A STUDY IMPACT ON HEALTH FINANCING MECHANISM ON MATERNAL MORTALITY REDUCTION IN INDONESIA:

Econometrics Analysis Using Panel Data from South East Asia Countries

By

Dara Ayu Prastiwi

THESIS

Submitted to

KDI School of Public Policy and Management

in partial fulfillment of the requirements

for the degree of

MASTER OF PUBLIC POLICY

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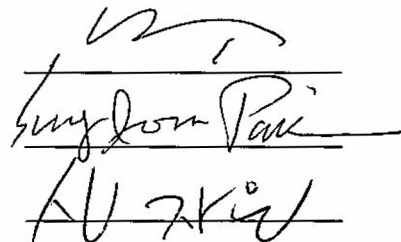**Dara Ayu Prastiwi**

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for the degree of MASTER OF

PUBLIC POLICY Committee in

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Approval as of December, 2014

ABSTRACT

A Study Impact on Health Financing Mechanism on Maternal Mortality
Reduction in Indonesia :
Econometrics Analysis Using Panel Data from South East Asia Countries
By

Dara Ayu Prastiwi

Maternal mortality is one of the biggest problem which faces most countries in the world. That is why this issue had been one of the goals from Millenium Development Goals 2015. This problem often attack developing and less develop countries in Africa and Asia. Where Indonesia, is also one of the countries which has this problem. Comparing to other countries in its region, ASEAN, Indonesia categoryzed in high maternal mortality ration based on 2010 data. Indonesia's maternal mortality ratio is 220 of 100.000 live births1, this ratio is above regional (200 of 100.00) (Indonesia Health Profile, 2010) and global average (210 of 100.000) Meanwhile Malaysia maternal mortality ratio is 29   of 100.0002, Thailand 44 of 100.0003 and Philippines 99 of 100.0004.

Maternal mortality is one of health problems that quite common for us. It can be caused by unbalance midwife which distributed all over the region, lack of knowledge of mother health for people who live in remote area and also for poor people. Health financing could also be one of the causes for this case. Where financing always be the main problem from some problems all over the world. Related on it, by this research I would like to focus on health financing mechanism which affecting maternal mortality ratio in Indonesia. I did comparative study for

ASEAN countries about this variable because all of the countries in that region have similar characteristics. I would like to know which one from absolute amount of financing and structure of financing which affecting maternal mortality ratio in Indonesia. I use panel data analysis with 10 years time series data of maternal mortality ratio, health expenditure , social security, external fund, and private insurance from ASEAN countries.

From the result we found that structure of financing have bigger impact to maternal mortality ratio rather than absolute amount of financing due to some unobservable factors such as medical existencem geographical contraint, level of poverty, total population, etc. Morover, it also showed that higher government expenditure on health couldn't guarantee less number of maternal mortality. It might be because of government itself had implemented less effective way to reduce maternal mortality. Besides that, external resource and social fund hava a big impactin reducing maternal mortality in South East Asia countries.

Dedicated to all of Nasution and Prasetyo Family

ACKNOWLEDGEMENTS

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I. INTRODUCTION

a. Background

Indonesia is the 4th largest population in the world with total population 242.325.638 people whose spread across more than 17.000 islands (Center of Bureau Statistics, 2011). As a country which has a lot of population and has a geographical constraint, human development become more complicated issues there. Human development is one of the engine factors in economic growth which influenced by the level of education and the level of health of citizen in a country. Those two factors always become problems in many countries, especially developing countries like Indonesia.

Regarding to those issues, United Nation develop eight world development goals which is known as Millennium Development Goals in 2000. Three of the goals are increasing health quality in the world which supported by higher quality of mother health, reducing mortality rate of children and combating contagious diseases like HIV/AIDS, malaria, etc. Those three of health factors are familiar in many developing countries. From those three indicators, improvement of maternal health target seems to be has the least progress of all (MDG's Report, 20120). This condition could be affect achievement of other MDG's targets such as eradicated poverty (MDG 1) and children health (MDG 4). The benefit of better maternal health not only for her family but also for economic growth in a country because they can increase number of women workers and promote economic well-being of communities and country.

In order to increase health quality based on MDG's goals, Indonesia government have been trying to developing and to implementing several policies such as social insurance, free delivery health service for poor family, giving birth assistance and etc. There is no significance improvement of health quality there. Over the last two decades Indonesia only showed low rate of health quality improvement. This condition supported by the data of MDG's goals achievement which stated that on those three factors, Indonesia still couldn't achieve its target on mother health and children mortality rate. The data showed current achievement MDG's goals data showed that the number of children mortality under 5-years is 44 0f 1000 children (Indonesia MDG's Report, 2010). That number still under Indonesia goals which are 33 of 1000 children. Moreover, there's also finding that the number of newborns out in Indonesia is 34 of 1000 children where its target is 19 of 1000 children. Indonesia has the worst mother health quality in South East Asia with the rate 307 of 100.000 based on MDG's report 2010.

Indonesia has low improvement of health which showed by Indonesia's performance based on the rank of Human Development Index. According to World Health Organization (WHO) 2011 report on Human Development Index (HDI), Indonesia had dropped from 108 to 124. While its neighborhood countries such as Malaysia, Philippines and Thailand got better HDI rank (Malaysia 66, Philippines 105 and Thailand 103). The measurement of HDI itself was counted by life expectancy, purchasing power and illiteracy rate. According to Human Development Report 2011 by UNDP, life expectancy at birth of Indonesia only 69,4 which compared to Malaysia 69,7, Thailand 71,5, Phillipenes72,4. Maternal mortality has contributed to life expectancy there, where Indonesia also has the highest maternal mortality rate comparing with those three countries. Indonesia's maternal mortality ratio is 220 of

100.000 live births, this ratio is above regional (200 of 100.00) (Indonesia Health Profile, 2010) and global average (210 of 100.000). Meanwhile, Malaysia maternal mortality ratio is 29   of 100.000, Thailand 44 of 100.000 and Philippines 99 of 100.000. Maternal   mortality is an important issue in Indonesia because based on census data of Indonesia in 2010, percentage of women population was decreased from 2009 (from   50,47% to 49,83%). Around 60% of women live in rural area of Indonesia, where maternal mortality problem was a big issue there comparing with urban area.   Compared with some of ASEAN countries, Indonesia has the largest woman population among those three countries.

Source : WHO Data Base

Graph 2. Women Population
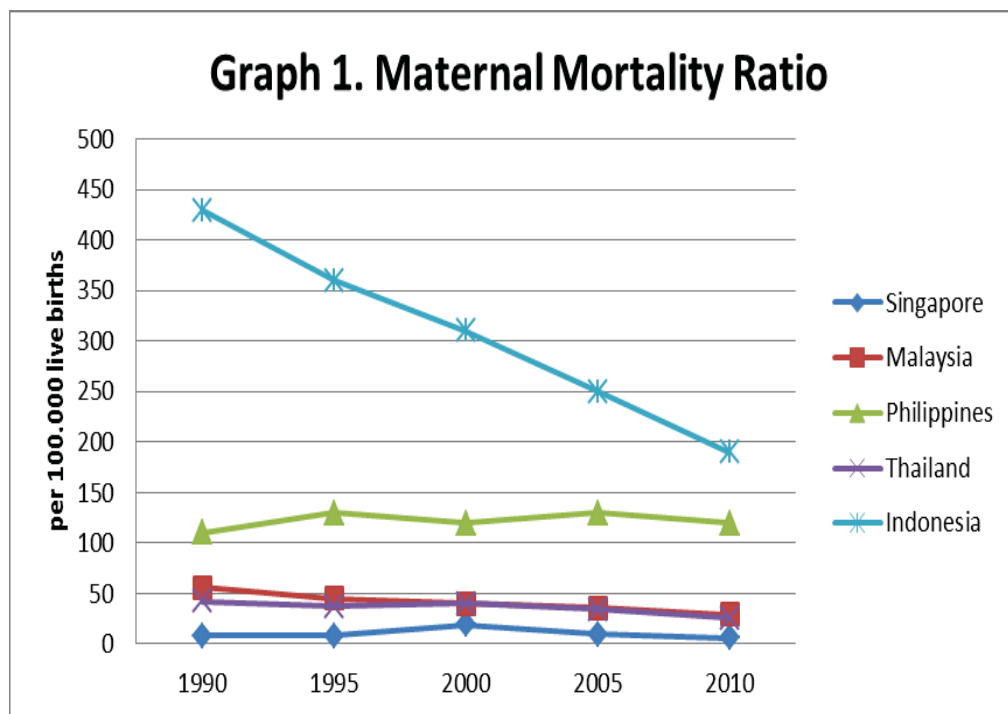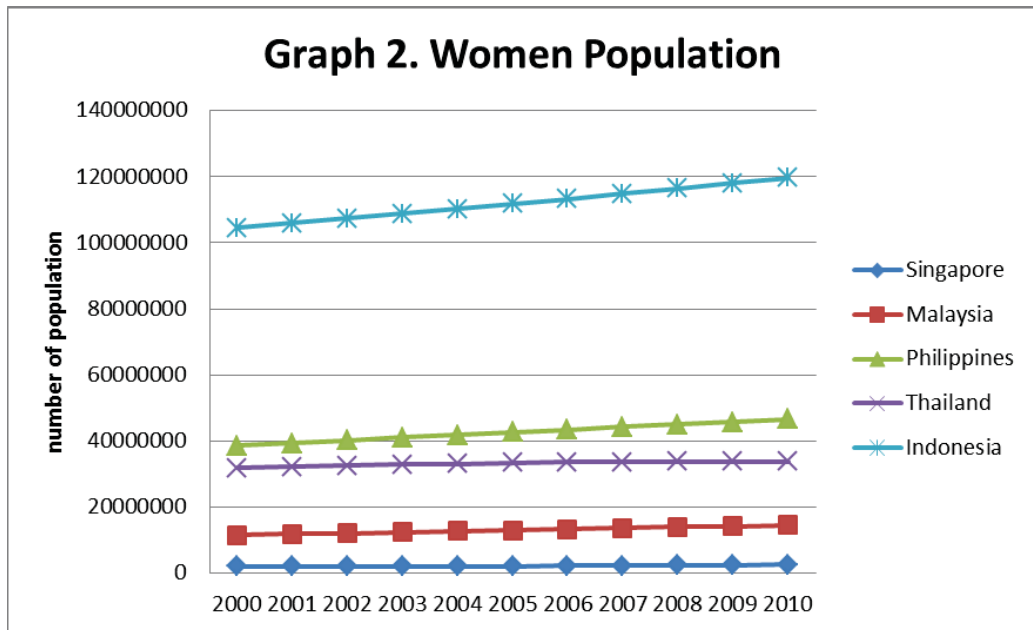
Source : World Bank Data Base

One of the factors that made gap between Indonesia and those countries is high inequality in health service utilization especially for births attended by skilled health personnel between rural-urban and poorest-wealthiest class. There is only 63% of birth attended by skulled health personnel in rural areas and 44% for poorest class while urban has 88% and wealthiest has 95%5. There is equality of health service utilization for Malaysia and Thailand, in contrast Philippines still has inequality of health servince utilization. Event thought its happened in Philippines, but they still have lower maternal mortality ratio and higher HDI than Indonesia.

Some people say that low health quality of Indonesia especially high rate of maternal mortality among several countries above is affected by low proportion of total health expenditure that spend by Indonesia GNP comparing to those countries. The budget of health care financing in Indonesia only 2,6% of its GNP, whereas WHO set the standard of health care budget in each country around 5% of its GNP

4

(WHO Report, 2000). If we compare the budget of Indonesia with its neighboring countries' budgets such as Philippines, Malaysia, and Thailand, it showed that Indonesia had the smallest budget of all; Indonesia's 2.6% was significantly smaller than the respective 3,8%, 4,4%, and 4% in the countries listed above. This data showed there is weak commitment from the Indonesian government to solve health problems there, which causing low health expenditure in Indonesia compared with other countries.

GRAPH 3. Total Health Expenditure of ASEAN Countries
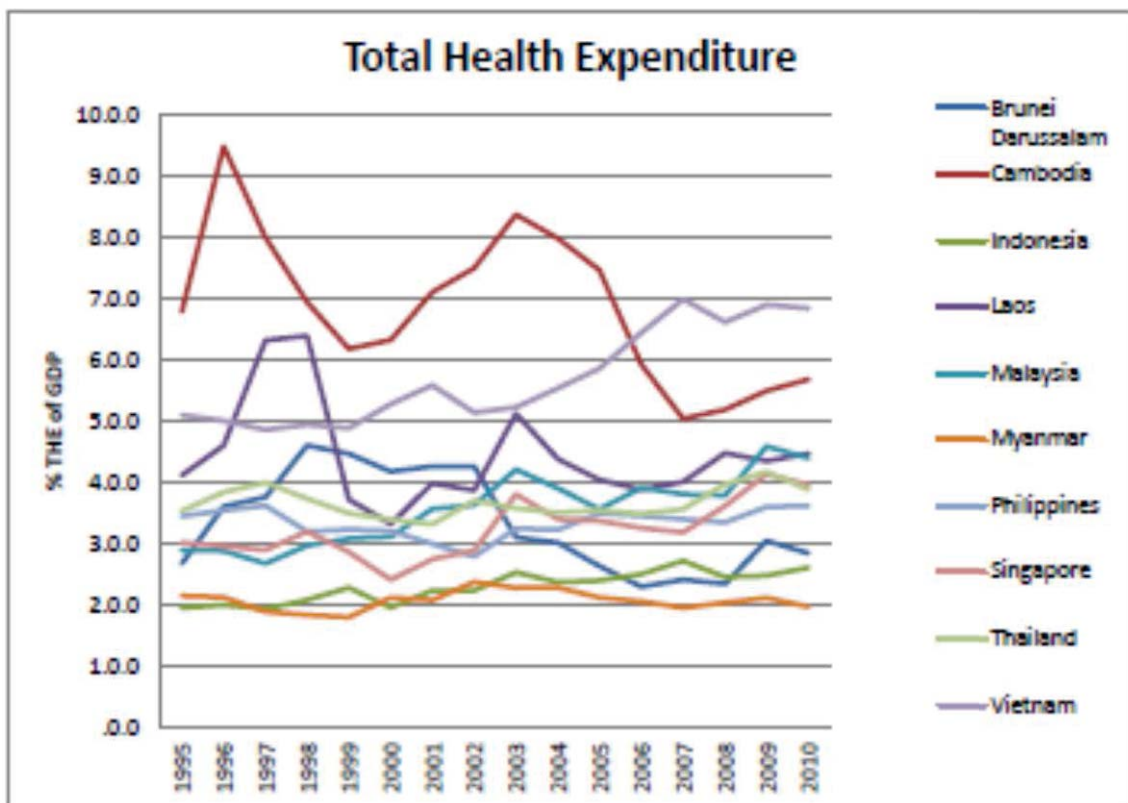
Source : WHO Data Base, National Health Account

GRAPH 4. Per Capita Health Spending (USD)
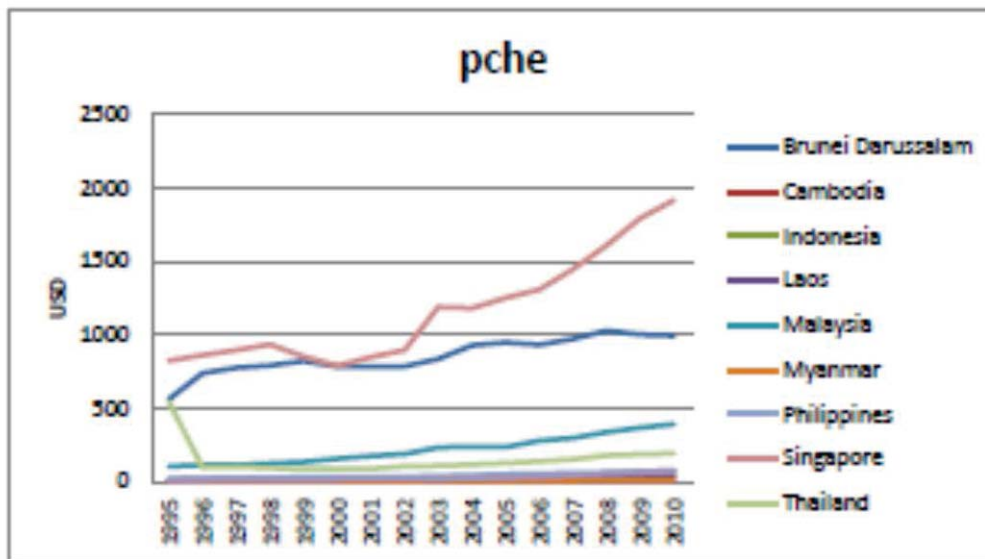
Source : WHO Data Base, National Health Account

According to the report of health performance in Indonesia, there are six components which affected health performance, such as effort, financing mechanism, human resources of health services, drugs availability, community empowerment, and health management (Indonesia Health Report 2002). Based on those factors, some health experts in Indonesia like Thabrany said that financing mechanisms are the most fundamental factor that determined health quality (Thabrany 2003).

GRAPH 5.MMR and GGHE of ASEAN Countries

average data on MMR and GGHE
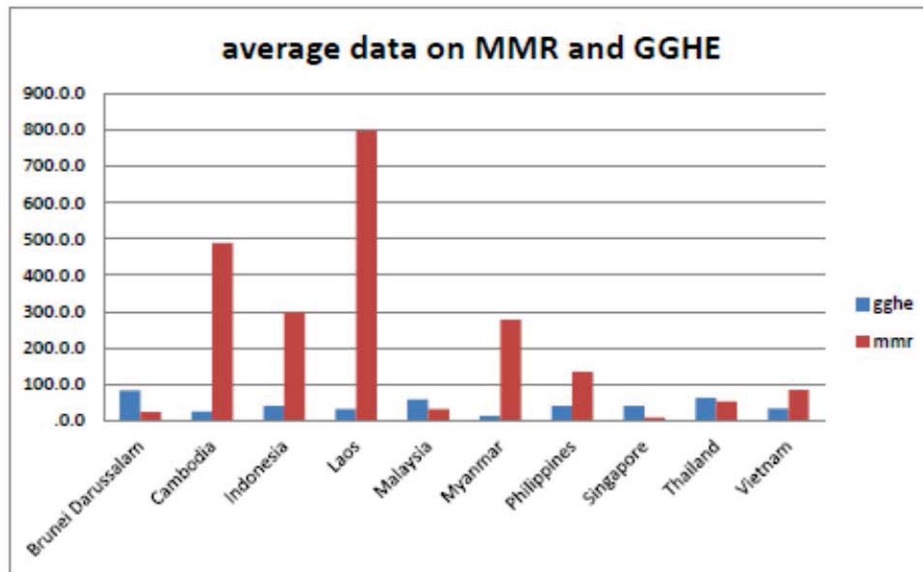
Source : WHO Data Base, National Health Account

I argue that higher government expenditure of health will affect better health outcome. , we can see the fact on graph 5 above. Based on that graph we can see that the top 3 highest general government expenditure like in Brunei, Malaysia and Thailand have less maternal mortality ratio compared to the rest countries in ASEAN. I found that Indonesia percentage expends on health is 49, 1% from government expenditure and 50, 1% from private expenditure. Meanwhile Malaysia has 55, 5% from government and 44, 5% from private. Furthermore, Philippines has 35, 3% from government and 64, 7% from private. Most of private expenditure on health financing in Indonesia and Philippines come from Out of Pocket financing.

b. Research Question and Hypothesis

By this research I would like to know which one between absolute amount of health expenditure which indicated by per capita health spending, and health financing structure which indicated by share of financing resource of total health spending that the most contributed factor in affecting low improvement of decreasing

maternal mortality ratio in Indonesia. I also would like to know whether public spending have strong contribution to decrease MMR or not. Furthermore, I also would like to find out the financing mechanism solution to solve that problem in order to decrease maternal mortality ratio in Indonesia. Some people said that absolute amount of financing has bigger contribution to decrease MMR, but in my opinion the structure of financing itself would have stronger correlation to decreasing MMR. Because of the budget constraint that always be the reason of government to handling of any development program, we should find more effective way to allocate our limit budget, and find the best way of health financial structure. Moreover, in contrast with general perspective which stated public spending is important to tackle this problem, but based on my basic analysis before I believe that nowadays public spending will have less contribution to handle this issue.

c. Methodology

On this research I will try to analyze the data of 10 ASEAN countries to explore more about their maternal health performance and health financing in each country. I will overlay the time series data of maternal health outcome in each country with their policy changes based on 15-years data. From that overlay we could find the impact of its policy changes to the outcome result. Later we could know which one is give better result in maternal health outcome between absolute amount and financing structure. After that, we could learn more and adapt either management or budget from the country who has the best performance of decreasing its MMR which appropriate for Indonesia condition in order to reach the goal of increasing maternal health in Indonesia.

d. Organizational of Study

There will be five parts on this research. Part I serves as an overall introduction of the paper. Part II shows the literature review which not only supported my arguments but also some literature that contrast with my arguments which could showed that I still recognize several factors which might related to my issues here. Part III will data description and survey result. Part IV will shows the finding of result analysis. And the last part, Part V will become the conclusion.

II. LITERATURE REVIEW

2.1 Country Profile

2.1.1 Indonesia Health Profile

By the early 1990s, Indonesia had experienced in improving socio-economic indicators. Life expectancy at birth reached 69 years (67 years for males and 72 years for females) in 2005 and the infant mortality rate gradually declined from 68 per 1000 in 1990 to 32 per 1000 in 2005. The proportion of population living in poverty had dropped dramatically from 60% in 1970 to an estimated 17% in 2004 and the literacy rate for those aged 15 years or more was 91% in 2004. However, these achievements received a setback in mid-1997 with the economic crisis. Although the health status of Indonesia was not affected drastically in the short term, the proportion of people living in poverty had rose during the period of political, economic and social instability. Most recently, poverty rates have been reported to be declined.

Indicators show that the health situation of mothers, children and adolescents in Indonesia has much room for improvement. Wide geographical variation exists for infant and maternal mortality. Mortality rates for children (less than five years) and infants (under one year) remain at 46 and 32 deaths per 1000 live births, respectively, although a reduction in under-five and infant mortality rates reflects progress. Nevertheless, persistent rates of death among Indonesian children within the first year of life, one third of which occur within one month after birth, are a reflection of the quality of health care during prenatal, delivery and postnatal periods. Indeed, all three major causes of infant mortality — acute respiratory infections, perinatal complications, and diarrhoea — could be considerably reduced through quality health prevention and care.

All estimates was confirmed that the maternal mortality ratio (307/100 000 live births) in Indonesia is among the highest in the South-East Asia Region (Indonesia Demographic and Health Survey 2002-2003). The lifetime risk of a mother dying which causes by childbirth is estimated to be 1 in 65 — compared with 1 in 1100 in Thailand (WHO 2002). In Indonesia, 58% of deliveries are estimated to take place at home; of those, 33% are in urban and 67% in rural areas. The rate of caesarean sections, one of the life-saving interventions in obstetrics, is 2% in rural and 7% in urban areas. Over-medicalization of deliveries is a concern in cities, while in rural areas the majority of women in need have no access to emergency services. The Ministry of Health has been made escalation in addressing maternal mortality by focusing on the three main areas outlined in the national 2001-2010 making pregnancy safer strategy, such as:

- Skilled attendance at delivery;

- Access to hospital care in case of complication; and

- Prevention of unwanted pregnancy and unsafe abortion.

There has been a decline of fertility in Indonesia from 3.0 children per woman of reproductive age in 1988-1991 to 2.2 children per woman in 2005. Compared with some countries in South-East Asia, the total fertility rate in Indonesia is relatively low, whereas decline has taken place in most provinces. It is vital to sustain and build on these achievements. The median age at first marriage for girls is 20.2 years. While median age at first birth is 21.9 years, 16% of childbearing women are 18 years or younger. In addition, 11% of total fertility is attributable to births by the 15-19 year old age group (Indonesian demographic and health survey 2002-2003). Maternal, under-five, infant and neonatal mortalities are higher among mothers under the age of

20 compared to mothers above that age. These data demonstrate the importance of reproductive as well as adolescent health.

2.1.2 Indonesia Health System

The general decentralization process implemented in 2001 has had many impacts on the health system, even though it was not designed specifically with the health sector in mind. In particular, health financing, health information systems, human resources for health and service provision have been affected. Under decentralization, the responsibility for health care provision is largely in the hands of regional governments.

<u>Health financing</u>

Compared to its neighboring countries such as Malaysia and Thailand, Indonesia spends relatively less than them on health services. Estimated total expenditure on health per capita in 2003 was US$ 33 in Indonesia compared to US$ 149 in Malaysia and US$ 90 in Thailand. Within that, public sector spending on health per capita, in 2003 was estimated at US$ 11 in Indonesia, US$ 80 in Malaysia and US$ 63 in Thailand. Part of the discrepancy is explained by the fact that Malaysia and Thailand are richer countries, but another part is explained by the fact that they accord higher priority to health. Public expenditure on health as a share of the national economy was 1.2% in Indonesia, compared to 2% in Malaysia and 3.1% in Thailand.

The overall health financing situation in Indonesia is complex and incompletely documented. As shown in figure 1, around 36% of total expenditure is undertaken by public sector agencies, while 64% by private. By far, the largest single source of private expenditure is direct out-of-pocket payments by households,

accounting for nearly half of the total expenditure. Private services are largely financed by out-of-pocket payments, with some insurance and employer-financed expenditure that only benefit for minority of formal sector employees. Publicly provided services are financed by a mix of public budgets and user fees, in turn financed by a combination of households, employers and insurers. Until the advent of the new social insurance scheme for the poor, described below, insurance coverage of the population was low at (well under 10%).

Graph 6. Health Expenditure by Source of Financing, 2006
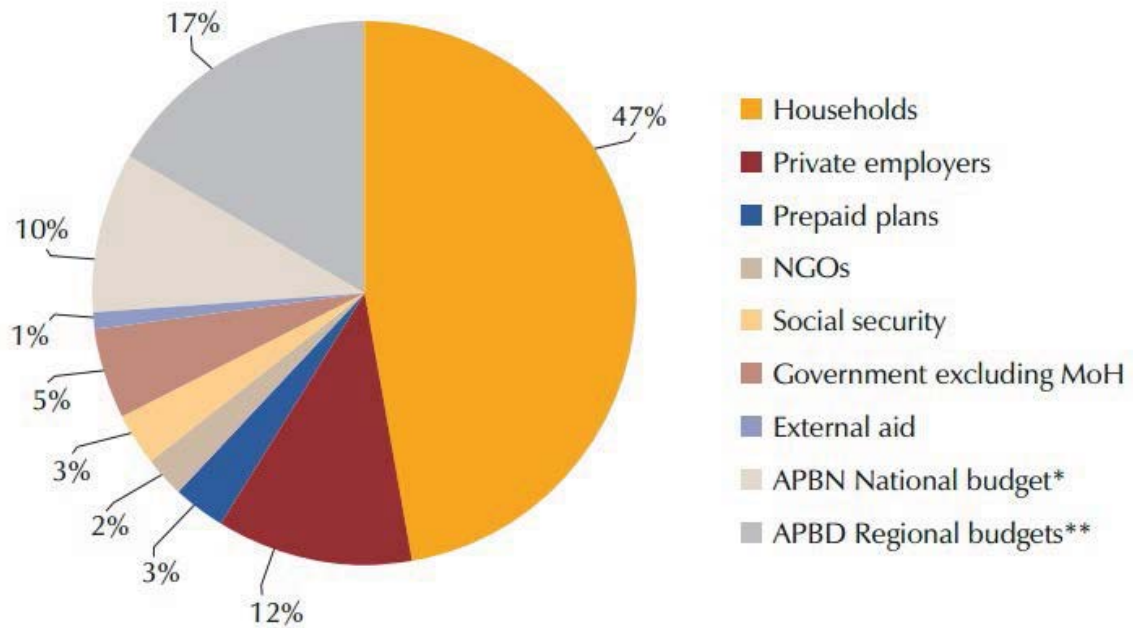
Source : Indonesia National Health Accounts 2006

Historically, high inequitable pattern of health financing has been observed. Distribution of household expenditures is even more skewed in favour of upperincome groups than the distribution of incomes itself. This reflects low utilization of health services by poor people and low use of public hospitals. The coverage of insurance, or direct employer-paid benefit, is confined to a minority of

formal sector employees. Public budgets are distributed inequitably between geographical areas, while the benefit-incidence analysis showed implicit subsidies were captured largely by higher income groups. Since 2005, a new non-contributory scheme has been designed to provide state-subsidized health insurance for poor households, using the civil servants' scheme as insurance carrier. This is an important and positive initiative, which may begin to address some of the above problems. Careful evaluation of the scheme will be required to determine the extent to which it improves access to quality services for the poor, and whether it is adequately funded.

A larger proportion of budgeted public expenditure now appears in district budgets, up from 10% (prior to decentralization) to 50%. In part, this merely reflects the transfer of responsibility for meeting salaries of civil servants from central to regional governments. A large proportion of programme operating expenses continue to be provided in a tightly earmarked fashion to regional governments from the decentralized component of the national-level budget. This national budget has been risen strongly in recent years (from a very low base), largely reflecting additional spending from the decentralized component and the new commitment to provide insurance coverage for the poor. In 2006, as depicted in figure above, Indonesia's health sector was not heavily dependent on external inflows, which accounted for less than 2% of the total expenditure. The inflows constituted a large share of public financing (6%), and a larger share still of public financing at central level (16%). However, 2002 probably marked a low point in external inflows, which had risen markedly during the economic crisis of 1997-2000 before declining. The inflows rose again in subsequent years, with the inception of new sources of funding, such as the Global Alliance for Vaccines and Immunization (GAVI) and Global Fund to fight HIV/AIDS, Tuberculosis and Malaria (GFATM).

<u>Health information systems</u>

Decentralization resulted in a partial breakdown of health information systems and led to an unclear division of reporting responsibilities. As a result, comprehensive data that cover the entire nation are not available. The disruption of the information flow makes it difficult to develop strategies and to monitor health programmes in provinces and districts. However, exceptions do exist in some vertical programmes (tuberculosis, malaria or HIV/AIDS) where the Central Government retains the responsibility as the principal recipient of GFATM grants to the country.

<u>Human resources for health</u>

The human resource health condition has major deficiencies in numbers and quality of the health workforce. Decentralization is one of many factors that acerbated longstanding problems with maldistribution and reportedly low productivity of health workers. Under decentralization it has been becoming harder for civil servants to be redeployed and move across different levels of government. Other factors are complicating management of the public sector workforce include poor incentives, widespread dual practice and expansion of the private sector in health services and educational facilities. The relatively low quality of the workforce is partly attributable to the lack of strong accreditation and licensing procedures. It will br impacting the quality, efficiency and equity of health care provision.

In 2001, the Ministry of Health reorganized its human resource functions. A new Institute for Empowerment and Development of Health Manpower was established to link and coordinate the previous separated centres in the development of an overall integrated strategic plan for health workforce development and a corresponding integrated information system. The World health report 2006 –

working for health emphasized the critical role of government in developing sound policies and plans for human resources for health, and calls on governments to identify key issues and priorities for action. The Ministry of Health has expressed its commitment to this process and improving the current situation.

Provision of health services

In the primary health care level, Indonesia generally regarded has relatively adequate levels of provision, with one public health centre for every 30 000 people on average. If sub-centres are included, there is one public facility per 10 000 people. However, these averages concealed large variations in geographic accessibility, with people in remote interior locations or small islands having particularly poor access. In addition to public facilities, private practices are operated by doctors, nurses and midwives, in many cases by the same personnel as are employed in public facilities. At the hospital level, Indonesia has low levels of bed provision at 0.6 beds per thousand population. Paradoxically, the utilization also low, with bed occupancy rates in the vicinity of 50% both in public and private facilities. Low utilization is also observed in public health centres where it is common to have fewer patients per day than staff employed. It is widely assumed that the high level and unpredictability of user fees deter utilization. As in many countries, health services are disproportionately concentrated in urban areas and particularly in the larger cities, where the clientele with the greatest ability to pay resides.

The private sector is increasingly important in the provision of health care in Indonesia, especially in big cities, with wide variations in quality of care. Furthermore, since there is no regulation of pricing or quality of service in place, users are vulnerable to unnecessary treatment and expenses. The role of non governmental

organizations (NGOs) in Indonesia has been growing during the last two decades but the exact number of NGOs providing health care services remains unknown.

While medicines to treat the vast majority of tuberculosis, malaria and HIV/AIDS cases exist, drugs are not reaching everyone due to limited affordability and availability, as well as other factors. Despite the presence of a strong Drug Regulatory Authority, responsible for the registration of medicines as well as quality control and inspection, counterfeit drugs remain a big problem. The fight against counterfeit drugs is resource intensive and requires substantial cooperation of other sectors. At the same time, the use of traditional medicines (such as jamu) is popular and widespread in Indonesia. Yet procedures for quality control of traditional medicines are limited in scope and difficult to implement, also because large numbers of small-scale manufacturers exist.

2.2 Health Financing

2.2.1 Definition and Types

The World Health Organization (WHO) defines health financing as the "function of a health system concerned with the mobilization, accumulation and allocation of money to cover the health needs of the people, individually and collectively, in the health system." It states that the "purpose of health financing is to make funding available, as well as to set the right financial incentives to providers, to ensure that all individuals have access to effective public health and personal health care" (WHO 2000). The rest of this section draws from PHR (1999) and Mossialos

and Dixon (2002). Health financing has three key functions and defined as revenue collection, pooling of resources, and purchasing of services.

a. Revenue Collection

Revenue collection is concerned with the sources of revenue for health care, the type of payment (or contribution mechanism), and the agents that collect these revenues. All funds for health care, excluding donor contributions, are collected in one way or another from the general population or certain subgroups. Collection mechanisms include taxation, social insurance contributions, private insurance premiums, and out-of-pocket payments. Collection agents (which in most cases also pool resources and purchase health care services from providers) could be government or independent public agencies (such as a Social Security agency), private insurance funds, or health care providers.

This group of indicators looks at how much is being spent on health care in the country and how much of this spending comes from public, private, and external donor sources. The health system performance criteria addressed by these indicators are access, equity, quality, and sustainability
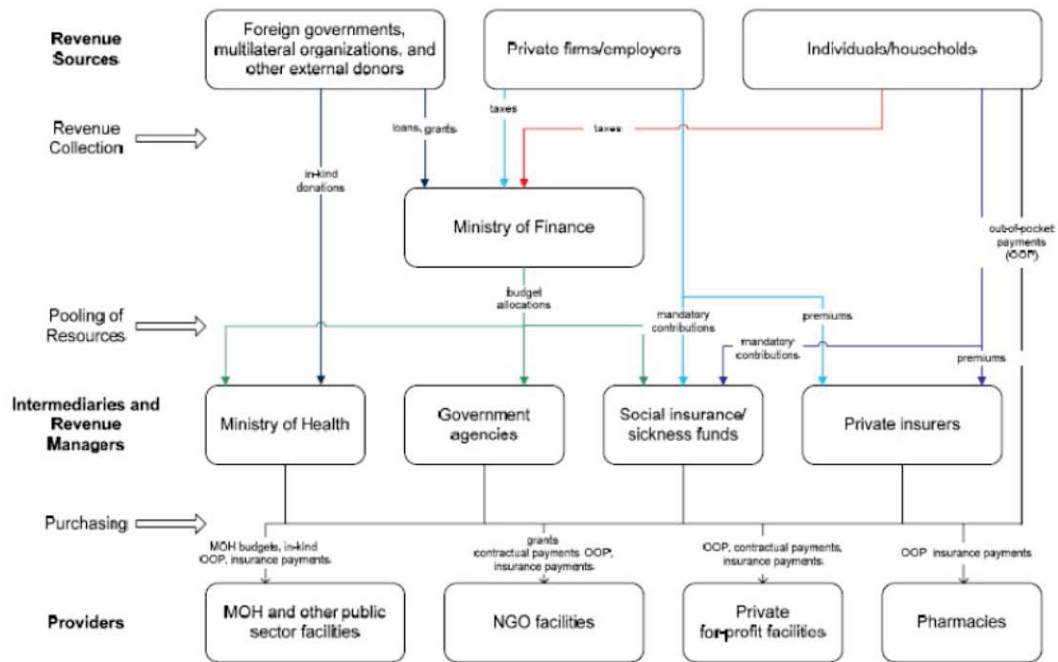
b. Pooling of Resources

Pooling of resources, the second main aspect of health financing, is the accumulation and management of funds from individuals or households (pool members) in a way that insures individual contributors against the risk of having to pay the full cost of care out-of-pocket in the event of illness. Tax-based health financing and health insurance both involve pooling. Note that fee-for-service user payments do not involve the pooling of resources. Some fees, however, may be set to "cross-subsidize" certain services or groups by charging more than the cost of production for a service or a group to allow less than the cost to be charged for another service or to another group. For the purposes of this rapid assessment, the indicators on pooling and allocation of financial resources focus on the government health budget and health insurance.

• Government budget allocation.

These indicators look at the MOH budget trends, the process of health budget preparation at various levels of health system administration, and the distribution of central and local government funds across different types of spending categories, services, and regions. The health system performance criteria assessed in this group of indicators are sustainability, equity, efficiency, access, and quality.

• Health insurance.

These indicators investigate the different types of insurance schemes (if any) operating in the country of interest, such as social, private, or community-based health insurance schemes. The health system performance criteria assessed in this part of the module are efficiency, equity, access, sustainability, and quality

c. Purchasing Services

Purchasing of health services is done by public or private agencies that spend money either to provide services directly or to purchase services for their beneficiaries. In many cases, the purchaser of health services is also the agent that pools the financial resources. Purchasers of health services are typically the Ministry of Health (MOH), Social Security agencies, district health boards, insurance organizations, and individuals or household (who pay out of pocket at time of using care). Purchasing can be either passive or strategic; passive purchasing simply follows predetermined budgets or pays bills when they are presented, whereas strategic purchasing uses a deliberate approach to seeking better quality services and low prices.

2.2.2 Health Financing in Decentralized System

The level of decentralization of the general government or the public health care sector is an important factor that can influence the patterns of resource flows

through the health system, as well as key issues related to, for example, service provision (such as the allocation of resources across programs or budget categories) and provider incentives for quality of services.

Part A in figure below shows the basic flow of government funds for the public health care sector under general government decentralization. A portion of government funds allocated for the public health care sector are distributed from the Ministry of Finance to the MOH, for general programs administered by the MOH.

The Ministry of Finance also allocates "grants" to decentralized political units (such as local government administrations or district councils), who then decide how much of these funds are allocated to health, among other sectors.

The funds from the Ministry of Finance to local government administrations are typically block grants determined by a number of criteria such as share of total population or burden of disease. Block grants may or may not include earmarks for health. If they do not, health competes at the local government level with other sectors for budget resources. Alternatively, the Ministry of Finance might pay certain recurrent costs of public health facilities such as the salaries of public health sector employees, in which funds flow directly from Ministry of Finance to MOH providers, and local governments do not have discretion over this part of health system financing.

Part B of figure below illustrates the flow of government funds for the public health care sector under MOH decentralization. In this type of system, funds flow to providers through a hierarchy of MOH administrative units, though salaries can sometimes be paid directly from the Ministry of Finance. When funds are allocated wholly within the health system without regard to local government decisions, the

main resource negotiations are first between the central MOH and districts or regions and second between the central MOH and the Ministry of Finance.

Both of these types of decentralization have strengths and weaknesses, and both can be managed well or poorly. Each country's health funding situation has to be examined on its own merits to identify how well it functions for adequate generation of revenues for health and for effective allocation of health resources to the service delivery level.
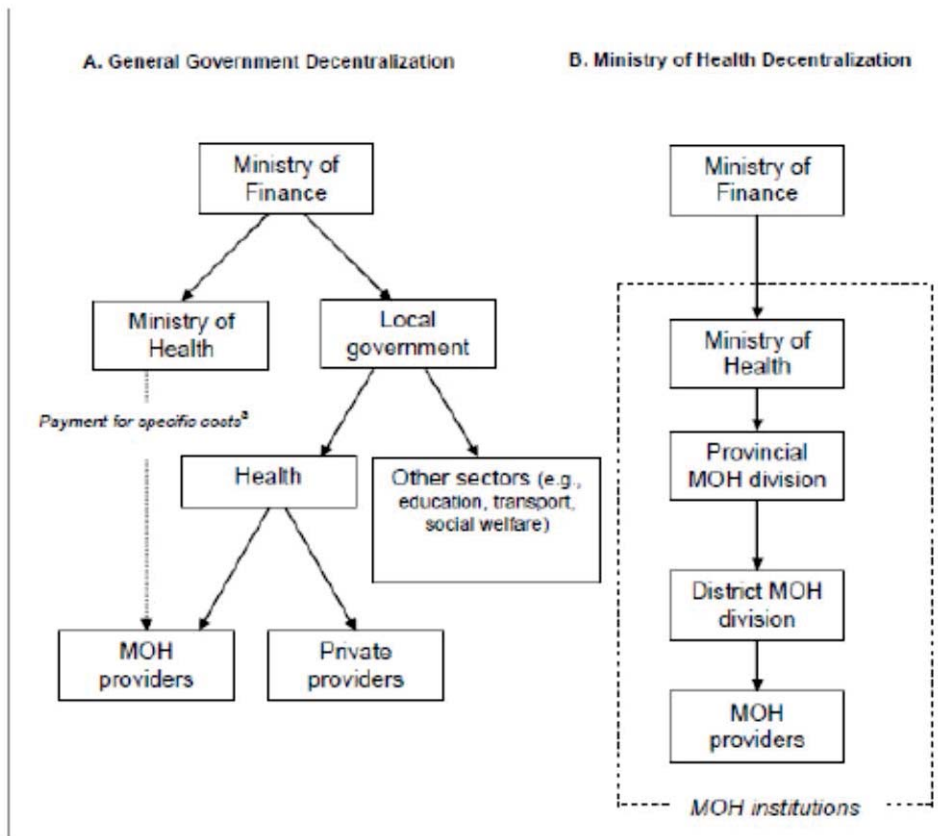
2.3 Maternal Health

2.2.1 Definition

Maternal health refers to the health of women during pregnancy, childbirth, and the postpartum period. It encompasses the health care dimensions of family planning, preconception, prenatal, and postnatal care in order to reduce maternal morbidity and mortality.

Preconception care can include education, health promotion, screening and other interventions among women of reproductive age to reduce risk factors that might affect future pregnancies. The goal of prenatal care is to detect any potential complications of pregnancy early, to prevent them if possible, and to direct the woman to appropriate specialist medical services as appropriate. Postnatal care issues include recovery from childbirth, concerns about newborn care, nutrition, breastfeeding, and family planning.

2.2.2 Problems

In many developing countries, complications of pregnancy and childbirth are the leading causes of death among women of reproductive age. A woman dies from complications from childbirth approximately every minute. According to the World Health Organization, in its World Health Report 2005, poor maternal conditions account for the fourth leading cause of death for women worldwide, after HIV/AIDS, malaria, and tuberculosis. Most maternal deaths and injuries are caused by biological processes, not from disease, which can be prevented and have been largely eradicated in the developed world — such as postpartum hemorrhaging, which causes 34% of maternal deaths in the developing world but only 13% of maternal deaths in developed countries.

Although high-quality, accessible health care has made maternal death a rare event in developed countries, where only 1% of maternal deaths occur, these

complications can often be fatal in the developing world because single most important intervention for safe motherhood is to make sure that a trained provider with midwifery skills is present at every birth, that transport is available to referral services, and that quality emergency obstetric care is available. In 2008 342,900 women died while pregnant or from childbirth worldwide. Although a high number, this was a significant drop from 1980, when 526,300 women died from the same causes. This improvement was caused by lower pregnancy rates in some countries; higher income, which improves nutrition and access to health care; more education for women; and the increasing availability of "skilled birth attendants" — people with training in basic and emergency obstetric care — to help women give birth. The situation was especially led by improvements in large countries like India and China, which helped to drive down the overall death rates. In India, the government started paying for prenatal and delivery care to ensure access, and saw successes in reducing maternal mortality, so much so that India is cited as the major reason for the decreasing global rates of maternal mortality.

One specific disease that causes significant maternal health problems is HIV/AIDS. Mother to child transmission of HIV in the developing world is a large concern; approximately 45% of infected mothers transmit the disease to their children and HIV is a major cause of maternal mortality, causing 60,000 maternal deaths in 2008. HIV rates are especially high in Sub-Saharan and Eastern Africa, where maternal mortality rates are on the rise.

Maternal health problems also include complications from childbirth that do not result in death. For every woman that dies during childbirth, approximately 20 suffer from infection, injury, or disabilityAlmost 50% of the births in developing countries still take place without a medically skilled attendant to aid the mother, and

the ratio is even higher in South Asia. Women in Sub-Saharan Africa mainly rely on traditional birth attendants (TBAs), who have little or no formal health care training. In recognition of their role, some countries and non-governmental organizations are making efforts to train TBAs in maternal health topics, in order to improve the chances for better health outcomes among mothers and babies.

III. DATA AND METHODOLOGY

3.1 Sampling Designs and Data Collections Mechanism

In this research we use longitudinal panel data which collected from WHO data of South East Asia countries that covers period from 1995 to 2010. There is limitation in this panel data due time, because there is no similar time series data which exist in each variables. For instance our dependent variable which is maternal mortality ratio was collected on year 1995, 2000, 2005 and 2010. But for some countries, there are also data for year 2001, 2003, 2006, 2007 2008, and 2009 which we found on each country data base or report. We successfully gathered all complete data for our independent variables from year 1995 to 2010.

3.2 Methodology

Both descriptive and econometric tools were used to analyze the impact of health financing indicators on maternal mortality ration in South East Asia countries. The descriptive analysis as used to describe the performance of each country in our 7 variables both dependent and independent as our comparison. Furthermore, the econometric analysis was used to measure the impact of health financing resources to maternal mortality ratio which available on panel data.

3.3 Modeling

In this research, we used regression model as the common practice to know the correlation between maternal mortality ratio as our dependent variable and health financing resources as our indepenpendent variables.

(3.1) MMRit= ß0 + Xitß + uit,

Where MMRit is maternal mortality ratio of country i in year t, Xit is the vector of selected health financing indicators at time t, ß is a vector of unknown parameters and uit is an error term that is assumed to be distributed according to the standard normal distribution. The assumption on normality is applied. It is also assumed that uit and Xit are uncorrelated. Efficient and unbiased estimates of the parameters cannot be obtained without treating the non random program placement and participation effects as fixed. The maternal mortality ratio model in (3.1) above has the feature that the marginal effects of the determinants of maternal mortality are constant across countries and there are no unobserved effects. It is however arguable that there is heterogeneity across countries and the marginal effects themselves depend on country characteristics. Moreover, maternal mortality is also affected by a number of unobservable effects such as geographical constraint, quality and quantity of medical expertise, etc. This leads us to allow for a range of interaction effects of closely-correlated determinants of maternal mortality ratio, scale effects of some of the variables such as geographical constraint, medical expertise,etc, as well as non-observable effects as shown in the model below:

(3.2) MMRit = ß0 + Xitß + Zi.+ ai + uit,

The disturbance uit is assumed to be uncorrelated with Xit and ai and has 0 mean and constant variance s2. The latent individual effect ai is assumed to be a un observable time invariant individual variable with zero mean and constant variance s2. Xit and Zi. are the observable health financing resources from each countries level time variant and time-invariant variables that affect maternal mortality ratio.

Moreover, the Xit and Zi.are factors assumed to be correlated with the time invariant individual variable aii but not to the disturbance term uit, that is,

Cov (Xit, ui) = 0 but

Cov (Xit , Zi.,ai) is assumed to be different from 0 for some Z's and X's variables

The two main methods of dealing with ai are to make the random effects or fixed effects assumption:

1. Fixed effects (FE): Assume ai is not independent of Xit, Zi

2. Random effects (RE): Assume ai is independent of Xit, Zi or E(ai | Xit,Zi) = 0

3.3.1 Variables for Regression

While selecting the variables for regression, we consider two important points such as important variable from health financing to reduce maternal mortality ratio and its exogeneity to current maternal mortality ration. Table 3.1 and 3.2 shows the list of our variables which used in regression model and their summary statistics. As we explained before, we would like to know which one between absolute amount of financing and structure of financing which affect MMR. The variable that we used to represent absolute amount of financing is per capita health spending among 10 South East Asia countries. For structure of financing we used share of Out of Pocket Financing variable, External Resource from Donor variable, General Government Health Expenditure variable, Social Security variable and Private Insurance variable.

Table 3.1 Description of Variables

Variables	Description
MMR	Maternal mortality ratio, number of mother dead during delivering birth over 100.000 birth
PCHE	Per capita health expenditure, absolute amount of money which spend for financing health care in each country
SOOP	Share of out of pocket, percentage share of out of pocket expenditure to financing health care
EXT	External share, percentage fund of total health expenditure which come from foreign aid
GGHE	General government health expenditure, percentage share of government spending from total health expenditure
SSEC	Social security
PRINS	Private insurance

3.4 Summary Statistics of Variables

The following table describes the summary of variables used for fixed effect and random effect model of analysis. Summary statistics like number of observations, mean, standard deviation, minimum and maximum are included.

Table 3.2 Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
mmr	55	194.3818	242.3551	3	1200
pche	55	228.5337	375.9745	.3254127	1917.37
soop	55	47.12131	18.48051	13.34605	90.28468
ext	55	4.041818	7.026661	0	29.2
gghe	55	16.68909	21.70891	.8	86.5
ssec	55	9.683636	11.20096	0	38.8
prins	55	11.88182	21.45926	0	91.8

The data above shows a huge gap of MMR performance among South East Asia countries due to its minimum and maximum score. Moreover, if we look at its per capita health spending, there is also big gap from its minimal and maximal score. It is possible to say that this per capita spending gap is correlated with MMR performance there. The data also shows high sharing of out of pocket financing which is 47,12%. That number make us assumed that health service categorized to impure public goods, because almost 50% share of spending come from individual in South East Asia countries. This condition will be difficult to increase health quality especially in maternal mortality case which we use as the indicator to measure health performance in this research, because not all citizen of South East Asia countries affordable to paying health service individually. Regarding to that finding, we should think certain kind of mechanism which could be successful to financing health service especially for maternal service in Indonesia.

IV. EMPIRICAL RESULTS AND DISCUSSION

4.1 RESULTS

Fixed Effet Panel Data Analysis

TABEL 4.1

FIXED EFFECT MODEL

```
. xtreg  mmr pche soop ext gghe ssec prins ,fe robust

Fixed-effects (within) regression          Number of obs    =         55
Group variable: panelid                    Number of groups =         10

R-sq:  within  = 0.5062                     Obs per group: min =        4
       between = 0.4527                                    avg =      5.5
       overall = 0.3571                                    max =        9

                                            F(6,39)          =       4.03
corr(u_i, Xb)  = -0.5315                    Prob > F         =     0.0031

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

mmr	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf. Interval]	
pche	-.1039963	.0796627	-1.31	0.199	-.2651293	.0571367
soop	3.628496	3.576306	1.01	0.317	-3.605267	10.86226
ext	-13.81065	6.383812	-2.16	0.037	-26.72313	-.8981703
gghe	-.2193308	4.689763	-0.05	0.963	-9.705273	9.266611
ssec	-4.544154	1.268491	-3.58	0.001	-7.10992	-1.978388
prins	12.52123	5.549208	2.26	0.030	1.296903	23.74557
_cons	1.87847	254.2219	0.01	0.994	-512.3339	516.0908
sigma_u	227.51831					
sigma_e	78.216284					
rho	.89430655	(fraction of variance due to u_i)				

Based on fixed effect analysis result which presented on the table above, we can see that p value for per capita health spending as the variable of absolute amount of financing is < 0,05. That indicated absolute amount of financing for health service doesn't have significant effect on maternal mortality ratio. In contrast, 3 of 6 variables

of financing stucture have p-value > 0,05, which indicated significant correlation between structure of financing and maternal mortality ratio. Those 3 indicators are external resource (donor), social security funds, and private insurance. There are negative correlation from external resource and social security with MMR, otherwise there is positive correlation between private insurance and MMR.

Random Effet Panel Data Analysis

TABEL 4.2

RANDOM EFFECT MODEL

```
. xtreg mmr pche soop ext gghe ssec prins ,re robust
```

| Random-effects GLS regression | | | | Number of obs | = | 55 |
| Group variable: **panelid** | | | | Number of groups | = | 10 |

R-sq:	within	=	0.3884			Obs per group: min =		4
	between	=	0.6887			avg =		5.5
	overall	=	0.5902			max =		9

| Random effects u_i ~ **Gaussian** | | | | Wald chi2(**6**) | = | 28.50 |
| corr(u_i, X) | = | **0** (assumed) | | Prob > chi2 | = | 0.0001 |

(Std. Err. adjusted for clustering on panelid)

mmr	Coef.	Robust Std. Err.	z	P>|z|	[95% Conf. Interval]	
pche	-.1685141	.0534325	-3.15	0.002	-.2732399	-.0637884
soop	5.647253	1.884347	3.00	0.003	1.954001	9.340506
ext	-6.948616	6.212344	-1.12	0.263	-19.12459	5.227353
gghe	2.5665	1.090032	2.35	0.019	.4300761	4.702924
ssec	-5.017706	1.361915	-3.68	0.000	-7.68701	-2.348402
prins	8.714214	3.375568	2.58	0.010	2.098223	15.33021
_cons	-94.92145	102.533	-0.93	0.355	-295.8825	106.0396
sigma_u	84.907876					
sigma_e	78.216284					
rho	.54095256	(fraction of variance due to u_i)				

There is different finding from random effect and fixed effect result. The table result of random effect above showed us significant correlation between MMR with absolute amount of financing and financing structure. As we can see, p value for absolute and structure variables are <0,05, except general government health

expenditure. There is negative correlation between MMR with per capita health expenditure, external resources and social security funds. In contrast, I found positive correlation between MMR with share of out –of-pocket financing and private insurance.

Hausman Test

After doing fixed effects test and random effects test, we have to choose either fixed model or random model to look at potential correlation of ai with X's and Z's. In order to know that, we did Hausman test (1978) to find out the regressors are correlated with financing effect or all regressors are not correlated with the individual effect.

The basic idea of Hausman test is to know difference between estimator in FE and RE. If the orthogonality assumption holds, both estimators should be consistent and thus, no systematic difference need to be observed. If there is systematic difference, then we have to consider the possibility

TABEL 4.3

HAUSMAN TEST

```
. hausman fe re
```

	—— Coefficients ——			
	(b) fe	(B) re	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
pche	-.1039963	-.1685141	.0645179	.0590857
soop	3.628496	5.647253	-2.018757	3.039606
ext	-13.81065	-6.948616	-6.862033	1.469642
gghe	-.2193308	2.5665	-2.785831	4.561328
ssec	-4.544154	-5.017706	.4735521	.
prins	12.52123	8.714214	3.807021	4.404458

```
                    b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

          chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                  =    -14.75   chi2<0 ==> model fitted on these
                                data fails to meet the asymptotic
                                assumptions of the Hausman test;
                                see suest for a generalized test
```

Table 4.3 shows that under the null hypothesis of zero correlation between the error term and the regressors, the test statistic is asymptotically distributed as chi-squared with the degrees of freedom equal to the number of regressors. The calculated test statistic with a significant value of chi^2 rejects the null hypothesis of orthogonality at five per cent significance level. This means that the difference in coefficients as shown in column 3 is systematic and leaves us with the fixed effect model to get consistent parameter estimates.

Therefore, in this thesis result estimation is made using household fixed effect estimator of panel data analysis to account for a positive correlation between the individual heterogeneity and the explanatory variables. The fixed effect estimation has an advantage over random effect model in that it account for the possible correlation between the responsive variables and unobserved heterogeneity (quality and quality if medical expert, geographical constraint to build infrastructure,etc)

without running into incidental parameter problem as ai (unobserved heterogeneity) is not estimated along with the ß (Wooldridge, 2002).

4.2 DISCUSSION

The hausman test result made us to use fixed effect model to se this maternal mortality problem in Indonesia. In response to my first research question, as we can see at table 4.1 it showed that structure of financing has stronger affect of MMR than absolute amount of financing. It result the same with my hyphotesis. That might be depend on other unobserve variable such as the existence of medical expert. For instance like in Singapore which has the highest per capita health spending compared with other and also has highes health quality which showed that least number of maternal mortality. We know that there are many of good health center which have many qualified medical expert there. Moreover, Singapore also has the least geographical constraint among all South East Asia countries and least population. That is why it could perform well with its high spending of health.

According to my secong question, we could see that general government health expenditure which represent public spending has high p value (. 0,05), it indicates unsignificant correlation between this variable and MMR. On the other hand, based on the result we could see that external resources, social security and private insurance have significant correlation with MMR. By 1% increase of external resources of financing will decrease MMR around 13,81% and by 1% increase of social security will decrease MMR around 4,54%. The external resources seems more effective because usually the donor not only giving money but also giving assistance related to health care, which in this case is maternal health. The assistances from the donor had been increasing utilization of money that used to decreasing maternal

mortality rate. Besides that, social security that managed by government also seems more effective, because usually there is subsidy system there, where the rich people will pay higher and the poor people will not pay anything.

In contrast, as private insurance increase by 1% it will increase MMR around 12,52%. If we look at those numbers, it can assume that donor resource is the most effective way to decrease MMR in South East Asia countries because donor know better than government itself. In Indonesia, there is only a few share of external fund for health financing. Share of Social Security in Indonesia is on average at ASEAN level, with average percentage 11,2% of THE there. On the other hand, private insurance might make MMR become worse because it will result lesshealthy for the one who has less income. As we realize that maternal mortality problem is a big problem for poor people. So I think private insurance is not an approriate choice to handle this problem.

V. CONCLUSION

The thesis is about correlation between health financing mechanism and maternal mortality problem in Indonesia. In order to know the correlation among those variables, we did comparative panel study between 10 South East Asia countries by seeing its MMR and health financing variables such as per capita health spending, share of out of pocket financing, share of general government health expenditure, share of social security fund, share of external resource, share of private insurance. The data above we found it national health account data which provided by WHO data bank from year 1995 – 2010. We did fixed effect model to answer the research questions on those variables.

From the result we found that structure of financing has bigger impact to maternal mortality ratio rather than absolute amount of financing due to some unobservable factors such as medical existence geographical constraint, level of poverty, total population, etc. Morover, it also showed that higher government expenditure on health couldn't guarantee less number of maternal mortality. It might be because of government itself had implemented less effective way to reduce maternal mortality. Besides that, external resource and social fund hava a big impact in reducing maternal mortality in South East Asia countries.

By looking at this result, I recommend that Indonesia government should revise it health financing mechanism by increasing proportion of social security fund. I would not suggest increase donor fund because it will be a good at early stage but will be affected higher dependency of Indonesia to donor fund. By using social security fund, there will be more fair spending between rich and poor people because the sytem is progressive. The rich people will pay higher than poor people for same amount of coverage cost.

The other things that usually forget by Indonesia government are the role from community participation to decrease maternal mortality rate. For some areas which are far away from the cities like remote areas, the existence of infrastructure itself to reach hospital isn't as good as in cities. Actually the plan to enhance infrastructure development is good, but it will take time to realize it. So I think by enhancing knowledge from community about maternal health, it would be much better to help reducing maternal mortality rate. At least, they can remind each other about when they have to check their fetus, when is the time to deliver the birth, etc.

In my conclusion, by reforming the scheme of health financing and combine it with enhance the knowledge of community about maternal health to increase community participation and speed up the construction of infrastructure development especially the roads, then the number of maternal mortality rate could be decrease faster than before. We hope the target of Indonesia government could be reach soon in line with the deadline.

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