first stage regression. A number of individual, household and community predictors, including the instruments associated with mothers' social capital, are included in the regression.

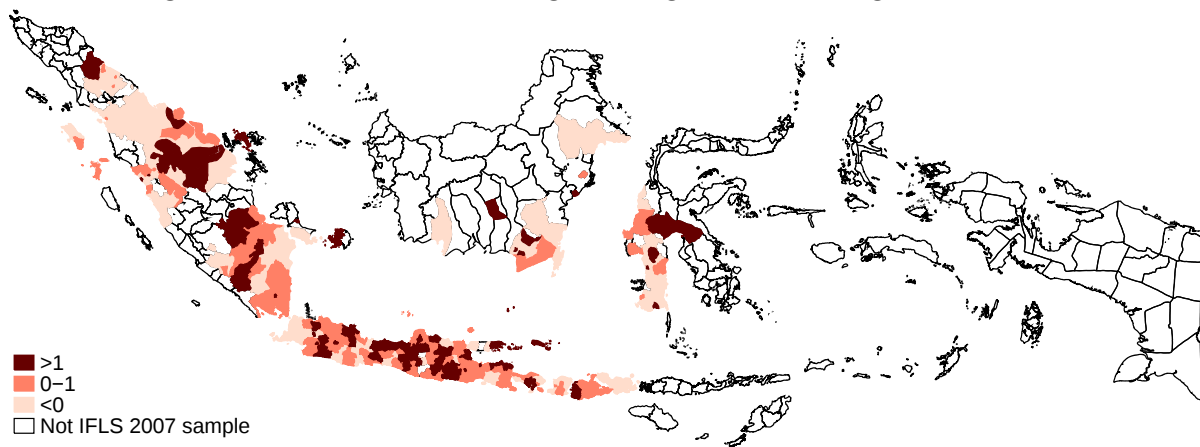
4.4.4 Results

The distribution of height and weight-for-age across local governments are presented to illustrate the variation in child health across local governments. Child height has for some time been viewed as a very useful summary indicator of child health (Martorell and Habicht, 1986). It is stock measure that reflects all health events since birth. It may not be immediately responsive to sudden events, such as economic crisis, but may well respond over time, particularly if the stock is large. Child height will be strongly

related to final adult height, which has been increasingly used as a useful summary indicator of health of a population (Fogel, 1994).

Figure 4.2 shows the distribution of child height across local governments in Indonesia. Child height varies across local governments, with children living in more developed regions (such as Jakarta, West Java and Yogyakarta) having better child height status. For example, boys in West Nusa Tenggara, North Sumatra, West Java and West Kalimantan are shorter than boys in Jakarta, while for girls I find those living in West Nusa Tenggara, North, West and South Sumatra and West Kalimantan are shorter than girls in Jakarta.

Figure 4.2: Distribution of height for age across local governments

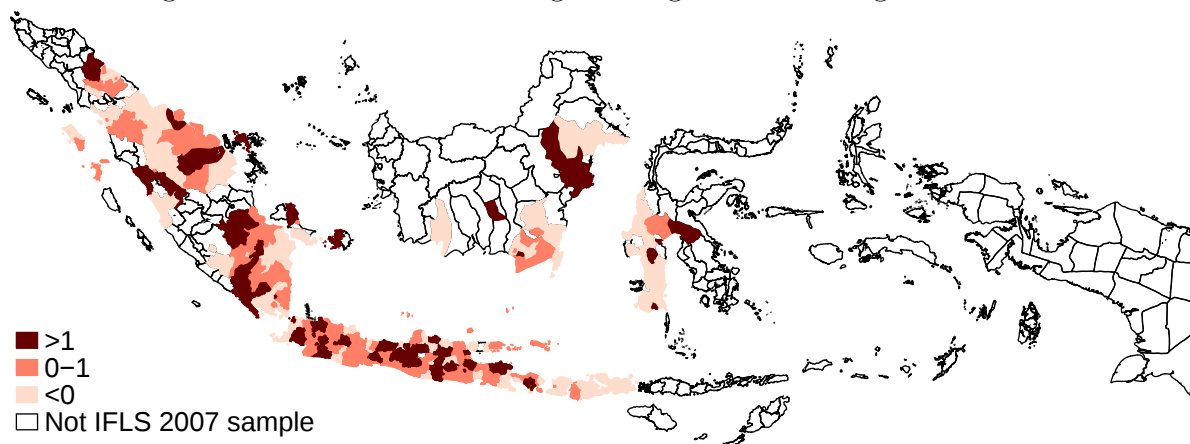


Source: author calculated based on IFLS 2007 data

Weight-for-age is widely thought to be a more responsive measure of child health to shock in the very short-run (Foster, 1995). Frankenberg et al. (1999) found that while no major differences were apparent between mean z -scores during the 1997-8 Indonesian crisis, for very young children there was an indication of decline in weight-for-age. Figure 4.3 shows the distribution of child weight which also shows variation across local governments. The pattern also shows that there is a disparity in child weight across local governments. For example, both boys and girls in Yogyakarta, Central Java and

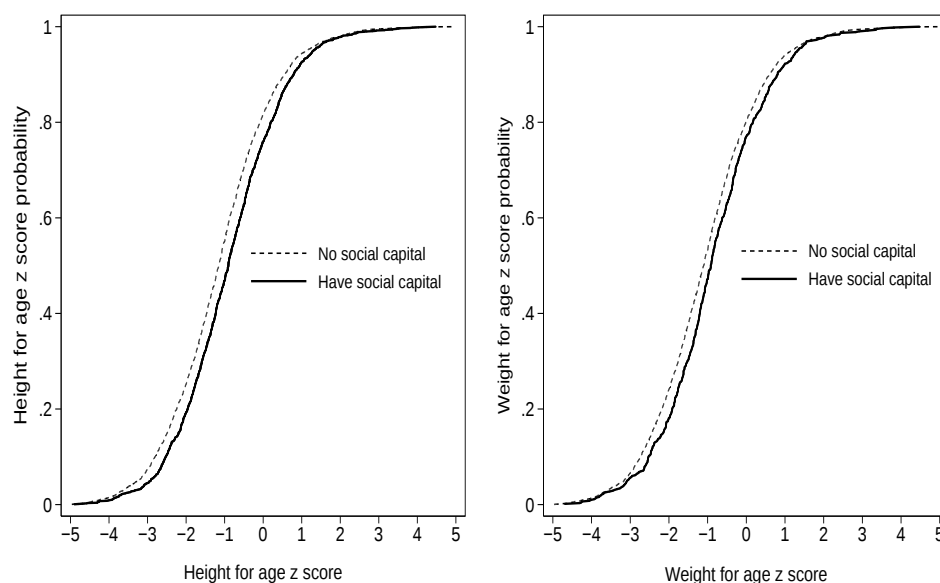
Bali tend to be heavier than boys and girls in West Nusa Tenggara, North Sumatra and South Sulawesi.

Figure 4.3: Distribution of weight for age across local governments



Source: author calculated based on IFLS 2007 data

Figure 4.4: Distribution of height and weight for age by mother's social capital



Source: author calculated based on IFLS 2007

The cumulative density functions for height and weight z-score by mother social capital are shown in figure 4.4. The difference in the distribution of child height and weight

between mothers who have social capital and mother who do not have social capital is striking. The curve for mother who have social capital is above the curve for mother who do not have social capital (and this difference is significant), indicating children of mother who have social capital are healthier than who do not have.

In the next section, the results from the correlation analysis and instrumental variable method are presented. I begin by explaining the bivariate analysis of the determinants. Then, the result of second stage regression which examines the association between mothers' social capital and child health are discussed. Lastly, I present the result from the first stage regression, which accounts for the reverse causality from child health to mothers' social capital.

4.4.5 Mothers' social capital and child health

Table 4.3 reports the bivariate correlation of selected determinants used for analysis. It shows that mothers' social capital is positively associated with both child height-and weight-for-age. The number of community activities is also positively associated with both child health measures. All instruments are associated with mothers' social capital.

Table 4.3: Bivariate correlation of selected determinants

	1	2	3	4	5	6	7	8	9
1	1.00								
2	0.66‡	1.00							
3	0.04‡	0.08‡	1.00						
4	0.05‡	0.09‡	0.12‡	1.00					
5	0.11‡	0.11‡	0.37‡	0.13‡	1.00				
6	0.04‡	0.04‡	0.05‡	0.08‡	0.05	1.00			
7	0.12‡	0.12‡	0.15‡	0.35‡	0.17‡	0.00	1.00		
8	0.08‡	0.07‡	0.07‡	0.00	0.04	0.00	0.10‡	1.00	
9	0.04‡	0.04‡	0.08‡	0.02	0.04	0.05‡	0.15‡	-0.03	1.00

Significance: ‡:5% ‡ ≤ 1%

Note: 1: child height for age; 2: child weight for age; 3: mother's social capital; 4: number active social groups within community; 5: program dissemination; 6: presence of kinship association; 7: number of saving and borrowing institution; 8: ethnic similarity; 9: number of neighbourhood association

Table 4.4 presents the instrumental variable estimation results. I relate child health outcomes to mothers' social capital on a number of individual, household and community predictors, including mothers' social capital and community activities.

Table 4.4: Results of second stage regression

	Height-for-age		Weight-for-age	
	Coef.	se	coef.	se
Mother's social capital	0.179‡	0.069	0.147‡	0.071
Number active groups in community	0.014‡	0.013	0.043‡	0.017
<i>Children characteristics:</i>				
Age	-0.141‡	0.008	-0.067‡	0.008
Boy	-0.064	0.036	-0.002	0.036
Birth weight (kg)	0.248‡	0.056	0.267‡	0.061
<i>Mother characteristics:</i>				
Age	0.000	0.003	0.008‡	0.003
Education: primary or less	-0.178‡	0.047	-0.152‡	0.050
Height (cm)	0.058‡	0.004	0.046‡	0.004
Reported poor health	-0.107	0.433	-0.508‡	0.176
Household size	-0.024‡	0.012	-0.018	0.012
Interact with her mother often	-0.097‡	0.042	-0.071	0.044
Household below median expenditure	-0.206‡	0.047	-0.266‡	0.050
<i>Community characteristics:</i>				
Log average community expenditure	0.375‡	0.075	0.336‡	0.094
Log total community population	0.047	0.030	0.011	0.031
Received underdeveloped village fund	-0.133‡	0.067	-0.170‡	0.088
Village head with graduate education or above	0.030	0.053	0.022	0.058
Urban areas	0.172‡	0.054	0.151‡	0.066
Constant	-16.284‡	1.352	-14.664‡	1.640
Significance: ‡:5% ‡ ≤ 1%				

A mother's social capital is positively associated with her child health. One standard deviation increase in a mother's social capital is associated with an increase in the initial height-for-age by nearly 18% and weight-for-age of her child by 15%. Human capital in the form of a mother's education is positively associated with child health: children whose mothers are educated only up to the end of primary school are less healthy than those with more educated mothers. The effect of a mother's education on child health is quite large (18% for child height and 15% for child weight). Likewise, children who live in poor households (as measured by household below median expenditure) are less healthy than children from better-off households. One unit decrease

in household expenditure leads to a decrease in child health of 21-27%. Controlling for household resources, community expenditure is strongly related to child health. A negative association is shown between indicators of community underdevelopment (i.e. in receipt underdeveloped funds) and child health. This evidence reflects the fact that children living in poor communities are more disadvantaged with respect to their health compared to those who live in better-off communities. The fact that such a community underdeveloped programme has been implemented for many years may also indicate the lack of capacity of poor villages to improve children well-being. Furthermore, living in urban areas increases children health, due to the existence of better public health services in urban areas. The number of community activities or community social capital increases child health but it is only significant for child weight. Community leadership seems not to matter for child health.

4.4.6 Mothers' social capital and child health: two-way causality?

In analysing the relationship between mothers' social capital and child health, this study accounts for the reverse causality from a child's health to their mother's social capital: unhealthier children prevent mothers from participating in community activities, since mothers have to take care of the ill children. An instrumental variables method is used to rule out such reverse causation. A suitable instrument set is specified for mothers' social capital. I then test the validity of each set in the regression model. The results of the first stage regression (see table 4.5) suggest all instruments are highly correlated with mothers' social capital. Tests of instrument strength and relevance (Hansen, Lagrange multipliers, Wald, Kleibergen-Paap statistics) reveal their usefulness in identifying the effects of mothers' social capital.

Table 4.5: Results of first stage regression

	Height-for-age		Weight-for-age	
	Coef.	se	coef.	se
Mother's social capital	0.179‡	0.069	0.147‡	0.071
Number active groups in community	0.014	0.013	0.043‡	0.017
<i>Children characteristics:</i>				
Age	-0.141‡	0.008	-0.067‡	0.008
Boy	-0.064	0.036	-0.002	0.036
Birth weight (kg)	0.248‡	0.056	0.267‡	0.061
<i>Mother characteristics:</i>				
Age	0.000	0.003	0.008‡	0.003
Education: primary or less	-0.178‡	0.047	-0.152‡	0.050
Height (cm)	0.058‡	0.004	0.046‡	0.004
Reported poor health	-0.107	0.433	-0.508‡	0.176
Household size	-0.024‡	0.012	-0.018	0.012
Interact with her mother often	-0.097‡	0.042	-0.071	0.044
Household below median expenditure	-0.206‡	0.047	-0.266‡	0.050
<i>Community characteristics:</i>				
Log average community expenditure	0.375‡	0.075	0.336‡	0.094
Log total community population	0.047	0.030	0.011	0.031
Received underdeveloped village fund	-0.133‡	0.067	-0.170‡	0.088
Village head with graduate education or above	0.030	0.053	0.022	0.058
Urban areas	0.172‡	0.054	0.151‡	0.066
Constant	-16.284‡	1.352	-14.664‡	1.640
Significance: ‡:5% ‡ ≤ 1%				

Dissemination information about community activities is strongly correlated with mothers' social capital. Mothers living in communities with higher numbers of neighbourhood associations have more social capital than those living in less well-endowed neighbourhoods. Likewise, mothers' social capital is positively associated with the number of social and informal financial institutions in their community. These institutions include rolling funds, saving and borrowing groups, and self-help groups or *kelompok masyarakat*. I expect the higher percentage of ethnic similarity and kinship groups to be related to mothers' social capital, and the expectation is confirmed. In fact, the magnitude effect of kinship groups is the largest among all instruments, at 23%.

Communities with higher numbers of activities (including village cooperatives, youth groups, religious activities, family groups and neighbourhood security groups) are likely to provide more mothers' social capital. The magnitude of this effect indicates that one standard deviation increase (measured at the community level) in the number of community activities is associated with an increase in mothers' social capital by 2-3%. Mothers' education and age as well as the age of their children are significantly associated with social capital. Mothers who have completed primary education or less have less social capital than those with a higher level of education. Mothers with older children are likely to have more social capital than those with younger children. Mothers who have a boy are likely to have lower social capital than those who have a girl. However, there is no evidence that other characteristics (such as the mothers' height, general health, and kinship ties) are associated with social capital. Living in a household with below median per capita expenditure decreases the average of mothers' social capital; however, household size seems not to matter. Living in a denser population decreases their social capital: I find positive and significant association between those determinants. Mothers living in richer communities are likely to have more social capital than those living in poor communities. Living in poor community (as indicated from villages which received community underdeveloped programme) decreases mothers' social capital. However, the association between both determinants and mothers' social capital is not significant. Community leadership as measured by the village head's level of education seems not to matter for mothers' social capital.

4.5 Discussion

The purpose of this chapter is to examine the association between mothers' social capital and their children's health in decentralised Indonesia. It follows recent studies

which argue that social capital is an endowment which exists within communities, but individuals have to access it through social participation (Putnam, 1995; Berkman and Kawachi, 2000; Helliwell, 2003; Subramanian et al., 2002). In this study, I measure mothers' social capital as the extent to which a mother participates in several community activities, and ask whether her participation affects her child's health, as measured by height and weight-for-age. Since social capital is conceptualised both at individual and community level, I also include the number of available community activities in order to capture community social capital. This study uses the case of mothers' involvement in community activities in Indonesia, of particular interest because of its longstanding tradition of indigenous community involvement (Grootaert, 1999; Beard, 2005, 2007; Miller et al., 2006). This provides a unique opportunity to examine the extent to which this community tradition affects child health.

This study improves on a number of methodological points in earlier literature. First, using instrumental variable estimation, I try to mitigate reverse causality between both determinants (see for example De Silva and Harpham (2007); Tuan et al. (2006); Surkan et al. (2007)). Second, this study extends Nobles and Frankenberg (2009) study by examining not only individual social capital (in the form of mothers' participation in community programmes) but also community social capital (in the form of the number of community activities). By analysing both types of social capital this study is able to examine their effect on child health from both the supply and the demand sides. Third, this study uses height- and weight-for age to measure child health. This means I am able to examine the effect of mothers' social capital not only on the long-term measure but also on the short-term measure of child health (Fogel, 1994; Foster, 1995).

Our main results show that mothers' social capital is positively associated with their children's health, and that the relation between the two follows a causal relationship, with an instrumental variable estimator providing strong evidence for the causal flow

running from mothers' social capital to child health. All instruments are highly correlated with mothers' social capital; tests of their strength and relevance also reveal their usefulness in identifying the effects of mothers' social capital.

Other individual and socio-demographic determinants confirm the findings of prior studies. Higher schooling for mothers in the household is associated with higher child health, confirming the results found by Thomas (1994) in Brazil, Ghana and the United States. The importance of mothers' health status for their children health is shown from the significance of mothers' health endowment and self-rated health (Kuh and Wadsworth, 1989; Frankenberg and Jones, 2004). As expected, children living in poor households are less healthy than those from better-off households. The detrimental effect of poverty on child health in both developed and developing countries has been well-documented in prior studies (see for example Aber et al. (1997) for the review).

Community social capital in the form of active community activities also improves child health particularly for child weight-for-age. The null findings for child height but significant findings for child weight may signal the benefits of community social capital for buffering children from health shocks as child weight is widely thought to be a more responsive measure of child health to shock in the short-run (Foster, 1995). Community social capital matters in terms of buffering community members (including women and children) from health shocks such as those incurred by economic crisis and natural disaster (Putnam, 1995) (and the latter did occur in Indonesia during the period of the IFLS survey). The fact that a child living in a community with denser community activities is likely to have better health status may signal the benefit of these groups for buffering children well-being from such shocks.

The strong association of all instruments with mothers' social capital explains channels for its improvement. These findings relate to prior explanations where social and financial associations have an important function, namely to strengthen solidarity among

community members (Grootaert, 1999; Beard, 2005; Putnam, 1995). Putnam (1995) explain that the presence of kinship groups (in which the majority of members often come from same ethnic background) may provide a channel for creating bonding social capital which reinforces reciprocity and solidarity (Putnam 1995). Within these groups, mothers can get to health services as well as access knowledge and information, all of which provide benefits for their children. In addition, the significant relation between the dissemination of information and mothers' social capital signals those activities are vital for Indonesia, a country where access to information or community programmes is very limited due to geographic remoteness. Lack of access to information is also widely documented as being one of the most important factors causing lower participation of women and men in community programmes in many developing countries (World Bank, 2004).

This study leaves a number of limitations needing to be addressed, some of which may be dealt with in future research. First, I am unable to control for all unobservable features of communities that might simultaneously generate relatively high levels of mothers' social capital and better child health. I try to include a number of socio-demographic determinants within a community that potentially affect child health. However, unobservable features (such as climate or language across communities) might drive both a women's choice to get involved in community activities and also have an effect on her child's health. Second, this study examines lack of specific measures of trust, social support, and what community activities mean to the women in the sample. The Indonesia Family Life Survey 2007 data is rich in many ways, but is not specifically geared towards measuring those features of social networks that matter for children well-being. Further, the data is limited with respect to the characteristics of the community members with whom individuals interact. Third, this study is also limited in its focus on the reduced-form relationship between social participation and children

health: I do not study the mechanisms that link these two phenomena, research into which may reveal additional implications for the household. For example, it is possible that one way that social capital improves children well-being is by increasing a woman's knowledge and resources to such a degree that her relative position in the household also shifts. Examining the gendered nature of parenting, economic autonomy, and the allocation of resources to children is beyond the scope of this specific study.

Despite these limitations, the findings have several important implications, both for the literature and for the practices of development in developing countries. First, recent works on public health and epidemiology in developed countries find that social capital predominantly improves adult health and well-being (Berkman and Kawachi, 2000; Helliwell, 2003; Subramanian et al., 2002; Viswanath et al., 1996; Farquhar et al., 2005). The empirical results of our study confirm the validity of the positive effect of social capital on child health formation in the context of a developing country, thus demonstrating that the potential benefits of social capital are not limited to developed countries. Second, the types of community activities examined in this study are found not only in Indonesia: similar activities are widespread in other developing countries. Thus, Narayan and Pritchett (1999) illustrate how such activities help to improve household welfare in rural Tanzania, while Grootaert and Bastelaar (2002) codify the important roles these types of activities hold in enhancing development across developing countries from Cambodia, India, Bangladesh, Madagascar, Kenya and South Africa. However, very few studies have examined the effect of community activities on child health. This study suggests that such activities are not only beneficial for household economy, but also for other aspects of citizens well-being.

4.6 Conclusion

This chapter examines the link between mothers' social capital and children's health in decentralised Indonesia, which I find follows a causal relationship. Findings from instrumental variable estimation provide strong evidence for the causal flow running from mothers' social capital to children's health, where instruments are highly correlated with mothers' social capital but uncorrelated with child health. The findings suggest that enhancing mothers' social capital through enlarging community activities, specifically those that facilitate mothers' access to health programme and information, may provide a channel for reducing disparities in child health and well-being in decentralised Indonesia.

Chapter 5

Public spending and healthcare demand in Indonesia: Multilevel finite mixture analysis

Summary: While the benefits of decentralisation measures aimed at improving healthcare demand have been widely discussed, empirical findings of the effect of decentralised health spending on healthcare demand remain mixed. Using the Indonesian national socio-economic survey (*Susenas*) 2009, this chapter examines the effect of decentralised health spending on healthcare demand in the context of health reform in the country. A multilevel finite mixture negative binomial model is used to account for two features of health reform in the Indonesian context: heterogeneous demand for healthcare and decentralised health services. The model is found to provide a reasonable fit to two groups of unobserved healthcare demand: healthy and unhealthy groups. The findings show that decentralised health spending decreases healthcare demand. Low efficiency in local healthcare services indicates weak links between decentralised health spending and improved healthcare demand. So instead of an association with decentralised health spending, healthcare demand is significantly associated with universal health insurance coverage, transportation costs to health facilities, inter-government fiscal transfer, health status and household expenditure. The findings suggest that to increase healthcare demand, policymakers should improve efficiency in local health services and spend more on financing policies to improve access, particularly for those citizens living in remote and rural regions¹.

¹Under review in Health Policy. This paper was presented at second UK MPlus user meeting, 16 March 2011.

5.1 Introduction

Ensuring the accessibility of healthcare services is fundamental to improving health outcomes. Government and policymakers in both developed and developing countries have increased national spending to address the increasing demand for healthcare services. This is especially important for developing countries which encounter high demand for healthcare, but which at the same time still face a lack of funds to finance the healthcare system. In these countries, improving the efficiency of health spending, not merely the amount of money spent on health is the key to achieving better healthcare services.

Health sector decentralisation is believed to improve allocative efficiency by introducing greater diversity into the supply of health services to meet the various healthcare preferences of the local population (Robalino et al., 2001; Bossert, 1998; Boyer et al., 2011). Boyer et al. (2011) explain that decentralisation (which involves the transfer of certain functions to lower levels of government, thus bringing them closer to the beneficiaries of local public services) can have a positive effect on the provision of such services. Allocative efficiency tends to improve when providers are given better information about local needs, while at the same time technical efficiency improves as health services become less hierarchical. However, this is not enough. For decentralisation to help improve the delivery of healthcare through making public choice consistent with local health needs and household capacity to access, adequate institutional capacity and accountability are also required.

A number of studies have examined the relation between health spending and healthcare demand, and they show mixed results. Using data from 51 countries of the World Health Survey from 2000-2003, Saksena et al. (2010) find that total health spending as a share of gross domestic product is not associated with a household's access to outpatient and inpatient services. Rather, they find the strongest predictor to be household self-payment. In contrast, using cross-sectional health expenditure aggregates from 31

countries, Hopkins (2010) finds that public health spending is more prevalent in terms of access to curative healthcare, but not in relation to pharmaceutical care. The significance of public health spending in terms of healthcare demand is also shown in the Palmer et al. (2004) study, which finds that increased levels of funding to maternal and child services improves access to these services. The later study indicates that higher health spending increases healthcare demand, particularly when funds are allocated to programmes that are specifically targeted at increasing access to healthcare. In support of these findings, World Bank (2008b) shows that health financing targeted at programmes for the poor is correlated with increased healthcare access in Indonesia, while decentralised public health spending is not. This indicates that it is the quality of implementation of such programmes that matters and not public health spending *per se*.

As well as their findings being mixed, prior studies have a number of limitations. Typically, they are based on either aggregate analyses (Kruse et al., 2012; Saksena et al., 2010; Xu et al., 2003) or on individual analyses (Hidayat, 2008; Rokx et al., 2009) which, Robinson (1950) writes, risk the invalid transfer of results observed at the aggregate to the individual level. He further notes that this risk may lead to bias inference due to the loss of information when substituting ecological for individual correlations. Moreover, such aggregate analyses are often based on cross-country data (Saksena et al., 2010; Xu et al., 2003). One problem with this is that it is difficult to disentangle the effect of the various unobserved variables that can arise from different health systems, different institutional settings or different cultures (Kruse et al., 2012). In particular, when seeking to draw inferences from a large sample of countries, researchers have at times found it hard to control for all unobserved determinants, potentially leading to bias estimates on the effect of health spending on healthcare demand.

On the other hand, individual analyses of healthcare demand ignore the socio-

economic context within which individuals experience differential levels of healthcare. Hidayat (2008) and Rokx (2008), for example, examine healthcare demand in Indonesia, but their analyses do not account for the contextual effects of decentralised healthcare reform. Snijders and Bosker (1999) explain that ignoring the nested structure of individuals within the larger context may again result in bias estimates, as it means that any similarities between individuals caused by being nested within same area contexts are not accounted for. In effect, the nesting of individual units within large local government units may lead to the underestimation of standard errors of effect of local government level characteristics. While statistical methods have become available to address this issue, empirical investigations of the links between health spending and healthcare demand have remained restricted in their scope. This limited scope, it is argued, is due largely to applying ‘single-level’ methodological procedures to a problem that is intrinsically multilevel.

Moreover, most existing studies estimating healthcare demand are based on ill people as a sample (i.e. Singh and Ladusingh, 2010; Erlyana et al., 2011). Estimating healthcare demand conditional on the event of illness poses some problems. First, there may be an association between self-assessed health status and healthcare use (Akin et al., 1998), raising the possibility of endogeneity (on the grounds that there are unobservable determinants correlated with both the likelihood to report illness and to seek healthcare). The estimated responses of healthcare demand to exogenous variables based on such a sample only would therefore be biased (Dow, 1996). Second, conditional estimates may also be susceptible to an under-reporting of the incidence of illness in surveys, and hence would yield only a lower-bound estimate (Sauerborn et al., 1996). The total effects of price on demand can thus be inferred only from unconditional estimation (Hidayat, 2004), which would produce long-run price effects (Dow, 1996).

This research adds to existing studies on the effect of public health spending on healthcare demand in several ways. First, instead of using cross-country data, this study uses a large sample of local governments within a single country as one of the units of analysis. This enables us to control for those determinants that potentially affect the association between decentralised health spending and healthcare demand. The advantage of using local government studies is that such contexts are considerably more similar within the boundaries of a single country than they are across countries (Kruse et al., 2012). Second, the use of multilevel finite mixture analyses allows us to investigate whether the effect of local government conditions on individual healthcare demand varies between local governments as well as between unobserved heterogeneous demand groups (i.e. healthy and unhealthy groups), making them more appropriate for testing the effect of decentralised public spending on healthcare demand. Asparouhov and Muthen (2006, 2009) discuss the advantages of multilevel finite mixture models over single level modeling analyses, in which the former allow us to explore population heterogeneity that is caused by within and between group variables. Third, the sample in this study is based on healthy and unhealthy individuals. This minimises the estimation problem of healthcare demand resulting from unobserved determinants correlated with the likelihood to report illness and to seek healthcare (Dow, 1996). The results of this study therefore may be more robust compared with prior studies which do not account for these characteristics of healthcare reform and healthcare demand.

Indonesia is particularly suitable for this study due to the number of important health sector reforms that have been carried out there since 2001. Decentralisation has transferred the planning and managing of the health sector from central to local government. Local governments have a legal responsibility to provide basic healthcare and are also free to set user fees for public health services. In addition, public resources for health have increased almost fourfold since decentralisation (World Bank, 2008c), and

the Indonesian government has committed to improving both financial and physical access to quality healthcare for poor people. Financial protection against catastrophic expenditure has improved since the introduction of a health insurance programme for the poor in 2004. This was expanded into a health insurance scheme for the whole population in 2008. The scheme serves as one of the key building blocks of the government's proposed universal coverage scheme. A large amount of public financial help has also been delivered, dedicated to building up healthcare facilities and infrastructure. The number of public health centres has increased continuously, from 7,237 in 2000 to 8,234 in 2007 (The Ministry of Health, 2007). However, few empirical studies examine the effect of these health reforms on healthcare demand.

In sum, the research questions to be answered in this chapter are as follows: To what extent is decentralised health spending associated with healthcare demand? How is healthcare demand affected by public health spending after controlling for individual socio-demographic and local government determinants related to demand and supply of healthcare? and What are the implications of health sector decentralisation for healthcare and healthcare demand in Indonesia?

5.2 Decentralisation, public health spending and health care demand in developing countries

Decentralisation has become a major trend worldwide in developing countries during the last three decades. Transferring authority and resources from central to local government can bring allocative benefits for the provision of local public goods and services (Bardhan, 2002). Decentralisation can improve healthcare demand by enhancing the participation of the community in the decision-making and implementation process, and by strengthening local health authorities to be better able to tailor staff, resources

and procedures to local circumstances than central government (Robalino et al., 2001; Bossert, 1998). A decentralised health sector is said to be closer to its clients, experience reduced information costs, be better able align of needs to local preferences, and be able to allow for increased flexibility and transparency (Lieberman, 2002).

Its focus on the association between decentralisation, public health spending and healthcare demand places this paper in that broader category of literature which deals with the effectiveness of public health spending. It is argued that fiscal health decentralisation will improve healthcare demand through better allocative efficiency of public health spending. The central idea is that a centralistic health system usually lacks the 'time and place knowledge' needed to implement policies and programmes in a way that reflects citizens needs and preferences. If properly managed, fiscal decentralisation can be a way to improve allocative efficiency and therefore healthcare demand (Oates, 1972). However, despite the merit argument of fiscal health decentralisation, there is little empirical evidence that countries with a decentralised system have actually experienced either improved healthcare demand or improved health outcomes. Moreover, not much is known yet about the enabling or constraining conditions needed for effective health sector decentralisation (Jutting et al., 2005).

One such landmark study examine fiscal decentralisation, public spending, and healthcare demand is conducted by Filmer and Pritchett (1999). This analysed the association between the two health outcome indicators of public healthcare spending as a share of gross domestic product and under-five mortality, across 100 countries in 1990. Controlling for relevant socioeconomic determinants and using a variety of checks for robustness, Filmer and Pritchett find that gross domestic product per capita, income inequality, mean years of female schooling, ethnic fragmentation, and being more than 90% Muslim jointly explained about 95% of the variance in infant and under-five mortality across the countries. Once these were controlled for, public health spending as a

share of gross domestic product explained less than 1% of the cross-national variance in infant or under-five mortality. Filmer and Pritchett (1999) further suggest that the way in which health spending translates into actual programmes that improve health services is the missing link in the chain that explains the lack of correlation between public health spending and health outcomes. More public health spending should, on the face of it, be associated with better healthcare services, which in turn should be associated with better health outcomes. Analysing the effects of public health spending on healthcare demand can thus be viewed as an attempt to explain this chain.

As already indicated, existing research examining the association between public health spending and healthcare demand has produced mixed results. Using data pertaining to 51 countries of the World Health Survey from 2000-2003, Saksena et al. (2010) find that self-payment is the strongest predictor of household access to outpatient and inpatient services, rather than total health spending as a share of gross domestic product. In contrast, using cross-sectional health expenditure aggregates from 31 countries, Hopkins (2010) finds that public health spending is more likely to be associated with access to curative healthcare than pharmaceutical care. The significance of public health spending as a factor in demand for healthcare is also presented in the Palmer et al. (2004) study, which shows that increased levels of health system funding for maternal and child services are linked to their better access to these services. The study also indicates that health spending increases healthcare demand particularly when it is allocated to programmes that are specifically targeted at increasing healthcare access. In support of these findings, World Bank (2008b) shows that health financing which targets the poor is correlated with increased healthcare access in Indonesia, while decentralised public health spending is not. This indicates that it is the quality of the implemented programmes that matter and not public health spending per se.

Rather than being entirely related to public health spending, variations in healthcare

demand are determined by a range of factors. These include the monetary and non-monetary costs of receiving care (Cauley, 1987; Gertler and Van-der Gaag, 1990; Peter et al., 2008; Hutchinson, 1999), supply side factors (such as quantity and quality of healthcare) (Peter et al., 2008; Chomitz et al., 1998; Anderson and Rosenberg, 1990) and the socio-economic and demographic characteristics of the patients, in particular their income and gender (Develay et al., 1996; Gupta and Dasgupta, 2000; Van-Doorslaer et al., 2007; Lewallen and Courtright, 2002; Muller et al., 1998).

Using healthcare reform case studies in Cote d'Ivoire and Peru, Van der Gaag and Gertler (1990) show that demand for healthcare is price sensitive, and that children and the poor are hurt more than the population in general by the introduction of user fees. Researchers also find that non-monetary determinants (such as distance or travel time to health service points of access) are strong predictors for healthcare demand in developing countries (Gomez, 2002; Heller, 1982; Hutchinson, 1999). Peter et al. (2008), for example, find an inverse relationship between distance or travel time to health facilities and the use of health services in several African countries. Using data from Uganda's integrated household surveys, Hutchinson (1999) finds that for each additional kilometre travelled to the health unit, healthcare usage fell by approximately 1%, that the poor were more willing to pay a higher price to reduce the time cost, and that children in the lowest income quintiles demanded care the least.

Other studies reveal healthcare quantity and quality to be determinants of low healthcare use in developing countries, where absenteeism of health workers, unequal geographic distribution of physicians, and the lack of hospital distribution are well-documented as obstacles to people accessing healthcare (Peter et al., 2008; Chomitz et al., 1998; Anderson and Rosenberg, 1990). Chaudhury et al. (2006) report that in the six month period studied, about 35% of health workers in Bangladesh, Ecuador, India, Indonesia, Peru and Uganda were absent for some time during official public

working hours. Higher-ranking and more powerful providers, such as doctors, were absent more often than lower-ranking ones, and there was little evidence that low salary strongly affected absence. The study does however find evidence suggesting that the quality of infrastructure at the facility plays a role. Unequal distribution of physicians and hospitals are common in developing countries, and their high concentration in urban cities negatively affects healthcare access (Anderson and Rosenberg, 1990; World Bank, 1994). Most physicians prefer to settle in urban areas, which offer opportunities for professional development, education and other amenities for their families, and attractive employment opportunities. However, it is in rural and remote areas, especially in developing countries, that the most severe public health problems are found. There is thus a mismatch between the geographic distribution of physicians and the real need for them (Chomitz et al., 1998).

Studies also show a strong relationship between socio-economic and demographic characteristics (such as income and gender) and healthcare demand in developing countries. Household income is always found to be a strong predictor for healthcare demand, as healthcare in developing countries is still characterised by high numbers of self-paying patients (Van-Doorslaer et al., 2007). People in poor countries tend to have less access to health services than those in better-off countries; within countries, the poor have less access to health services (Peters et al., 2008). In Asian and Latin American countries, Muller (1998) finds there to be male bias in access to healthcare: women are to a larger extent deterred from accessing healthcare due to time constraints and opportunity costs (Lewallen and Courtright, 2002).

A number of studies examine the association between public health spending and healthcare demand in Indonesia. In its review of the country's health spending and health outcomes, World Bank (2008b) finds the effect of decentralised public spending on overall healthcare use to be weak. Kruse et al. (2012) analyse the association be-

tween decentralised health spending and outpatient care use based on a panel dataset of 207 Indonesian local governments over the period 2001 to 2004. They find a positive effect in the public sector between the two for the poorest two quartiles. Their analysis suggests that increased public health spending improves targeting of the poor, as behavioural changes in public healthcare use are pro-poor.

Rokx et al. (2009) examine demand inducement created by public health financing through insurance coverage and socio-economic changes using the 2007 *Susenas* survey of 285,000 households. This study suggests that healthcare use may be higher among those who are insured than among those who are not. Outpatient use rates in the month preceding the survey for those who had any health insurance averaged 17.3%, compared with 12.5% for those who had none. The same associations were observed for inpatient use rates, with those having health insurance reporting more than double the use rates of those without it. Hidayat (2004) used the Indonesian Family Life Survey 2002 to examine the effect of health financing (via the health insurance programme) on healthcare demand in Indonesia. The demand for outpatient care from three alternative providers was modelled using multinomial logit regression for samples unconditional on being ill and conditional on being ill. Findings confirm that health financing through the health insurance programme has a positive impact on the demand for healthcare. The magnitude effects of health insurance programmes on healthcare demand are higher for unconditional estimates (about 7.5% for public providers and 20% for private providers). Exogenous determinants in the unconditional on being ill sample estimates explain a higher variation of the model than that in the conditional sample.

5.3 Indonesian healthcare reform

Indonesia is the fourth most populous country in the world with an estimated population of 228 million in 2008. It has experienced rapid economic growth over the last quarter of a century and its gross national income per capita has increased from USD\$620 in 1980 to USD\$3,560 in 2007. This has also led to remarkable social development, particularly in the areas of health and nutrition; life expectancy at birth has increased from 55 in 1980 to 71 years in 2007, while the under-five child mortality rate per 1,000 live births has dropped from 125 in 1980 to 31 in 2007 (World Bank, 2008b). Although there has been significant improvement in human development over the past forty years, significant challenges remain. One vital issue is that of the low use of healthcare services, with on average a mere 4% of those who are ill using inpatient services (World Bank, 2008b). Compared to other countries with a similar level of economic development, these figures are substantially lower: World Bank (2008b), for example, shows that 10-16% of the Thai population seek inpatient treatment when ill.

Over the past decade, a number of important health sector reforms aimed at improving healthcare access have taken place in Indonesia. With the implementation of decentralisation in 2001, the responsibility for delivery of services (including health services) was delegated to local government. Specifically, decentralisation transfers the planning and management of the health sector from central to local government. Local governments have a legal responsibility to provide basic healthcare; they are also free to set user fees for public health services (to be used as a revenue stream for local government operations) and there are no rules or guidelines stipulating how they should allocate resources or carry out particular programmes. Local governments are not required to justify local spending to central government based on outputs or pre-defined objectives, but instead are accountable to local parliaments. These new health management responsibilities are supported by increased transfer of financial and human

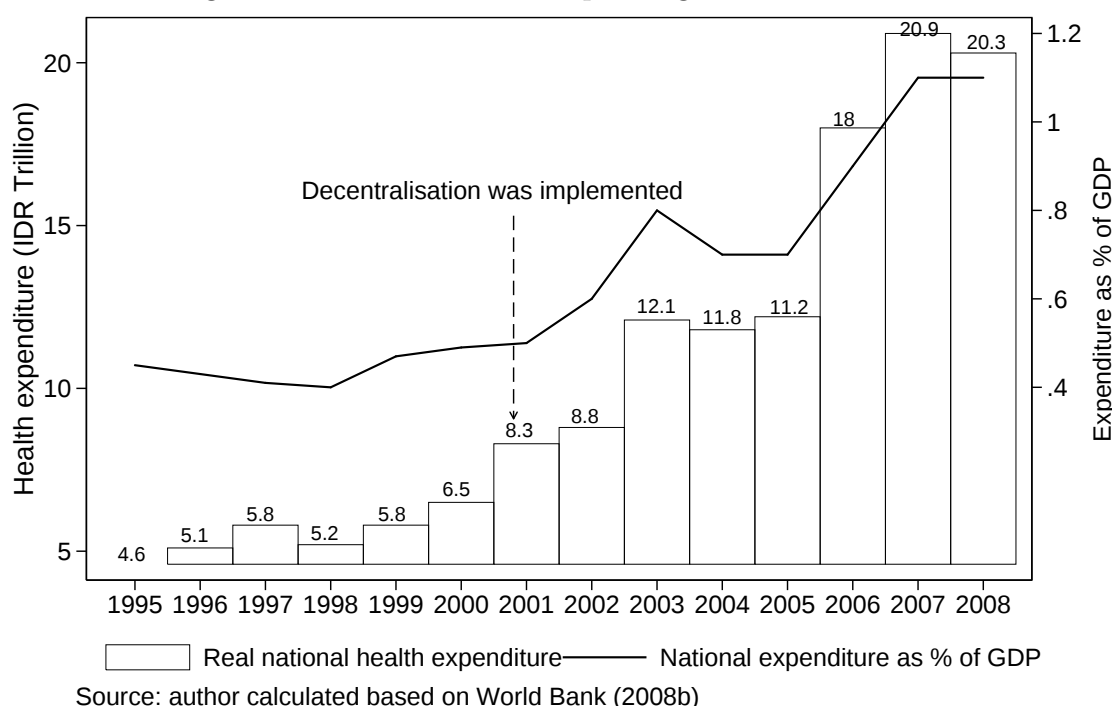
resources from central government. World Bank (2008b) reports that public resources for health have increased almost fourfold since decentralisation. Almost a quarter of a million health workers were also transferred to local government areas (Rokx et al., 2010).

As part of decentralisation, the Indonesian government also committed to improving both the financial and physical access of poor people to quality healthcare. Financial protection against catastrophic expenditure has improved since the introduction of the health insurance programme, *Askeskin* which was specifically designed to increase access of poor households to health services. This *Askeskin* programme had two components. First, operational funds were provided to each local health centre (*Puskesmas*) in the form of capitation payments. Second, a fee-for-service health insurance scheme was introduced, covering third-class hospital beds and reimbursed through the Indonesian state-owned enterprise which administered it (*PT Askes*). This programme differed from the previous programme for the poor in two ways. First, rather than being purely government-run, it provided a block grant to *PT Askes*, which then targeted poor households with *Askeskin* payment cards and refunded hospital claims. Second, beneficiaries were targeted individually, rather than by household (as had been the case with the previous programme), and cards were issued on that basis. Initially there were 36.1 million target beneficiaries. However, this was soon expanded to include more than 76 million individuals in 2008, under a health insurance scheme designed to cover the whole population, known as *Jamkesmas*. The *Jamkesmas* programme is currently being implemented throughout Indonesia and serves as one of the key building blocks of the government's proposed universal coverage scheme (Rokx et al., 2009). So far, 96 million individuals have signed up to it.

Assessments of the Indonesian health system over recent decades have consistently pointed to low levels of public funding as one of the main reasons for poor health sector

performance (World Bank, 2008b). For the 15 years leading up to 2000, Indonesia spent less than 0.5% of gross domestic product on health, a level considerably below that of other countries in the region (World Bank, 2008b). Since 2001 however, there has been an increase in public funding of the health sector. Health spending as a share of overall national spending rose from 2.6% in 2001 to 4.4% in 2008. As a share of gross domestic product it also increased, although remained low, increasing from 0.5% to 1.1% over the same period (Figure 5.1).

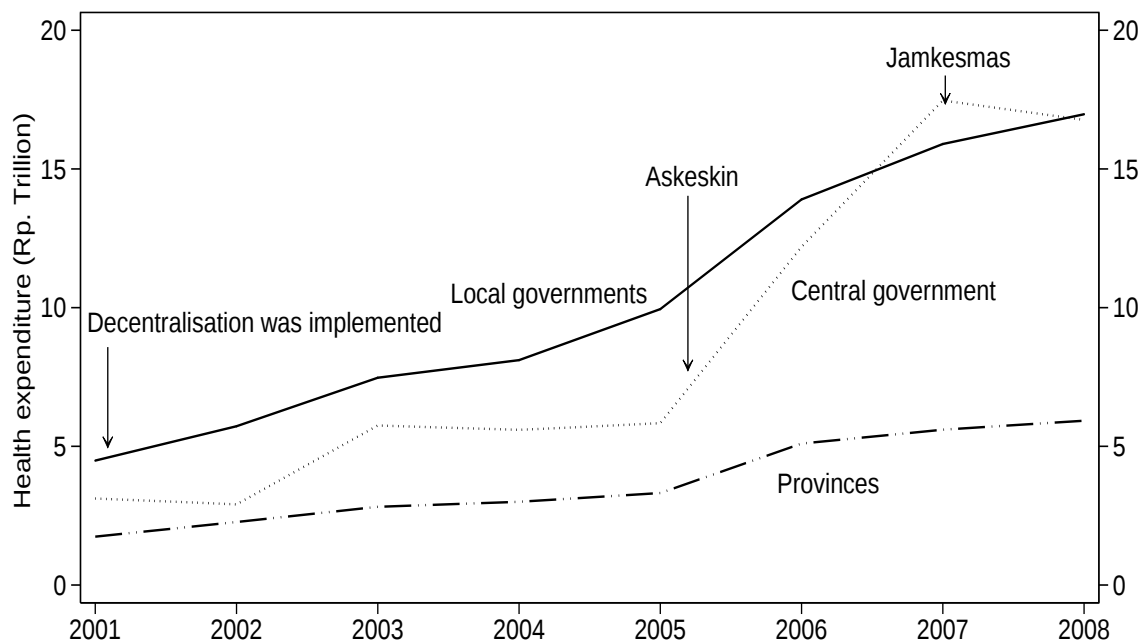
Figure 5.1: Indonesia health spending from 1995 to 2008



Over the period 2001 to 2008, the average annual rate of health expenditure growth in Indonesia was 29% overall - 41% for central government expenditure, 23% for provincial expenditure, and 24% for local government expenditure. Most health expenditure is spent at local government level, a trend which has remained fairly consistent over time. However, in 2006 the central level share increased and was budgeted to increase further in 2008. This can largely be explained by the increase in social spending, or the *Aske-*

skin health insurance programme for the poor (which in 2008 became the *Jamkesmas* programme) (World Bank, 2008b), which is classified as central government expenditure. Provincial government spending reached a high of 22% in 2002, a figure which dropped to 14% in 2007 (Figure 5.2).

Figure 5.2: Transfer of health spending since decentralisation



Source: author calculated based on World Bank (2008b)

In spite of the high share of expenditure between central and local government, local governments remain highly dependent on central government for their revenue, 90% of which they receive as transfers from the centre (World Bank, 2008b). The largest of these, 56% of total revenues, is the general allocation grant or *dana alokasi umum*, which is a formula-based untied grant (Hofman et al., 2006). The other main transfers are shared tax revenue (11% of total revenue) and shared non-tax revenue (12% of total revenue). The former consists largely of property and income taxes administered by central government and transferred back to local government. The shared, non-tax revenue is largely a natural-resource revenue that is distributed back

to the districts (World Bank, 2008b). Finally, there is the specific allocation grant (*dana alokasi khusus*), a tied resource whose use is determined centrally but which only accounts for a modest share of local government revenue (3-5% from 2005 to 2007). Local government's own revenue is non-negligible and has been increasing as a share of total local government revenue from 10 to 16% between 2001 and 2007 (World Bank, 2008b); however, it is unequally distributed.

Another aspect of Indonesia's health system that receives a large amount of public financial support is the development of healthcare facilities and infrastructure. According to the 2007 Indonesia Health Profile, a report by the Ministry of Health (2007), the number of public health centres has risen continuously from 7,237 in 2000 to 8,234 units in 2007. The number of medical personnel has also risen over time. For example, in 2004, the number of public health centre personnel stood at 141,566, of which 8,934 were physicians, 40,070 were nurses, and 48,252 were midwives. By 2007, these numbers were 184,445, 11,701, 56,727 and 56,408 respectively.

It was widely expected that these increased funds, together with decentralisation and the expectation of greater freedom to change budget allocations at local government level, would lead to improvement in the delivery of services, as the changed accountability relationships resulted in services being more attuned to local needs. However, results to date are mixed. Immunisation rates remain low (BPS, 2003; Indonesia NIHRD, 2005). The use of ambulatory care services is also low, self-treatment remaining the most common response to illness for many people (World Bank, 2008b). There is also great variation between local governments in terms of the efficiency with which resources are used (Indonesia NIHRD, 2005). World Bank (2008b) assessments across local governments indicate a weak relationship between public expenditure on health and either immunisation coverage or the number of births attended by a skilled health provider. Kruse et al. (2012) find decentralised public health spending to be largely

driven by central government transfers. They show a positive effect of public health spending on outpatient care use in the public sector for the poorest two quartiles, while no evidence that public expenditure crowds out the use of private services or household health spending. Roxk et al. (2009) find that health expenditure at local government level has continued to increase following decentralisation but that a lack of local government capacity means it tends not to be managed properly, with the health budget being spent mostly on administration rather than services (World Bank, 2008b).

5.4 Data and method

This study combines data from various sources. Data on individuals is provided by the Indonesian socio-economic survey (Susenas) 2009. Local government data is provided by the national village census (Podes) 2008; the local development budget and expenditure information 2008, and the consumer price index 2008 are drawn from Ministry of Finance and BPS. The assembled data possesses a multilevel structure in which individuals are nested within local governments.

5.4.1 The Indonesian Socio-Economy Survey (Susenas) 2009 and official statistics

Susenas is one of the oldest and most well-regarded national representative household surveys among developing countries (Ravallion and Lokshin, 2007). It is implemented by the government's Central Bureau of Statistics, and since 1993 it has been fielded yearly and is representative at local government level. Each year, the survey has a sample size of about 250,000 households (close to 1,200,000 individuals) (BPS, 2007). The survey instrument contains a core questionnaire, which collects information on the socio-demographic characteristics of household members, their education, labour

market activities, and access to various services, including outpatient and inpatient healthcare. I use the Susenas 2009 wave which records in detail inpatient visits to public and private healthcare facilities, and which consists of 1,142,675 members of 282,387 households living under 471 local governments.

This study links individual data from Susenas with administrative data from the Indonesian village potential census (Podes) 2008 and the local government finance information system 2008. Podes is a national census at the lowest administrative tier of local government (BPS Indonesia, 2006). It collects various socio-economic indicators from all Indonesian villages and urban neighbourhoods, ranging from infrastructure to village governance. The census consists of data about all 75,410 villages and urban neighbourhoods nested within more than 450 local governments. I calculated the aggregates to measure the distribution of healthcare services facilities and health workers within each local government. It also collects information regarding distances between individual villages or urban neighbourhood and their nearest hospital. Average transportation costs between the two are calculated by multiplying the distance data with the standard transportation cost per kilometre within cities (data regarding the latter being collected from the Indonesian Ministry of Transportation).

The Indonesian Ministry of Finance has compiled local government development budget and expenditure information since 1994. These official statistics are known as the local government finance information system, and provide detailed information about local government health spending (The Indonesian Ministry of Finance, 2008). In this study, I use local government spending data from one year before the Susenas survey was conducted (local government development spending in the Indonesian government budgeting system takes at least one year to take effect). Since the price level of consumer goods and services in Indonesia varies across regions (Strauss et al., 2004), the amount of local government spending is deflated with the consumer price index for

urban and rural regions. Rural inflation is taken to be 5% higher than urban inflation, a calculation which produces real spending adjusted with regional inflation (Thomas and Frankenberg, 2007; Resosudharmo and Jotzo, 2009). The consumer prices index 2008 data is retrieved from the Indonesian Government Central Bureau of Statistics.

5.4.2 Healthcare demand and fiscal decentralisation measure

Length of stay in hospital is well-documented in healthcare literature as a good proxy for measuring both demand for healthcare and consumption of health resources (Clearly et al., 1991; Leyland and Boddy, 1997; Deb and Trivedi, 2002; McLachlan and Peel, 2000). The term ‘hospital’ is used to refer to any medical institution (i.e. public hospital, private hospital, healthcare centre). Once admitted as a patient for treatment, an individual is considered hospitalised irrespective of the length of stay. Table 5.1 presents the distribution of length of stay; the average hospital stay is six days.

Table 5.1: Distribution of length of hospital stay

Count	freq.	relative (%)	count	freq.	relative (%)	count	freq.	relative (%)
0	1,130,061	97.79	31	8	0	80	4	0
1	3,642	0.32	36	10	0	81	1	0
2	3,595	0.31	37	9	0	85	1	0
3	4,394	0.38	38	7	0	90	26	0
4	2,739	0.24	39	3	0	92	2	0
5	2,017	0.17	40	53	0	93	1	0
6	867	0.08	41	3	0	96	1	0
7	3,507	0.30	42	4	0	100	7	0
8	501	0.04	44	4	0	101	4	0
9	313	0.03	45	36	0	102	2	0
10	842	0.07	46	5	0	104	1	0
11	213	0.02	47	3	0	105	3	0
12	276	0.02	48	2	0	110	3	0
13	99	0.01	49	1	0	120	5	0
14	625	0.05	50	23	0	124	1	0
15	408	0.04	51	4	0	140	4	0
16	69	0.01	52	1	0	150	5	0
17	68	0.01	54	2	0	180	2	0
18	60	0.01	55	2	0	202	1	0
19	21	0	56	1	0	211	1	0
20	188	0.02	57	1	0	212	2	0
21	120	0.01	60	77	0.01	220	1	0
22	29	0	61	1	0	225	1	0
23	26	0	62	3	0	234	1	0
24	20	0	65	3	0	240	1	0
25	40	0	66	1	0	300	3	0
26	11	0	70	29	0	302	1	0
27	13	0	72	1	0	310	1	0
28	36	0	73	1	0	330	1	0
29	9	0	74	2	0	333	2	0
30	328	0.03	75	3	0	365	1	0

Source: author calculated based on Susenas 2009 data

Decentralised public health spending is measured by local government health expenditure per capita; in Indonesia this is relatively low, at IDR2,300, at today's exchange rate this is about USD\$0.25. Table 5.2 presents summary statistics of the analytic sample. To avoid confounding determinants, I include in the model local government and individual control determinants associated with healthcare demand. These are described in more detail below.

Table 5.2: Summary statistics of analytic sample

	Mean or %	sd	min	max
<i>Local government</i>				
Health spending per capita (IDR)	2,300	2,400	250	35,000
Number of hospitals	13	21	0	126
Physicians per 1,000 population	0.25	0.21	0.00	1.72
Shared of general allocation fund on total revenue	57%	26%	3%	88%
Log average transportation cost	13.41	1.31	10.12	15.76
Bed occupancy ratio	58%	15%	30%	89%
<i>Individual</i>				
Age	29	20	0	98
Female	50%	50%	0%	100%
Married	46%	50%	0%	100%
Education	elementary school	1	0	4
Log household expenditure	19.05	0.59	14.80	22.91
Household size	5	2	1	22
Number of symptoms	1	1	0	7
Remote islands	4%	20%	0%	100%
Urban	35%	0%	48%	100%
Covered by health insurance	18%	45%	0%	100%
Covered by <i>Jamkesmas</i>	31%	46%	0%	100%
Covered by local health insurance	2%	15%	0%	100%
N unconditional				
Individuals	1,155,566			
Local governments	471			
N conditional				
Individuals	400,458			
Local governments	471			
Source: Susenas 2009 data and official statistics				

5.4.3 Local government determinants

The share of the local government general allocation fund as a proportion of total local government revenue is included to control for the effect of intergovernmental fiscal decentralisation of healthcare demand. This is high, with the average being above 60%. Since most local governments still depend on central government grants to finance the health sector, a higher share of the local government general allocation fund is expected to be associated with higher healthcare demand.

To control the models on healthcare access and facilities, I include the distribution of hospitals, physicians per 1000 population, and average transportation costs to the nearest hospital. For the definition of distance, this study uses the distance between each neighbourhood or village to the nearest hospital (Akin et al., 1984, 1998). The model also includes hospital bed occupancy rate as a proxy for measuring hospital efficiency (Rokx et al., 2010). The average transportation cost to the nearest hospital is relatively expensive, at about IDR11,000 (USD\$1.1).

All local government key determinants are derived from administrative reference data rather than from the Susenas surveys themselves. This source enhances accuracy (or reduces measurement error). The use of this independent data also alleviates concerns arising from the use of the same surveys in calculating both aggregate and individual determinants in the estimation (Deaton, 2001). For example, if health status distribution within local government is calculated from the same individual surveys, a simple compositional association cannot be easily ruled out.

5.4.4 Individual socio-demographic determinants

Health insurance coverage, household health expenditure, health status and socio-demographic determinants are included as individual and household control determinants. Three types of healthcare insurance are included in the models. First, extent of health insurance coverage is constructed to measure whether health insurance increases healthcare demand. The survey consists of information regarding whether individuals are covered by health insurance. I find that 18% of respondents were covered by health insurance. Second, health insurance for the general population, *Jamkesmas*, is included to measure whether public health finance targeting improving healthcare access for the poor is associated with increased healthcare demand. About 30% of respondents receive *Jamkesmas*. Third, since some local governments have implemented an alternative

health insurance scheme for their citizens, I include this determinant in the estimation to address whether local targeted public health finance improves healthcare demand (only about 2% of respondents are covered by this local health insurance).

Income is considered an important determinant of demand for healthcare, the finance of which is still characterised in Indonesia by high self-payment (Van-Doorslaer et al., 2007; Rokx et al., 2009). This study uses household expenditure as a proxy for income. Information about income is biased and difficult to assess in many developing countries, particularly in subsistence farming households. Income data is also typically prone to under-reporting and measurement error, ignoring the contribution of own production and in-kind transfers. Household expenditure is a more accurate measure for household economic resources than income, in the context of both developed and developing countries (Deaton and Zaidi, 2002; Jorgensen, 2002). It was adjusted with the 2009 consumer price index data for urban and rural areas, and the log taken in order to correct for skewed distribution. The average household expenditure is IDR1.9 million per annum (which at today's rate is about USD\$190).

Health status is measured according to the number of days an individual reports symptoms. Previous studies show that this measure captures many aspects of individual health related to healthcare use (Sha et al., 2005; Kroenke et al., 1994). The survey consists of detailed information about how many days during the last three months respondents were disrupted because of headache, cough, fever, diarrhea, toothache and other symptoms. I aggregate the number of symptoms and treat this determinant as a continuous variable.

Several individual household, social and demographic determinants are also included to control whether healthcare demand is related to individual education, gender, marital status, household size and geographic location. Education is measured by examining the level attained by the respondent within the Indonesian educational system. Most

respondents are educated at primary school or less. Marital status is used to control whether being married is associated with higher healthcare demand compared to being divorced, widowed or single. Household size is used as a proxy measure of household needs for healthcare and is relatively large, with about five members within a household. Dummy determinants indicating urban and remote areas are constructed to capture the effect of geographic location and regional development. Respondents living in rural areas and mainland islands are used as a reference group.

5.4.5 Multilevel finite mixture analyses

The locus of health decentralisation reform in this study is local government. In this regard, the analysis needs to recognise the nested structure of health sector reforms at local government level, making multilevel analyses appropriate and ordinary regression analyses inappropriate (Snijders and Bosker, 1999; Hox, 2002; Rabe-Hesketh and Skrondal, 2012). This nesting of individuals within large local government units may lead to an underestimation of the standard errors of effects of local government-level characteristics, the significance of which in ordinary regression analyses can be overestimated. Multilevel regression analyses on the other hand are able to account for this clustering of individuals within local governments by separating individual and local government variance in healthcare demand. Hypotheses on the effects of local government characteristics on healthcare demand can thus be tested appropriately using this technique.

Multilevel finite mixture analyses are used in this study since the dependent determinant (length of hospital stay) is count variable. Deb and Trivedi (1997) explain that finite mixture analyses are better than zero-inflated and hurdle model analyses for the analysis of length of hospital stay. Zero-inflated analyses give more weight to the probability that the count variable equals zero, incorporating an underlying mechanism that

splits individuals between non-users and potential users (Jones et al., 2007). Hurdle model analyses imply that the count measure of healthcare demand is a result of two different decision processes: the first specifies decision to seek care, the second models the positive values of the variable for those individuals who receive some care (Jones et al., 2007). As an alternative to these analyses, Deb and Trivedi (1997) propose the use of finite mixture analyses as the most appropriate for the empirical modeling of healthcare demand. They argue that these create a better framework than the hurdle model, distinguishing users and non-users of healthcare (Deb and Trivedi, 1997). The finite mixture models offer a more tenable distinction for typical cross-sectional data between ‘healthy’ and ‘unhealthy’ groups of healthcare users (the difference being determined by health status, attitudes to health risk, and choice of lifestyle) (Deb and Trivedi, 2002). These models provide a more natural representation, since each latent class (‘healthy and unhealthy groups’) can be seen as a ‘type’ of individuals while still accommodating heterogeneity within each class. It can also be seen as a discrete approximation of an underlying distribution that does not need to be parametrically specified (Yau et al., 2003; Greene, 2004).

I fit multilevel finite mixture analyses to capture the nested structure of the data and unobserved heterogeneous healthcare demand. A modelling framework that recognises the nested structure (local government and individual) is a multilevel model, while a framework that recognises unobserved heterogeneous demand in which the population can be grouped into healthy and unhealthy groups of healthcare users is a finite mixture model. I estimate models with two latent groups/components reflecting healthy and unhealthy groups of healthcare users. This number of latent groups is consistent with health economics literature, which finds strong empirical support for two such groups (Munkin and Trivedi, 2009; Deb and Trivedi, 1997, 2002).

Consider a mixture of two components distributions, corresponding respectively to

healthy and unhealthy groups of healthcare users. Let Y_{ij} represent the length of stay for the j th individual in the i th local government. Let M be the number of local governments in n_i be the number of observations in the i th local government, the total number of observations being $N = \sum_{i=1}^M n_i$. Denote x_{ij} as a vector of determinants associated with Y_{ij} . A two-component mixture model for the probability density function of Y thus takes the form:

$$f(y_{ij}; x_{ij}) = \pi(x_{ij})\phi_1(y_{ij}; x_{ij}) + (1 - \pi(x_{ij}))\phi_2(y_{ij}; x_{ij})$$

where $\pi(x_{ij})$ denotes the probability of the patient belonging to the first component/group, and $\phi_g(y; x)$ is the g th component distribution ($g=1,2$). Analogous to Thompson et al. (1998), the proportion π may be specified as a logistic function of x , viz,

$$\pi(x_{ij}) = \frac{\exp \xi_{ij}}{1 + \exp \xi_{ij}}, \xi_{ij} = w_{ij}^T \gamma + V \quad (i = 1, \dots, M; j = 1, \dots, n_i),$$

where superscript T denotes vector transpose, $w_{ij} = [1 \ x_{ij}^T]^T$, γ is a vector of unknown logistic coefficients, and V_1 represents the unobservable random effect due to the i th local government affecting the proportion π , and is taken to be iid $N(0, \lambda)$. It is further assumed that g th component density is followed by negative binomial distribution, with

$$f(y|\mu, \alpha) = \frac{\Gamma(y + \alpha^{-1})}{\Gamma(y + 1)\Gamma(\alpha^{-1})} \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu} \right)^{\alpha^{-1}} \left(\frac{\alpha^{-1}}{\alpha^{-1} + \mu} \right)^y,$$

$$\alpha \geq 0, y = 0, 1, 2, \dots$$

where $\Gamma(\cdot)$ is the gamma function, μ is the mean or expected value of the distribution and α is the over-dispersion parameter. When $\alpha=0$ the negative binomial

distribution is the same as a Poisson distribution.

Asparouhov and Muthen (2006) show the advantages of a multilevel finite mixture over single level modeling techniques, in that it allows us to explore population heterogeneity caused by within and between cluster level determinants. They note that this model allows heterogeneity to be investigated more fully and more accurately attributing different aspects of the heterogeneity to the different levels. Yau et al. (2003) make an attempt to fit a two-component mixture that accounts for the correlation between and heterogeneity inherited from unobserved determinants of length of hospital stay outcomes. They introduce simultaneous random effects in the mixture probability and the component distributions.

The sample in this study is based on individuals whose responses are conditional and unconditional on being ill. Estimating healthcare demand conditional on the event of illness poses some problems. There may be an association between self-assessed health status and healthcare use (Akin et al., 1998), raising the possibility of endogeneity (on the grounds that there are unobservable determinants correlated with both the likelihood to report illness and to seek healthcare). The estimated responses of healthcare demand to exogenous variables based on an ill sample only would therefore be biased (Dow, 1996). Conditional estimates may also be susceptible to an under-reporting of the incidence of illness in surveys, and hence would yield only a lower-bound estimate (Sauerborn et al., 1996). The total effect of prices on demand can be inferred only from unconditional estimation (Hidayat, 2004), and such estimations would produce long-run price effects (Dow, 1996). The characteristics of the unconditional on being ill sample used in this study minimise the estimation problem of healthcare demand resulting from unobserved determinants correlated with the likelihood to report illness and to seek healthcare (Dow, 1996).

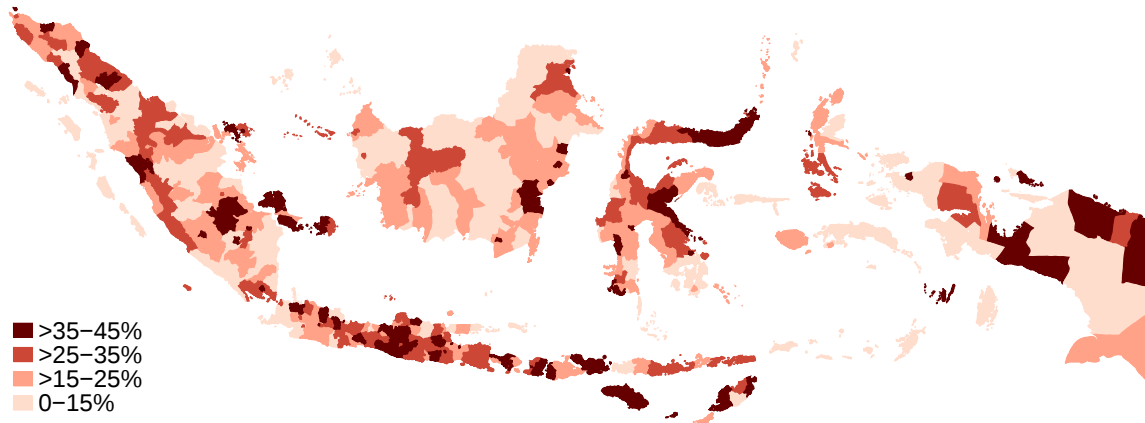
Regarding the distribution of component densities, I choose the usual densities for

count data i.e. the Poisson and negative binomial (Deb and Trivedi, 1997; Cameron and Trivedi, 1998; Sin and White, 1996). The number of components are chosen using Akaike information criterion (AIC) and Bayesian information criterion (BIC) (Wang et al., 1996; Sin and White, 1996). For each of the models, I report the estimated regression coefficient, standard errors, residual variance, AIC, BIC and log likelihood as indicators of model fit. All models were estimated with maximum likelihood estimation. Mplus 6.1 is used to estimate the models.

5.5 Results

Figure 5.3 shows the map of average individual healthcare demand across local governments in Indonesia, highlighting the geographical variations in healthcare demand across local governments. An attempt at a summary is given in Table 5.3 (mainland-remote correlation and centroid correlation), which along with the map hints at mainland-remote and central-local government gradients. Simple correlations between new centroids and healthcare demand show that as one moves from the capital city Jakarta, healthcare demand is reported to decrease (-0.0117). Likewise, as one moves towards remote regions, healthcare demand is also reported to decrease (-0.0054). Disparities in demand exist between central-local government as well as between the mainland-remote regions of Indonesia.

Figure 5.3: Distribution of average length of hospital stay in 471 local governments



Source: author calculated based on Susenas 2009 data

Table 5.3 Centroids correlation with average LOS

New centroid	Central-Local government	Mainland-Remote
Average LOS	-0.0117‡	-0.0054‡
Significance: †:5% ‡ ≤ 1%		

Tables 5.4 and 5.5 present the model selection and regression results of the multilevel finite mixture of the unconditional and conditional on being ill samples. The results for both samples are relatively similar. Akaike information criterion supports the negative binomial model for unconditional and conditional on being ill samples. AIC values for this model are lower than those for the Poisson model (359854 and 225120 for negative binomial and 459039 and 294718 for Poisson respectively), as are BIC values (360342 and 225565 for negative binomial and 459504 and 295141 for Poisson respectively). Based on these results, the negative binomial is used as the preferred model for further analysis. For both samples, the healthy group comprises 99% of the population, with an average hospital stay of five days annually; the unhealthy group constitutes 1% of population with a mean stay of 19 days per year. Mean healthcare demand estimated from the model is seven days, with a minimum of four days and a maximum of 19 days. The fitted two components multilevel finite mixture negative binomial distributions are

plotted in appendix A.3.2. and A.3.3.

Table 5.4: Model selection results

	One class		two classes	
Unconditional being ill	Poisson	NB	Poisson	NB
Akaike (AIC)	468049	362429	459039	359854
Bayesian (BIC)	468148	362679	459504	360342
Loglikelihood	-239471	-181194	-229481	-179886
Conditional being ill				
Akaike (AIC)	301428	225669	294718	225120
Bayesian (BIC)	301634	225896	295141	225565
Loglikelihood	-155695	-112813	-147320	-112519

The majority of the determinants included in the model have a statistically significant bearing on healthcare demand, particularly with the healthy group. The effects of some determinants vary across latent groups (corresponding to both healthy and unhealthy groups), with a statistically significant impact. First, I discuss the results for local government determinants.

Decentralised health spending (as measured by local government health spending per capita) decreases healthcare demand for both healthy and unhealthy groups (-0.505, $p < 1\%$ and -0.324, $p < 1\%$ for the unconditional on being ill sample and -0.121, $p < 1\%$ and -0.161, $p < 1\%$ for the conditional being ill sample). Low efficiency of local health providers at improving healthcare demand is shown from the null association of number of hospitals and bed occupation ratio for unhealthy groups. The negative association between doctors per capita and healthcare demand further signal low performance of local health provision.

Intergovernmental fiscal transfer via the general allocation fund is significant for healthcare demand. In both groups and samples, local government areas which receive greater fiscal transfers have a higher demand for healthcare compared to those which receive less. However, the average transportation cost to the nearest hospital is negatively associated with healthcare demand (-0.359, $p < 1\%$ and -0.115, $p < 1\%$ for the

unconditional on being ill sample and -0.228, $p < 1\%$ and -0.101, $p < 1\%$ for the unconditional on being ill sample). This indicates that commuting costs matter to accessing healthcare services.

Table 5.5: Results of multilevel finite mixture negative binomial

	Unconditional being ill				conditional being ill			
	Healthy		unhealthy		healthy		unhealthy	
	Coef.	se	coef.	se	coef.	se	coef.	se
Intercept	-43.856‡	1.426	-18.593‡	0.997	-63.733‡	3.377	-18.870‡	0.898
<i>Local government</i>								
Health spending per capita	-0.505‡	0.212	-0.324‡	0.147	-0.121‡	0.009	-0.161‡	0.031
Number of hospitals	0.002	0.002	-0.002	0.002	-0.002	0.004	-0.001	0.002
Physicians per 1,000 population	-0.311	0.228	-0.294	0.207	-0.851	0.388	-0.265	0.174
Shared of general allocation fund on total revenue	0.468‡	0.170	0.441‡	0.148	0.527‡	0.297	0.341‡	0.123
Log average transportation cost	-0.359‡	0.046	-0.115‡	0.040	-0.228‡	0.080	-0.101‡	0.034
Bed occupancy ratio	0.008‡	0.003	-0.002	0.003	0.005	0.005	-0.005	0.002
<i>Individual</i>								
Age	0.025‡	0.002	0.015‡	0.001	0.079‡	0.005	0.010‡	0.001
Female	0.804‡	0.067	-0.076‡	0.033	1.388‡	0.148	-0.101‡	0.032
Married	1.196‡	0.079	0.084‡	0.043	2.136‡	0.228	0.027‡	0.040
Education	-0.186‡	0.024	-0.067‡	0.016	-0.120‡	0.068	-0.039‡	0.016
Number of health symptoms	0.861‡	0.021	0.437‡	0.019	0.066‡	0.074	0.029‡	0.013
Log household expenditure	2.244‡	0.064	0.967‡	0.043	3.053‡	0.165	1.011‡	0.040
Household size	-0.348‡	0.016	-0.122‡	0.011	-0.446‡	0.045	-0.104‡	0.010
Remote areas	0.063	0.239	-0.325	0.185	0.812	0.383	-0.292	0.155
Urban	0.626‡	0.066	0.225‡	0.044	0.783‡	0.170	0.280‡	0.043
Number of health insurance	0.513‡	0.053	0.048	0.044	0.376‡	0.141	0.111‡	0.041
Covered by <i>Jamkesmas</i>	1.119‡	0.062	0.386‡	0.040	1.742‡	0.165	0.433‡	0.037
Covered by local health insurance	0.784‡	0.149	0.061‡	0.007	1.448‡	0.317	0.048‡	0.008
Variances:								
Individual	0.402‡	0.021	0.210‡	0.017	0.310‡	0.012	0.160‡	0.021
Local government	0.026‡	0.002	0.012‡	0.003	0.021‡	0.003	0.013‡	0.000
Class size	99%		1%		99%		1%	
Significance: †:5% ‡ $\leq 1\%$								

The bottom part of the table shows household and individual coefficients. Variation is found in the effect of insurance types in both healthcare demand groups. The number of individuals with health insurance is also significant but only for the healthy group (0.513, $p < 1\%$ for the unconditional being ill sample and 0.376, $p < 1\%$ for the condi-

tional being ill sample). This may indicate that health insurance in Indonesia is more elastic for the healthy group than for the unhealthy group. Controlling for individual and local government determinants, healthcare financing of the poor *Jamkesmas* and local citizens is positive and significant for both healthy and unhealthy groups. This is an indication that this type of health insurance provides some financial protection for poor people wanting to access hospital care.

Healthcare demand is expected to vary with age, as older people tend to have higher healthcare needs than younger people. As regards to sex differential, within the healthy group women tend to result in a higher demand for healthcare than men; however, when they are ill women are less likely to access care than men. Being married is likely to result in more demand for healthcare than being widowed, divorced or single. Being educated makes it less likely for members of both healthy and unhealthy groups to seek out a hospital for healthcare. Household expenditure increases healthcare demand for both healthy and unhealthy groups. The magnitude effect of household expenditure on healthcare demand is relatively strong, particularly for the healthy group (2.244, $p < 1\%$ for the unconditional on being ill sample and 3.053, $p < 1\%$ for the conditional being ill sample). Household size (which indicates household needs and well-being) is negatively associated with healthcare demand. In both healthy and unhealthy groups, individuals from larger families are less likely to access hospital care than those from smaller families. This household behaviour is a corollary of the positive effect of household monthly expenditure.

As expected, having lower health status (as indicated by having more days with symptoms) tends to incur more demand for healthcare. A significant effect of health symptoms is shown on both groups and samples. With regard to geographic location, respondents living in urban areas are more likely to seek healthcare than those living in rural areas. This indicates that the concentration of healthcare services in Indonesia

is in urban rather than rural areas. In contrast, those living on remote islands are less likely to seek hospital care, but the association is not significant.

The variance of the unconditional on being ill sample is higher than that of the conditional being ill sample. This indicates that exogenous variables in the unconditional sample estimates explain a higher variation of the model than those in the conditional sample. The variances are significant in all specifications. The estimation of this variance at local government level goes some way to ensuring that the rest of the estimates (taken from per capita health expenditure on local health insurance) are robust against unobserved local government heterogeneities and unobserved healthcare demand. Studies in the literature which ignore such heterogeneities or higher levels of geography, as well as ignoring unobserved heterogeneities of healthcare demand, may not be as robust. This is worth bearing in mind when comparing these results with those in the literature.

5.6 Discussion

This chapter aims to examine the association between public health spending and healthcare demand in decentralised Indonesia. I follow health economics literature, which often uses inpatient length of hospital stay to measure healthcare demand. Using multilevel finite mixture analyses, this study goes beyond existing healthcare demand literature which is typically based exclusively on individual or aggregate data. Multilevel finite mixture analyses offer the advantage of being able to take into account the nested structure of health decentralisation reforms in a local government context as well as the unobserved heterogeneity of healthcare demand. Moreover, by focusing on local government as a unit of analysis, this study also contributes to existing healthcare demand studies on the effectiveness of public health spending, which have mostly used

a single country as the unit of analysis. The advantage of local government studies is that such contexts are considerably more similar within the boundaries of a single country than they are across a country. The analyses are thus able to control for those unobserved heterogeneities between local governments that may impact on the effects of health financing reform on individual healthcare demand. Furthermore, the use of unconditional on being ill individuals as a sample in this study may minimise the estimation problem of healthcare demand which can result from unobserved determinants correlated with the likelihood to report illness and to seek healthcare. Prior studies suggest that the total effects of price on demand can be inferred only from unconditional estimation, and such estimations would produce long-term price effects.

The main results show that decentralised health spending decreases healthcare demand for both healthy and unhealthy groups. This negative association continues to confirm prior study findings (World Bank, 2008b; Saksena et al., 2010). World Bank (2008) shows null findings on the relation between public health spending and health outcomes as well as public health spending and healthcare use in Indonesia. The signal of low efficiency in local healthcare services is also shown in this study. The indicators of local government capacity with regard to health services (i.e. doctors per 1,000 population and the distribution of hospital care) and hospital efficiency (i.e. bed occupation ratio) are shown to be weakly correlated and not significant for healthcare demand.

Disparities in access to healthcare between urban areas and remote islands in Indonesia are apparent, with those living in urban areas more likely to have access to healthcare than those in rural areas. Those living on remote islands are less likely to access healthcare than those living on the main islands. The detrimental effect of commuting distance on healthcare demand is also shown from the negative association of transportation costs. In all models, I find consistent results showing that individuals living in local governments with more expensive transportation costs are less likely to

access healthcare.

The findings also show the benefits of health financing policies that directly target the enlarging of healthcare access (i.e. *Jamkesmas* and local health insurance). This study presents consistent results which show that *Jamkesmas* and the local health insurance increase healthcare demand by both healthy and unhealthy groups. This result supports findings of earlier studies which show the significant effect of *Jamkesmas* on increasing outpatient and inpatient healthcare service use in Indonesia (see for example Hidayat et al. (2008); World Bank (2008b); Rokx et al. (2009)). Using probit analysis, Rokx et al. (2009) for example found that those covered by *Jamkesmas* had outpatient use rates 2.5% higher than those without insurance, and inpatient use rates about 1.0% higher. While prior studies only show the positive effect of *Jamkesmas* on a single group of healthcare demand, this study shows that the significant effect of *Jamkesmas* is responsive both for healthy and unhealthy groups.

The impact of socioeconomic-demographic determinants and health status on healthcare demand appears to be consistent with prior studies. Healthcare demand increases for older individuals, as the human immune system tends to decrease with age. Confirming earlier studies, healthcare demand appears to be varied with regard to gender. Women are more likely to access healthcare than men when they are healthy, but when they are sick, are less likely to access healthcare than their counterparts. This finding confirms prior studies of developing countries which found that females generally have lower access to healthcare than males, particularly when they are ill (Brawn, 2000). The positive effect of being married on care demand is also shown in earlier studies (for example, Joung et al., 1995). Joung et al. (1995) found that married people tend to use health services more frequently than people who have never married. One reason for this could be that married people have advantages (such as economic resources, and social and psychological support) that make them more aware of the importance

of healthcare. As expected, lower health status increases healthcare demand in both groups. The strong association between the two is also shown in earlier studies.

Higher household expenditure is also highly significant for increasing healthcare demand for both healthy and unhealthy groups, as is the effect of household size (which also captures household needs and well-being). This significant association of household expenditure and household size indicates that healthcare demand in Indonesia is accessible regardless of socio-economic status. While this evidence has been well-established by earlier studies (Hidayat, 2004; Van-Doorslaer et al., 2007), the findings of this study show that the effect of household expenditure on healthcare demand is apparent for both healthy and unhealthy groups. The positive effect of education on healthcare demand also confirms earlier studies (Hidayat, 2008; Erlyana et al., 2011). Education increases the likelihood of the individual to access healthcare, as they may use their enhanced knowledge to address their health issues.

The main limitation of this study is that the model does not include detailed measures of quality of hospital healthcare as part of the explanatory determinants, important as it contributes to the reasoning behind choice. However, at the moment such data is very limited, and does not provide reliable measures of quality. This is one area of possible future research when the data become readily available. Moreover, data used by this study on inpatient length of hospital stay came not from hospital administrative records of admitted inpatients, but from a nationally representative survey designed to collect information from Indonesians about their socio-economic conditions. As such, it is subject to recall bias and digit preference, making the results and interpretations influenced to some extent by reporting bias.

Despite these limitations, the findings make a number of important contributions to the effectiveness of public health spending and healthcare demand literature, as well as to Indonesia's healthcare policy. Most of the country's existing healthcare

demand literature focuses on individual level analyses to explain healthcare access (see for example Hidayat (2008); World Bank (2008b); Rokx et al. (2009); Erlyana et al. (2011)). This study shows that the country's healthcare demand is also affected by local government conditions related to access to healthcare, such as transportation costs and capacity of the local healthcare provider. It also shows that by accounting for two different groups of unobserved healthcare demand, we can uncover healthcare demand heterogeneity caused by individual and local government determinants. From an empirical perspective, these results suggest that unobserved characteristics which influence healthcare demand and that are not captured by the present data must be taken into account in its analysis.

From a policy perspective, this study suggests that simply expanding health insurance alone will not be an effective tool to increase healthcare demand in Indonesia: it shows that low healthcare demand is also responsive to transportation costs. In other words, what healthcare insurance coverage does is to reduce user fee, but it does not reduce transportation costs for accessing healthcare. That citizens in rural areas and on remote islands often encounter a commuting challenge when attempting to seek health treatment from a healthcare provider is thus currently going unrecognised. With an underdeveloped transportation infrastructure and insufficient availability of public transport, travelling and seeking treatment from a healthcare provider is relatively more expensive and more time-consuming for rural and remote island residents. An important device that government could thus implement to generate more health service use by this group would be to expand healthcare infrastructure. However, the policies of expanding both medical infrastructure and health insurance coverage need not be mutually exclusive. While building up the former, the government should continue to expand the latter; this will help to reduce the self-payment costs incurred by individuals. As a result, rural and remote island residents would then have extra money to offset

commuting costs, ultimately leading to a greater use of health services in Indonesia.

5.7 Conclusion

This chapter examines the relationship between local public health spending and healthcare demand in Indonesia. It highlights that analysing individual healthcare demand within a local government context provides a more adequate picture of health reform than analysing the association of both determinants in a cross-country context. Its analysis provides a more accurate estimation of healthcare demand in Indonesia by accounting both for decentralised healthcare services and the heterogeneous demand for healthcare. By dividing the sample into two unobserved healthcare demand groups (healthy and unhealthy), this study uncovers the varying effect of individual and local government determinants on low healthcare use in Indonesia. The results highlight a theoretical explanation linking individual healthcare demand beyond the mechanism at individual level, and show that the social and political context should be considered more broadly, to include elements such as the capacity of local government to provide healthcare services.

The results show that decentralised public health spending decreases healthcare demand for both healthy and unhealthy groups. This negative association may signal the inefficiency of local healthcare services, where health spending is unable to translate into services that improve healthcare demand. Such an indication is also shown from the weak correlation between healthcare demand and measures of quantity and quality of health services (bed occupation ratio, the distribution of hospitals and doctors). Instead of resulting from decentralised health spending, the variation between healthy and unhealthy demand groups in Indonesia can be explained by universal health insurance coverage, transportation costs, inter-government fiscal transfer, health status

and household expenditure. The significant association with public financing through the universal health care programme confirms that public health spending will increase healthcare demand when such spending is used to finance policies and services that directly target to improve healthcare access.

Chapter 6

Conclusion

6.1 Introduction

In this final chapter, the central conclusions of this study are discussed as well as the most noteworthy results and limitations of my approach. It begins by presenting key findings of this study. The main contributions that this study makes to the literature of decentralisation and well-being are elaborated. Next, the policy implications of this study for current decentralisation reform in Indonesia are presented. Finally, I give direction for future research most likely to overcome these.

6.2 Key findings

Recalling the main aim of this study, it is to examine the consequences of decentralisation reform on public services and citizen well-being in decentralised Indonesia. It seeks to find answers to three questions: (a) When local governments are charged with new responsibilities and provided with new resources, to what extent can they promote public services and citizen well-being? (b) Why are some local governments more effective than others in promoting well-being? (c) What are the implications of decentralisation reform for local public service performance and citizen well-being? To

answer these questions I present four empirical chapters using different sources of data and methodological approaches. Compared to other developing countries, Indonesia's recent experience is unique, both in terms of its approach to decentralisation and also the amount of public functions and public resources transferred to local government.

The key findings show that after about five years of decentralisation, disparities in both public service delivery and well-being have appeared between more developed and less developed regions. All empirical chapters show there to be a negative correlation between district centroids, and all indicators of public services and well-being show that once one moves outside Indonesia's capital, local public service performance and well-being are reported to decrease. Likewise, as one moves further from the centre towards remote islands, local public service performance and well-being continue to decrease. The fact that there is an existing deep disparity in local public services and well-being signals the continuing impact of central government on local government and regional development in the country.

This study also shows that the extent to which local governments are able to take advantage of the opportunities provided by decentralisation varies. Indeed, the empirical chapters all indicate there to be a wide variability in the extent to which local governments have responded to new opportunities and constraints, and dealt with the legacies of the past. Some have signalled that they are able to make significant headway in providing better public services and enhancing well-being, while others have proved to be dysfunctional. We are presented with a vision of a system where local corruption, ineffective and unresponsive local governments side-by-side with those surprisingly adept at introducing better governance.

Either an inspiration for participation and innovation or as a locus of sloth and corruption - these are contrasting images of the performance of local government as it responds to new responsibilities and resources concomitant with decentralisation in

Indonesia. Yet theories of economics, political science and public administration all anticipate that good will emerge from restructuring government through decentralisation - greater efficiency and fiscal responsibility, more democratic accountability and opportunities for participation, and better quality services that respond to local needs. As indicated in the first chapter and the findings of this study however, empirical results have not always been as robust as theory would predict, drawing into question theoretical linkages that lead from decentralisation to better local public services and well-being. In this study, we find some important channels for effective and ineffective decentralisation to promote local government public services and well-being.

Firstly, we address the ineffective structure of political institutions. In most empirical chapters, this study finds results to be consistent, namely that ineffectiveness on the part of local political institutions at ensuring local political accountability leads to reduced public service performance and well-being. This decreases of public services performance and well-being along with the perception of local conflict incidence related to both local and national elections, local corruption, and political fragmentation. In chapter two and three for example, this study presents the hypotheses that political freedom through direct local government election should stimulate local office holders to improve government performance (Rikers, 1961). However, we discover null findings and even negative results. This evidence may signal that that the link between political decentralisation, local public services and well-being in Indonesia is not a direct one. Indeed, poor performance of local public services is deeply rooted in local political and social contexts: local governments often fail to provide better public services when political accountability is absent due to weak checks and balances, lack of transparency, and weak electoral incentives. Where political accountability is lacking, decentralisation is likely to create powerful incentives for political and bureaucratic agents to capture local political processes and misallocate public resources (Prud'homme, 1995; Litvack

et al., 1998; Crook and Manor, 1998b; Goldsmith, 1999; Treisman, 2000; Fisman and Gatti, 2002). Political and fiscal decentralisation thus can lead to an increase in local corruption rather than the desired strengthening of democracy and improvement to local public services.

Secondly, there is the issue of lack of local government capacity. All empirical chapters signal that decentralisation increases well-being through the improved capacity of local government to deliver public services. This study shows that well-being increases along with local government fiscal and administrative capacity to deliver public services. For example, the contrasting associations of political and fiscal decentralisation with citizen happiness indicate that decentralisation in Indonesia increases citizen happiness through the improved fiscal capacity of local government to deliver public services, rather than through better opportunities for direct political participation. The determinants reflecting local government capacity to deliver public goods and services support this finding. The capacity of local bureaucrats (indicated by the level of education of village/neighbourhood heads) has a positive association with happiness. Cross-level interaction of high local spending on public services with unemployed status and poor health shows a similar positive association with happiness. Moreover, the detrimental effect of weak local government capacity on well-being is also shown. In most empirical chapters, it is shown that local government corruption and budget allocation inefficiency decrease well-being. Children living in communities which are targeted by the underdeveloped villages programme are likely to be less healthy than those living in communities which do not qualify for the programme. The null result of community leadership reflects a lack both of capacity and commitment to promoting both mothers' social capital and child health. Furthermore, the negative association of decentralised public health spending in Indonesia with healthcare demand signals inefficiencies in healthcare services, with health spending unable to translate into services that increase

healthcare demand. This low efficiency is indicated by the weak link between the indicators of local government capacity in regard to health services (e.g. physicians per 1000 population and the distribution of hospital care) and hospital efficiency (e.g. bed occupancy ratio) with healthcare demand.

Thirdly, we found the contrast effect local conflict and social capital on public services and well-being. This study show a consistent result that social capital in the form of individual participation in community programmes and social groups (individual social capital) and social groups (community social capital) matters for improving local government public services and well-being. In contrast, local conflict and violence, which is also captured in terms of social capital, decreases the effectiveness of local government public services and thus individual well-being. A well-established body of literature examines the beneficial effects of individual and community social capital on development outcomes.

Putnam's analysis of Italy's local government found that higher social capital leads to better local government performance (Putnam, 1993). He posits that the degree to which devolution of authority leads to better local government is based on the level of organisation of civil society and the extent to which civil actors are able to monitor and hold local officials accountable. Getting citizens involved directly in various community programmes can improve the capacity of local government to provide services. Such community participation can affect this capacity by, for example, providing direct material benefits or helping to target material resources most efficiently within a community (Fox and Aranda, 1996; Blair, 2000). Meanwhile, social groups not only can exert pressure on local governments to provide better services, but can also provide models of the most appropriate kind of services and how improvements can be made in accordance with local concerns (Heller, 2001). In the Indonesian context, the positive association of community participation and social groups with development has

been documented in previous studies (Shiffman, 2002; Grootaert and Van-Bastelaer, 2002; Sullivan, 1992; World Bank, 2004). These show that the involvement of local community volunteers and various social organisations have become a hallmark of the country's socioeconomic development. In many instances, these organisations began as grassroots initiatives and were subsequently adopted by higher levels of government as regional and national programmes (Shiffman, 2002; World Bank, 2004). The results thus confirm that the benefits of individual and community social capital not only extend to improving outcomes of such community programmes, but also to improving local public service performance.

6.3 Main contributions

This study makes several contributions to the current literature on decentralisation and well-being. Firstly, the research demonstrates that local governments continue to vary in terms both of their service performance and the extent to which they are able to take advantage of the opportunities offered by decentralisation. While most prior research demonstrates the occurrence of this variation across developing countries or provinces within a country, this study shows that it occurs across local governments within a single country. It also identifies certain limitations of cross-country studies, and suggests that the consequence of decentralisation reform on public service performance and well-being is more relevant if we use local government as the unit of analysis.

Secondly, the findings support the fiscal decentralisation hypothesis. This states that fiscal decentralisation can improve citizen well-being through the capacity of local government to provide better policies and public services. In the context of a newly democratic, developing country, quality of local government seems more important for citizen well-being than freedom in local democracy. As noted, citizens are happier and

more satisfied when their local government is able to spend more of their budget for the provision of public goods and services. Moreover, the negative association between local government GDP and happiness represents an important contrast with previous analyses of the macroeconomic implications of decentralisation (see for example Davoodi and Zou (1998), Diaz-Serano and Rodriguez-Pose (2001), Iimi (2005)). These results also suggest that the ultimate goal of decentralisation should be improving citizen well-being and not necessarily high economic growth. Whether these lead to both economic growth and improved citizen well-being depends on the capacity of local government to deliver them effectively.

Thirdly, in line with Frey and Stutzer (2002), this study also shows that subjective well-being is much more than just a personal issue: it is also strongly associated with contextual issues such as government policy and reforms. The results show that the degree of citizen well-being varies across local governments and is significantly associated with local politics and socio-economic conditions. Thus from an empirical perspective, this study suggests that it is important to consider other local government social, economic, and political determinants and to examine their effects on well-being. By substantially enlarging the scope of questions considered pertinent to address, multi-level analysis provides the basis for developing a detailed contextual description of how local government performance can be enhanced to improve citizen well-being.

Fourthly, the study shows social capital affects well-being. This extends findings from studies of developed countries in the context of a developing country. In particular, the significant effect of mothers' social capital on child health confirms the validity of the positive effect of social capital on child health formation in a developing country. Moreover, our use of the instrumental variables method goes beyond much previous research in this area which rarely takes into account reverse causality between mothers' social capital and child health. This method provides strong evidence for the causal

flow running from mothers' social capital to child health.

Lastly, this study goes beyond existing literature by examining two features of healthcare demand under decentralisation in Indonesia (i.e. decentralised health spending and unobserved heterogeneity of healthcare demand). Moreover, by focusing on local government as a unit of analysis I also contribute to those existing studies which address the effectiveness of public health spending mostly by using a single country as a unit of analysis. Local government studies have the advantage that such contexts are considerably more similar within the boundaries of a single country than they are across countries. This means any analysis is able to control for unobserved heterogeneities between local governments that potentially affect healthcare demand. Furthermore, the use of individuals that are unconditional on being ill as a sample in this study may minimise the estimation problem of healthcare demand resulting from unobserved determinants correlated with the likelihood to report illness and to seek healthcare. This study shows that exogenous determinants in the unconditional on being ill sample estimates explain a higher variation of the model than that in the conditional sample.

6.4 Policy implications for current decentralisation and development in Indonesia

It is clear that decentralisation has the potential to contribute to the improved performance of local government. It can provide new opportunities for responsiveness to local needs. It can mean that governance improves. It can mean that citizens hold public officials and agencies more accountable. However, this study indicates that decentralisation alone does not automatically achieve these ends. Decentralisation in Indonesia in 2001 set in motion a number of significant changes at local government level; more than a decade later however, local governments continue to vary in terms both of their

performance and of the extent to which they take advantage of the opportunities offered by decentralisation. This study shows that the benefits predicted by proponents of decentralisation provide a palette of possibilities, not of realities.

This study indicates that the promises offered by decentralisation in Indonesia are likely to be realised only when each local government strengthens its capacity and improves accountability in its provision of public goods and services. In other words, improving decentralisation outcomes in terms of well-being is dependent on the ability of local governments to provide goods and services that meet the needs of local citizens. This study shows that citizens report themselves to be happier and more satisfied when local governments are able to provide better public goods and services for them (that is, are able to spend more of their budget on providing public services). In contrast, well-being decreases in the face of local corruption and of weak capacity to govern.

The following points seem to be crucial milestones for Indonesia in improving its local government capacity and enhancing well-being during the decentralisation process. Firstly, with the massive shift of resources to lower levels of government since decentralisation, improving the efficiency of how local resources are spent is the key to achieving better services. Disappointingly however, this study shows that the majority of local governments still spend most of their general allocation fund on civil servant salaries. Helping local governments to spend their resources better by removing full coverage of the civil service wage bill from the general allocation fund would create an incentive for them to allocate that part of their budget earmarked for public services more efficiently. Local governments currently have significant authority over planning and budgets, but they do not yet have clear incentives to use these funds to maximise economic development and service delivery outputs for local citizens. On the contrary, current transfer rules create incentives for local governments to increase the size of their civil service and create disincentives for them to allocate local expenditures more

strategically to achieve their objectives. Elimination of the general allocation funds automatic coverage of all civil service wages would create incentives for local governments to allocate their budgets more efficiently. Significant savings could also be achieved by reducing spending on core administrative services, the largest public spending item of sub-national governments. Disproportionate spending on administrative services has crowded out capital investment and spending on front-line service providers, both of which would generate more output for each rupiah spent. With far larger resources now flowing to the regions, more effective local government administration is required. It therefore becomes crucial to invest in capacity-building with the aim of improving project development and implementation skills. This is especially crucial if local governments are to effectively manage the additional funds needed to tackle low investment in public infrastructure.

Secondly, better allocation policy and planning are also needed so that local public spending can help people who most need it. This study shows disparities in public services and well-being between more developed and less developed regions. Well-being also varies among social, economic, and health groups (e.g. health status of boys and girls, happiness of richer and poorer, health status of ill and healthy groups). Local governments could thus implement allocation better through financing policies that directly target those in greatest need. Such policies would provide benefits not only in terms of improving the well-being of the poor but also in addressing inequalities that may have arisen since decentralisation. For example, this study shows that measures such as *Jamkesmas* increases the number of poor people accessing healthcare. However, this is not enough in itself: local governments could also devise policy to reduce the costs of transportation needed to access hospital services, making it more likely that citizens in rural and remote areas will make use of the healthcare which decentralisation has made available to them. However, the policies of expanding both medical infrastructure

and health insurance coverage need not be mutually exclusive. While building up the former, the government should continue to expand the latter; this will help to reduce the self-payment costs incurred by individuals. As a result, rural and remote island residents would then have extra money to offset commuting costs, ultimately leading to a greater use of health services in Indonesia.

Last but not least, there is a need to strengthen local government accountability. Effective decentralisation and good governance are, to some extent, functions of accountability. Indonesia's decentralisation went hand-in-hand with the country's democratisation. The result was a major realignment of accountability at local government level. This study signals not only good news but also bad news about local accountability during decentralisation. Negative news regarding corruption and money politics is evident, but at the same time there are promising signs for accountability, including the existence of lively social groups, more vocal users of local government services, and an encouraging degree of transparency. Reinforcing accountability of the various channels by clarifying responsibilities, encouraging competition and transparency, fostering a free press, empowering social groups, and showing restraint in interfering in local matters, may thus be the most appropriate stance the government can take. For example, future improvements in governance might focus more on strengthening the linkage between local accountability and citizen happiness.

Improving public spending efficiency, better allocation policy and planning, and strengthening local government accountability are all possibilities for improving decentralisation performance in Indonesia. While the shape of formal institutions, the specific forms of the relationship between state and citizens, and the constraints of regional development are unique to Indonesia, the broader issues of the need to balance the relationship between local government and citizens, the mobilisation of an informed citizenry, and the promotion of local public services and well-being are not. Thus,

this study, which took as its focus a single country, holds lessons for many others; the accomplishments and constraints witnessed by Indonesia's local governments may well resonate in the stories that are experienced in many countries elsewhere in the world.

6.5 Limitations and suggestions for further research

There are certain limitations to my approach that I was not able to deal with in this study; to better validate my conclusion it is vital that future research addresses these shortcomings. In this section, I discuss the issues most in need of further improvement and elaboration, and I provide some suggestions on how to move forward in examining the impact of decentralisation reform in Indonesia on well-being.

6.5.1 Add qualitative research to enrich understanding of the process of decentralisation

This study is based on quantitative research methodology. Its focus is thus on the examination of the relationship between variables associated with decentralisation and the need to test the hypothesis of whether decentralisation is associated with public services and well-being based on survey data. Yin (2009) explains that quantitative methodology is commonly used to answer the research questions who, what, where, how many and how much. The main limitation of this study is thus that it is unable to understand what happened during the process of decentralisation, and the way each stakeholder interacts. For example, in this study we find an indication of some local governments performing better in terms of public service delivery and well-being, but we have been unable to explore in greater depth why and how such differences arise. It is essential therefore to conduct qualitative research to address those research questions that cannot be addressed using the quantitative approach. We could for example

identify relevant case studies, and compare those local governments which perform better and those which perform less well, amassing data from focus group discussions, in-depth interviews and observations to understand why performances differ so widely. Such qualitative research is also fruitful to understand the dynamics of local politics, especially how and to what degree local governments are influenced by the various actors and relationships at play.

6.5.2 Extend research to include longitudinal data

This study rests on cross-sectional data, and as such does not incorporate time as an analytical dimension. This limitation in practice means that causality claims in the true sense cannot be made, and that causality can run in the opposite way than stated. The problem of reverse causality is outlined in chapter two and four. For example, chapter two suggests it is possible the causal chain linking participation and transparency with improved local public services are the other way around. Information dissemination might by itself change respondents' perception of services, simply by providing more information about changes to and improvement in service delivery. In chapter four, almost every determinant could be considered endogenous in the model, as happiness affects almost all aspects of social, political, and economic life, both of individuals and institutions (Graham, 2009). The causation between these determinants is beyond the scope of this study, but constitutes an important future area of research. This study identifies two ways to rule out reverse causality. First, one can use instrumental variable estimation, a method I apply in chapter three. In this study, I use an instrumental variable estimator to rule out reverse causality between mothers' social capital and their children's health. We can also use a set of instruments that highly correlate with mothers' social capital but not with child health. This eliminates the difficulty created by the potentially simultaneous determination of child health and mothers' so-

cial capital. With suitable instruments, the effect of social interaction which facilitates mothers' social capital on child health can be estimated. Second, we also can apply longitudinal data to rule out the possibility that selection rather than causation processes may underlie the relationship between determinants associated with decentralisation and well-being. Unfortunately, longitudinal data involving a sufficient number of local governments, as well as decentralisation and well-being measures to perform multilevel analyses, is yet to be collected.

6.5.3 Extend research to other well-being measures

The second limitation is the well-being measures that this study uses. Although citizens' responses regarding local government performance can be used as a proxy measure for public service performance, this measure may suffer from social desirability bias. The perceived measure is also often affected by determinants unrelated to decentralisation performance, such as age, gender, education, income, ethnicity, attitudes, and predispositions related to political beliefs or past experiences. Future anticipated data collection and analysis will need to improve measurement for individual localities and provide more rigorous controls for potential bias regarding individual satisfaction as a measure of public service delivery quality (including peer group/expectations effects) as well as actual associations with objective measures. Likewise, inpatient length of hospital stay data used in this study is not taken from hospital administrative records, but from a nationally representative survey designed to collect information about the socio-economic condition of Indonesians. This type of data may subject to recall bias and digit preference, meaning that the results and their interpretation are influenced to some extent by reporting bias. Future research would be more likely to avoid this by using data taken directly from hospital inpatient records. Moreover, we could also enlarge other objective and subjective measures of well-being to enhance the robustness of our

conclusions. In this study, I use only four measures of well-being (citizen satisfaction with basic local services, self-rated happiness, child health and healthcare demand). Due to the limitation of data availability, this study is limited to the use of citizen satisfaction and happiness as measures of subjective well-being. However, another measure of subjective well-being is life satisfaction; scholars also refer to suicide rates and mental health as proxy indicators (see for example Graham, 2008). Examining the relationship between decentralisation and various measures of subjective well-being can thus only improve the robustness of our results. Furthermore, given the importance of human development indicators in measuring development achievement in developing countries, it would also be of relevance to refer to mother and children mortality, access to basic education, and poverty as additional measures of well-being and welfare (World Bank, 2004). This relationship between decentralisation and human development indicators would certainly prove an interesting and fruitful research area of investigation.

6.5.4 Extend research to other decentralisation and local government capacity measures

This study uses measures of political and fiscal decentralisation; however, I do not include measures of administrative decentralisation. Future study may thus need to examine, for example, the number of civil servants transferred from central to local government to capture the effect of administrative decentralisation on well-being. Our measure of local leadership and bureaucracy capacity also needs to be improved with better indicators. In chapters two and three, I refer to the *bupati/walikota* or mayor coming from one of the new political parties as a proxy for the new leadership background. In the future, it would be good to also use other leadership capacity measures which capture leadership ideas, skills and strategic choices, all of which can be directly linked with local government performance (Grindle, 2007). Moreover, given the impor-

tance of a leadership network as a mechanism for channelling local government innovation, it would also be interesting to examine the *bupati* networks and their relationship with local government performance. There are five types of leadership networks which may have a strong influence on local performance within the context of decentralisation in Indonesia: religious, military, business, professional bureaucrat, and political. It may thus prove relevant to examine whether the *bupati/walikota* comes from any of these backgrounds. Due to the lack of availability of local government corruption data, this study uses proxy data from respondent answers rather than from a separate data source. In chapter two, I use perceived corruption as a proxy of local government corruption; however, this may suffer from social desirability bias. In chapter three, when constructing the aggregate for proxy data of local government corruption, I try to minimise any measurement error by excluding the respondent from calculations. Nevertheless, these issues may still affect the findings. Future anticipated data collection and analysis are needed to ensure more reliable measures of local government corruption. Henderson and Kuncoro (2002) developed a measure of local government corruption by analysing various types of bribes by firms in Indonesia. This measure is more reliable; however, the survey only covers a limited number of local government authorities. In addition, the model in chapter five does not include detailed measures of quality of hospital healthcare - one of the determinants of healthcare demand - as part of the explanatory determinants. Issues of performance and quality in the delivery of hospital services are also critical when assessing the effectiveness of different healthcare providers to evaluate different health policies. However, adequate measures of quality have not been available to policy-makers and care providers. This is due to the problems inherent in gathering timely and relevant data, the fact that hospital care has so many dimensions, and that so many factors aside from provider quality affect patient outcomes. This is one area of possible future research when the data becomes readily available.

6.5.5 Extend research to longer period of data

Recent studies hint that thinking about the sequence of reform in developing countries is important to ensure understanding of the working of institutional reforms such as decentralisation and local democracy (Grindle, 2007). Decentralisation reform implies change to political organisation, the representation of interests, and the processes involved in public debate and decision-making. Examining decentralisation in terms of its stages of development may thus provide clues to indicate when institutional capacity and local democracy work for effective decentralisation. Traditional theories of fiscal federalism have developed in a Western context, and have been challenged in terms of their political applicability to the design and implementation of decentralisation in developing countries (Bardhan, 2002). Fundamental to the workings of this normative model is the pre-condition that local governments already have sufficient institutional capacity to enable them to discharge their responsibility (Dillinger, 1994). This model implicitly assumes well-established systems and mechanisms that enable citizens to express their preferences and local governments to respond to their demands. In many developing countries that have embraced decentralisation however, these pre-conditions or processes are either lacking or are still in the process of being established and developed. Undertaking analysis of the stages of decentralisation reform would thus provide insight into the time dimension of change and at the same time promote greater tolerance of local governments in developing countries to establish pre-conditions for effective decentralisation. The empirical chapters in this study only refer to one period or point in time, capturing only a snapshot of decentralisation and well-being in Indonesia after about six to eight years of decentralisation. To examine sequences of decentralisation reform, future research would need to examine a longer period of data. This is possible given the annual data made available by the Indonesian National Socio-Economic Survey (Susenas) and the Potential Village Census (Podes) which cover the period before

and after decentralisation. However, I was unable to do this, as the data and time are restricted. Much has been made with the time and data obtained for this study.

6.5.6 Extend research to cover a greater number of local government authorities

One notable downside of using local government as a contextual unit is that the number available to be analysed is necessarily rather low. In particular, data taken from the Governance Decentralisation Survey 2006 and the Indonesian Family Life Survey 2007 cover only around half of the total local government authorities in Indonesia. Although the survey design is representative and provides a sample sufficient to perform multilevel analysis as the highest hierarchical level, statistical power at this level is still relatively low. Thus, part of the non-significant cross-level interaction effects featured in this study (and in particular part of the large number of non-significant direct local government level effects) might have reached statistical significance if I had been able to analyse a larger number of contextual units. However, keeping this limitation in mind, it is all the more compelling that quite substantial and robust local government effects have been found in most of the empirical chapters. If future research were thus able to include a broader range of local governments, this would almost certainly result in even stronger findings on the interplay between decentralisation and individual well-being. Fortunately, the ongoing Indonesian Family Life Survey 2012 includes all of the country's local governments, meaning that I will be able to re-examine the results from chapter three and four when the data is available.

6.5.7 Extend research to include spatial multilevel analyses

The final limitation of this study rests on its use of multilevel analysis, which in this study assumes that local governments are independent of each other. This assumption ignores the geography which states that certain local governments share a boundary with others. In other words, multilevel analysis can account for a nested spatial structure but ignores the non-nested spatial order. For example, the nature of economic development in Indonesia means that it is influenced by that of surrounding regions because of the economic or social processes which crosses regions. For instance, people may go to seek healthcare in the neighbouring local governments because of hospital quality. The mechanism by which well-being may also be affected by spatial process is beyond the scope of this study, but it constitutes an important future area of research. There are a number of ways in which researchers have attempted to add a spatial component to their multilevel model. A series of articles by Morenoff and colleagues (Sampson et al., 1999; Morenoff et al., 2001; Swaroop and Morenoff, 2006) discuss a two-stage procedure employed in order to join multilevel and spatial models (using HLM software). Another methodology splits the higher level variance component into two: a spatially structured component and an unstructured component. Such models have been termed 'hierarchical geo-statistical models' (Chaix et al., 2001). The splitting of the level two variance component can be accomplished through the use of multiple membership models or conditional autoregressive models, which are usually estimated using Bayesian estimation procedures (available in MLwiN or WinBUGS) (see Lawson et al., 2004). It has been shown that these provide a better model fit and more precise and stable estimates of the higher level intercepts than conventional multilevel models (Chaix et al., 2001; Savitz and Raudenbush, 2009; Swaroop and Morenoff, 2006). Moreover, they can also be used to measure the magnitude of diffusion, feedback, and spill over effects resulting from spatial proximity.

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Appendix A

Appendix 1: Multilevel regression results and correlations

A.1 Chapter two

A.1.1 Multilevel regression results with factor analysis of perceived local public service performance

	Model A		Model B	
	coef.	(s.e)	coef.	(s.e.)
<i>Household</i>				
Age of household head	0.001†	0.001	0.002†	0.001
Female household head	0.047	0.039	0.061	0.041
Household head education	0.008	0.010	0.014	0.011
Log household expenditure	0.003	0.020	0.010	0.021
Unemployed household head	-0.048	0.034	-0.051	0.035
Eastern part Indonesia	-0.207‡	0.047	-0.164‡	0.049
Remote islands	-0.513†	0.213	-0.323†	0.182
Participate in community programme	0.044†	0.014	0.043†	0.014
Knowledge about village development budget	0.081†	0.032	0.047†	0.033
Perceived corruption in local government	-0.190†	0.015	-0.186†	0.015
Knowledge conflict related to local and national election	-0.070†	0.040	-0.080†	0.042
Participate in local election	-0.007	0.040	0.002	0.041
Have access to newspapers, radio, tv and Internet	0.030†	0.012	0.029†	0.012
<i>Local government</i>				
Direct democracy	0.078	0.147	0.066	0.154
Proportion of adult literacy	0.236	0.616	0.532	0.671
Proportion of active social groups	0.495†	0.410	0.472†	0.435
Political fragmentation	-0.166‡	0.478	-0.147†	0.484
Share of public services spending on total development spending			0.767	0.517
Proportion of public managers with graduate education			0.067	0.222
Mayor from new political party			-0.003	0.149
Constant	-0.261‡	0.597	-1.376‡	0.741
ρ	0.044		0.052	
Significance: * :10% †:5% ‡≤ 1%				

A.2 Chapter three

A.2.1 Multilevel regression results of self rated happiness with xtmixed

	Model A		Model B		Model C	
	Odd.	se	odd.	se	odd.	se
<i>Local government</i>						
Log total public service spending	0.094‡	0.024	0.103‡	0.025	0.098‡	0.027
Shared of balancing fund on total revenue	0.002‡	0.001	0.004‡	0.001	0.004‡	0.001
Proportion of civil service salary on total development expenditure	-0.020‡	0.066	-0.032‡	0.070	-0.042‡	0.072
Direct election	0.010	0.011	0.003	0.012	0.003	0.012
Shared of population vote majors because large campaign fund and same ethnicity	-0.086‡	0.021	-0.059‡	0.023	-0.059‡	0.023
Conflict and violence incidence	-0.028‡	0.014	-0.034‡	0.015	-0.034‡	0.015
Mayor comes from new political party	-0.023	0.015	-0.008	0.015	-0.008	0.015
Proportion of village head with graduate education or above	0.041	0.033	0.041	0.035	0.039	0.035
Proportion of active social groups	0.115‡	0.034	0.074‡	0.036	0.073‡	0.036
Log gross domestic product	-0.022‡	0.011	-0.023‡	0.011	-0.023‡	0.011
Geographic areas (in 1,000km ²)	-0.016	0.024	-0.007	0.025	-0.006	0.025
<i>Individual</i>						
Age			-0.003‡	0.000	-0.003‡	0.000
Age ²			0.000‡	0.000	0.000‡	0.000
Female			0.007‡	0.006	0.007‡	0.006
Years schooling			0.006‡	0.001	0.006‡	0.001
Unemployed			-0.082‡	0.023	-0.111‡	0.026
Divorced			-0.198‡	0.019	-0.198‡	0.019
Widowed			-0.055‡	0.013	-0.054‡	0.013
Praying every day			0.038‡	0.008	0.038‡	0.008
Poor health			-0.067‡	0.006	-0.068‡	0.006
Help neighbors			0.032‡	0.007	0.032‡	0.007
Living separately from spouse			-0.063‡	0.013	-0.063‡	0.013
No child			-0.094‡	0.014	-0.094‡	0.014
Household size			0.004‡	0.002	0.004‡	0.002
Log household expenditure			0.063‡	0.005	0.063‡	0.005
Remote islands			-0.007	0.068	-0.007	0.068
Migration			-0.011	0.008	-0.011	0.008
High spending x poor health					0.007	0.015
High spending x unemployed					0.118‡	0.052
Constant	1.650‡	0.305	0.348‡	0.340	0.439‡	0.372
Local government variances	0.025		0.026		0.027	
Log likelihood	-11810.071		-8142.667		-8140.0224	
Significance: ‡:5% ‡ ≤ 1%						

A.2.2 Bivariate correlation of self rated happiness determinants

	1	2	3	4	5	6	7
1	1						
2	0.01‡	1					
3	0.01	-0.11‡	1				
4	0.02‡	0.53‡	0.09‡	1			
5	-0.02	-0.01‡	0.08‡	0.17‡	1		
6	-0.05‡	-0.01	-0.06‡	0.29‡	0.11‡	1	
7	-0.03‡	0.37‡	-0.03‡	-0.02	0.28‡	0.33‡	1
8	0.05‡	0.05‡	0.05‡	-0.33‡	0.06‡	-0.35‡	0.10‡
9	0.04‡	-0.03‡	0.09‡	-0.44‡	0.01	0.47‡	0.17‡
10	-0.01	0.02	0.18‡	-0.08‡	0.06‡	-0.07‡	-0.01
11	0.02‡	0.87‡	0.00	-0.61‡	-0.01	-0.35‡	0.19‡
12	0.00	0.07‡	0.05‡	0.28‡	-0.33‡	0.11‡	-0.03‡
13	-0.09‡	-0.04‡	0.02	0.06‡	0.07‡	0.03‡	0.01
14	-0.02‡	-0.01	0.01	0.01	0.02	0.00	0.01
15	0.02‡	-0.02	-0.01	0.01	0.00	0.01	-0.02
16	0.15‡	0.00	0.02	-0.17‡	-0.03‡	-0.24‡	-0.03‡
17	-0.02‡	0.02	-0.01	-0.01	0.01	-0.02‡	0.02
18	-0.08‡	-0.01	-0.01	0.00	0.00	0.01	-0.01
19	-0.06‡	-0.02‡	-0.01	0.02‡	0.03‡	0.02	0.00
20	0.04‡	-0.01	0.00	0.01	0.02	0.04‡	0.01
21	-0.12‡	-0.04‡	0.01	0.02	-0.01	-0.02‡	-0.04‡
22	0.03‡	0.00	-0.02	0.05‡	0.02	0.06‡	0.03‡
23	-0.02	0.04‡	-0.02	-0.01	0.03	0.03‡	0.03‡
24	0.04‡	0.02	0.00	-0.03‡	-0.04‡	-0.03‡	-0.01
25	0.00	-0.06‡	-0.01	0.03‡	-0.01	-0.01	-0.04‡
26	0.11‡	0.02	0.05‡	-0.20‡	-0.07‡	-0.26‡	-0.07‡
27	0.00	-0.03‡	-0.04‡	0.02‡	-0.10‡	0.02	-0.09‡
28	0.02	0.03‡	-0.01	-0.07‡	-0.05‡	-0.07‡	-0.03‡
29	0.01‡	0.67‡	-0.07‡	-0.37‡	-0.20‡	0.00	0.19‡
30	0.01‡	0.12‡	-0.02	-0.06	-0.03‡	0.00	0.02‡

Significance: †:5% ‡ ≤ 1%

Note: 1: self-rated happiness; 2: log total public service spending; 3: direct election; 4: shared of balancing fund on total revenue; 5: proportion of civil service salary on total development expenditure; 6: shared of population vote majors because large campaign fund and same ethnicity; 7: conflict and violence incidence; 8: proportion of active social groups; 9: proportion of village head with graduate and higher education; 10: mayor from new political party; 11: log gross domestic product; 12: geographic areas (1,000 km²); 13: age; 14: age²; 15: female; 16: education; 17: unemployment; 18: divorces; 19: widowed; 20: praying every day; 21: poor health; 22: help neighbours; 23: living separately from spouse; 24: no child; 25: household size; 26: log household expenditure; 27: remote islands; 28: migration; 29: interaction between high spending and poor health; 30: interaction between high spending and unemployed.

	8	9	10	11	12	13	14
8	1						
9	0.71‡	1					
10	-0.10‡	-0.05‡	1				
11	0.38‡	0.45‡	-0.06‡	1			
12	-0.31‡	-0.42‡	-0.09‡	-0.07‡	1		
13	-0.04‡	-0.03‡	0.02	-0.05‡	-0.02‡	1	
14	-0.01	-0.01	0.00	-0.01	-0.01	0.54‡	1
15	0.00	0.00	-0.01	-0.02	0.00	0.00	0.01
16	0.22‡	0.22‡	-0.01	0.11‡	-0.12‡	-0.39‡	-0.08‡
17	0.04‡	0.04‡	-0.01	0.05‡	-0.03‡	-0.09‡	-0.02
18	0.00	0.00	0.01	0.00	-0.01	0.05‡	0.01
19	-0.02	-0.01	0.00	-0.03‡	-0.02	0.37‡	0.09‡
20	-0.02	-0.04‡	-0.01	-0.03‡	-0.01	0.07‡	0.02
21	0.00	0.02	0.01	0.00	0.01	0.14‡	0.02‡
22	-0.04‡	-0.03‡	0.00	-0.02	0.03‡	-0.02‡	-0.01
23	0.00	0.00	0.00	0.03‡	-0.03‡	-0.07‡	-0.02
24	0.02	0.01	-0.02	0.03‡	0.02	-0.44‡	-0.10‡
25	0.03‡	0.04‡	-0.02‡	-0.03‡	0.01	-0.10‡	-0.03‡
26	0.21‡	0.24‡	-0.02	0.18‡	-0.10‡	-0.02	0.00
27	-0.02‡	-0.05‡	-0.02‡	-0.06‡	0.07‡	0.00	0.00
28	0.04‡	0.03‡	-0.02	0.04‡	0.00	-0.07‡	-0.02‡
29	-0.02‡	-0.05‡	0.08‡	0.39‡	0.02	-0.03‡	-0.01
30	0.00	0.00	0.02	0.06‡	0.00	-0.05‡	-0.01
	15	16	17	18	19	20	21
15	1						
16	-0.09‡	1					
17	-0.09‡	0.06‡	1				
18	0.06‡	-0.06‡	0.00	1			
19	0.16‡	-0.24‡	-0.03‡	-0.03‡	1		
20	0.11‡	0.04‡	-0.03‡	-0.02	0.02‡	1	
21	0.05‡	-0.10‡	0.00	0.02‡	0.08‡	-0.02	1
22	-0.05‡	0.05‡	0.03‡	0.00	-0.04‡	0.01	-0.06‡
23	0.05‡	0.03‡	0.01	-0.02	-0.05‡	-0.01	-0.01
24	-0.22‡	0.27‡	0.02‡	-0.03‡	-0.50‡	-0.02	-0.09‡
25	-0.01	0.03‡	0.05‡	-0.03‡	-0.10‡	-0.02‡	0.01
26	0.00	0.36‡	-0.02‡	-0.01	0.00	0.04‡	-0.01
27	0.00	-0.01	-0.01	0.00	0.00	0.02	0.03‡
28	-0.01	0.17‡	0.01	0.02‡	-0.04‡	0.00	-0.01
29	-0.01	0.01	0.01	-0.01	-0.02‡	-0.01	0.09‡
30	-0.04‡	0.02‡	0.48‡	-0.01	-0.02	-0.02	0.00

Significance: ‡:5% ‡ ≤ 1%

Note: 1: self-rated happiness; 2: log total public service spending; 3: direct election; 4: shared of balancing fund on total revenue; 5: proportion of civil service salary on total development expenditure; 6: shared of population vote majors because large campaign fund and same ethnicity; 7: conflict and violence incidence; 8: proportion of active social groups; 9: proportion of village head with graduate and higher education; 10: mayor from new political party; 11: log gross domestic product; 12: geographic areas (1,000 km²); 13: age; 14: age²; 15: female; 16: education; 17: unemployment; 18: divorces; 19: widowed; 20: praying every day; 21: poor health; 22: help neighbours; 23: living separately from spouse; 24: no child; 25: household size; 26: log household expenditure; 27: remote islands; 28: migration; 29: interaction between high spending and poor health; 30: interaction between high spending and unemployed.

	22	23	24	25	26	27	28
22	1						
23	-0.01	1					
24	0.04‡	0.03‡	1				
25	0.01	-0.07‡	0.09‡	1			
26	0.00	0.04‡	0.02	-0.31‡	1		
27	-0.02	-0.02	0.00	-0.02	0.01	1	
28	-0.01	0.08‡	0.06‡	-0.09‡	0.12‡	0.01	1
29	-0.04‡	0.02	0.02	-0.04‡	0.02	-0.03‡	0.02‡
30	0.01	0.01	0.01	0.02‡	-0.02	-0.01	0.00
	29	30					
29	1						
30	0.15‡	1					

Significance: ‡:5% ‡ ≤ 1%

Note: 1: self-rated happiness; 2: log total public service spending; 3: direct election; 4: shared of balancing fund on total revenue; 5: proportion of civil service salary on total development expenditure; 6: shared of population vote majors because large campaign fund and same ethnicity; 7: conflict and violence incidence; 8: proportion of active social groups; 9: proportion of village head with graduate and higher education; 10: mayor from new political party; 11: log gross domestic product; 12: geographic areas (1,000 km²); 13: age; 14: age²; 15: female; 16: education; 17: unemployment; 18: divorces; 19: widowed; 20: praying every day; 21: poor health; 22: help neighbours; 23: living separately from spouse; 24: no child; 25: household size; 26: log household expenditure; 27: remote islands; 28: migration; 29: interaction between high spending and poor health; 30: interaction between high spending and unemployed.

A.3 Chapter five

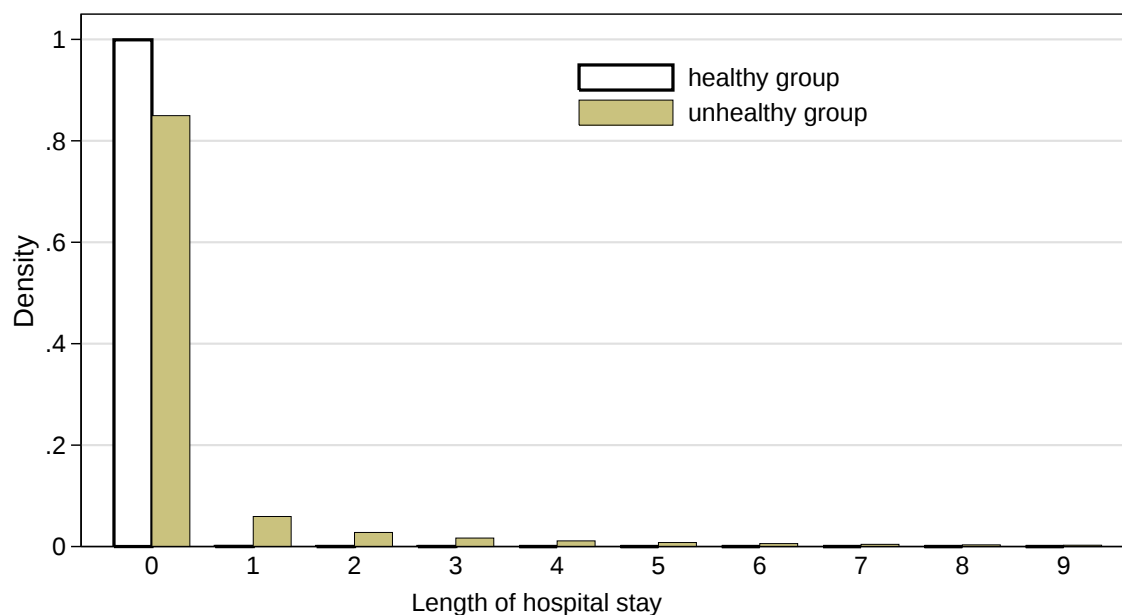
A.3.1 Bivariate correlation of healthcare demand determinants

	1	2	3	4	5	6	7
1	1						
2	-0.001	1					
3	0.013‡	0.227‡	1				
4	-0.017‡	0.289‡	-0.418‡	1			
5	0.005‡	-0.228‡	-0.112‡	-0.145‡	1		
6	0.008‡	-0.262‡	0.185‡	-0.539‡	0.126‡	1	
7	0.003	-0.127‡	-0.059‡	-0.308‡	0.198‡	0.147‡	1
8	0.001	0.025‡	-0.002	0.016‡	0.010‡	-0.033‡	0.054‡
9	0.035‡	-0.047‡	-0.003	-0.066‡	0.032‡	0.033‡	0.051‡
10	-0.007‡	0.049‡	0.006‡	0.076‡	-0.029‡	-0.049‡	-0.085‡
11	0.002	-0.006‡	0.001	-0.011‡	0.004‡	0.003‡	0.005‡
12	0.019‡	-0.022‡	-0.015‡	-0.014‡	0.010‡	0.012‡	0.033‡
13	0.010‡	-0.015‡	0.161‡	-0.176‡	-0.003	0.117‡	0.011‡
14	0.032‡	0.106‡	0.257‡	-0.153‡	-0.067‡	0.130‡	-0.022‡
15	0.021‡	-0.066‡	0.395‡	-0.539‡	0.008‡	0.340‡	0.113‡
16	0.043‡	0.006‡	-0.019‡	0.034‡	-0.010‡	-0.025‡	0.004‡
17	-0.007‡	0.176‡	-0.068‡	0.229‡	-0.075‡	-0.109‡	-0.129‡
18	0.019‡	0.006‡	0.165‡	-0.156‡	-0.019‡	0.118‡	0.020‡
19	0.004‡	0.071‡	-0.063‡	0.149‡	-0.032‡	-0.119‡	-0.087‡
	8	9	10	11	12	13	14
8	1						
9	0.001	1					
10	0.007‡	-0.212‡	1				
11	-0.001	0.022‡	-0.023‡	1			
12	0.001	0.599‡	-0.140‡	0.007‡	1		
13	-0.003	0.204‡	-0.033‡	-0.046‡	0.274‡	1	
14	0.024‡	-0.103‡	0.413‡	-0.022‡	-0.038‡	0.278‡	1
15	0.001	0.012‡	0.004‡	0.006‡	-0.0131‡	0.235‡	0.327‡
16	0.002	0.055‡	-0.043‡	0.004‡	0.008‡	-0.111‡	-0.040‡
17	-0.022‡	-0.033‡	0.066‡	-0.003	-0.017‡	-0.067‡	-0.085‡
18	-0.002	0.015‡	0.028‡	0.007‡	0.006‡	0.251‡	0.352‡
19	-0.066‡	-0.007‡	0.068‡	0.002	-0.040‡	-0.150‡	-0.239‡
	15	16	17	18	19		
15	1						
16	-0.031‡	1					
17	-0.135‡	0.038‡	1				
18	0.246‡	-0.026‡	-0.045‡	1			
19	-0.168‡	0.067‡	0.075‡	-0.196‡	1		

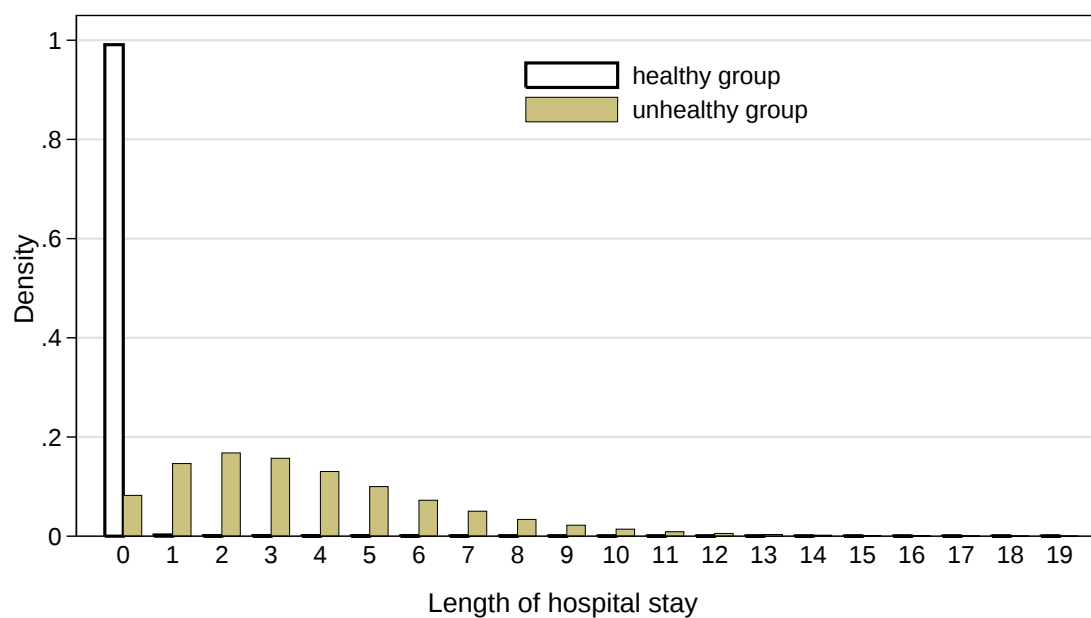
Significance: ‡:5% ‡ ≤ 1%

Note: 1: length of hospital stay; 2: local health spending per capita; 3: physicians per 1,000 population; 4: log average transportation cost; 5: shared of general allocation fund on total revenue; 6: number of hospitals; 7: bed occupancy ratio; 8: covered by local health insurance; 9: age; 10: household size; 11: female; 12: married; 13: education; 14: log household expenditure; 15: urban; 16: number of health symptoms; 17: remote islands; 18: number of health insurance; 19: covered by *Jamkesmas*.

A.3.2 The distribution of two component multilevel finite mixture negative binomial for unconditional being ill sample



A.3.3 The distribution of two component multilevel finite mixture negative binomial for conditional being ill sample



Appendix B

Appendix 2: Stata and MPlus code

B.1 Stata code for chapter two

```
* pre_govgds, jarwo 21 Jan 2012
* does tranforming local political institution and
* incentives via political decentralisation
* improve local public service performance?
* inspired from the works of :
* 1. Kaiser, K and Pattinasarany, D and Schulze, GG (2006)
*   Decentralisation, governance and public service in Indonesia
* 2. Eckhardt, S (2008) Political accountability, fiscal conditions and
*   local government performance: cross-sectional evidence from Indonesia
* I improve those works by applying multilevel mimic analyses as those works are
* either based on aggregate analysis or individual analysis
* I use recent data from GDS 2006
* multilevel mimic analyses are estimated using MPlus program
* the findings confirm prior studies:
* 1. less effective local political institutions negatively associatid
*   with performance
* 2. participation via community activities and social groups positively
*   associated with performance
* 3. incentives through fiscal dec positively associated with
*   performance particularly when
*   more budget spends for services which directly consumed by citizens

* Note that respondent is household since perceived satisfaction
* on services questions are asked to household head
* age, education, employment status are refered to household head
```

```
clear all
```

```

set mem 200m
set more off
capture log close
set lines 140
set matsize 300

* create directories for better files management
log using E:\data\chapter2\pre_govgds, text replace
global dir1 "E:\data\chapter2\gds2\"
global dir2 "E:\data\chapter2\gds2\pemda2006"
global dir3 "E:\data\chapter2\gds2\data"
global dir4 "E:\data\chapter2\gds2\temp"
global dir5 "E:\data\chapter2\gds2\logfile"

use $dir1\gds11_a, clear
* health service
recode rd4_1 (3=0)(2=1)(1=2)(else=.), gen (hltserv)
// else =. = do not know and not applicable
label var hltserv "perceive of health services"
label def hltserv 0 "worst" 1 "no change" 2 "better"
label val hltserv hltserv

* education service
recode re3_1a (3=0)(2=1)(1=2)(else=.), gen (eduserv)
label var eduserv "perceive of education services"
label def eduserv 0 "worst" 1 "no change" 2 "better"
label val eduserv eduserv

* general service
recode rf2_1 (3=0)(2=1)(1=2)(else=.), gen (genserv)
label var genserv "perceive of general adm. service"
label def genserv 0 "worst" 1 "no change" 2 "better"
label val genserv genserv

* factor analysis
factor hltserv eduserv genserv, pcf
predict perform
rotate

recode rk4_5a (1=1) (3=0) (else=.)
recode rk4_5b (1=1) (3=0) (else=.)
recode rk4_5c (1=1) (3=0) (else=.)
recode rk4_5d (1=1) (3=0) (else=.)

```

```

recode rk4_5e (1=1) (3=0) (else=.)
egen abmed=rsum(rk4_5a rk4_5b rk4_5c rk4_5d rk4_5e)
    label var abmed "use media in last week (radio, tv, newspaper, internet)"

recode rc1_7a (1=0) (3=1) (else=.), gen(npns)
    label var npns "non pns respondent"
    label def npns 1 "yes" 0 "no"
    label val npns npns

egen pce= rsum (rm5_1 rm5_2)
// need to multiply with consumer price index 2006 later
    label var pce "household monthly expenditure"

recode rk2_1 (1=1) (else=0), gen (polpar)
    label var polpar "participate in major election"
    label def polpar 1 "yes" 0 "no"
    label val polpar polpar

recode rd6_1 (1=1) (3=0) (else=.)
recode rd6_2 (1=1) (3=0) (else=.)
recode re5_1 (1=1) (3=0) (else=.)
recode re5_2 (1=1) (3=0) (else=.)
recode rf4_1 (1=1) (3=0) (else=.)
recode rf4_2 (1=1) (3=0) (else=.)
recode rg5_1 (1=1) (3=0) (else=.)
recode rg5_2 (1=1) (3=0) (else=.)
egen corrup=rsum( rd6_1 rd6_2 re5_1 re5_2 rf4_1 rf4_2 rg5_1 rg5_2)
    label var corrup "perceived corruption in local government"

recode rk3_1a (1=1) (3=0) (else=.), gen(bgt)
    label var bgt "knowledge about local government budget"
    label define bgt 1 "yes" 0 "no"
    label value bgt bgt

destring prov, replace
gen eastern=prov
recode eastern (51/91=1) (else=0)
    label var eastern "respondent living at eastern Indonesia"
    label def eastern 0 "outside eastern" 1 "eastern"
    label val eastern eastern

gen remote=0
    replace remote=1 if kabunm == "KAB. JAYAWIJAYA" | kabunm == "KAB. BURU" | ///

```

```

kabunm == "KAB. KEPULAUAN SULA" | ///
kabunm=="KAB. TIMOR TENGAH SELATAN" | kabunm == "KAB. BARRU" | ///
kabunm == "KAB. ALOR" | ///
kabunm=="KAB. PANGKAJENE KEPULAUAN" | kabunm=="KAB. FLORES TIMUR" | ///
kabunm=="KAB. NIAS"
label var remote "respondents living in small islands"
label def remote 1 "yes" 0 "no"
label val remote remote

recode daerah (1=1) (2=0), gen(urban)
label def urban 1 "urban" 0 "rural"
label var urban "respondent living in urban areas"
label val urban urban

destring prov kabu keca desa, replace
keep gds11 gds12 gds13 prov kabu keca desa provnm kabunm kecanm desanm daerah ///
pce polpar eastern remote hltserv eduserv genserv perform corrup ///
npns abmed bgt urban
save $dir41, replace

use $dir111_b, clear
recode rb_4 (1=0) (3=1), gen (female)
label var female "female respondent"
label def female 1 "female" 0 "male"
label val female female

gen edu = rb_9
replace edu=0 if rb_8 ==1
replace edu=. if edu > =8 // don't have answer
label var edu "respondents education"
label def edu 0 "no schooling" 1 "elementary school" 2 "junior high school" ///
3 "high school" 4 "diploma 1" 5 "diploma 2" 6 "undergraduate" 7 "post graduate"
label val edu edu

ren rb_7 age
drop if age > 90 // removed outliers
label var age "respondent age when interviewed"

recode rb_11 (1=0) (3=1) (else=.), gen(unemp)
label var unemp "unemployed respondents"
label def unemp 1 "yes" 0 "no"
label val unemp unemp
keep gds11 age female edu unemp rb_1

```

```

keep if rb_1==1 // only use household head
save $dir42, replace

use $dir111_j2, clear
gen parti=rj2_2
    replace parti=0 if rj2_1==0
    recode parti (1=1) (else=0)
    bysort gds11: egen part=sum(parti)
    bysort gds11: keep if _n==1 // only use one obs.
    label var part "participation in community activities"
keep gds11 part
save $dir43, replace

use $dir111_i.dta, clear
keep if ri_type==5
    recode ri_1 (1=1) (3=0) (else=.), gen(cpkd)
    label var cpkd "conflict on local and national election"
    // proxy less effective political institutions
    label def cpkd 1 "yes" 0 "no"
    label val cpkd cpkd
keep gds11 cpkd
save $dir44, replace

* public manager education
use $dir112,clear
keep prov kabu lb1_7
destring prov kabu, replace
recode lb1_7 (6 7 = 1) (else=0), gen (edu)
save $dir4, replace

use $dir121,clear
keep prov kabu sb_7
destring prov kabu, replace
recode sb_7 (6 7 = 1) (else=0), gen (edu)
save $dir4, replace

use $dir126,clear
keep prov kabu ib_7
destring prov kabu, replace
recode ib_7 (6 7 = 1) (else=0), gen (edu)
save $dir4, replace

use $dir131,clear

```

```

keep prov kabu pc_7
destring prov kabu, replace
recode pc_7 (6 7 = 1) (else=0), gen (edu)
save $dir4, replace

use $dir135,clear
keep prov kabu eb_7
destring prov kabu, replace
recode eb_7 (6 7 = 1) (else=0), gen (edu)
save $dir4, replace

use $dir137,clear
keep prov kabu hb_7
destring prov kabu, replace
recode hb_7 (6 7 = 1) (else=0), gen (edu)
save $dir4, replace

append using $dir4, keep(prov kabu edu)
append using $dir4, keep(prov kabu edu)
append using $dir4, keep(prov kabu edu)
append using $dir4, keep(prov kabu edu)
append using $dir4, keep(prov kabu edu)
append using $dir4, keep(prov kabu edu)
bysort prov kabu: egen bredu=mean(edu)
    label var bredu "proportion of public managers with grad/postgrad edu"
bys prov kabu: keep if _n==1
ren prov prop
ren kabu kabkota
keep prop kabkota bredu
save $dir4, replace

* put all together
use $dir41, clear
destring prov kabu, replace
mmerge gds11 using $dir42, ukeep(age female edu unemp rb_1)
mmerge gds11 using $dir43
mmerge gds11 using $dir44
save $dir4, replace

* merge all local government vars
use $dir22, clear // N local gov in gds 2 = 134
mmerge prop kabkota using $dir4, ukeep (bredu)
mmerge id_district using $dir206, ukeep(lit)

```

```

drop if _merge==2
mmerge id_district using $dir206, ukeep(sosgrp)
keep if _merge==3
mmerge id_district using $dir206, ukeep(demdir lead)
mmerge id_district using $dir205, ///
ukeep(totrev pad bfund hltxp eduexp admexp devexpend)
mmerge id_district using $dir22005, ukeep(cpi2005)
mmerge id_district using $dir22006, ukeep(cpi2006)
keep if _merge==3

* labelling polfrag and demdir
label var polfrag "political parties fragmentation 2004-2009"
label def polfrag 1 "yes" 0 "no"
label val polfrag polfrag

label var demdir "direct election"
label def demdir 1 "yes" 0 "no"
label val demdir demdir

* generate riil local government balancing fund, revenue and spending
gen rbfund=bfund*cpi2005
// riil local government balancing fund
gen rtotrev=totrev*cpi2005
// riil total local government revenue
gen rtotdev=devexpend*cpi2005
// riil total local government development expenditure
gen rpad=pad*cpi2005
// riil local government own source revenue
egen spend=rsum(hltxp eduexp admexp)
// spending for health, education and gov. administration
gen rspend=spend*cpi2005
// riil spending for health, education and gov. adminitration

* share balancing fund on total revenue, total spending for adm.,
* health and educations service
gen sbfund=rbfund/rtotrev
label var sbfund "share balancing fund on total revenue 2005"
* kdensity, normal
gen spad=rpad/rtotrev
label var spad "share local own resources revenue on total revenue 2005"
* kdensity, normal
gen spserv=rspend/rtotdev
label var spserv "share spending on adm.,health and edu service on totdev spend 2005"

```

```

* kdensity, normal

keep id_district prop kabkota bredu lit sosgrp sbfund spad ///
spserv demdir polfrag lead cpi2006
save $dir4, replace

* merge individu with local gov vars
use $dir4, clear
ren prov prop
ren kabu kabkota
mmerge prop kabkota using $dir4, ukeep(id_district bredu ///
lit sosgrp sbfund spad spserv demdir polfrag lead cpi2006)
keep if _merge==3
drop _merge

* riil household expenditure
gen rpce =pce*cpi2006
replace rpce=(rpce)+(0.05*rpce) if urban==0
// inflation in rural area taken to be 5% higher than urban area
    label var rpce "real household expenditure"
gen lpce=ln(rpce)
* check k-density, normal
    label var lpce "log real household expenditure"

drop if age <=17 // only use respondent who have right to vote
drop if perform==.

keep perform hltserv eduserv genserv female age edu lpce unemp ///
npns eastern remote part bgt corrup cpkd ///
lit abmed sosgrp demdir polp bredu polfrag id_district sbfund ///
spad spserv lead

order perform female age edu lpce unemp npns eastern remote ///
part bgt corrup cpkd lit abmed demdir polp polfrag sbfund ///
spad spserv bredu lead id_district

* clean before use
!del $dir4
!del $dir4
!del $dir206
!del $dir206
!del $dir206
!del $dir205

```

```
!del $dir22005
!del $dir22006
```

```
* check missing missing data
gen byte complete= perform !=. & hltserv !=. & eduserv !=. ///
& genserv !=. & female !=. ///
& age!=. & edu!=. & lpce!=. & unemp!=. & npns!=. & eastern!=. ///
& remote!=. & part!=. ///
& bgt!=. & corrup!=. & cpkd !=. & lit!=. & abmed!=. & sosgrp!=. ///
& demdir!=. & polp!=. ///
& bredu!=. & polfrag!=. & sbfund!=. & spad!=. & spserv!=. & lead!=.
```

```
* tab complete, missing data= 15%
```

```
* for multilevel analysis later, create numeric commid,
* just use the 1st obs number
sort id_district
gen obsn = _n
bysort id_district: gen idkabkota=obsn[1]
xtset idkabkota
```

```
order id_district age female edu lpce unemp eastern remote ///
part bgt corrup cpkd ///
polp abmed demdir lit sosgrp polfrag bredu spserv lead
```

```
sum perform age female edu lpce unemp eastern remote part ///
bgt corrup cpkd ///
polp abmed demdir lit sosgrp polfrag bredu spserv lead
```

```
pwcorr perform age female edu lpce unemp eastern remote part ///
bgt corrup cpkd ///
polp abmed demdir lit sosgrp polfrag bredu spserv lead, star(.05) bon
```

```
estpost correlate perform age female edu lpce unemp eastern remote part ///
bgt corrup cpkd ///
polp abmed demdir lit sosgrp polfrag bredu spserv lead, matrix listwise
est store c1
esttab using $dir4.tex", unstack noobs compress
```

```
global xvars1 part bgt corrup cpkd lit demdir polp abmed sosgrp polfrag
global xvars2 age female edu lpce unemp eastern remote part ///
bgt corrup cpkd polp abmed demdir lit sosgrp polfrag
```

```

global xvars3 age female edu lpce unemp eastern remote part ///
bgt corrup cpkd polp abmed ///
demdir lit sosgrp polfrag spserv bredu lead

save $dir3_gds2006, replace

* Analyses
xtreg perform, i(idkabhkta) re robust
estimates store perform0, title(perform0)
    estimates store perform0, title(perform0)
    estout perform0, style(fixed) cells ("b(fmt(%9.3f)) se(fmt(%9.3f)) ///
    p (fmt(%8.2f))")
    estout perform0 using "perform0.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

xtreg perform $xvars1, i(idkabhkta) re robust
estimates store perform1, title(perform1)
    estimates store perform1, title(perform1)
    estout perform1, style(fixed) cells ("b(fmt(%9.3f)) se(fmt(%9.3f)) ///
    p (fmt(%8.2f))")
    estout perform1 using "perform1.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

xtreg perform $xvars2, i(idkabhkta) re robust
estimates store perform2, title(perform2)
    estimates store perform2, title(perform2)
    estout perform2, style(fixed) cells ("b(fmt(%9.3f)) se(fmt(%9.3f)) ///
    p (fmt(%8.2f))")
    estout perform2 using "perform2.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

xtreg perform $xvars3, i(idkabhkta) re robust
estimates store perform3, title(perform3)
    estimates store perform3, title(perform3)
    estout perform3, style(fixed) cells ("b(fmt(%9.3f)) se(fmt(%9.3f)) ///
    p (fmt(%8.2f))")
    estout perform3 using "perform3.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

```

```

codebook
log close
exit

* next work at mplus
* first transfer the data to mplus format
* stata2mplus using "E:\data\chapter2\gds2\data\pre_gds2006", replace

* create map
clear all
set mem 200m
set more off
* map
cd e:
use ssindex, clear
mmerge id_district using masterkodessn2009
keep if _merge==3
drop _merge
save ssi, replace
use masterpetaina, clear
mmerge prop kabkota using ssi, ukeep (id_district nssi)
drop if _merge==2
drop _merge

cd e: shp2dta using indo_kab_rm, database(subar) coordinate(indocoor) ///
genid(id) replace
set scheme slcolor
spmap nssi using "indocoor.dta", id(id) fcolor(Reds2) clnumber(4) ///
clbreak (-0.7 0 1 2) ///
ndfcolor(none) ocolor(none ..)
graph save $dir3, replace

graph export e:..eps, replace

* create graph
clear all
set mem 200m
set more off
use E:, replace
* drop if id_district=="Kab. Jayawijaya"
* drop if id_district=="Kab. Kepulauan Sula"

* scatter plot

```

```

set scheme sicolor
tway scatter nssi mpserv || lfit nssi mpserv, ///
ytitle(seholds) plotregion(style(none)) ///
yaxis(1 2) xsize(7)
graph save srv, replace
tway scatter nssi mspad || lfit nssi mspad, ///
ytitle(seholds) plotregion(style(none)) ///
yaxis(1 2) xsize(7)
graph save spad, replace

graph combine srv.gph spad.gph

tway scatter nssi msosgrp || lfit nssi msosgrp, ///
ytitle(seholds) plotregion(style(none)) ///
yaxis(1 2) xsize(7)
graph save sos, replace
tway scatter nssi mpart || lfit nssi mpart, ///
ytitle(seholds) plotregion(style(none)) ///
yaxis(1 2) xsize(7)
graph save part, replace
graph combine sos.gph sos.gph

tway scatter nssi mmed || lfit nssi mmed, ///
ytitle(seholds) plotregion(style(none)) ///
yaxis(1 2) xsize(7)
graph save med, replace
tway scatter nssi mcpkd || lfit nssi mcpkd, ///
ytitle(seholds) plotregion(style(none)) ///
yaxis(1 2) xsize(7)
graph save cpkd, replace
graph combine med.gph cpkd.gph

pwcrr nssi mpserv mspad msosgrp mpar mmed mcpkd,star(.01) bon
pwcrr nssi mpserv mspad msosgrp mpar mmed mcpkd,star(.05) bon
pwcrr nssi mpserv mspad msosgrp mpar mmed mcpkd,star(.10) bon
clear

* graph rank
cd e:
use ssprop, clear
save temp1, replace

use gds1, clear

```

```

summ ssi
local n=_N
gen append=0
gsort -ssi
append using temp1
replace append=1 if append==.

gen str label1=""
local i=1
while 'i'<='n'
replace label1=district if append==0 & _n=='i'
local i='i'+60

summ ssi
replace label1=district if ssi==r(min)

gen str label2=""
local i=2
while 'i'<='n'
replace label2=district if append==0 & _n=='i'
local i='i'+60

summ ssi if append==1
gen str label3=district if district=="Yogyakarta" ///
| district=="Gorontalo" | ///
district=="Kalimantan Barat" | district=="Maluku Utara" ///
| district=="Jawa Barat" ///
| district=="Sumatra Utara"
gen str label4=district if district=="Papua" | ///
district=="Lampung" | ///
district=="Sulawesi Tengah" | district=="Jawa Timur"
replace label4=district if ssi==r(min)
gen zero=0
gen one=1

set scheme s1color

twoway (scatter ssi zero if append==0, xline(0) xline(1) /*
*/ mlab(label1) mlabc(black) /*
*/ mlabp(9) mcolor(black) mfcolor(none) msymbol(s)) /*
*/ (scatter ssi zero if append==0, mlab(label2) mlabc(black) mlabp(3) /*
*/ mcolor(black) mfcolor(none) msymbol(s)) /*

```

```

*/ (scatter ssi one if append==1, mfcolor(none) mlab(label3) /*
*/ mlabc(black) /*
*/ mlabp(3) mcolor(black) msymbol(s) xlab(-1 " " 0 "Local governments" /*
*/ 1 "Provinces" 2 " ")) /*
*/ (scatter ssi one if append==1, msymbol(s) mlab(label4) mlabc(black) mlabp(9) /*
*/ mcolor(black) mfcolor(none) /*
*/ ylab(, grid) legend(off) ytitle(ssi) /*
*/ subtitle("ssi") saving(ssi, replace))
graph export indonesia-ssi.emf, replace

```

B.2 MPlus code for chapter two

```

* MPlus code for multilevel mimic model for perceived
* public service performance only for main determinants

Title: Multilevel mimic model for perceived public
       service performance only for main determinants
Data:
File is E:\data\chapter2\gds2\data\pre_gds2006.dat ;
Variable:
Names are female age edu lpce unemp eastern remote part bgt corrup cpkd abmed
polpar lead hltserv eduserv genserv idkabkota lit demdir polfrag bredu
sosgrp spserv;
Usevariables are idkabkota age female edu lpce unemp eastern remote
part bgt corrup cpkd lit abmed sosgrp polfrag demdir hltserv eduserv genserv
polpar;
Within are age female edu lpce unemp eastern remote part bgt corrup cpkd
polpar abmed;
Between are lit sosgrp demdir polfrag;
Cluster is idkabkota;
Categorical = hltserv eduserv genserv;
Missing are all (-9999) ;
Analysis:
Type = twolevel ;
Estimator = WLSMV;
Starts = 10;
Model :
%within%
y1 by hltserv eduserv genserv;

```

```

y1 on age female edu lpce unemp eastern remote part bgt corrup cpkd
polpar abmed;
%between%
y2 by hltserv eduserv genserv;
y2 on lit sosgrp demdir polfrag;

```

Output: standardized;

```

* MPlus code for multilevel mimic model for perceived public service performance
* after all control determinants included

```

Title: Multilevel mimic model for perceived public service performance
after all control determinants included

Data:

File is E:\data\chapter2\gds2\data\pre_gds2006.dat ;

Variable:

Names are female age edu lpce unemp eastern remote part bgt corrup cpkd abmed
polpar lead hltserv eduserv genserv idkabkota lit demdir polfrag bredu
sosgrp spserv;

Usevariables are female age edu lpce unemp eastern remote part bgt corrup cpkd abmed
polpar lead hltserv eduserv genserv idkabkota lit demdir polfrag bredu
sosgrp spserv;

Within are age female edu lpce unemp eastern remote part bgt corrup cpkd
polpar abmed ;

Between are lit sosgrp spserv bredu demdir lead polfrag;

Cluster is idkabkota;

Categorical = hltserv eduserv genserv;

Missing are all (-9999) ;

Analysis:

Type = twolevel ;

Estimator = WLSMV;

Starts = 10;

Model :

%within%

y1 by hltserv eduserv genserv;

y1 on age female edu lpce unemp eastern remote part bgt corrup cpkd
polpar abmed;

%between%

y2 by hltserv eduserv genserv;

```
y2 on lit sosgrp spserv bredu demdir lead polfrag;
```

```
Output: standardized;
```

B.3 Stata code for chapter three

```
* pre_happyina, jarwo 27 June 2011
* source: IFLS wave 4 year 2007
* inspired from the works of
* 1. Frey, B. and Stutzer, A. (2000). Happiness, economy and institutions.
* 2. Bjornskov, C., Drehe, A., and Fischer, J. (2008). On decentralization
*    and life satisfaction.
* 3. Rodriguez-Pose, A. and Maslauskaitė, K. (2012). Can policy make us
*    happier? Individual characteristics, socio-economic factors and
*    life satisfaction in Central and Eastern Europe.
* I improve these works in several ways:
* 1. I use local governments as unit of analysis
* 2. I use multilevel to account local government conditions on individual happiness
* 3. I use the case of developing country as a case study
* main findings: local government spending for public service is significant
* for happiness leadership from new political party is negatively associated
* with happiness. Null finding is found from the effect of leadership from
* new political party.

* 30 July 2012, add interaction variables:
* high public spending for public services and poor health,
* and high public spending for public services and unemployment

clear all
set mem 500m
set more off
capture log close
set lines 140
set matsize 300

* create directories for files management
log using E:\data\chapter4\ifls2007\logfile\pre_happyina, text replace
global dir1 "E:\data\chapter4\ifls2007\hh07dta\"
global dir2 "E:\data\chapter4\ifls2007\pem07dta\"
global dir3 "E:\data\chapter4\ifls2007\pce07\"
global dir4 "E:\data\chapter4\ifls2007\data\"
global dir5 "E:\data\chapter4\ifls2007\temp\"
global dir6 "E:\data\chapter4\ifls2007\logfile\"

use $dir3\pce07nom, clear
keep provid kapid kecid commid07 hhid07 hhsize pce lnpce wrice - waltb
* kdensity lnpce //check lnpce: sensibly normal?
```

```

* pce still nominal number need to multiply with
* consumer price index to get riil pce
save $dir5, replace

use $dir13a_sw, clear
gen happy = sw12
    replace happy=4 if sw12==1
    replace happy=3 if sw12==2
    replace happy=2 if sw12==3
    replace happy=1 if sw12==4
    replace happy=. if sw12==9
label var happy "Taken all things together how would you say things are these days"
label def happy 4 "very happy" 3 "happy" 2 "unhappy" 1 "very unhappy"
label val happy happy
    drop sw12
keep hhid07 pid07 happy
save $dir5, replace

use $dir13a_dl1.dta, clear
keep hhid07 pid07 dl06 dl07 pidlink
ren dl06 hiedu
ren dl07 grade
gen tmptk=0 //kotretan: tingkat pendidikan
    replace tmptk = 1 if hiedu==02 | hiedu==11 | hiedu==17 | hiedu==72 | hiedu>90
    replace tmptk = 2 if hiedu==03 | hiedu== 4 | hiedu==12 | hiedu==73
    replace tmptk = 3 if hiedu==05 | hiedu==06 | hiedu==15 | hiedu==74
    replace tmptk = 4 if hiedu==60 | hiedu==61 | hiedu==62 | hiedu==63 | hiedu==13
    replace grade=1 if grade>90 & grade<.
    //Prep for nex block: assume DK as first grade in SD/SMP/et
    gen edu = 0
* those completed
    replace edu = 6 if tmptk==1 & grade==7 //SD, completed
    replace edu = 9 if tmptk==2 & grade==7 //SMP,completed
    replace edu = 12 if tmptk==3 & grade==7 //SMU,completed
    replace edu = 16 if tmptk==4 & grade==7 //Uni,completed
* those not even completed first grade
    replace edu = 0 if tmptk==1 & grade==0 //effectively not started SD
    replace edu = 6 if tmptk==2 & grade==0 //...not started SMP
    replace edu = 9 if tmptk==3 & grade==0 //...not started SMU
    replace edu = 12 if tmptk==4 & grade==0 //...not started Uni
* those started
    replace edu = 0 + grade if tmptk==1 & grade>0 & grade<7
    //SD, started but not grad

```

```

    replace edu = 6 + grade if tmptk==2 & grade>0 & grade<7
    //SMP, started but not grad
    replace edu = 9 + grade if tmptk==3 & grade>0 & grade<7
    //SMU, started but not grad
    replace edu = 12 + grade if tmptk==4 & grade>0 & grade<7
    //Uni, started but not grad
* tab edu tmptk          //check
    label var edu "respondents education"
    keep hhid07 pid07 edu pidlink
save $dir5, replace

use $dir13a_tk1, clear
gen unemploy = tk01d
    recode unemploy (1=1) (else=0)
    tab unemploy,m
label def unemploy 1 "unemployed" 0 "employed"
    label val unemploy unemploy
label var unemploy "unemployed status"
keep hhid07 pid07 unemploy
save $dir5, replace

use $dir13b_kk1.dta, clear
keep hhid07 pid07 pidlink kk01
    recode kk01 (1=1) (2=2) (3=3) (4=4) (else=.), gen (phlt)
    label var phlt "poor health respondent"
    label def phlt 4 "very poor" 3 "poor" 2 "fair" 1 "excellent"
    label val phlt phlt
save $dir5, replace

use $dir13a_pk1.dta, clear
keep pid07 hhid07 pidlink pk00b
    gen sohh=pk00b
    recode sohh (1=0) (3=1) (9.=0)
label def sohh 1 "living separately with spouse" 0 "living together with spouse"
    label val sohh sohh
label var sohh "living separately with spouse"
save $dir5, replace

use $dir13a_mg1.dta, clear
ren mg18e migration
    recode migration (1=1) (3=0) (else=0)
label def migration 1 "migrate at more than 6 months at 12" ///
0 "not migrate more than 6 months at 12"

```

```

    label val migration migration
    label var migration "move outside house more than 6 months at 12"
keep hhid07 pid07 pidlink migration
save $dir5, replace

* help and religiosity
use $dir13a_tr, clear
keep tr01-tr07 tr11 tr12 tr13 tr13x pid07 hhid07 pidlink
gen help = tr01
    replace help=4 if tr01==1
    replace help=3 if tr01==2
    replace help=2 if tr01==3
    replace help=1 if tr01==4
    label def help 4 "strongly agree" 3 "agree" 2 "not agree" 1 "strongly not agree"
label val help help
    label var help "I am willing to help people in this village if they need it"
    drop tr01
gen pray = tr13
    replace pray=3 if tr13 >=1
    replace pray=2 if tr13x==2
    replace pray=1 if tr13x==3
    label def pray 3 "every day" 2 "not every day" 1 "do not practice"
    label val pray pray
label var pray "how many times do you pray each day?"
    drop tr13 tr13x
    keep hhid07 pid07 pidlink help pray
save $dir5, replace

use $dir13a_br1, clear
egen nchild=rowtotal(br03 br04 br06 br07)
    label var nchild "number of children"
gen chldness=0
    replace chldness=1 if nchild==0
replace chldness=0 if nchild >1
label var chldness "no children"
keep hhid07 pid07 nchild chldness
save $dir5, replace

use $dir13b_pm1, clear
recode pm26f (1=1) (else=0), gen (pdae)
    label var pdae "chose bupati because of same ethnic"
recode pm26i (1=1) (else=0), gen (ctran)
    label var ctran "chose bupati because of big money campaign"

```

```

egen cor=rsum(pdae ctran) // proxy local corruption
    label var cor "chose bupati because of same ethnic and big money campaign"
keep hhid07 pid07 cor
save $dir5, replace

* Put individual level data all together
use $dir13a_cov, clear
gen age2=age*age
    label var age2 "age square of respondent"
    recode sex (1=0)(3=1), gen(female)
    label def female 1 "female" 0 "male"
label val female female
label var female "respondent is female"
drop sex

mmerge hhid07 using $dir5, table ukeep(provid kabid kecid commid07 hhsiz pce lnpce)
mmerge hhid07 pid07 using $dir5, table ukeep(edu)
mmerge hhid07 pid07 using $dir5, table ukeep(unemploy)
mmerge hhid07 pid07 using $dir5, table ukeep(happy)
mmerge hhid07 pid07 using $dir5, table ukeep(phlt)
mmerge hhid07 pid07 using $dir5, table ukeep(sohh)
mmerge hhid07 pid07 using $dir5, table ukeep(migration)
mmerge hhid07 pid07 using $dir5, table ukeep(pray help)
mmerge hhid07 pid07 using $dir5, table ukeep(nchild chldness)
mmerge hhid07 pid07 using $dir5, table ukeep(cor)
keep if _merge==3
drop _merge

*recode marital status dummies: completely exhaustive
*i.e. one should be left out in reg.
gen single = (marstat==1) | (marstat==9)
gen married = marstat==2
gen sdivorce = (marstat==3) | (marstat==4)
gen widow = marstat==5
    label def single 1 "single status" 0 "else"
    label def married 1 "married status" 0 "else"
    label def sdivorce 1 "divorced status" 0 "else"
    label def widow 1 "widowed status" 0 "else"
    label val single single
    label val married married
    label val sdivorce sdivorce
    label val widow widow
    label var single "Single status"

```

```

    label var married "Married status"
    label var sdivorce "Divorced status"
    label var widow "Widowed status"
    drop marstat

* real hh expenditure
mmerge kabid using $dir22007, table ukeep(cpi2007)
gen rpce=pce*cpi2007
* logged for correct skeweness of household expenditure distribution
gen lrpce=log(rpce)
* kdensity lnpce //check lnpce: sensibly normal?
    label var lrpce "log real household expenditure"

keep provid kabid kecid commid07 hhid07 pid07 happy phlt female age age2 ///
edu unemploy single widow sdivorce ///
lrpce hhszsize sohh migration pray help nchild cor chldness
save $dir4, replace

* put local goverment level data all together
use $dir2, clear
mmerge id_district using $dir22006, ukeep(cpi2006)
drop if _merge==2
mmerge id_district using $dir22006, ukeep(sosgroup kdsedu)
drop if _merge==2
mmerge id_district using $dir22007, ukeep(pilkadal)
drop if _merge==2
mmerge id_district using $dir22007, ukeep(gdp2007)
drop if _merge==2
mmerge id_district using $dir22006, ukeep(conflict)
drop if _merge==2
mmerge id_district using $dir22007, ukeep(areas)
drop if _merge==2
mmerge id_district using $dir22007, ukeep(lead)
drop if _merge==2
mmerge id_district using $dir22006
drop if _merge==2

* gen local government geographic areas
gen juris=areas/1000000
    label var juris "local government geographic areas"

* log local government gross domestic products
gen lgdp=log(gdp2007)

```

```

    label var lgdp "log local government gross domestic product 2007"
* kdensity lgdp //check lgdp: sensibly normal?

* multiply local government revenue and spending with consumer price index
* to get riil revenue and spending
gen rbfund =bfund*cpi2006
    label var rbfund "riil local government balancing fund 2006"
gen rtotrev = totrev*cpi2006
    label var rtotrev "riil local government total revenue 2006"
gen rserv= srvedped*cpi2006
    label var rserv "riil local government spending for services 2006"

* shared balancing fund on total revenue
gen sbfund=(rbfund/rtotrev)*100
    label var sbfund "shared of balancing fund on total loggov rev 2006"
* log total spending for services
gen lserv=log(rserv)
    label var lserv "log local government spending for services 2006"

save $dir4, replace

* merge individual and local government data
use $dir4, clear
mmerge kapid using $dir2, ukeep(kapid id_district)
mmerge id_district using $dir4

* aggregate individual for local government
bys id_district: egen corr=mean(cor)
bys id_district: gen corr1=corr-(cor/_N)
// this will removed respondent from aggregate calculation
label var corr1 "share of people choose major because ethnict and campaign money"

* interaction between individual and local government conditions
xtile qlserv=lserv, nq(4)
gen hpserv=0
replace hpserv=1 if qlserv==4
gen aphlt = phlt
recode aphlt (1 = 0) (2 3 4 =1 )
gen hpserv_phlt= hpserv*aphlt
    label var hpserv_phlt "loggov with high spending X average/poor health status"
gen hpserv_unemp=hpserv*unemploy
    label var hpserv_unemp "loggov with high spending X unemployed status"

```

```

* dummy eastern and remote islands
gen eastern=0
replace eastern=1 if prop=="KALIMANTAN SELATAN" | prop=="KALIMANTAN TENGAH" ///
| prop=="SULAWESI BARAT" | prop=="KALIMANTAN BARAT"
gen remote=0
replace remote=1 if id_district=="Kab. Nias Selatan" | ///
id_district=="Kab. Pulau Pisau" | id_district=="Kab. Luwu Utara" | ///
id_district=="Kab. Luwu Timur" | id_district=="Kab. Tabalong"
    label var remote "respondent living in remote island"

* keep only necessary variables
keep id_district commid happy sbfund lserv lgdp corr1 sosgroup ///
age age2 female edu sdvorce widow unemploy pray phlt help sohh ///
migration chldness ///
hhsize lrpce remote pilkadal  juris conflict lead hpserv_phlt ///
hpserv_unemp  eastern ///
kdsedu ptot

order lserv pilkadal sbfund ptot corr1 conflict sosgroup kdsedu ///
lead lgdp juris  ///
age age2 female edu unemploy sdvorce widow pray phlt help ///
sohh chldness ///
hhsize lrpce remote migration hpserv_phlt hpserv_unemp

pwcrr happy lserv pilkadal sbfund corr1 ptot conflict sosgroup ///
kdsedu lead lgdp juris  ///
age age2 female edu unemploy sdvorce widow pray phlt help ///
sohh chldness ///
hhsize lrpce remote migration hpserv_phlt hpserv_unemp, star(.01) bon

pwcrr happy lserv pilkadal sbfund ptot corr1 conflict sosgroup ///
kdsedu lead lgdp juris  ///
age age2 female edu unemploy sdvorce widow pray phlt ///
help sohh chldness ///
hhsize lrpce remote migration hpserv_phlt hpserv_unemp, star(.05) bon

estpost correlate zappy lserv pilkadal sbfund ptot corr1 conflict sosgroup ///
kdsedu lead lgdp juris  ///
age age2 female edu unemploy sdvorce widow pray phlt ///
help sohh chldness ///
hhsize lrpce remote migration hpserv_phlt hpserv_unemp, matrix listwise
est store c1
esttab using $dir4.tex, unstack noobs compress

```

```

* put in better order
order happy age age2 female edu sdivorce widow unemploy pray phlt help ///
sohh migration chldness ///
hhsz lrpce remote sbfund lserv pilkadal corr1 ptot sosgroup lgdp

global xvars1 lserv sbfund ptot pilkadal corr1 conflict ///
lead kdsedu sosgroup lgdp juris
global xvars2 lserv sbfund ptot pilkadal corr1 conflict ///
lead kdsedu sosgroup lgdp juris ///
age age2 female edu unemploy sdivorce widow pray phlt help sohh chldness ///
hhsz lrpce remote migration
global xvars3 lserv sbfund ptot pilkadal corr1 conflict ///
lead kdsedu sosgroup lgdp juris ///
age age2 female edu unemploy sdivorce widow pray phlt help sohh chldness ///
hhsz lrpce remote migration hpserv_phlt hpserv_unemp

* only use respondents who answer happiness question
drop if happy==.

* clean before analyses
!del $dir7
!del $dir7
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir5
!del $dir2
!del $dir22006
!del $dir22006
!del $dir22007
!del $dir22007
!del $dir22006
!del $dir22007
!del $dir22007
!del $dir22006

```

```

* check missing missing data
gen byte complete= sbfund!=. & sbfund!=. & lserv!=. & ///
pilkadal!=. & corri!=. & conflict!=. ///
& lead!=. & sosgroup!=. & lgdp!=. & juris!=. & age!=. ///
& female!=. & edu!=. & unemploy!=. ///
& sdivorce!=. & widow!=. & pray!=. & phlt!=. & help!=. ///
& sohh!=. & chldness !=. ///
& hhszsize!=. & lrpce!=. & remote!=. & migration!=.
* missing data = 36%, my need to do multilevel imputation data

*for multilevel analysis later, create numeric commid,
*just use the 1st obs number
sort id_district
gen obsn = _n
bysort id_district: gen idkab=obsn[1]
xtset idkab

* null model
gllamm happy, i(idkab) link(oprobit) f(binom) adapt
estimates store gllamm0
estimates store happy0, title(happy0)
    estimates store happy0, title(happy0)
    estout happy0, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy0 using "happyo.tex", style(tex) ///
cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
varlabels(_cons Constant) replace

* create empirical Bayes prediction using gllapred
sort idkab
qui by idkab: gen last=_n==_N
gllapred eb, u
sort ebm1
egen pickone = tag(idkab)
sort ebm1 ebs1
generate u0rank = sum(pickone)
set scheme s1color
serrbar ebm1 ebs1 u0rank if pickone==1, scale(1.96) ///
ylines(0) saving(ichs3.gph, replace)

* include all local government variables
gllamm happy $xvars1, i(idkab) link(oprobit) f(binom) adapt
estimates store gllamm1

```

```

estimates store happy1, title(happy1)
    estimates store happy1, title(happy1)
    estout happy1, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy1 using "happy1.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

* include individual and local goverment control
gllamm happy $xvars2, i(idkab) link(oprobit) f(binom) adapt
estimates store gllamm2
estimates store happy2, title(happy2)
    estimates store happy2, title(happy2)
    estout happy2, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy2 using "happy2.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

* include individual, local goverment control,
* and interaction determinants
gllamm happy $xvars3, i(idkab) link(oprobit) f(binom) adapt
estimates store gllamm3
estimates store happy3, title(happy3)
    estimates store happy3, title(happy3)
    estout happy3, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy3 using "happy3.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

* estimate using xtmixed
* null model
xtmixed happy || idkab:, mle variance nostderr
estimates store xtmixed0
estimates store happy4, title(happy4)
    estimates store happy4, title(happy4)
    estout happy4, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy4 using "happy4.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///

```

```

varlabels(_cons Constant) replace

* include all local government variables
xtmixed happy $xvars1 || idkab:, mle variance nostderr
estimates store xtmixed1
estimates store happy5, title(happy5)
    estimates store happy5, title(happy5)
    estout happy5, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy5 using "happy5.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
varlabels(_cons Constant) replace

* include individual and local government control
xtmixed happy $xvars2 || idkab:, mle variance nostderr
estimates store xtmixed2
estimates store happy6, title(happy6)
    estimates store happy6, title(happy6)
    estout happy6, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy6 using "happy6.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
varlabels(_cons Constant) replace

* include individual, local government control,
* and interaction determinants
xtmixed happy $xvars3 || idkab:, mle variance nostderr
estimates store xtmixed2
estimates store happy7, title(happy7)
    estimates store happy7, title(happy7)
    estout happy7, style(fixed) cells ("b(fmt(%9.3f)) ///
se(fmt(%9.3f)) p (fmt(%8.2f))")
    estout happy7 using "happy7.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
varlabels(_cons Constant) replace

** Note: gllamm and xtmixed results are relatively similar
* check
* codebook
clear

* Caterpillar self rated happiness

```

```

use $dir4, clear
mean happy, over(kabid)
use $dir22007, clear
mmerge kabid using $dir2
drop if sd==.
drop if lower==.
drop if upper==.
gen happy=mean
gen happy_reversed = happy * -1
sort happy_reversed
egen rank=group(happy_reversed)
gen xrank=7-rank
keep in 1/7
set scheme s1color
twoway scatter xrank happy, xline(0.056) ///
ylab(, value label angle(0)) || ///
rcap lower upper xrank, horizontal xtitle("") ///
yttitle("") yaxis(1 2) xsize(7)

```

```

use $dir22007, clear
mmerge kabid using $dir2
drop if sd==.
drop if lower==.
drop if upper==.
gen happy=mean
sort happy
egen rank=group(happy)
gen xrank=5-rank
keep in 1/5
set scheme s1color
twoway scatter xrank happy, xline(0.056) ///
ylab(, value label angle(0)) || ///
rcap lower upper xrank, horizontal ///
xtitle("") yttitle("") yaxis(1 2) xsize(7)

```

```

clear
* create map
clear all
set mem 500m
set more off
capture log close
set lines 140
set matsize 300

```

```

* create directories for better files management
log using E:\pre_mapindhlt, text replace
global dir1 "E:\indomap\"
global dir2 "E:\indomap\logfile"
global dir3 "E:\indomap\maps"

use $dir1, clear
mmerge prop kabkota using $dir1/hp, ukeep (mhappy)
drop if _merge==2
drop _merge
save $dir1, replace
drop if mhap==4
cd e: shp2dta using indo_kab_rm, database(subar) ///
coordinate(indocoor) genid(id) replace

set scheme s1color
use $dir1, clear
set scheme s1color
spmap mhappy using "indocoor.dta", id(id) fcolor(Reds2) ///
clmethod(custom) clnumber(4) ///
clbreak (0 1 2 3 4) ndfcolor(none) ocolor(none ..)
graph export $dir2.eps, replace

exit

```

B.4 Stata code for chapter four

```
* jarwo, pre_mosocap 2007, july 01 2010
* inspired from Nobles and Frankenberg's article
* title "mother's community participation and children's health in Indonesia
* I improve in several ways:
* 1. I use instrumental variable estimation to establish causal relationship
* 2. I use individual and community social capital measures
* 3. I use recent data from IFLS 2007
* findings: mother social capital significantly associated with child health

clear all
set mem 500m
set more off
capture log close
set lines 140
set matsize 300

* create directories for better files management
log using E:\data\chapter5\ifls2007\logfile\pre_mosocap, text replace
global dir1 "E:\data\chapter5\ifls2007\hh07dta\"
// IFLS 2007 individual folder data
global dir2 "E:\data\chapter5\ifls2007\cf07dta\"
// IFLS 2007 community folder data
global dir3 "E:\data\chapter5\ifls2007\pce07\"
// IFLS 2007 household expenditure folder data
global dir4 "E:\data\chapter5\ifls2007\data\"
global dir5 "E:\data\chapter5\ifls2007\temp\"
global dir6 "E:\data\chapter5\ifls2007\logfile\"

***** get sample mother and kids 2007 *****

use $dir1\bk_ar1, clear
* check for multiple obs per person per household
* keep one obs per person, even if they are dead or ninhh.

bysort pidlink: gen bign = _N
tab bign
tab bign ar01a

* R is ninhh, but has another obs somewhere else, like ar01a ==5.
* what I want to be careful here is not dropping dads that are
* ninhh but that don't have an obs somewhere else.
```

```

drop if bign ~= 1 & ar01a == 3
bysort pidlink: gen bign2 = _N
tab bign2

* There are still 301 people with mult obs.
* Look at where these obs are

sort pidlink
by pidlink: gen liln = _n
tab liln ar01a if bign2 ~= 1

* Drop they who have 2 dead and death
drop if liln==2 & ar01a==0
drop if liln==3 & ar01a==0
drop if liln==4 & ar01a==0
drop if ar01a == 1 & bign2 ~= 1

* Check once more
bysort pidlink: gen bign3 = _N
tab bign3
drop bign bign2 bign3 liln
count
keep hhid07 pid07 pidlink ar01a ar07 ar09 ar10 ar11 ar16
sort hhid07 pid07
tab ar01a if ar09 == .
sort hhid07 pid07
list hhid07 pid07 ar07 ar09 in 1/20
tempfile cproster07
sort pidlink
save $dir507, replace
clear

use $dir1, clear
bysort pidlink: gen bign = _N
tab bign
drop bign
keep pidlink member07
sort pidlink
mmerge pidlink using $dir507
tab _merge
drop if _merge == 1 // don't want people not in bk_ar1
bysort pidlink: gen bign = _N

```

```

tab bign
drop bign
count

* create a file of mothers
* women over 14. drop women with no info on age

keep if ar07==3 & ar09>=15 & ar09 ~=. // women over 14
count

* Don't want moms who are not in the household or dead in 00
drop if ar01a == 3
drop if ar01a == 0

* Be sure to rename all vars, so that the merge works
rename pid07 mid07
rename pidlink midlink
rename ar01a m_ar01a_07
label var m_ar01a_07 "Mother HH Status in '07"

ren ar09 momage07
gen momagesqr = momage07*momage07
label var momagesqr "mother age 2007 squared"
ren ar16 momedu
recode momedu (1/2=1) (else=0)
label def momedu 0 "else" 1 "elementary school or less"
label var momedu "mother education"
label val momedu momedu

sort hhid07 mid07
tempfile mom
save $dir5, replace

use $dir1, clear
bysort pidlink: gen bign = _N
tab bign
drop bign
keep pidlink member07
sort pidlink
mmerge pidlink using $dir507
tab _merge
drop if _merge == 1 // don't want people not in bk_ar1
bysort pidlink: gen bign = _N

```

```

tab bign
drop bign
count

* create a file of fathers
* men over 14. drop men with no info on age

keep if ar07==1 & ar09>=15 & ar09 ~=. // men over 14
count //
keep hhid07 pid07 ar01a pidlink member07

* Be sure to rename all vars, so that the merge works
rename pid07 fid07
rename pidlink fidlink
rename ar01a d_ar01a_07
    label var d_ar01a_07 "Father HH Status in '07"
rename member07 d_member07
sort hhid07 fid07
tempfile dad
save $dir5, replace

use $dir1, clear
bysort pidlink: gen bign = _N
tab bign
drop bign
keep pidlink member07
sort pidlink
mmerge pidlink using $dir5/cproster07
tab _merge
drop if _merge == 1 // don't want people not in bk_ar1
bysort pidlink: gen bign = _N
tab bign
drop bign
count

* Create a file for kids
keep if ar09 <= 10 //kids under 10
** drop kids who are dead or not in the hh **
drop if ar01a == 0
drop if ar01a == 3
count
keep hhid07 pid07 ar01a ar07 ar09 ar10 ar11 pidlink member07
gen cage = ar09 // children age in year

```

```

        label var cage "children age 2007"
gen sex = ar07
recode sex (3=2)
        label def sex 1 "male" 2 "female"
        label var sex "child sex"
label val sex sex
gen fid07=ar10
gen mid07=ar11
tempfile kid
sort hhid07 mid07
save $dir5, replace

* merge kids to mothers

use $dir5, replace
sort hhid07 mid07
mmerge hhid07 mid07 using $dir5/mom
tab _merge
rename _merge momkidmerge
sort hhid07 mid07
keep if momkidmerge == 1 | momkidmerge == 3

* check to see if merge
* worked as expected

list hhid07 pid07 mid07 ar09 ar01a momkidmerge in 1/20
count if pid07 == mid07
count if pidlink == midlink
sort hhid07 pid07
by hhid07 pid07: gen bign=_N
tab bign
drop bign

** Note :
** Unmerged cases are due to
** Mother is out of the HH, Dead
** known by: 51 or 52 on line no
** OR when I went through each case and looked
** at ar01a for the HH in which mom lives, she
** is dead or not in the HH

count if momkidmerge == 1 & mid07 ~= 51 & mid07 ~= 52 & ///
mid07 ~= 98 & mid07 ~= 99 & ar01a ~=3

```

```

* used the following list to go back and check against the HH roster.
* comment it out here though
* list hhid07 pid07 mid07 ar09 ar07 if momkidmerge == 1 & mid07 ~= 51 & ///
* mid07 ~= 52 & mid07 ~= 98 & mid07 ~= 99 & ar01a ~=3

count
tab ar01a
tab ar01a momkidmerge
tab momkidmerge ar07

count if pidlink == ""
count if midlink == ""
tab momkidmerge if midlink == ""
drop if momkidmerge == 1

* check to see if still have
* missings on midlink

count if midlink == ""
sort hhid07 pid07
by hhid07 pid07: gen bign=_N
tab bign
drop bign
sort pidlink
by pidlink: gen bign=_N
tab bign
tab pidlink if bign ~= 1
drop bign

sort midlink
by midlink: gen bign=_N
tab bign
drop bign
sort hhid07 pid07
count //
tempfile momkid
save $dir5, replace

* merge kids to fathers
use $dir5, clear
sort hhid07 fid07
mmerge hhid07 fid07 using $dir5/dad

```

```

tab _merge
rename _merge dadkidmerge
sort hhid07 pid07
keep if dadkidmerge == 1 | dadkidmerge == 3

* check to see if merge worked as expected

count if pid07 == fid07
count if pidlink == fidlink
count if fidlink == ""
count if pidlink == ""
tab dadkidmerge if fidlink == ""
sort hhid07 pid07
by hhid07 pid07: gen bign = _N
tab bign
drop bign

** Note :
** Unmerged cases are due to
** Father is out of the HH, Dead
** known by: 1)51 or 52 on line no
** OR when I went through each case and looked
** at ar01a for the HH in which dad lives

count if dadkidmerge == 1 & fid07 ~= 51 & fid07 ~= 52 & ///
fid07 ~=98 & fid07 ~= 99 & ar01a ~=3

* used the following list to go back and check against the HH roster.
* comment it out here though
* list hhid07 pid07 fid07 ar09 ar07 dadkidmerge if dadkidmerge == 1 &
* fid07 ~=51 & fid07 ~=52 & fid07 ~=98 & fid07 ~=99 & ar01a ~=3;

count if ar01a == 3 & dadkidmerge == 1 & fid07 ~=51 & fid07 ~=52 // 0
count //
tab ar01a
tab ar01a dadkidmerge
tab dadkidmerge ar07

** Note:
** Here I will not drop kids who did not match up
** to a father (dadkidmerge == 1) because these kids
** may have information on their mothers, I can
** impute for missings on dad's

```

```

** information if dad's characteristics are used.
** However, this will result in some father's having
** missing data for pidlink.

sort hhid07 pid07
by hhid07 pid07: gen bign=_N
tab bign
drop bign
sort pidlink
by pidlink: gen bign=_N
tab bign
tab pidlink if bign ~= 1
drop bign
sort fidlink
by fidlink: gen bign=_N
tab bign
drop bign
sort hhid07 pid07
tempfile dadkid
save $dir5, replace

* merge dadkid with momkid to create family file

mmerge hhid07 pid07 using $dir5/momkid
tab _merge

* Do not want kids with info on fathers, but no information on mothers-
* drop if _merge is equal to 1

keep if _merge == 2 | _merge == 3

* check to see if merge
* worked as expected

tab _merge ar07
count if midlink == pidlink
count if midlink == ""
count if pidlink == ""
count if fidlink == ""
count if midlink == fidlink
count if fidlink == pidlink

rename _merge fammerge

```

```

sort hhid07 pid07
by hhid07 pid07: gen bign=_N
tab bign
drop bign
sort pidlink
by pidlink: gen bign = _N
tab bign
drop bign
sort midlink
by midlink: gen bign = _N
tab bign
drop bign
sort fidlink
by fidlink: gen bign = _N
tab bign
drop bign
sort hhid07 pidlink
by hhid07 pidlink: gen bign = _N
tab bign
drop bign

desc
count
* drop kids more than 10 years old
drop if ar09 > 11
keep if ar09 <=10
tab ar09
count
desc

* this is my sample size before casewise deletion of children
* with missing values on variables

codebook midlink

save $dir5/mysamp, replace // this is my sample for children and mother 2007

** these are the unique number of mothers before casewise deletion of
** children with missing values on variables**
** this file consist height information for all respondents 2000
** later I will merge this file using child identifier (pidlink)
** on sample roster

```

```

*****
***** get child with complete information on height and weight*****
***** get mother 2007 with complete information on community participation**
*****

** start to collect child height measurement
use $dir11_1.dta, clear
ren us06 weight
ren us03 age
ren us01 sex
drop if age > 10 // only use children 10 or younger
keep hhid07 pid07 pidlink age weight sex
save $dir5, replace

use $dir11_2.dta, clear // health measurement book 2007
** check for number of obs
bys hhid07 pid07: gen bign = _N
tab bign
drop bign
bys pidlink: gen bign = _N
tab bign
drop bign
keep hhid07 pid07 pidlink us04
ren us04 height
save $dir5, replace

use $dir5, clear
mmerge hhid07 pidlink using $dir5, table ukeep (weight)
drop _merge
mmerge hhid07 pidlink using $dir5, ukeep (height)
drop if _merge==2 // get rid of respondents above 10 years
drop _merge

drop if weight==. // only use children who have
// a complete weight and height information
drop if heigh== .

count // so far 9336 children who have complete info on height and weight

save $dir5, replace

* create mother community participation file
use $dir13b_pm3, clear

```

```

keep if pm3type=="I"
keep hhid07 pid3b pm15a pm16a pidlink
ren pid3b mid07
ren pidlink midlink

gen m_pkk = pm16a
replace m_pkk = 1 if pm16a ==1
replace m_pkk = 0 if pm16a ==3
replace m_pkk = . if pm16a ==9
replace m_pkk = 0 if pm15a ==3
replace m_pkk = 0 if pm15a ==8
replace m_pkk = 0 if pm15a ==9 | pm15a==. // assume don't know not participate
    label def m_pkk 0 "not participate" 1 "participate"
    label var m_pkk "Mother participated/used PKK Activities"
    label val m_pkk m_pkk
    tab m_pkk
save $dir5_pkk, replace

use $dir13b_pm3, clear
drop pid3b
ren pid07 mid07
ren pidlink midlink
keep hhid07 mid07 midlink pm3type pm15 pm16 pm18ax pm18a pm15a pm16a pm18aax pm18aa
keep if pm3type=="A" | pm3type=="B" | pm3type=="C" | pm3type=="D"
reshape wide pm15 pm16 pm18ax pm18a pm15a pm16a pm18aax pm18aa, ///
i(hhid07 mid07 midlink) ///
j(pm3type "A" "B" "C" "D")

gen m_commtg = pm16A
replace m_commtg = 1 if pm16A ==1
replace m_commtg = 0 if pm16A ==3
replace m_commtg = . if pm16A ==9
replace m_commtg = 0 if pm15A ==3
replace m_commtg = 0 if pm15A ==8
replace m_commtg = 0 if pm15A ==9
    label def m_commtg 0 "not participate" 1 "participate"
    label var m_commtg "Mother participated/used community meeting"
    label val m_commtg m_commtg

gen m_coop = pm16B
replace m_coop = 1 if pm16B ==1
replace m_coop = 0 if pm16B ==3
replace m_coop = . if pm16B ==9

```

```

replace m_coop = 0 if pm15B ==3
replace m_coop = 0 if pm15B ==8
replace m_coop = 0 if pm15B ==9
    label def m_coop 0 "not participate" 1 "participate"
    label var m_coop "Mother participated/used cooperatives"
    label val m_coop m_coop

gen m_labor = pm16C
replace m_labor = 1 if pm16C ==1
replace m_labor = 0 if pm16C ==3
replace m_labor = . if pm16C ==9
replace m_labor = 0 if pm15C ==3
replace m_labor = 0 if pm15C ==8
replace m_labor = 0 if pm15C ==9
    label def m_labor 0 "not participate" 1 "participate"
    label var m_labor "Mother participated/used voluntary labor"
    label val m_labor m_labor

gen m_village = pm16D
replace m_village = 1 if pm16D ==1
replace m_village = 0 if pm16D ==3
replace m_village = . if pm16D ==9
replace m_village = 0 if pm15D ==3
replace m_village = 0 if pm15D ==8
replace m_village = 0 if pm15D ==9
    label def m_village 0 "not participate" 1 "participate"
    label var m_village "Mother participated/used village improvement"
    label val m_village m_village

tab m_commtg
tab m_coop
tab m_labor
tab m_village

save $dir5_commtg, replace
use $dir5_pkk, clear
mmerge hhid07 mid07 midlink using $dir5_commtg, ///
table ukeep (m_commtg m_coop m_labor m_village)
drop _merge
gen mp_summ=m_commtg+m_coop+m_labor+m_village+m_pkk
    label var mp_summ "Number of programme in which mother participants"

gen mp_s1 = mp_summ

```

```

recode mp_s1 0=0 1/5=1 *=.
  label def mp_s1 0 "not participate" 1 "participate"
  label var mp_s1 "Mom participated in at least one of five com programs, 2007"
  label val mp_s1 mp_s1

keep hhid07 mid07 midlink m_commtg m_coop m_labor m_village m_pkk mp_summ mp_s1
sort hhid07 mid07 midlink
save $dir5, replace

use $dir13b_cov, clear
keep hhid07 pid07 pidlink marstat age sex
ren pid07 mid07
ren pidlink midlink
drop if sex==1
count // 15634 women
sort hhid07 mid07 midlink
save $dir5, replace

use $dir5, clear
mmerge hhid07 mid07 midlink using $dir5, table ukeep (sex age)
keep if _merge==3
drop if mp_summ==. // only use mother who complete answer //
// community participation section

count

saveold $dir5, replace
use $dir5, clear
mmerge hhid07 mid07 midlink using $dir5, table ukeep ///
(hhid07 mid07 midlink m_commtg m_coop m_labor m_village m_pkk mp_summ mp_s1)
keep if _merge==3
drop _merge
save $dir5, replace

count // we know amount of complete information on
      // children height and weight as well as mother community participation
codebook weight
codebook height
codebook mp_summ

*****
***** create other explanatory and instrumental variables *****
*****

```

```

* mother's general health
use $dir13b_kk1.dta, clear
rename pid07 mid07
ren pidlink midlink
* check for number of obs
bys hhid07 mid07: gen bign = _N
tab bign
drop bign
bys midlink: gen bign = _N
tab bign
drop bign
keep hhid07 mid07 midlink kk01
ren kk01 mghl
recode mghl (4=1) (else=0)
    label def mghl 1 "poor or average" 0 "else"
    label var mghl "mother report poor or average health"
    label val mghl mghl
save $dir5, replace

* mother interact with her mother often
use $dir13b_ba0, clear
rename pid07 mid07
* check for number of obs
bys hhid07 mid07: gen bign = _N
tab bign
drop bign
bys pidlink: gen bign = _N
tab bign
drop bign
rename pidlink midlink
keep hhid07 mid07 midlink ba06bm
ren ba06bm interactm // mother often meet with her mother
recode interactm (4/5=1) (else=0)
    label def interactm 0 "meet less than one a week" 1 "meet at least one a week"
    label var interactm "mother meet her mother at least one a week"
    label val interactm interactm
save $dir5, replace

* mother height in cm
use $dir11_2.dta, clear
rename pid07 mid07
* check for number of obs

```

```

bys hhid07 mid07: gen bign = _N
tab bign
drop bign
bys pidlink: gen bign = _N
tab bign
drop bign
ren pidlink midlink
keep hhid07 mid07 midlink us04
ren us04 mheight
keep hhid07 mid07 midlink mheight
    label var mheight "mother height in cm"
sum mheight
save $dir5, replace

use $dir14_ch1, clear
* collect information on birthweight 2007 from from book women.
* This means pidlink and pid here is mother not kids
* cek for multiple observation per hh
bysort pidlink: gen bign = _N
tab bign
ren pid07 mid07
ren pidlink midlink
keep hhid07 mid07 midlink ch24
ren ch24 birthweight07
sort hhid07 mid07 midlink
save $dir5, replace

* merge midlink with midlink on mysamp07
use $dir5, clear
mmerge hhid07 mid07 midlink using $dir5
drop if _merge==2
bysort hhid07 mid07 midlink : keep if _n==1 // only need one mother per obs
save $dir5, replace
count

* mother rotating credit association (arisan)
use $dir13b_pm1.dta, clear
ren pid07 mid07
ren pidlink midlink
keep hhid07 mid07 midlink pm01
ren pm01 rosca
recode rosca (3 9 =0)
    label def rosca 0 "No" 1 "Yes"

```

```

        label var rosca " have you participate in arisan?"
        label val rosca rosca
    bysort midlink: keep if _n==1 // only need one obs.
    save $dir5, replace

    use $dir13b_pm3, clear
    keep if pm3type=="I"
    keep hhid07 pid3b pm15a pm16a pidlink
    ren pid3b mid07
    ren pidlink midlink
    ren pm15a pkk
    recode pkk (1=1) (else=0)
        label def pkk 0 "don't know" 1 "know"
        label var pkk "mother know pkk activity in this village"
        label val pkk pkk
    tab pkk
    save $dir5, replace

    use $dir13b_pm3, clear
    drop pid3b
    rename pid07 mid07
    gen midlink = pidlink
    keep hhid07 mid07 midlink pm3type pm15 pm16 pm18ax pm18a pm15a ///
    pm16a pm18aax pm18aa
    keep if pm3type=="A" | pm3type=="B" | pm3type=="C" | pm3type=="D"
    reshape wide pm15 pm16 pm18ax pm18a pm15a pm16a pm18aax pm18aa, i(hhid07 mid07) ///
    j(pm3type "A" "B" "C" "D")

    ren pm15A comeet
    recode comeet (1=1) (else=0)
        label def comeet 0 "don't know" 1 "know"
        label var comeet "mother know community meeting in this village"
        label val comeet comeet
    ren pm15B coop
    recode coop (1=1) (else=0)
        label def coop 0 "don't know" 1 "know"
        label var coop "mother know cooperative activity in this village"
        label val coop coop
    ren pm15C vlabor
    recode vlabor (1=1) (else=0)
        label def vlabor 0 "don't know" 1 "know"
        label var vlabor "mother know voluntary labor activity in this village"
        label val vlabor vlabor

```

```

ren pm15D vimprov
recode vimprov (1=1) (else=0)
  label def vimprov 0 "don't know" 1 "know"
  label var vimprov "mother know village improvement activity in this village"
  label val vimprov vimprov
save $dir5, replace

use $dir5, clear
mmerge hhid07 mid07 midlink using $dir5, table ukeep (vimprov coop comeet vlabor)
drop _merge
gen pdes= pkk+vimprov+vlabor+coop+comeet
label var pdes "mother have infor on pkk and other programme in community"
save $dir5, replace

* households expenditure
* be aware daily, weekly and monthly !
use $dir307nom.dta, clear
keep provid kaid kecid commid07 hhid07 hhsize hhexp pce lnpce
* kdensity lnpce //check lnpce: sensibly normal?
mmerge kaid using $dir307, ukeep(cpi2007)
mmerge hhid07 using $dir1_sc, ukeep(sc05)
drop _merge
ren sc05 urban
recode urban (2=0) // household in urban area
  label def urban 0 "rural" 1 "urban"
  label var urban " household lived at urban area"
  label val urban urban
gen rpce=pce*cpi2007
replace rpce=(rpce)+(0.05*rpce) if urban==0
// inflation in rural area taken to be 5% higher than urban area
  label var rpce "real household expenditure"
gen lnrpce=ln(rpce)
* check k-density, normal
  label var lnrpce "log real household expenditure"
keep provid kaid kecid commid07 hhid07 hhsize hhexp rpce lnrpce urban
save $dir5, replace

* community lack of care
use $dir22.dta, clear
ren s31a population
gen pop= population/100000
gen lnpop=log(population)
replace lnpop=0 if lnpop==.

```

```

    label var pop "total number of population in the village"
    save $dir5, replace

* number of active social groups in the village
use $dir21_pmkd.dta, clear
keep commid07 pmkdtype pmkd2
drop if pmkdtype=="19"|pmkdtype=="20"|pmkdtype=="21"| ///
pmkdtype=="22"|pmkdtype=="23"|pmkdtype=="24"
tab pmkd2,m
recode pmkd2 (2/3 = 0)
recode pmkd2 (6 9 = 0)
bysort commid07: egen ngodensity = sum(pmkd2)
bysort commid07: keep if _n==1
    label var ngodensity "total number of social group in the village"
    save $dir5, replace // ngo density - higher score higher density

use $dir2, clear
keep commid07 go01 go02
recode go01 (3 8 =0)
gen tradisiorg = go01
gen kinship = go01
replace kinship= 1 if go01 == 1 | go02 == 3
replace kinship= 0 if go01 == 0 | go02 ~= 3
    label def kinship 0 "No" 1 "Yes"
    label var kinship "presence of kinship based organisation in community"
    label val kinship kinship
    save $dir5, replace

use $dir21_g.dta, clear
keep commid07 gtype g3a
recode g3a (3 6 8 9 =0)
bys commid07: egen credit= sum(g3a)
bys commid07: keep if _n==1
    label var credit "presence various credit facilities in village"
    tab credit,m
    save $dir5, replace

use $dir22.dta,clear
keep commid07 s30b
tab s30b,m
tabstat s30b, m // med=10
replace s30b = 10 if s30b==.
ren s30b nassos

```

```

        label var nassos "number of neighborhood association in the village"
save $dir5, replace

use $dir2.dta, clear
keep commid07 kd00aa
ren kd00aa etdom
        label var etdom "ethnic domination in the village"
save $dir5, replace

use $dir22.dta,clear
keep commid07 s61
recode s61 (1 =1) (else=0)
ren s61 pkpsbbm
tab pkpsbbm
        label def pkpsbbm 0 "No" 1 "Yes"
        label var pkpsbbm " receive under development programme"
        label val pkpsbbm pkpsbbm
save $dir5, replace

use $dir21_ir.dta, clear
keep if irtype=="A" // village head
recode ir3a (60/63=1) (else=0), gen(vhedu)
        label def vhedu 1 "graduate education or above" 0 "high school education or below"
        label var vhedu "village head education"
        label val vhedu vhedu
save $dir5, replace

*****
***** put them all together*****
***keep looking 9176 sample and make sure the reason why is dropped*****
*****

* merge individual file
use $dir5, clear
mmerge hhid07 mid07 midlink using $dir5, table ukeep (mghl)
drop _merge
mmerge hhid07 mid07 midlink using $dir5, ukeep (interactm)
keep if _merge==3
drop _merge
mmerge hhid07 pid07 pidlink using $dir5, ukeep (birthweight)
drop if _merge==-1
drop if _merge==2
sum birthweight // mean = 3.17796

```

```

gen missing = birthweight
replace missing = 0 if missing ~= .
replace missing = 1 if missing ==.
replace birthweight = 3.177 if birthweight == . | birthweight > = 8
mmerge hhid07 mid07 midlink using $dir5, ukeep (rosca)
drop if _merge ==2
mmerge hhid07 mid07 midlink using $dir5, ukeep (pdes)
drop if _merge==2
drop _merge
mmerge hhid07 mid07 midlink using $dir5, ukeep (mheight)
keep if _merge==3
replace mheight=150 if mheight <=130
drop _merge
save $dir5, replace

* merge household folder
use $dir5, clear
mmerge hhid07 using $dir5, table ukeep (provid kabid kecid commid07 ///
hhid07 hhsz hhexp rpce lnrpce urban)
drop if _merge==2
drop _merge
save $dir5, replace

* merge community file
use $dir5, clear
mmerge commid07 using $dir5, ukeep (lnpop pop)
drop _merge
mmerge commid07 using $dir5, ukeep (kinship)
drop _merge
mmerge commid07 using $dir5, ukeep (credit)
drop _merge
mmerge commid07 using $dir5, ukeep (etdom)
drop _merge
mmerge commid07 using $dir5, ukeep (nassos)
drop _merge
mmerge commid07 using $dir5, ukeep(vhedu)
drop _merge
mmerge commid07 using $dir5, ukeep(pkpsbbm)
drop _merge
drop if pop==.
bysort commid07: keep if _n==1
save $dir5, replace

```

```

* merge individu with household
use $dir5, clear
mmerge hhid07 pid07 pidlink mid07 midlink using $dir5, ukeep (provid kabit ///
kecid commid07 hhid07 hhexp hhszrp rpce lnrpce urban)
drop _merge
save $dir5, replace

* merge with community file
use $dir5, clear
mmerge commid07 using $dir5, ukeep (lnpop pop ngodensity kinship ///
credit etdom nassos pkpsbbm vhedu)
keep if _merge==3
drop _merge
drop if height==.
drop if weight==.
count

* agregat for expenditure for hh and community
bysort commid07: egen lnrpcecm= mean(lnrpce)
label var lnrpcecm "mean real community per capital expenditure"
bysort hhid07: egen lnrpcehh= mean(lnrpce) // mean percapita hh expenditure
label var lnrpcehh "mean real per capita hh expend"
gen mrpcexpd = hhexp/hhszrp
label var mrpcexpd "monthly real percapita expenditure"
tabstat lnrpce, stats(median) // median per capita expenditure = 17.30662
gen medexpend = lnrpce // household below median per capita expenditure
replace medexpend =1 if medexpend <= 17.30662
replace medexpend =0 if medexpend > 17.30662
label def medexpend 0 " above median per capita expenditure" 1 ///
" below median percapita expenditure"
label val medexpend medexpend
label var medexpend "household below median percapita expenditure"

*****
**** height and weight for age z score *****
*****

** height for age z score US
egen zwaus = zanthro(height,ha,US), xvar(cage) gender(sex) gencode(male=1, female=2)
label var zwaus "heigh for age z score 2007"

** weight for age z score US
egen zwaus2 = zanthro(weight,wa,US), xvar(cage) gender(sex) gencode(male=1, female=2)

```

```

label var zwaus2 "weight for age z score 2007"

gen male=sex
recode male (2=0)
label def male 0 "child is female" 1 "child is male"
label val male male
label var male "child is male"
drop sex
count
drop if zwaus ==.
drop if zwaus2==.
count

* clean files before analysis
!del $dir5
!del $dir5
!del $dir5
!del $dir5

* keep only necessary variables
keep provid kapid kecid commid07 hhid07 pid07 pidlink mid07 midlink zwaus ///
zwaus2 mp_summ ngodensity rosca pdes kinship credit etdom nassos ///
cage male birthweight missing momage07 momagesqr momedu mghl mheight ///
lnrpce interactm hhsize urban medexpend lnrpcecm lnpop pop pkpsbbm vhedu
save $dir5, replace

* get summary of analytic sample
sum zwaus zwaus2 mp_summ ngodensity rosca pdes kinship credit etdom nassos ///
cage male birthweight missing momage07 momagesqr momedu mghl mheight ///
interactm hhsize urban medexpend ///
lnrpcecm lnpop pkpsbbm vhedu

* get median height and weight for girl and boy
tabstat zwaus if male==1, stats(median) // boy
tabstat zwaus if male==0, stats(median) // girl
tabstat zwaus2 if male==1, stats(median)
tabstat zwaus2 if male==0, stats(median)
tabstat zwaus if male==1, stats(mean sd min max)
tabstat zwaus if male==0, stats(mean sd min max)
tabstat zwaus2 if male==1, stats(mean sd min max)
tabstat zwaus2 if male==0, stats(mean sd min max)

* get bivariate correlation of selected variables

```

```

pwcrr zwaus zwaus2 mp_summ ngodensity pdes kinship ///
credit etdom nassos, star(.10) bon
estpost correlate zwaus zwaus2 mp_summ ngodensity pdes kinship ///
credit etdom nassos, matrix listwise
est store c1
esttab using $dir5.tex", unstack noobs compress

* short way to collect variable
global xvarsg ngodensity cage male birthweight momedu ///
mheight mghl hhszize interactm ///
momage07 medexpend urban lnrpcecm lnpop pkpsbbm vhedu

*** ivreg2
ivreg2 zwaus $xvarsg (mp_summ = pdes nassos etdom credit kinship), ///
gmm2s first robust cl(commid07)
estimates store zwaus, title(Model 071)
estout zwaus using zwaus107.tex, style(tex) cells("b(fmt(%9.3f)) p(fmt(%9.3f))") ///
collabels("$\beta$" "$p$") ///
stats(idstat idp j jp cdf,                /// to nicely label block of tests
labels("Kleibergen-Paap LM stats (under id)"    ///
      "LM $p$ value"                          ///
      "Hansen's J"                            ///
      "J $p$ value"                          ///
      "Cragg-Donald Wald F stats (weak id)")) ///
varlabels(_cons Constant mp_summ "Mothers' socap" cage Age male ///
"Boy" birthweight97 "Birthweight (kg)" ///
mheight "Height (cm)" momage07 "Age" ///
momedu "Education: primary +" mghl "Reported poor health" ///
interactm "Interact with her mother often" hhszize "Household size" ///
medexpend "Household below median expenditure" urban "Urban areas" ///
idt "Recived under village fund" ngodensity "Number act groups in com" ///
lnrpcecm "Log average community expenditure" ) replace

ivreg2 zwaus2 $xvarsg (mp_summ = pdes nassos etdom credit kinship), ///
gmm2s first robust cl(commid07)
estimates store zwaus2, title(Model 2)
estout zwaus2 using zwaus207.tex, style(tex) cells("b(fmt(%9.3f)) p(fmt(%9.3f))") ///
collabels("$\beta$" "$p$") ///
stats(idstat idp j jp cdf,                /// to nicely label block of tests
labels("Kleibergen-Paap LM stats (under id)"    ///
      "LM $p$ value"                          ///
      "Hansen's J"                            ///
      "J $p$ value"                          ///

```

```

        "Cragg-Donald Wald F stats (weak id)") //
varlabels(_cons Constant mp_summ "Mothers' socap" cage Age male ///
"Boy" birthweight97 "Birthweight (kg)" ///
mheight "Height (cm)" momage07 "Age" ///
momedu "Education: primary +" mghl "Reported poor health" ///
interactm "Interact with her mother often" hhsize "Household size" ///
medexpend "Household below median expenditure" urban "Urban areas" ///
idt "Recived under village fund" ngodensity "Number act groups in com" ///
lnpcecm "Log average community expenditure" ) replace

des
codebook
log close
exit

* jarwo,pre_mosocap, 6 November 2012
* create rank of height and weight
* for province and local governments
clear all
set mem 500m
set more off
capture log close
set lines 140
set matsize 300

* create directories for files management
log using E:\data\chapter5\ifls2007\logfile\pre_birthweight, text replace
global dir1 "E:\data\chapter5\ifls2007\hh07dta\"
global dir2 "E:\data\chapter5\ifls2007\cf07dta\"
global dir3 "E:\data\chapter5\ifls2007\pce07\"
global dir4 "E:\data\chapter5\ifls2007\data\"
global dir5 "E:\data\chapter5\ifls2007\temp\"
global dir6 "E:\data\chapter5\ifls2007\logfile\"

use $dir5\cosample, clear
mmerge hhid07 using $dir307nom, ukeep(kabid provid)
mmerge kabid using $dir4
ren id_district district

** height for age z score US
egen zwaus = zanthro(height,ha,US), xvar(cage) ///
gender(sex) gencode(male=1, female=2)
label var zwaus "heigh for age z score 2007"

```

```

** weight for age z score US
egen zwaus2 = zanthro(weight,wa,US), xvar(cage) ///
gender(sex) gencode(male=1, female=2)
label var zwaus2 "weight for age z score 2007"
keep district prop provid kapid zwaus zwaus2
save $dir5, replace

```

```

* rank for children height for age
use $dir5, replace
* child health status for local governments
bys kapid: egen mheight=median(zwaus)
bys kapid: egen mweight=median(zwaus2)
bys kapid: keep if _n==1
save $dir5, replace

```

```

use $dir5, replace
bys provid: egen mheight=median(zwaus)
bys provid: egen mweight=median(zwaus2)
bys provid: keep if _n==1
save $dir5, replace

```

```

use $dir5, clear
keep prop mheight
ren prop district
save $dir51, replace

```

```

use $dir5, clear
keep district mheight
summ mheight
local n=_N
gen append=0
gsort - mheight
append using $dir51
replace append=1 if append==.

```

```

gen str label1=""
local i=1
while 'i'<='n'
replace label1=district if append==0 & _n=='i'
local i='i'+60

```

```

summ mheight

```

```

replace label1=district if mheight==r(min)

gen str label2=""
local i=2
while 'i'<='n'
replace label2=district if append==0 & _n=='i'
local i='i'+60

summ mheight if append==1
gen str label3=district if district=="JAWA BARAT" | ///
district=="DKI JAKARTA" | ///
district=="KEPULAUAN RIAU" | district=="DI YOGYAKARTA"
gen str label4=district if district=="Lampung"
replace label4=district if mheight==r(min)
gen zero=0
gen one=1

set scheme s1color

twoway (scatter mheight zero if append==0, xline(0) xline(1) mlab(label1) /*
*/ mlabc(black) mlabp(9) mcolor(black) mfcolor(none) msymbol(s)) /*
*/ (scatter mheight zero if append==0, mlab(label2) mlabc(black) /*
*/ mlabp(3) mcolor(black) mfcolor(none) msymbol(s)) /*
*/ (scatter mheight one if append==1, mfcolor(none) mlab(label3) /*
*/ mlabc(black) mlabp(3) mcolor(black) msymbol(s) /*
*/ xlab(-1 " " 0 "Local governments" 1 "Provinces" 2 " ")) /*
*/ (scatter mheight one if append==1, msymbol(s) mlab(label4) /*
*/ mlabc(black) mlabp(9) /*
*/ mcolor(black) mfcolor(none) ylab(, grid) legend(off) /*
*/ ytitle(Height for age) /*
*/ subtitle("Height for age") saving(mheight, replace))

graph export indonesia-mheight.emf, replace

* rank for child weight for age
clear
use $dir5, clear
keep prop mweight
ren prop district
save $dir51, replace

use $dir5, clear

```

```

keep district mweight
summ mweight
local n=_N
gen append=0
gsort - mweight
append using $dir51
replace append=1 if append==.

gen str label1=""
local i=1
while 'i'<='n'
replace label1=district if append==0 & _n=='i'
local i='i'+60

summ mweight
replace label1=district if mweight==r(min)

gen str label2=""
local i=2
while 'i'<='n'
replace label2=district if append==0 & _n=='i'
local i='i'+60

summ mweight if append==1
gen str label3=district if district=="KEPULAUAN RIAU" | ///
district=="DKI JAKARTA" ///
| district=="DI YOGYAKARTA" | district=="JAWA BARAT"
gen str label4=district if district=="Lampung"
replace label4=district if mweight==r(min)
gen zero=0
gen one=1

set scheme s1color

twoway (scatter mweight zero if append==0, xline(0) xline(1) mlab(label1) /*
*/ mlabc(black) mlabp(9) /*
*/ mcolor(black) mfcolor(none) msymbol(s)) /*
*/ (scatter mweight zero if append==0, mlab(label2) mlabc(black) mlabp(3) /*
*/ mcolor(black) mfcolor(none) msymbol(s)) /*
*/ (scatter mweight one if append==1, mfcolor(none) mlab(label3) /*
*/ mlabc(black) mlabp(3) /*
*/ mcolor(black) msymbol(s) xlab(-1 " " 0 "Local governments" 1 /*

```

```

*/ "Provinces" 2 " ") /*
*/ (scatter mweight one if append==1, msymbol(s) mlab(label4) /*
*/ mlabc(black) mlabp(9) mcolor(black) mfcolor(none) /*
*/ ylab(, grid) legend(off) ytitle(Weight for age) /*
*/ subtitle("Weight for age") saving(mweight, replace))
graph export indonesia-mweight.emf, replace

graph combine mheight.gph mweight.gph

* create map weight and height for age and mother social capital
clear all
set mem 200m
set more off
capture log close
set lines 140
set matsize 300

* create directories for better files management
log using E:\pre_mapindhlt, text replace
global dir1 "E:\indomap\"
global dir2 "E:\indomap\logfile"
global dir3 "E:\indomap\maps"

use $dir1
* this file consists information of weight and
* height of all children below 10
keep hhid07 pidlink weight height sex cage // watch 9336 children
mmerge hhid07 using $dir107nom, ukeep(kabid provid)
keep if _merge==3

** height for age z score US
egen zwaus = zanthro(height,ha,US), xvar(cage) ///
gender(sex) gencode(male=1, female=2)
label var zwaus "heigh for age z score 2007"

** weight for age z score US
egen zwaus2 = zanthro(weight,wa,US), xvar(cage) ///
gender(sex) gencode(male=1, female=2)
label var zwaus2 "weight for age z score 2007"

* child health status for local governments
bys kabid: egen hgtnkab=mean(zwaus)
bys kabid: egen wgtnkab=mean(zwaus2)

```

```

bys kabit: keep if _n==1
keep kabit hgtkab wgtkab
ren kabit cdkabkota
save $dir1, replace

use $dir1, clear
mmerge cdkabkota using $dir1
drop if _merge==2
drop _merge

cd e: shp2dta using indo_kab_rm, database(subar) ///
coordinate(indocoor) genid(id) replace
spmap hgtkab using "indocoor.dta", id(id) fcolor(Reds2) ///
clnumber(3) clbreak (-5 0 1 3) ///
ndfcolor(none) ocolor(none ..)
graph save $dir3, replace
spmap wgtkab using "indocoor.dta", id(id) fcolor(Reds2) ///
clnumber(3) clbreak (-3 0 1 3) ///
ndfcolor(none) ocolor(none ..)
graph save $dir3, replace
clear

use $dir1, clear
mmerge hhid07 using $dir107nom, ukeep(kabit provid)
keep if _merge==3
keep mp_summ provid kabit
bys kabit: egen mpart=mean(mp_summ)
bys kabit: keep if _n==1
ren kabit cdkabkota
keep cdkabkota mpart
save $dir1, replace
use $dir1, clear
mmerge cdkabkota using $dir1
drop if _merge==2
drop _merge
save $dir1, replace

cd e: shp2dta using indo_kab_rm, database(subar) ///
coordinate(indocoor) genid(id) replace
set scheme s1color
spmap mpart using "indocoor.dta", id(id) fcolor(Reds2) clnumber(4) ///
clbreak (0 0.15 0.30 0.60) ndfcolor(none) ocolor(none ..)
graph save $dir3, replace

```

```

clear
use $dir1, clear
mmerge commid07 using $dir107nom, ukeep(kabid provid)
keep if _merge==3
keep ngodensity provid kabid
bys kabid: egen ngokab=mean(ngodensity)
bys kabid: keep if _n==1
ren kabid cdkabkota
keep cdkabkota ngokab
save $dir1, replace
use $dir1, clear
mmerge cdkabkota using $dir1
drop if _merge==2
drop _merge
save $dir1, replace

cd e: shp2dta using indo_kab_rm, database(subar) ///
coordinate(indocoor) genid(id) replace
set scheme s1color
spmap ngokab using "indocoor.dta", id(id) ///
fcolor(Reds2) clnumber(3) clbreak (0 1 9) ///
ndfcolor(none) ocolor(none ..)
graph save $dir3, replace
clear
exit

```

B.5 Stata code for chapter five

```
* pre_los2009, Jarwo, October 8, 2010
* reestimate, August 2012
* by adding bed occupation ratio to measure efficiency of healthcare
* context:
* one major problem at health sector in Indonesia is
* low health care demand. To increase health care demand
* government implement various health financing reform
* this paper aims to understand whether health financing reform
* increase health care demand? More broadly this paper is purposed
* to understand what determinants can explain health care demand
* in Indonesia?
* this work is inspired from:
* 1. Singh, CH and Ladusigh, L. (2010) Inpatient length of stay:
*   a finite mixture modeling analysis
* 2. Hidayat, B (2008) are there differences between
*   unconditional and conditional demand estimates?
*   implications for future research and policy
* 3. Rokx et al. (2009) Health financing in Indonesia
* 4. World Bank (2008) Investing in Indonesia's health
* I improve prior works in several ways:
* 1. I use multilevel finite mixture analysis to capture
*   the nature of health reform and unobserved health care demand
* 2. I use unconditional being ill as a sample
* main findings: decentralised public health spending decrease
* healthcare demand. This negative association may signal
* low efficiency on local health provision. Number of hospitals,
* doctors and BOR are weakly associated with healthcare demand as well
* instead decentralised health spending,
* variation on health and unhealthy groups is
* explained by universal health insurance
* coverage, transportation cost to health care,
* intergovernmental fiscal transfer
* household socio economic status and health status
* source: susenas 2009

clear all
set mem 500m
set more off
capture log close
set lines 140
set matsize 300
```

```

* create directories for better files management
log using E:\data\chapter3\ssn2009\logfile\pre_los09, text replace
global dir1 "E:\data\chapter3\ssn2009\"
global dir2 "E:\data\chapter3\ssn2009\data"
global dir3 "E:\data\chapter3\ssn2009\pemda2009"
global dir4 "E:\data\chapter3\ssn2009\temp"
global dir5 "E:\data\chapter3\ssn2009\logfile"

use $dir1\ssn09ki, clear
ren b1r1 prop
    label var prop "provinces code"
ren b1r2 kabkota
    label var kabkota "districts code"
ren b1r3 kec
    label var kec "sub district code"
ren b1r4 deslurah
    label var deslurah "village code"
ren b1r8 codesamp
    label var codesamp "individual sample code"
ren b1r9 codert
    label var codert "household sampe code"
recode b1r5 (2=0), gen(urban)
    label var urban "respondents living in urban areas"
label def urban 1 "urban" 0 "rural"
label val urban urban

ren art hhsize
    label var hhsize "household size"

recode jk (1=0) (2=1), gen (female)
    label var female "respondent is female"
    label def female 1 "female" 0 "male"
    label val female female

ren umur age
    label var age "respondent's age when interviewed"

recode kwn (2=1) (else=0), gen(mar)
    label var mar "respondent is married"
    label def mar 1 "married" 0 "else (single,divorced or widowed)"
    label val mar mar

```

```

gen pedu = b5r13
gen edu = b5r16
replace edu = 0 if pedu==1 | b5r13==.
replace edu = 1 if b5r16==1 | b5r16==2 // elementary school
replace edu = 2 if b5r16==3 | b5r16==4 // secondary school
replace edu = 3 if b5r16==5 | b5r16==6 | b5r16==7 // high school
replace edu = 4 if b5r16==8 | b5r16==9 | b5r16==10 ///
| b5r16==11 | b5r16==12 // university
label var edu "respondent's education"

recode b5r1a (2=0) // flu
recode b5r1b (2=0) // coughed
recode b5r1c (2=0) // influenza
recode b5r1d (2=0) // asthma
recode b5r1e (2=0) // diarrhoea
recode b5r1f (2=0) // headache
recode b5r1g (2=0) // toothache
recode b5r1h (2=0) // else
egen symthoms=rowtotal(b5r1a b5r1b b5r1c b5r1d b5r1e b5r1f b5r1g b5r1h)
    label var symthoms "number of health symthoms"
// a proxy of health status

gen symth_1=0
replace symth_1=1 if symthoms >=1
    label var symth_1 "respondent at least have one symptom"
label def symth_1 1 "yes" 0 "no"
label val symth_1 symth_1

recode b5r7 (1=1) (2=0), gen(inpat)
    label var inpat "respondents have inpat treatment last year"
    label def inpat 1 "yes" 0 "no"
    label val inpat inpat

gen pubhos = b5r8a
    replace pubhos=0 if b5r8a==.
// the way b5r8 is coded, missing = not have inp. treatment
gen prihos = b5r8b
    replace prihos=0 if b5r8b==.
gen hltcen = b5r8c
    replace hltcen=0 if b5r8c==.
gen naked = b5r8d
    replace naked=0 if b5r8d==.
gen batra = b5r8e

```

```

        replace batra=0   if b5r8e==.
    gen else = b5r8f
        replace else=0   if b5r8f==.

    egen los=rsum(pubhos prihos hltcen naked batra else)
        label var los "how many days have inpat treat in hosp last year"

    recode prop (52/94=1) (else=0), gen(eastern)
        label var eastern "respondent living in eastern part Indonesia"
        label def eastern 1 "eastern" 0 "western"
    label val eastern eastern

    keep prop kabkota kec deslurah codesamp codert female age ///
    edu hhsize mar symthoms symth_1 ///
    eastern urban los
    save $dir4, replace

    use $dir109kr.dta, clear
    ren b1r1 prop
    ren b1r2 kabkota
    ren b1r3 kec
    ren b1r4 deslurah
    ren b1r8 codesamp
    ren b1r9 codert
    destring prop kabkota kec deslurah codesamp codert, replace

    recode b8r1a (2=0) // public servant health insurance
    recode b8r1b (2=0) // labour health insurance
    recode b8r1c (2=0) // private health insurance
    recode b8r1d (2=0) // health financing from employee
    recode b8r1f (2=0) // health fund

    egen nhisr=rsum(b8r1a b8r1b b8r1c b8r1d b8r1f)
        label var nhisr "number of health insurances which cover household"

    recode b8r1e (1=1) (else=0), gen (fhisr)
        label var fhisr "respondent recieved free health services (jamkesmas)"
        label def fhisr 1 "yes" 0 "no"
    label val fhisr fhisr

    recode b8r1g (1=1) (else=0), gen (lghisr)
        label var lghisr "respondent is covered by locgov health insurance"
        label def lghisr 1 "yes" 0 "no"

```

```

label val lghisr lghisr

ren b7r25 pce
// need to multiply with consumer price index to get riil household expenditure
label var pce "household monthly expenditure"

keep prop kabkota kec deslurah codesamp codert nhisr fhisr lghisr pce
save $dir4, replace

use $dir4, clear
mmerge prop kabkota using $dir12009, ukeep(id_district)
gen remote=0
replace remote=1 if id_district=="Kab. Manggarai Timur" | ///
id_district=="Kab. Paniai" | ///
id_district=="Kab. Mamberamo Raya" | ///
id_district=="Kab. Nduga" | id_district=="Kab. Lanny Jaya" | ///
id_district=="Kab. Mamberamo Tengah" | id_district=="Kab. Yalimo" | ///
id_district=="Kab. Kepulauan Mentawai" | ///
id_district=="Kab. Sumba Barat Daya" | ///
id_district=="Kab. Siau Tagulandang Biaro" | ///
id_district=="Kab. Raja Ampat" | ///
id_district=="Kab. Tolikara" | id_district=="Kab. Buton Utara" | ///
id_district=="Kab. Waropen" | id_district=="Kab. Mappi" | ///
id_district=="Kab. Nias Selatan" | ///
id_district=="Kab. Sumba Tengah" | id_district=="Kab. Dogiyai" | ///
id_district=="Kab. Seram Bagian Timur" ///
| id_district=="Kab. Landak" | ///
id_district=="Kab. Boven Digoel" | id_district=="Kab. Nagekeo" | ///
id_district=="Kab. Flores Timur" | id_district=="Kab. Nias" | ///
id_district=="Kab. Nagan Raya" | ///
id_district=="Kab. Buru" | id_district=="Kab. Sarmi" | ///
id_district=="Kab. Maluku Tenggara Barat" | ///
id_district=="Kab. Asmat" | id_district=="Kab. Kepulauan Talaud"
label var remote "remote islands in Indonesia"
label def remote 1 "remote island" 0 "main island"
label val remote remote
save $dir4, replace

* put all together
use $dir4, clear
mmerge prop kabkota codesamp codert using $dir4, ukeep(nhisr fhisr lghisr pce)
mmerge prop kabkota using $dir12009, ukeep(id_district)
mmerge id_district using $dir32008, ukeep(hospit doc bima oksrs oksrss bor)

```

```

mmerge id_district using $dir32008, ukeep(dau totrev hspe pop totspe)
mmerge id_district using $dir32009, ukeep(cpi2009)
mmerge id_district using $dir32008, ukeep(cpi2008)
keep if _merge==3
drop _merge

* riil household expenditure and household health expenditure
gen rpce=pce*cpi2009
replace rpce=(rpce)+(0.05*rpce) if urban==0
// inflation in rural area taken to be 5% higher than urban area
    label var rpce "real household expenditure"
* chek k-density rpce, sensibly normal
gen lpce= log(rpce)
    label var lpce "log riil household expenditure"

* riil general allocation fund from central government,
* total local gov. revenue, health spending,
* and total local government spending

gen rdau=dau*cpi2008
gen rtotrev=totrev*cpi2008
gen rhspe=hspe*cpi2008
gen rtotspe=totspe*cpi2008

* share dau on total local government revenue
gen sdau=rdau/rtotrev
    label var sdau "share general allocation fund on totrev 2008"
* health spending per capita 2008
gen hcapit=rhspe/pop
    label var hcapit "health spending per capita 2008"
* physicians per 1000 population
gen doccap=(doc/pop)*1000
    label var doccap "physicians per 1000 population 2008"
* transportation cost to nearest hospital
bysort prop kabkota: egen cost=mean(oksrs+oksrs)
gen rcost=cost*cpi2009
gen lcost=log(rcost)
* kdensity lcost, sensibly normal
label var lcost "log transportation cost to nearest hospital"

* keep only necessary variables
keep prop kabkota id_district kec deslurah codesamp codert ///
age hhsize female mar edu urban symthoms los ///

```

```

urban remote nhisr fhisr lpce  doccap lcost sdau ///
hospit bor  symth_1 lghisr hcapit

* order in better way
order  prop kabkota id_district kec deslurah codesamp codert ///
age hhsz female mar edu urban symthoms los ///
urban remote nhisr fhisr lghisr lpce  doccap lcost ///
sdau hospit bor hcapit

drop if los==.
// only use resp complete information on inpatient hospital stay

* clean before use
!del $dir4
!del $dir2
!del $dir4
!del $dir4
!del $dir12009
!del $dir32008
!del $dir32008
!del $dir32009
!del $dir32008

* check missing missing data
gen byte complete= age!=. & hhsz!=. & female!=. & mar!=. & edu!=. ///
& urban!=. & symthoms!=. & los!=. ///
& urban!=. & remote!=. & nhisr!=. & fhisr!=. & lpce!=. & doccap!=. ///
& lcost!=. & sdau!=. ///
& hospit!=. & bor!=. & lghisr!=.
* missing data = 14%

*for multilevel analysis later, create numeric commid,
*just use the 1st obs number
sort id_district
gen obsn = _n
bysort id_district: gen idkab=obsn[1]
xtset idkab

save $dir409, replace
* codebook
log close

* descriptive of analytic sample

```

```

estpost summ los hcapit doccap lcost sdau hospit bor lghisr ///
age hhsize female mar edu lpce urban symthoms remote nhisr fhisr
estout using "e:.xls",replace ///
cells("count mean sd min max")

* bivariate correlation
order los hcapit doccap lcost sdau hospit bor lghisr age ///
hhsize female ///
mar edu lpce urban symthoms remote nhisr fhisr
pwcorr los hcapit doccap lcost sdau hospit bor lghisr age hhsize ///
female mar edu lpce urban symthoms remote nhisr fhisr, star(.01) bon

estpost correlate zos hcapit doccap lcost sdau hospit bor lghisr age hhsize ///
female mar edu lpce urban symthoms remote nhisr fhisr, matrix listwise
est store c1
esttab using $dir4.tex", unstack noobs compress

* transfer the data to MPlus format
* stata2mplus using stata2mplus using $dir2_los2009, replace
* for unconditional being ill sample
* keep if symth_1==1 // for conditional being ill sample
* stata2mplus using stata2mplus using $dir2_los2009_ill, replace
* for conditional being ill sample
* next work at MPlus

use $dir409, clear
* Try multilevel model and treat los as poisson
global xvars "age hhsize female mar edu urban symthoms remote ///
nhisr fhisr ///
lpce doccap lcost sdau hospit bor lghisr hcapit"
gllamm los $xvars, i(idkab) f(poisson) adapt
estimates store gllamm1
estimates store los1, title(los1)
    estimates store los1, title(los1)
    estout los1, style(fixed) cells ("b(fmt(%9.3f)) se(fmt(%9.3f)) ///
p (fmt(%8.2f))")
    estout los1 using "los1.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

use $dir409, clear

```

```

keep if symth_1==1 // for conditional being ill sample
global xvars "age hhsize female mar edu urban symthoms ///
remote nhisr fhisr ///
lpce  doccap lcost sdau hospit bor lg hisr hcapit"
gllamm los $xvars, i(idkab) f(poisson) adapt
estimates store gllamm2
estimates store los1, title(los1)
    estimates store los1, title(los1)
    estout los1, style(fixed) cells ("b(fmt(%9.3f)) se(fmt(%9.3f)) ///
    p (fmt(%8.2f))")
    estout los1 using "los1.tex", style(tex) ///
    cells("b(fmt(%9.3f)) se(fmt(%9.3f)) p(fmt(%8.2f))") ///
    varlabels(_cons Constant) replace

clear

* Try single level finite mixture model
use $dir409, clear
ren los y

global xvar "age hhsize female mar edu urban symthoms ///
remote nhisr fhisr ///
lpce  doccap lcost sdau hospit bor lg hisr hcapit"

// negative binomial
nbreg y $xvar, disp(constant) robust
estat ic
mfx, var(age hhsize female mar edu urban symthoms ///
remote nhisr fhisr lpce  doccap lcost sdau hospit bor ///
lg hisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) adec(2) 2aster ///
addstat(mean,e(Xmfx_y)) replace

fmm y $xvar, mix(negbin1) comp(2) robust
test [component1=component2]
estat ic

mfx, var(age hhsize female mar edu urban symthoms ///
remote nhisr fhisr lpce  doccap lcost sdau hospit bor ///
lg hisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) adec(2) 2aster ///
addstat(mean,e(Xmfx_y))

```

```

mfx, predict(eq(component1)) var(age hhsiz female mar ///
edu urban symthoms ///
remote nhisr fhisr lpce doccap lcost sdau hospit bor ///
lghisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) adec(2) 2aster ///
addstat(mean,e(Xmfx_y))

mfx, predict(eq(component2)) var(age hhsiz female ///
mar edu symthoms ///
urban remote nhisr fhisr lpce doccap lcost sdau hospit ///
bor lghisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) adec(2) 2aster ///
addstat(mean,e(Xmfx_y)) word

preserve
collapse (median) $xvar
expand 10
gen y = _n-1

predict yhat1, eq(component1)
predict yhat2, eq(component2)

gen delta1 = 'e(delta1_est)'
gen delta2 = 'e(delta2_est)'
gen psi1 = yhat1 / delta1
gen psi2 = yhat2 / delta2
gen phi1 = ln(1+delta1)
gen phi2 = ln(1+delta2)

gen f1 = exp(lngamma(y+psi1) - lngamma(y+1) - ///
lngamma(psi1) + ln(delta1)*y ///
- (y+psi1)*phi1)
gen f2 = exp(lngamma(y+psi2) - lngamma(y+1) - ///
lngamma(psi2) + ln(delta2)*y ///
- (y+psi2)*phi2)
gen f = 'e(pi1_est)']*f1 + 'e(pi2_est)']*f2

set scheme s1color
graph bar (asis) f1 f2, bar(1, fintens(inten0) ///
lw(medthick)) over(y) ///
title(Predicted densities at median X, size(vlarge)) ///
legend(label(1 infrequent health care users) ///
label(2 frequent health care users) cols(1)) xsize(8) ysize(5)

```

```

graph save fmm-negbin1.gph, replace
clear

use $dir409, clear
ren los y
global xvar "age hhsize female mar edu urban symthoms ///
remote nhisr fhisr ///
lpce doccap lcost sdau hospit bor lghisr hcapit"
keep if symth_1==1 // for conditional being ill sample
// negative binomial
nbreg y $xvar, disp(constant) robust
estat ic
mfx, var(age hhsize female mar edu urban symthoms ///
remote nhisr fhisr lpce doccap lcost sdau hospit bor ///
lghisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) addec(2) 2aster ///
addstat(mean,e(Xmfx_y)) replace

fmm y $xvar, mix(negbin1) comp(2) robust
test [component1=component2]
estat ic

mfx, var(age hhsize female mar edu urban symthoms ///
remote nhisr fhisr lpce doccap lcost sdau hospit bor ///
lghisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) addec(2) 2aster ///
addstat(mean,e(Xmfx_y))

mfx, predict(eq(component1)) var(age hhsize female mar ///
edu urban symthoms ///
remote nhisr fhisr lpce doccap lcost sdau hospit bor ///
lghisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) addec(2) 2aster ///
addstat(mean,e(Xmfx_y))

mfx, predict(eq(component2)) var(age hhsize female mar ///
edu symthoms ///
urban remote nhisr fhisr lpce doccap lcost sdau hospit ///
bor lghisr hcapit) at(median)
outreg2 using fmm-negbin, mfx bdec(3) addec(2) 2aster ///
addstat(mean,e(Xmfx_y)) word

```

```

preserve
collapse (median) $xvar
expand 20
gen y = _n-1

predict yhat1, eq(component1)
predict yhat2, eq(component2)

gen delta1 = 'e(delta1_est)'
gen delta2 = 'e(delta2_est)'
gen psi1 = yhat1 / delta1
gen psi2 = yhat2 / delta2
gen phi1 = ln(1+delta1)
gen phi2 = ln(1+delta2)

gen f1 = exp(lngamma(y+psi1) - lngamma(y+1) - ///
lngamma(psi1) + ln(delta1)*y ///
- (y+psi1)*phi1)
gen f2 = exp(lngamma(y+psi2) - lngamma(y+1) - ///
lngamma(psi2) + ln(delta2)*y ///
- (y+psi2)*phi2)
gen f = 'e(pi1_est)']*f1 + 'e(pi2_est)']*f2

set scheme s1color
graph bar (asis) f1 f2, bar(1, fintens(inten0) lw(medthick)) over(y) ///
title(Predicted densities at median X, size(vlarge)) ///
legend(label(1 Infrequent health care users) ///
label(2 Frequent health care users) cols(1)) xsize(8) ysize(5)
graph save fmm-negbin2.gph, replace

clear
exit

clear all
set mem 200m
set more off
capture log close
set lines 140
set matsize 300

* create directories for better files management
log using E:\pre_mapindhlt, text replace

```

```

global dir1 "E:\indomap\"
global dir2 "E:\indomap\logfile"
global dir3 "E:\indomap\maps"

use $dir1, clear
mmerge prop kabkota using $dir1
drop if _merge==2
drop _merge
save $dir1, replace

cd e: shp2dta using indo_kab_rm, database(subar) ///
coordinate(indocoor) genid(id) replace
replace mlos=0.80 if mlos > 0.90
set scheme slcolor
spmap mlos using "indocoor.dta", id(id) fcolor(Reds2) clnumber(4) ///
clbreak (0 0.10 0.20 0.30 0.90) ndfcolor(none) ocolor(none ..)

clear
exit

```

B.6 MPlus code for chapter five

```

* MPlus code for multilevel mixture negative binomial
* one clas unconditional being ill sample

```

```

Title: multilevel mixture negative binomial one
      clas unconditional being ill sample

```

```

Data:

```

```

File is E:\data\chapter3\ssn2009\data\pre_los2009.dat ;

```

```

Variable:

```

```

Names are

```

```

age hhsiz female mar edu urban symthoms los remote nhisr fhisr lghisr
lpce symth_1 idkab hcapi lcost doccap sdau hospit bor;

```

```

Usevariables are idkab age hhsiz female mar edu

```

```

urban symthoms los remote nhisr fhisr lghisr lpce hcapi lcost doccap
sdau hospit bor;

```

```

Within are age female mar edu symthoms lpce hhsiz remote urban
nhisr fhisr lghisr;

```

```

Between are hcapi hospit doccap sdau lcost bor;

```

```

Cluster is idkab;
Count is los (nb);
Classes = c(1);
Missing are all (-9999) ;
Analysis : type = twolevel mixture;
            processors = 2;
            estimator = ML;
            starts = 0;
Model:
  %within%
  %overall%
  los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
  %c#1%
  los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
  %between%
  %overall%
  los on hcapiit hospit doccap sdau lcost bor;
  %c#1%
  los on hcapiit hospit doccap sdau lcost bor;
  los;

```

Output: Tech1 Tech4 Tech8;

```

* MPlus code multilevel mixture negative binomial
* two classes for unconditional being ill

```

```

Title: multilevel mixture negative binomial
       two classes for unconditional being ill
Data:
File is E:\data\chapter3\ssn2009\data\pre_los2009.dat ;
Variable:
Names are
age hhsize female mar edu urban symthoms los remote nhisr fhisr lghisr
lpce symth_1 idkab hcapiit lcost doccap sdau hospit bor;
Usevariables are idkab age hhsize female mar edu
urban symthoms los remote nhisr fhisr lghisr lpce hcapiit lcost doccap
sdau hospit bor;
Within are age female mar edu symthoms lpce hhsize remote urban
nhisr fhisr lghisr;

```

```

Between are hcapiit hospit doccap sdau lcost bor;
Cluster is idkab;
Count is los (nb);
Classes = c(2);
Missing are all (-9999) ;
Analysis : type = twolevel mixture;
           processors = 2;
           estimator = ML;
           starts = 0;
Model:
  %within%
  %overall%
  los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
  %c#2%
  los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
  %between%
  %overall%
  los on hcapiit hospit doccap sdau lcost bor;
  %c#2%
  los on hcapiit hospit doccap sdau lcost bor;
  los;

Output: Tech1 Tech4 Tech8;

* MPlus code for multilevel mixture negative binomial
* one clas for conditional being ill

Title: multilevel mixture negative binomial
       one clas for conditional being ill
Data:
File is E:\data\chapter3\ssn2009\data\pre_los2009_ill.dat ;
Variable:
Names are
age hhsize female mar edu urban symthoms los remote nhisr fhisr lghisr
lpce idkab hcapiit lcost doccap sdau hospit bor;
Usevariables are idkab age hhsize female mar edu
urban symthoms los remote nhisr fhisr lghisr lpce hcapiit lcost doccap
sdau hospit bor;
Within are age female mar edu symthoms lpce hhsize remote urban

```

```

nhisr fhisr lghisr;
Between are hcapiit hospit doccap sdau lcost bor;
Cluster is idkab;
Count is los (nb);
Classes = c(1);
Missing are all (-9999) ;
Analysis : type = twolevel mixture;
           processors = 2;
           estimator = ML;
           starts = 0;
Model:
  %within%
  %overall%
  los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
  %c#1%
  los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
  %between%
  %overall%
  los on hcapiit hospit doccap sdau lcost bor;
  %c#1%
  los on hcapiit hospit doccap sdau lcost bor;
  los;

```

Output: Tech1 Tech4 Tech8;

```

* MPlus code for multilevel mixture negative binomial
* two classes for conditional being ill

```

```

Title: multilevel mixture negative binomial two
       classes for conditional being ill

```

```

Data:
File is E:\data\chapter3\ssn2009\data\pre_los2009_ill.dat ;
Variable:
Names are
age hhsize female mar edu urban symthoms los remote nhisr fhisr lghisr
lpce idkab hcapiit lcost doccap sdau hospit bor;
Usevariables are idkab age hhsize female mar edu

```

```

urban symthoms los remote nhisr fhisr lghisr lpce hcapit lcost doccap
sdau hospit bor;
Within are age female mar edu symthoms lpce hhsize remote urban
nhisr fhisr lghisr;
Between are hcapit hospit doccap sdau lcost bor;
Cluster is idkab;
Count is los (nb);
Classes = c(2);
Missing are all (-9999) ;
Analysis : type = twolevel mixture;
            processors = 2;
            estimator = ML;
            starts = 0;

Model:
%within%
%overall%
los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
%c#2%
los on age female mar edu symthoms lpce hhsize remote urban nhisr fhisr lghisr;
%between%
%overall%
los on hcapit hospit doccap sdau lcost bor;
%c#2%
los on hcapit hospit doccap sdau lcost bor;
los;

Output: Tech1 Tech4 Tech8;

```