HEALTH INEQUITY AMONGST HOUSEHOLDS UNDER THAI PUBLIC HEALTH INSURANCE

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ความไม่เสมอภาคทางด้านสุขภาพภายใต้ระบบประกันสุขภาพของประเทศไทย

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วิทยานิพนธ์นี้เป็นส่วนหนึ่งของการศึกษาตามหลักสูตรปริญญาวิทยาศาสตรมหาบัณฑิต
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วัตถุประสงค์ เพื่อศึกษาความเสมอภาคของค่าใช้จ่ายด้านการรักษาพยาบาล การเข้าถึง
การรักษา และจำนวนของครัวเรือนที่เจอปัญหาของค่ารักษาพยาบาลที่สูงเกินไป หลังจากที่มีการ
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วิธีการวิจัย ข้อมูลที่ใช้วิเคราะห์ในการศึกษานี้ คือ ข้อมูลจากการสำรวจภาวะเศรษฐกิจ
และสังคมของครัวเรือนและการสำรวจอนามัยและสวัสดิการ ที่จัดทำโดยสำนักงานสถิติแห่งชาติปี
พ.ศ. 2556 โดยใช้ Kakwani Index เพื่อศึกษาว่าค่ารักษาพยาบาลทำให้เกิดความไม่เสมอภาคด้าน
การเงินในคนที่มีฐานะทางเศรษฐกิจที่แตกต่างกัน และใช้ Horizontal Index of Inequity เพื่อ
ศึกษาการเข้าถึงของการรักษาพยาบาลของผู้ป่วยในและผู้ป่วยนอกเปรียบเทียบระหว่างคนที่มีฐานะ
ทางเศรษฐกิจที่แตกต่างกันจำแนกตามควินไทล์ นอกจากนั้นจะคำนวณจำนวนครัวเรือนที่มีค่า
รักษาพยาบาลที่สูงเกินไปโดยสูตรขององค์การอนามัยโลกและธนาคารโลก

ผลการศึกษา พบว่าค่าใช้จ่ายด้านการรักษาพยาบาลจะเป็นปัญหาสำหรับคนยากจน
มากกว่าคนที่มีฐานะร่ำรวยกว่า และการให้บริการทางการแพทย์พบว่ามีผลประโยชน์ต่อคนที่ร่ำรวย
มากกว่าคนยากจน เนื่องจากในผลการศึกษาของข้อมูลการสำรวจอนามัยและสวัสดิการ พบว่าคน
ยากจนมีภาวะการเจ็บป่วยมากกว่าแต่คนที่มีฐานะร่ำรวยกว่าได้รับการรักษาพยาบาลที่มากกว่า และ
โครงการการประกันสุขภาพสำหรับประชาชนมีผลทำให้จำนวนคนที่ต้องจ่ายค่ารักษาพยาบาลที่สูง
ลดลงได้ แต่คนที่อาศัยอยู่ในเขตเมืองต้องประสบปัญหาอัตราค่ารักษาพยาบาลที่สูงมากกว่าชนบท

สรุปผลการศึกษา โครงการการประกันสุขภาพของประชาชนจะสามารถช่วยให้คน
ยากจนสามารถเข้าถึงบริการทางการแพทย์ได้มากขึ้น แต่ค่าใช้จ่ายยังคงเป็นปัญหาสำหรับคนยากจน
เนื่องจากค่ารักษาพยาบาลที่สูงขึ้นและงบประมาณของโครงการมีจำกัด และคนยากจนจำนวนมาก
อาจไม่สามารถเข้าถึงการรักษาได้ เนื่องจากต้นทุนค่ารักษาพยาบาลที่สูงขึ้นเกินกว่ารายได้ของ
ครัวเรือน นโยบายการประกันสุขภาพของรัฐควรถูกพัฒนาเพื่อช่วยเหลือให้คนที่ยากจนได้รับการ
รักษาพยาบาลเมื่อจำเป็นโดยคำนึงถึงหลักการความเสมอภาคด้านการเงินการคลังมากขึ้น

สาขาวิชา   เศรษฐศาสตร์สาธารณสุขและการ   ลายมือชื่อนิสิต ⋯⋯⋯⋯⋯⋯⋯⋯⋯

จัดการบริการสุขภาพ   ลายมือชื่อ อ.ที่ปรึกษาหลัก ⋯⋯⋯⋯⋯⋯

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AYUSH SHARMA: HEALTH INEQUITY AMONGST HOUSEHOLDS UNDER THAI PUBLIC HEALTH INSURANCE. ADVISOR: ASSOC. PROF.SIRIPEN SUPAKANKUNTI, Ph.D., 117 pp.

Objectives: The general objectives are to study the progressivity of healthcare financing and equity towards healthcare utilization, and to measure the catastrophic health expenditures after the implementation of Universal Coverage in year 2001.

Methods: The dataset of Household Socio-Economic Survey and Health and Welfare Survey of year 2013 was obtained from the National Statistical Office. Kakwani Index was used to measure the progressivity of out-of-pocket payment against the Lorenz curve of income inequality. Index of Horizontal Inequity was used to measure the access of healthcare across quintiles according to the income of population sample. And the methodology proposed by the World Bank and WHO was used to measure the incidence of catastrophic health expenditure.

Results: The results of the finding for vertical equity indicate that the poor bears more financial burden than the rich population. And the horizontal equity towards healthcare utilization also favors the rich population. According to the result of this study, health insurance also protects households from catastrophic health expenditure. The urban area dwellers face more catastrophic health payment than the rural area people.

Conclusions: The financial burden is concentrated among the poor population and healthcare service still favors the rich population. The financial problem that the poor population faces leads them to the reduction of access towards healthcare utilization. The National Health Insurance system does protect its population from catastrophic health expenditure, but there are still some occurrences of catastrophic health expenditure among Thai households. Further adjustments of policy towards health insurance are required in order to make healthcare service equitable in terms of fairness in financing.

Field of Study:	Health Economics and	Student's Signature	....
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CONTENTS

List of Tables

List of Figures

List of Abbreviations

CHE	Catastrophic Health Expenditure
CI	Concentration Index
CSMBS	Civil Servant and Medical Benefit Scheme
CTP	Capacity to Pay
GDP	Gross Domestic Product
GPF	Government Pension Fund
GPS	Government Pension Scheme
HI	Index of Horizontal Inequity
HWS	Health and Welfare Survey
LIC	Low Income Card
MDG	Millennium Development Goals
MOPH	Ministry of Public Health
NHA	National Health Account
NHS	National Health System
NHSO	National Health Security Office
NSO	National Statistical Office
OOP	Out of Pocket Health Payment
SES	Socio-Economic Survey
SSF	Social Security Fund
SSS	Social Security Scheme
UC	Universal Coverage
WHO	World Health Organization

CHAPTER 1

INTRODUCTION

1.1 Problems and Significance

The main aim of the Government all over the world is to provide Health equity for its population regardless of their socio-economic status. Health is a universal human aspiration and a basic human need (OECD, 1992). The differences in socio-economic status and the lifestyle of living effects the population in various ways in the aspects of healthcare (Whitehead, 1992).

First of all, there is reliable proof that the underprivileged population has lower survival rates, deceased sooner than the privileged populations. For instance, an offspring who are born to educated parents in some countries, have a life span of over 5 years more than a child born into an uneducated groups. Huge gaps in death can also be observed in urban and rural area and in various regions of the country. For instance, newborn death rates in the USSR of year 1987 were over 21 out of 1000 births in urban, comparing to 31 out of 1000 births in rural (Whitehead, 1992).

Second, there are huge variances in the degree of sickness. Not only does underprivileged people suffers from greater burden of sickness but also suffers from chronic illness and disability at young age. In many countries, low income people experience chronic illness more than high income people (Whitehead, 1992).

These findings suggest that people with high demand for healthcare, which also includes preventive care, are the ones that are least likely to get a good quality healthcare service. Most importantly, national health policies cannot claim to be concerned about the health of its population when the healthcare needs for the underprivileged groups are not met (Whitehead, 1992).

The problem that cause so much burden towards the disadvantaged groups are the amount of direct payments that they have to pay for their healthcare services (Tangcharoensathien et al., 2011). The direct payments toward healthcare services reduce the equity in healthcare system of developing countries. Lack of financial risk-pooling mechanism cause the poor people to reduce their expenditure on necessities due to high amount of healthcare spending (S. Limwattananon, Tangcharoensathien, & Prakongsai, 2007). People in lower-income countries tend to have minor access towards healthcare than the higher income countries. When healthcare needs are not being met, the populations health status worsens, which cause them to lose their income and leads to higher healthcare costs with their illness being untreated which leads to more complications (Peters et al., 2008).

The society whether rich or poor can be determined by the quality of the population's health status, how fairly health is distributed across the social economic status, and the protection provided from disadvantage due to sickness. Health equity is essential to this foundation (Marmot & Health, 2007). Observation towards various developing countries showed us that there is a slow improvement in achieving health equity. Developing countries in Asia and Latin America have adopted the Universal

Coverage Scheme in order to reduce the Health Inequity situation in their countries (Prakongsai, Limwattananon, & Tangcharoensathien, 2009).

Minor improvement of equity in health care has been seen in developing countries (Prakongsai, Limwattananon, & Tangcharoensathien, 2009). In South East Asia countries, fast but less equitable socioeconomic growth , in addition with diverse rate of demographic and epidemiological transitions, have caused health inequalities and post great public problem for national health systems, especially in controlling the incidence of communicable disease and the rise of non-infectious disease in old-age population (Chongsuvivatwong et al., 2011).

In Thailand, Universal Coverage was started in year 2001 in order to decrease inequitable access towards health care for its population. Without proper access to health care treatment, Thai people would have poor health which would result in poor productivity and sustainability causing a decline in economic growth of Thailand. When compared with other low-income countries, Thailand spends low portion of its gross domestic product (GDP) on healthcare. In 2002, spending on healthcare is only 3.5% of GDP, lesser than those lower-income countries of 5.6% of GDP (Prakongsai et al., 2009). The government's scheme such as the universal coverage and other scheme help reduce the inequity of health care towards people with different social economic status. However, the problem that Thailand, low- income countries, and middle-income countries face in providing Universal Coverage include limited Government fund for providing health care services, insufficient infrastructure on health service and poor technical capacity of the governments (Prakongsai et al., 2009). Expanding coverage of high-quality services and ensuring sufficient human resources

are crucial in attaining universal coverage and other health care insurance scheme (Tangcharoensathien et al., 2011). Converting the healthcare payments from direct payment to pre-payment is the solution to the broadening access towards healthcare and protecting the households from facing high amounts of healthcare payments (World Health Organization, 2005).

The main focus of this research is on assessing the health equity achievements of the Thai health system year 2013. The particular year were chosen because the National Statistical Office of Thailand had conducted surveys for Socio-Economic status and Health and Welfare status of the population in the following years. There are past research paper on analyzing the equity of Thailand published year 2009, but the data that the researcher use are of year 2007. In this case, the formula that the researcher used to calculate is unknown to us, so comparison cannot be done here but the analysis of the indicator can be done of year 2007 to year 2013. So the concern of this study is to analyze the health equity adjustments during year 2013 to observe whether the health insurance policies are moving the Thai National Health System towards the right direction.

1.2 Background

Seven countries in Southeast Asia have different degrees in economic growth and expansion of healthcare coverage and financial protection: two lower-income countries with less coverage which are Laos and Cambodia. And for the five middle income countries, three of them have more than 50% coverage and policies progressing towards universal coverage are Philippines, Indonesia, and Vietnam. And the two

countries that have already achieved universal coverage are Malaysia and Thailand (Tangcharoensathien et al., 2011).

1.2.1 Country Profile

In 2009, Thailand population was around 66.9 million containing a labor force of 38.9 million. The amount of the overall employment was 38.4 million with 41 percent contributing into agricultural section. More than 50 percent of them were self-employed and no income family workers. Thailand had rapidly increase in its aging population, with the number of older person in 2010 of 7.5 million which was 11.8 percent of the overall population. It has been predicted that in 2020, the number of elder people will rise to 11 million which represents 17.2 percent of the total population (Asher, Oum, & Parulian, 2010).

Thailand is in the range of upper-middle income economy since 2011. Thailand have made rapid progress in economic development from low-income country to upper-middle income country in less than a generation. Thailand had been a role model for other country because of its rapid growth and remarkable poverty reduction, especially in the 1980s. Thailand's rapid economic growth during the early 1990s was disturbed by the Asian crisis year 1997-1998. After the crisis, the economic growth is moderate, with a robust growth period, for instance at around 5 percent from 2002 to 2007, followed by the global financial crisis of year 2008-2009, the economic disasters from flood in 2011, and the political problems in 2010 and 2013-2015. As a result, this crisis cause Thailand to decline into the category of the low and middle income East Asian neighboring nations in current years. Thailand will most likely meet the goals of the MDG (Millennium Development Goals) on aggregate level. Maternal mortality and

under five years mortality rates have been drastically declined, and majority of population which is 95% now can use to clean water and sanitation. Poverty in Thailand are mostly situated in rural areas, with over 80 percent out of 7.3 million poor people situated in the rural areas (according to year 2013). Some regions, especially the North and Northeastern region, declined greatly in economic development when compared to other regions. The paybacks of economic achievement have not been equally distributed from Bangkok region, Thailand's largest and richest urban area, to the rest of the country. There still are problems with income inequality and lack of equal opportunities. Income inequality, which is measured by the Gini Coefficient, has fallen in previous years, but continue to rise consistently high beyond 0.45 (http://www.worldbank.org/en/country/ thailand/overview). (Bank, April 2015) The table below shows the GDP growth rate and Gini coefficient for Thailand of Year 1992-2006 (Sakunphanit & Suwanrada, 2011).

Table 1 . GDP growth and the Gini coefficient Year 1992-2006

Year	1992	1994	1996	1998	2000	2002	2004	2006
GDP % growth	8.1	9.0	5.9	-10.5	4.8	5.3	6.3	5.1
Gini Coefficient	0.54	0.53	0.52	0.51	0.53	0.50	0.50	-

Source: GDP Growth from National Economic and Social Development Board (NESDB); Macronomic indices for Measuring Equity in Health Finance and Delivery 1992-1998, Center for Health Inequity Monitoring, Faculty of Medicine, Naresuan University, 2001; Gini coefficient for 2000-2004 from NESDB and National Statistical Office.

1.2.2 Public Health Insurance

1.2.2.1 Universal Health Care (30 Baht) Program

This program was initiated at the exact time of the 7th National Economic and Social Development Plan (1992-1996), the UC was started in October 2001. The scheme has combined all the existing health insurance schemes which belongs to the Ministry of Public Health (MOPH), such as the Health Welfare Program for the Low Income and Disadvantaged (HWPLID) and the Health Card Scheme (500 baht Health Card for Families). The main aim of the Universal Coverage Scheme is to provide full healthcare coverage for all Thai citizens that are excluded from the Social Security Health Insurance Scheme (SSS) or the Civil Servants' Medical Benefit Scheme (CSMBS). Authorized persons have to register with the networks for the free insurance card and pay a co-payment fee of 30 baht for each hospital visits (inpatient and outpatient visits) but the co-payment was abolished in 2006 (Asher et al., 2010).

The Universal Coverage Scheme receives its financial source from the government revenue. For inpatients, the government pays the hospital according to the Diagnosis Related Group, DRG, or the type of disease that the patients have. For outpatients, lump sum amounts to hospital was contributed by the government for the number of individuals who are registered according to the specific hospital location, this process is called capitation (Asher et al., 2010).

1.2.2.2 Social Security Scheme (SSS)

The Social Security Scheme was established by the Social Security Office (SSO), which is the department of government under the Ministry of Labor. The main objective of the SSO is to handle the Social Security Fund (SSF) and the Workmen's Compensation Fund according to the Social Security Act 1999 and the Workmen's Compensation Act 2003(SSO 2008a). The SSF is now offering seven types of welfares, such as, non-work-related sickness, maternity, invalidity, deceased, old people, and benefits for unemployment, including allowance for children, for those who are insured under Article 33 of the Social Security Act 1999. In December 2008, those who are insured under Article 33 (mandatory insurance) were 8,779,131 people, and those people who are insured under Article 39 (voluntary insurance) are about 514,422 people (SSO 2008a). In 2008, the SSF provides coverage for 25.11% of the employed personnel of 37 million or 14 percent of the overall population of 66.4 million (Asher et al., 2010).

The SSF is funded through employees, employers, and government funds, the rate of contribution for sickness, maternity, invalidity and deceased benefits, or in other word called package I, was 1.5% of insured earnings (range of 1,650 to 15,000 baht) during 1991-1997, maximum rate established by the law. During the financial crisis in 1997, the contributory rate was decreased to 1% of insured earnings in 1998. The contributory rate later increase to 2% in 1999 with the old-age benefit and child allowance was included, or package II. The contributory rate for package II later increase to 3% in 2003 (Asher et al., 2010).

The contributory rate for package III started in 2004 which is for unemployment benefit is 0.5% each for workers and employers and 0.25% for the government. The total contributory rate for SSF becomes 5% for employees and employers and 2.75% for the government. The SSO also receives contributions from the voluntary insured persons (Article 39) of 432 baht per month for the 6 types of benefit: illness, maternity, invalidity, deceased, child allowance and pension for elder people, the government contribute 120 baht for these benefits. Voluntary insured person under Article 40 contributes 3,360 baht per year which covers only 3 types of benefit: maternity, invalidity, and deceased (Asher et al., 2010).

In 2008, the total contributions received from employers, employees, and the government was 106.909.39 million baht to the SSF, an upsurge of 6.98% from 2007. The total amounts of money paid to the recipients were 35,690.51 million baht which was an upsurge of 10.15% from 2007 (Asher et al., 2010).

1.2.2.3 Civil Servant Medical Benefit Scheme CSMBS

Government personnel (which include civil servants) are insured by various types of social security benefits, including elder population, healthcare service, and child-related coverage. All the coverage provided are funded from general tax revenues (Asher et al., 2010). The table below conceptualizes the health-care benefits provided for government officials.

Table 2. Health-care and Medical Benefits for Government Officials

Compensation	Health-care and Medical Benefits
Coverage	- Civil Servants, parents, spouse and (up to three) children.
Public hospital	- All expenditures are covered under the regulations of Ministry of Finance. - All medical expenditures are covered; 650 Baht per day for hospital room and food expenditures are provided for a period not to exceed 13 days.
Private hospital	- Medical expenditures are covered for emergency case only. - Half of the health-care expenditures are covered, but does not exceed 3,000 Baht within 30 days.

Source: Chandoevwit (2006)

Before the introduction of the Government Pension Funds, according to old-age pensions, a government official who is retired have an option between two forms of old-age income security, a pension, or a lump sum payment, which is based on the criteria such as retirement age, service length, and disability (Asher et al., 2010). After the consideration of the following factors, the government could then calculate the following formula for monthly pension:

Pension = [(employment year) * (last salary)]/50

The lump sum payment was equal to the last salary earned times the number of employment years. The government pension can be transferred to their children or relatives (Asher et al., 2010).

The government retirees increase from 154,940 in 1990 to 217,733 in 1996, which cause the government expenditure on old-age income security to rise by about 20% annually from 6.6 billion to 19.7 billion Baht (Phananiramai, 2003). As a result, in March 1997, the GP was changed to GPF under the Government Pension Fund Act 1996. It contains two major changes, (i) the original pension benefits is decreased by using the average of 60 month salary rather than last month's salary and the ceiling is not more than 70% of the replacement rate. (ii) the Act informs the Government to collect a reserve fund equivalent to 3 times of the fiscal budget for gratuity and pension payments. The GPF is mandatory except for those who were enrolled before March 27, 1997 and chose the option to stay with the old pension or the GP scheme (Asher et al., 2010).

In 2006, there were 1,721,722 civil servants in the Government Pension Scheme and 1,172,953 civil servants under the GPF scheme (Asher et al., 2010).

1.2.2.4 The Number of People with Different Health Care Coverage Schemes

The National Health Security Office (NSHO) was started in 2002 to monitor the universal coverage scheme. The number of thai people covered by the UC scheme rose from 43.35 million people in 2002 to nearly 47 million people in 2008. The population who are not insured by UC are covered by other insurance scheme, such as SSO, CSMBS and others. The proportion of Thai people who are insured by the health insurance scheme rose from 92.47% in 2002 to 99.15% in 2008 (Asher et al., 2010). (Table 3)

Table 3. The Number of People with Different Health Care Coverage Schemes

	2002	2003	2004	2005	2006	2007	2008
UC	45.35	45.97	47.1	47.34	47.54	46.67	46.95
SSO	7.12	8.09	8.34	8.74	9.2	9.58	9.84
CSMBS	4.05	4.03	4.27	4.15	4.06	5.013	5
Population	61.12	62.45	62.54	62.81	62.39	62.41	62.55
Population with Coverage	56.52	58.08	59.71	60.45	61.04	61.63	62.02
% Population with Coverage	92.47	93.00	95.47	96.24	97.84	98.75	99.15

Source: Annual Report of National Health Security Office, 2009.

Note: Unit in million persons
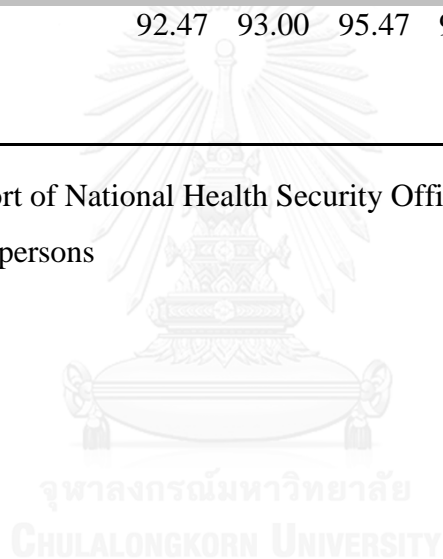
The table below summarizes the Public Health Insurance Schemes when the universal coverage was achieved, early 2002.

Table 4. Health Insurance Schemes when universal coverage was achieved, early 2002

Scheme	Government agencies	Target Population	Coverage	Source of fund	Payment method
Civil Servant Medical Benefit Scheme (Since 1963)	Ministry of Finance	Government employee, retiree and dependents	6 million, 10% of total population	General tax, non contributory	Fee for service reimburse-ment model
Social Health Insurance (Since 1990)	Social Security Office	Private sector employee	8 million, 13% of total population	Payroll tax tripartite contribution	Capitation inclusive OP, IP
UC Scheme (Since 2002)	National Health Security Office	Rest of population	47 million, 74% of total population	General tax, non-contributory	Capitation OP and P&P, glo-bal budget and DRG for IP

Source: (Tangcharoensathien, Prakongsai, Limwattananon, Patcharanarumol, & Jongudomsuk, 2007)

1.3 Research Questions

1)   According to the data from National Statistical Office on Household Survey of year 2013, are there progressivity towards healthcare payments with regards to Universal Health Coverage and other Thai Health System?

2)   Does the Thai Health Insurance expand access towards healthcare utilization among households in Thailand year 2013?

3)   Does the Thai Health Insurance reduce the catastrophic health expenditure among households in Thailand year 2013?

1.4 Objectives

1.4.1 General Objectives:

    The general objectives are to study the progressivity of healthcare financing and equity towards healthcare utilization, and to measure the catastrophic health expenditures with regards to Thai Health Insurance among households in Thailand.

1.4.2 Specific Objectives:

1)   Identify the source of income for households according to their Socio-Economic Status or the income quintiles.

2)   To measure the Gini Coefficient using households income.

3)   To study the vertical equity or the progressivity of healthcare finance by using out-of-pocket payment as a source of payment.

4)   To measure the horizontal equity or the equity of healthcare utilization among households in Thailand.

5)   To measure the catastrophic health expenditure among households in Thailand.

6) Propose the policy guidelines towards reducing the inequities in healthcare spending and access to healthcare, and also in protecting households from catastrophic health expenditure.

1.5 Scope of study:

The study of vertical equity, horizontal equity, and catastrophic health expenditure was done by using the House Hold Survey datasets of year 2013 that was conducted by the National Statistics Office (NSO). The Household Survey dataset contains two sub dataset: 1) Socio-Economic Surveys and the 2) Health and Welfare Surveys. The main indicators that will be used in this study are the household income, household expenditure and out-of-pocket health payments from the Socio Economic Survey, and the number of visits, and inpatient and outpatient healthcare expenditures from the Health and Welfare Survey. Expected result can be nationally represented, however, the healthcare utilization of private and public hospital would not be analyze separately because the data was combined. And the expenditure according to specific diseases also would not be included in this study.

1.6 Research Hypothesis:

The study on health inequities and catastrophic health expenditure among households in Thailand can be tested as the following hypothesis:

1) The major source of income for rich people are from salary and business, while the major source of income for poor people are from farming and pension.

2) The gini coefficient of year 2013 is higher or worsens than the previous year.

3) The vertical equity among the Thai households year 2013 is regressive with regards to Thai Health Insurance.

4) People with low income socio-economic status have lesser access towards healthcare utilization with regards to Thai Health Insurance.

5) The catastrophic health expenditure would likely be occurring to the lower income households than the higher ones.

1.7 Possible Benefits:

The possible benefits of this study may aids policy makers to analyze the effects of the Health Insurance Policies towards the access of healthcare utilization of its population. And the policy makers can examine the impact of Thai health insurance on the healthcare payments of the rich and the targeted poor population. And also to examine the catastrophic health expenditure of its population with regards to Thai Health Insurance. The result of this study can be used to reform a new Health Insurance Policies to expand coverage of healthcare insurance in order to increase access of healthcare to its people. And to reduce the burden of healthcare expenditure on the poor population by making the high and middle income population to contribute more of its payment that is suitable and not too high. Use as a guide to aid the government in improving the national health insurance and more understanding in Catastrophic Health Expenditure.

CHAPTER 2

LITERATURE REVIEW

2.1 Concepts of Equity

Equity in health is defined as the huge variations in health status of different countries and different groups of people within the same country are being focused (Whitehead, 1992).

These variations can be measured from the health statistical standard. However, not every variation can be identified as inequities. The word inequity has a moral and ethical aspect. It is often refers to the differences that are redundant and preventable, but at the same time are considered being unfair and unjust. So in order to identify an inequitable situation, the cause has to be analyze to be biased in the context of the situation in the rest of society (Whitehead, 1992).

The empirical research on equity mainly focus on four main aspects: (i) equity in health profiles, (ii) equity in health care delivery, (iii) equity in healthcare financing, and (iv) equity in risk protection (Bhatia et al., 2009).

Two main theories according to justice was found in the literature of philosophy in the category of healthcare are the libertarian and Marxist/egalitarian approaches (Donabedian 1971). Libertarians focused on achievements of the minimum standards. Egalitarians' focused on making sure that healthcare payment is initiated with regards to ability to pay, everyone should have the same rights for accessing health care service and healthcare is a necessity with the aim of encouraging equality of health. There are

still debates going on between the policymakers about the distinction on equity between libertarian and egalitarian (Wagstaff and Van Doorslaer 2000). These debates leads to unanswered questions between the distinction of need and access (Bhatia et al., 2009).

The term access is widely used in both policy statements and the academic literature meaning "receipt of treatment" (Wagstaff & Van Doorslaer, 2000). Le Grand (1982) and Mooney (1983) have defined the word "access" refers to the opportunities obtainable towards its population, while the term "treatment" refers to the people who actually received this opportunity. A revised definition of access would mean that the time and money costs incurred in attaining medical service (Bhatia et al., 2009).

When measuring or assessing access in health care, the term "need" is often be included with these terms. In many academic literatures, the term 'need' is defined as ill-health. The term "equal treatment for equal need" is often used implying that the people who are sicker must receive more medical service. However, this definition is not complete (Culyer and Wagstaff 1993). The definition is not complete because, firstly, need for healthcare can only be apply when healthcare that can improve health conditions are available. Secondly, the non-ill people also need healthcare as for preventive medical service. An improved definition of need was proposed by Culyer and Wagstaff (1993) which is "the least amount of resources required to exhaust capacity to benefit". So in other words, it means the amount of expenditures required to reduce the effort to zero. In practical sense, need is often measured by indicators of health profile (Bhatia et al., 2009).

Assessments of equity in health profile or equity in healthcare service make contribute three clarifications of equity: equality of access, allocation with regards to

need, equality of health. However, access alone are not the only factor that effects the receipt of healthcare (Mooney 1983) and also do not always produce an allocation with regards to need or equality of health. Sen (1992) has improved the definition towards this arguments by implying that good health is a vital component for a person's functioning and flourishing; if people have a choice for good health and does not choose to do so, due to their religion, race, believe, and etc., the inequalities in health that occur would not be defined as unfair (Bhatia et al., 2009). Those people that are in the following situations: heath-damaging behavior where the choice of lifestyles is restricted, exposure to stressful working conditions, and inadequate access to healthcare service would be considered to be avoidable and unjust. But for the situation of natural variations may have been unavoidable but causing the sick people to move down the socio-economic status of income seems both preventable and unjust (Whitehead, 1992). Latest empirical work often defined access in delivery of healthcare service as the usage of medical service depending upon need (Bhatia et al., 2009).

Assessments of equity with regards to healthcare finance have defined that healthcare have to be financed with regards to the ability to pay. One aspects is the vertical equity, which means that the persons or households with the unequal ability to pay makes payment according to their dissimilar payments for health care. Another aspects is the horizontal equity, which means that the persons or households with the same ability to pay makes same payment (Wagstaff & Van Doorslaer, 2000). Empirical work in equity according to healthcare finance, both in OECD and developing countries, have mostly been concerned with the vertical equity (Bhatia et al., 2009).

Fairness of healthcare financing should be considered along with the catastrophic expenditure distributed across individuals and the extent to which society's aggregate resources are redistributed in order to lessen the financial burden on the vulnerable groups. In empirical literature, minimum standard approaches have taken to the account the amount of out-of-pocket payments for healthcare exceed a specified proportion of income, or put the households into poverty zone. Equity in risk protection can be analyzed by inspecting the proportion of poor households that is impoverished due to healthcare payments or incur catastrophic health expenditure with respect to their household income. Even though ensuring that public subsidies protect the poor households from the financial burden towards illness is an important matter, inspection of health subsidies whether it actually reaches the poor is also relevant for examining equity in risk protection. Benefit incidence analysis concentrated on the distribution of government subsidies for medical service and also in reducing the income inequalities among different socio-economic groups (Bhatia et al., 2009).

2.2 Measures of Equity

In order to analyze the equity according to Healthcare finance, ability to pay will be the main concern with healthcare financing. One aspect is the vertical equity, or the person with higher income contributes greater shares of its payment. While the other aspect is the horizontal equity, or the person with the same ability to pay makes equal payments for healthcare (Wagstaff & Van Doorslaer, 2000). In the first section, vertical equity will be explained first and after that the horizontal equity will be explained.

2.2.1 Vertical Equity and Progressivity of Health care finance

Early days work on progressivity of healthcare finance was focused on the tabulations of medical payment by income group. Payments are presented in absolute value rather than proportions of income so it's not possible to analyze the degree of progressivity according to each country. A definition of progressive financing system is that the share of the financial burden of healthcare payment of the lower income group is less than the share of society's income, while the share of the higher income group contributes a lot more of its shares towards the society's income (Kakwani, Wagstaff, & Van Doorslaer, 1997). While the regressive financing system would mean that the financial burden of lower income group exceeds their share of society's income and the higher income group contributes lesser than their share of society's income. And finally the proportional financing system means that the rich and the poor contributes the same percentage of their income (Wagstaff & Van Doorslaer, 2000).

Tabulation between the income shares and healthcare payment of different socio-economic groups can not indicate to us whether a particular source of system (or source of finance) is progressive or regressive than the other. But they can only tell us whether the system is progressive, regressive or proportional (Wagstaff & Van Doorslaer, 2000).

2.2.1.1 Kakwani's Progressivity Index

Kakwani's Index is the measurement of the progressivity of vertical equity. Kakwani's Index mainly focuses on the tax, out-of-pocket payment, or source of finance – proportionally departs from. It can be explained more in figure 1, the curve labeled $L_{pre}(p)$ is the Lorenz curve for income, this curve can be used to find the gini

coefficient of income. The gini coefficient indicates the degree of inequality that the country has based on the variations of population's income. The gini coefficient is two times the area of Lorenz curve and the line of equality (45 degree line). The gini coefficient ranges from 0 to 1, higher gini coefficient indicates higher inequality, which means that the income is more distributed towards the rich than the poor. The second curve labeled $L_{pay}(p)$, is the payment concentration curve. The concentration curve plots the cumulative proportion of the population (ranked according to living standard using income as with $L_{pre}(p)$) against the cumulative proportion of healthcare spending. The concentration index is defined with the reference of concentration curve. Concentration index indicates the relationship between the payments (tax or out-of-pocket payments) and the ability to pay. The range of concentration index is from -1 to 1, higher concentration index indicates a pro-poor situation, or the rich people contribute more of its payment than the poor people. If healthcare spending are absolutely proportional to the income, the $L_{pre}(p)$ curve and $L_{pay}(p)$ curve will overlap. If payment according to the proportion of income increase along the income quintile from poor to rich (progressive source of finance), then the $L_{pay}(p)$ curve lies under the $L_{pre}(p)$ curve. And if the payment according to the proportion of income decrease along the income quintile from poor to rich (regressive source of finance), then the $L_{pay}(p)$ curve lies on top of $L_{pre}(p)$ curve. So the degree of progressivity can be determined by observing the size of the area between $L_{pre}(p)$ curve and $L_{pay}(p)$ curve (Wagstaff & Van Doorslaer, 2000). If G_{pre} is equal to the Gini Coefficient of pre-payment income, C_{pay} is equal to the concentration index of payment, then the Kakwani's index of progressivity, π_k, is equal to:

(1) $\pi_k = C_{pay} - G_{pre}$

Kakwani's index is two times the area between $L_{pre}(p)$ curve and $L_{pay}(p)$ curve. If the system is progressive or pro-poor, π_k is equal to positive number. But if the system is regressive, which means that the $L_{pay}(p)$ curve lies above the $L_{pre}(p)$ curve, π_k is equal to negative number (Wagstaff & Van Doorslaer, 2000). The Kakwani Index ranges from -2 to +1, positive Kakwani index indicates a progressive system (the financial burden are on the rich), while negative Kakwani index a regressive system (the financial burden are on the poor) (Lambert, 1993).

Figure 1. Lorenz curve for pre-payment income and concentration index for payments
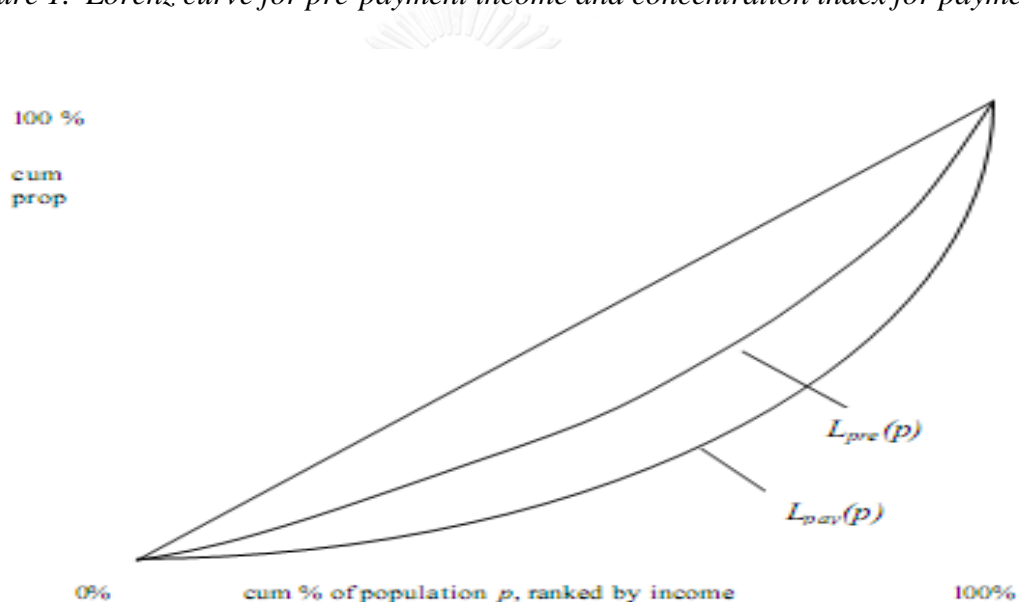
Source: Wagstaff and van Doorslaer, 1997

2.2.2 Horizontal Equity and Income Redistribution

Horizontal Equity means that, the persons or households that have equal ability to pay actually make equal payments regardless of their gender, race, marital status, place of residence, etc. Horizontal inequity might occur for a number of reasons. In private insurance, high-risk individuals (elderly, diabetic, health problems, smokers,

etc.) often pay higher premiums than low risk groups with same ability to pay. In a social insurance system, different groups may be qualified for various social insurance schemes and pay different contribution rates (Wagstaff & Van Doorslaer, 2000).

2.2.2.1 Measuring Horizontal Equity in the delivery of health care

Horizontal equity in the delivery of health care implies that the individuals with equal need of medical care should attain the same healthcare service regardless of their income status, gender, age, racial profile, marital status, and so on. Policy statements indicate that horizontal equity principle should not be directly related to the differences in income or the ability to pay. But if there are two persons with the equal demand for healthcare, it would be undesirable if the richer receive the better treatment than the poorer person. Thus income-related inequity is one of the main focus in this research (Wagstaff, Van Doorslaer, & Paci, 1991).

The illness concentration curve determines whether the illness is concentrated among the rich or the poor population. Firstly, the individuals are rank according to their income, ranging from poorest to richest. Then illness concentration curve is constructed (curve labeled g_{ill} in figure 2), which plots the population's cumulative proportion (ranked by income) against the proportions of illness population. If illness is concentrated in the lower income groups, the illness concentration curve will be above the 45 degree line or the line with perfect equity as in figure 2. The illness concentration curve is then compared with the expenditure concentration curve. The expenditure concentration curve would indicate whether the expenditure burden is concentrated among the rich or the poor population. The curve labeled gexp in fig. 2, or the expenditure concentration curve, plots the population's cumulative proportion

(ranked by income) against the proportion of total expenditure. In the figure below, the low income group uses healthcare service more than the high income groups, the expenditure concentration curve lies above the line of equality. If healthcare expenditure is proportional to their total ill-health, both of the concentration curve will coincide. If the low income groups receive lesser healthcare service when ill than the high income groups, the expenditure concentration curve will be under the illness concentration curve (Wagstaff et al., 1991).

Figure 2. Illness and expenditure concentration curves.
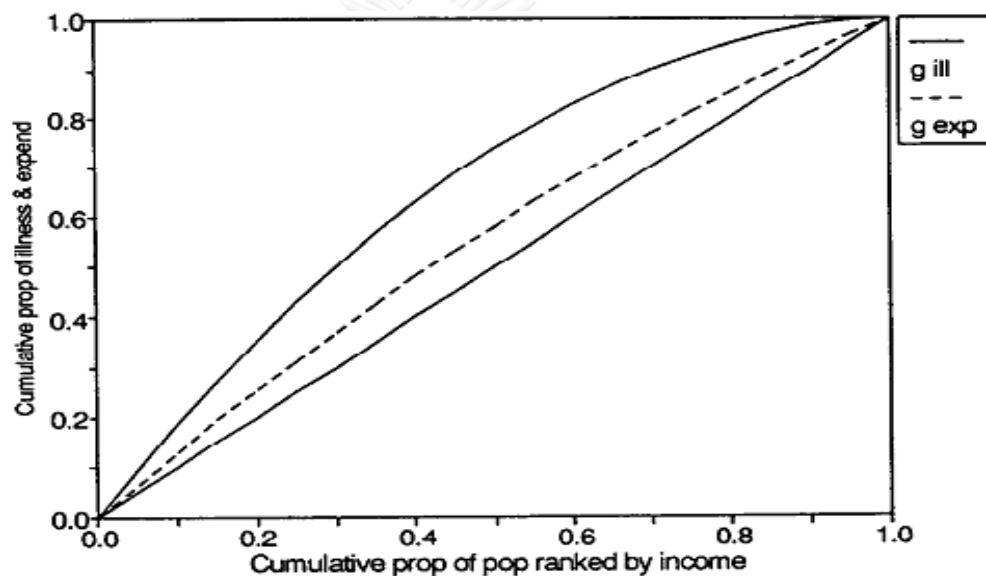
Source: Wagstaff et al., 1991

The illness concentration index dictates the nature of the illness concentration curve; negative concentration index indicates that the illness concentration curve is above the diagonal line. And positive concentration index indicates that the illness concentration curve is below the diagonal line. The range for illness concentration curve is from -1 to 1, negative concentration index reflects that inequality is concentrated amongst the poor. The closer the concentration index is towards -1, the more health inequality on disease burden there is amongst the poor. Positive concentration index

indicates that inequality is more situated amongst the rich. And if concentration index is equal to zero, it means that there are no correlation between ill health and socio-economic status (Wagstaff et al., 1991).

The expenditure concentration index also follows the pattern of the expenditure concentration curve; negative concentration index indicates that the expenditure concentration curve is above the diagonal line. And positive concentration index of healthcare expenditure indicates that the concentration curve is below the diagonal line. The range for expenditure concentration curve is from -1 to 1, the negative concentration index indicates that the service is favorable amongst the poor. Positive concentration index indicates that the service is favorable amongst the rich (Wagstaff et al., 1991).

After the expenditure concentration index and illness concentration index are calculated, the Horizontal Equity Index can now be calculated. Horizontal inequity index is equal to twice the area between the expenditure concentration curve and the illness concentration curve. If C_{ill} is the concentration index for illness, and C_{exp} is the concentration index for expenditures, then the formula for Index of horizontal inequity (HI) is equal to: $HI = C_{exp} - C_{ill}$

The range for Index of horizontal inequity (HI) is -2 to +2, the positive value indicates that the service favors the rich, while the negative value indicates that the service is favoring the poor (Wagstaff et al., 1991).

2.3 Catastrophic Health Expenditures

Health care in many Asian countries are mostly financed by out-of-pocket (OOP) payments from individuals. These healthcare payments have been destroying the equitable health system in developing countries. With no risk-pooling mechanism for healthcare payments, poor people have to pay OOP payments which drives their households into poverty (S. Limwattananon et al., 2007).

Catastrophic health expenditure happens when a household's total OOP healthcare payments equal or exceed 40% of household's ability to pay. The 40% threshold is interchangeable according to the countries' specific circumstance (Xu, 2005). The out-of-pocket payment is the numerator, and the capacity to pay is the denominator.

The catastrophic health expenditure with respect to household income is defined by using the out-of-pocket payment as the numerator, and the total household income as the denominator. The threshold that are widely used according to several countries is 10% threshold (O'Donnell & Wagstaff, 2008).

2.4 Existing Studies in Other Countries

A study on Equitap was brought up in this research for more clarifications on health systems financing and policy. There are 15 Equitap countries that joined the study: China, Hong Kong SAR, Bangladesh, Indonesia, Japan, Korea, Kyrgyz Republic, Malaysia, Mongolia, Nepal, Philippines, Sri Lanka, Taiwan and Thailand. These countries comprise a wide range of diversity with regards to the economic development, health system financing, and policy (Bhatia et al., 2009).

Taiwan, Korea and Japan have high-income developed economies with healthcare financing focused on social health insurance. These countries perform well in terms of equity in financing, protection against catastrophic health expenditures with the aid of private health sector, funded through national health insurance system which is controlled by the government (Bhatia et al., 2009).

Other group of countries consists of Hong Kong, Sri Lanka and Malaysia, which are tax funded. Even though Hong Kong is considered a high income country similar to Japan/Taiwan, their healthcare systems are financed differently. Hong Kong's healthcare system comprise of a dominant general revenue-financed, hospital dominated public sector, that mostly provides inpatient care, along with large ambulatory-based private sector that dominates in outpatient sector. Even though user fees are levied in public sector, in relation to average incomes these are quite minimal, and empirical study indicates that there are no catastrophic health expenditure and the government spending aids the most toward its poor population. Even though Sri Lanka and Malaysia are not high income countries, they both have strong public supply systems alongside excellent health profile indicators (Bhatia et al., 2009).

Social health insurance financing can found only in Mongolia, China, Thailand, Krygyz, Phillippines and Indonesia. Out of all of these countries, only Mongolia and Thailand have insurance system that are universally in coverage of all income groups, even though Philippines is exerting efforts in expanding coverage through insurance. In Thailand (before year 2006) and Mongolia, public sector charges user fees, but the public insurance system covers almost all the costs, and a higher cost coverage in case of inpatient services (Bhatia et al., 2009).

The remaining countries which are Bangladesh, India, Nepal and Sri Lanka have no significant social or private insurance due to their history of British colonization. Out of all these countries, only Sri Lanka does well in focusing the Government healthcare spending towards the poor and protect households against catastrophic health expenditure (Bhatia et al., 2009). The table below describes the percentage of total health expenditure from main sources.

Table 5. Healthcare financing (percentage of total health expenditure from main sources)

Countries	General govt. revenue	Social Insurance	All public finance	Private Insurance	Direct payments
Bangladesh (1999)	27.23%	0.00%	27.23%	0.0%	64.64%
China (2000)	14.89%	16.52%	31.4%	0.0%	60.35%
Hong Kong, SAR (1999-2000)	55.10%	0.00%	55.10%	12.52%	30.79%
Indonesia (2001)	23.71%	1.77%	25.48%	6.11%	68.41%
Japan	12%	68%	80%	0	18%
Korea	10%	45%	55%	2%	37%
Kyrgyz Republic	44%	5%	49%	0	51%
Malaysia	-	-	-	-	-
Mongolia			71%		17%
Nepal (1994-5 & 1995-6)	23.50%	0.00%	23.50%	0.00%	75.00%
Philippines	29%	9%	38%	56%	
Punjab (India) (1995-96)	40.73%	1.30%	42.03%	0.20%	56.41%
Sri Lanka (2002)	45.0%	0.00%	45.0%	6.0%	48.0%

| Taiwan (2000) | 9.17% | 51.78% | 60.95% | 8.90% | 30.15% |
| Thailand (2000) | 56.28% | 5.11% | 61.39% | 5.87% | 32.74% |

Source: Bhatia et al., 2009

Note: National/ Domestic/ Regional Health Accounts unless stated otherwise. Row totals sum to 100%.

A. Includes revenues from donors/ foreign aid.

B. Private enterprise, NGOs and community health insurance.

C. Payments by collective organizations, towns and villages through grass roots governments and rural cooperatives.

D. Public finance data for 1994-5 [HMG/Nepal, 2000 #985], private expenditure data from 1995-6 Nepal Living Standards Survey (Hotchkiss, Rous et al. 1998).

E. Private companies.

F. Revenue from private firms and NGOs for finance of own facilities.

2.4.1 Progressivity of Healthcare Finance in Other Country

Financial burden varies among low/middle income countries indicated in the Table below. Almost all the countries showed progressivity in their direct payment for healthcare, except for country like Vietnam, Korea, Indonesia, and Japan which are not so progressive in out-of-pocket payment compared to other countries. And the Kakwani Index shows that Sri Lanka and Mongolia have the most progressive system amongst these countries, which means that their rich population contribute more payments toward healthcare than the poor. The progressive system is vital to their country because it risk pools and aids the lower income population from the financial burden of healthcare. The only country that is regressive in this table is Japan which is one of the

high income countries in this list. Japan has a regressive system because of their low concentration index of out-of-pocket payment and high healthcare payment which demands their policy maker to adjust their policy in healthcare in order to reduce burden of healthcare payment of the poor population.

Table 6. Concentration and Kakwani Indices of EQUITAP countries

Country	Concentration Index of OOP	Kakwani Index
Nepal (2003-2004)	0.578	0.114
Mongolia (2008)	0.5642	0.1667
Cambodia (2007)	0.5249	0.1037
Malaysia (1997-2006)	0.4983	0.12337
China (Tianjin) (2008)	0.491	0.1413
Sri Lanka (2008)	0.4837	0.156
Vietnam (1998-2008)	0.385	0.0355
Korea (2008)	0.374	0.0372
Indonesia (2006)	0.3658	0.0556
Japan (2004)	0.219	-0.0614

Source: Rannan-Eliya, Somanathan, Adhikari, & Van Doorslaer, 2011

2.4.2 Horizontal Equity in Healthcare Delivery of Other Countries

Concentration index for Healthcare is provided in the table below which indicates the public sector, private sector, and the total of the two sectors. In the total

of two sectors, healthcare systems in the lowest income countries which are India, Bangladesh, China, and Indonesia favor the rich population more than the poor population because they rely more on direct payments for healthcare service. This indicates to us that the poor population in these countries pay for healthcare treatment less and receive lesser healthcare service because they could not afford to pay. The inpatient care for these low income countries mainly favors the rich while the non-hospital care slightly favors the poor. In Bangladesh, non-hospital care is slightly favorable towards the poor, indicating that low grade private sector providers are dependent upon the poor population. In Thailand and Sri Lanka, the total inpatient care is evenly distributed according to the ability to pay, which means that the poor population also has a fair chance for treatment with their limited ability to pay. In contrast to other low and middle income countries, this process is accomplished by the even distribution in public sector care. This is because of the almost lack of payment for healthcare in Sri Lanka and an effective system of healthcare coverage for the poor in Thailand. An equal distribution in healthcare, such as in Thailand and Sri Lanka healthcare system, does not actually imply that it is really equitable, since the poor people have a greater need for healthcare. So in Thailand and in Sri Lanka, horizontal equity has not been achieved yet. But for Bangladesh, China, India, and Indonesia, the horizontal equity is far from achievement than Thailand and Sri Lanka because of their high dependence on the out-of-pocket payment for healthcare service. Only in the high income countries such as Korea, Taiwan, and Hong Kong, that the healthcare service favors the poor more than the rich population (O'donnell et al., 2008). Utilization is indicated by need rather than the population's ability to pay (Lu et al., 2007).

Table 7. Concentration indices for Healthcare Utilization

Territory	Hospital inpatient			Hospital outpatient			Non-hospital care		
	Public	**Private**	**Total**	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
Bangladesh	0.3174	0.362	0.3361	0.0987	−0.0174*	0.0649	0.0134*	−0.0222	−0.0214
Gansu – China	0.2963	–	–	0.0446*	–	–	–	–	–
Heilongjiang China	0.3824			0.182					
Hong Kong	−0.4347	0.2074	−0.3814	−0.4333	0.0893*	−0.3231	−0.3159	0.0905	0.0094*
India	0.2458	0.473	0.3605	0.1311	0.1652	0.1504	−0.0505*	0.1368	0.1184
Indonesia	0.3745	0.4953	0.4243	0.312	0.3813	0.3416	−0.0931	0.0907	0.0165
Korea Rep	–	–	−0.2176	–	–	–	–	–	−0.0975
Sri Lanka	−0.0553*	0.3767	0.0109*	−0.0709	0.1267	−0.0414	0.0531*	0.1708	0.1529
Taiwan	–	–	−0.1170	–	–	−0.0179*	–	–	−0.0274
Thailand	−0.0335*	0.5963	0.0720*	−0.0404	0.2638	0.0838	−0.2099	−0.0014	−0.1056

Source: O'donnell et al., 2008

Note: O'donnell et al. calculations from the following datasets: Bangladesh – Health and Deomographic Surveys, 1999–2000; Gansu/Heilongjiang – National Health Household Interview Surveys, 2003; Hong Kong – Thematic Household Survey, 2002; India – National Sample Survey, 1995–96; Indonesia – SUSENAS, 2001; Korea – National Health Survey, 1998; Sri Lanka – Consumer Finance Survey, 1996–97; Taiwan – National Health Interview Survey, 2001; Thailand – Socioeconomic survey, 2002. Notes: (*) indicates that index is not significantly different from zero at 5%.

2.4.3 Catastrophic Health Expenditure in Other Countries

Vietnam also faces the similar inequity problems as in Thailand, and the situation is not severe like the lower income country. So the following table below describes the catastrophic incidence of out-of-pocket payment with respect to total income and capacity to pay. First, let's take a closer look at the out-of-pocket payment with respect to income, the threshold of 2.5 – 5% indicates that there are quite significant amount of household facing catastrophic health expenditure at this threshold, which are 55.5% and 33% respectively. And as the threshold is raised from 2.5% to 15% of total income, the incidence or headcount of people facing catastrophic health expenditure falls from 55.5% to 7.7%.

Now let's focus on the out-of-pocket spending with respect to capacity to pay, the 10% threshold indicates a significantly high amount of population facing catastrophic health expenditure at this threshold, which is approximately 41.5%. And as the threshold is raised from 10 to 20%, the incidence of catastrophic health expenditure drastically dropped from 41.5% to 19.3%. It indicates that most people face the catastrophic health expenditure with respect to ability to pay at a threshold of 10%, and as the threshold is raised from 10% to 40%, the catastrophic health expenditure headcount decreases from 41.5% to 5.1%.

Table 8. Catastrophic Expenditure for Vietnam Year 1998

OOP spending as share of total income	**2.5%**	**5%**	**10%**	**15%**
Headcount	55.5%	33%	14.2%	7.7%
OOP spending as share of ability to pay	**10%**	**20%**	**30%**	**40%**
Headcount	41.5%	19.3%	10.3%	5.1%

Source: Wagstaff & Doorslaer, 2003

Let's also have a look at the pattern of catastrophic health expenditure in high income country such as South Korea and Taiwan after the universal coverage policy implementation. High income countries like South Korea and Taiwan have a quite similar health system. Developing country like Thailand could learn some lessons from these high income countries for further adjustments to their UC policy.

According to the table below, the National Health Insurance for universal coverage was implemented in year 1989 for South Korea, and year 1995 for Taiwan.

Table 9. Comparison between the NHI implementation of South Korea and Taiwan

Years	**Pre-NHI**	**Policy year**	**Post-NHI**
South Korea	1988	1989	1990-1995
Taiwan	1994	1995	1996-2001

Source: Kwon, 2009

From the table below, the drastic reduction of incidence for catastrophic health expenditure can be observed in Taiwan after the policy implementation with the 5% and 10% threshold of OOP payment as share of total expenditure. But for South Korea, the result shows no reduction of catastrophic health expenditure after the

implementation of Universal Coverage. Many factors are involved in these situations between the two countries. The factors are: the development of the economy and the insurer effect. The factors associated in the insurer effect are: design of benefit coverage and copayment, differential access to medical institutions, and cost containment efforts (Kwon, 2009).

Figure 3. Catastrophic payment and headcount measures of South Korea and Taiwan
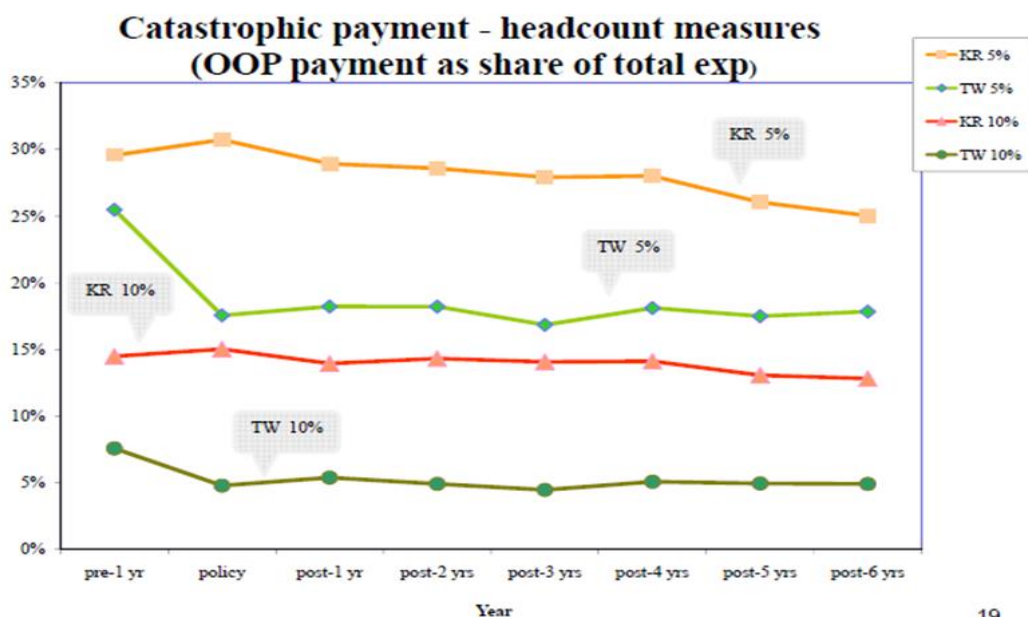
Source: Kwon, 2009

2.5 Existing Studies in Thailand

With the introduction of Universal Coverage Scheme, approximately 47 million people have become insured (Prakongsai et al., 2009). According to the statistical data from Thailand health systems reform (Tangcharoensathien et al., 2004); it shows an improving pattern of health equity with regards to both access and financial protection (O'Donnell et al., 2007). More importantly, the general tax was the most progressive source of finance towards the Universal Coverage Scheme and the Civil Servant Medical Benefit Scheme (Tangcharoensathien et al., 2010).

According to the study done by the (NSO, 2013), the gini coefficient or inequity of distribution of the income across the poorest towards the richest people have improved. Lesser gini coefficient indicates a more equitable economy. The gini coefficients across the income quintiles from year 2011 to 2013 are 0.376 to 0.367 respectively. It indicates that there is a reduction in inequity problem with respect to the household income (NSO, 2013).

The table below shows the distribution of individual household members in post-UC (2004) period by income quintiles for public health insurance schemes, 2004. Predictably, the Universal Coverage beneficiaries are mostly concentrated among the poor. Respectively 19% and 31% of the Universal Coverage with 30 baht co-payment (UCP) and Universal Coverage with exempted co-payment (UCE) belonged in the poorest quintile which is quintile 1. And Social Security Scheme and the Civil Servant Medical Benefit Scheme contain only 2% and 10% of the poorest quintiles. This indicates that many poor people who are covered by UC were the previous Low Income Card holders (Supon Limwattananon, Tangcharoensathien, & Prakongsai, 2008). In contrast, CSMBS provides coverage to most of its rich population, about 52% are situated in the richest quintile. And about 49% of Social Security Scheme belong to the richest quintiles (Tangcharoensathien et al., 2007).

Table 10. Distribution of individual household members by income quintiles for public health insurance schemes, 2004

	All population[a]	**SSS**	**CSMBS**	**UCE**	**UCP**
Quintile 1	20.0%	2.0%	10.2%	30.8%	19.4%
Quintile 2	20.0%	4.7%	6.1%	27.8%	22.6%
Quintile 3	20.0%	12.1%	9.6%	21.3%	23.9%
Quintile 4	20.0%	31.9%	22.9%	13.9%	20.7%
Quintile 5	20.0%	49.3%	51.2%	6.2%	13.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Sample Size	68,109	7,105	6,398	20,865	29,235

Source: Tangcharoensathien et al., 2010

Note: NSO Health and Welfare Survey 2004 (Tangcharoensathien et al., 2007)

[a]Include other types of health insurance schemes and no insurance SSS –Social Security Scheme, CSMBS –Civil Servant Medical Benefit Scheme, UC –Universal Coverage Scheme (UCE with exempted copayment, UCP with required payment of 30-Baht copay)

2.5.1 Study on Progressivity of healthcare financing in Thailand

According to the study of (Tangcharoensathien et al., 2007), the Thai health system has resulted in progressive incidence of healthcare finance after the implementation of the Universal Coverage Scheme. The table below shows that direct and indirect tax shows high degree of progressivity towards healthcare payment, in other words, it means that the rich populations are contributing more of their payment

than the poor people. This is a good indication, because it allows the government to finance the healthcare scheme through general taxation in order to aid the poor population that could not afford healthcare treatment. The concentration indexes (ranging from -1 to +1, the more positive indicates that the rich contribute more) of direct payment or out-of-pocket payment, were consistently progressive, 0.4883, 0.4626, 0.4705 in 2002, 2004 and 2006 respectively (Prakongsai et al., 2009). And the concentration index for the total source of finance (overall) were also consistently progressive.

Table 11. Progressivity of health financing contribution, 2003-2006

Financing sources	2002		2004		2006	
	CI[a]	Fraction[b]	CI[a]	Fraction[b]	CI[a]	Fraction[b]
Direct tax	0.8221	0.20	0.8162	0.21	0.7687	0.23
Indirect tax	0.5594	0.38	0.5958	0.37	0.5512	0.33
Social insurance contribution	0.4975	0.06	0.4561	0.07	0.4492	0.08
Private insurance premium	0.3785	0.09	0.4221	0.09	0.4188	0.08
Direct payment	0.4883	0.27	0.4626	0.26	0.4705	0.28
Overall	0.5719	1.00	0.5822	1.00	0.5593	1.00

[a] Concentration index (CI) > 0 indicates concentration among the economically better off. This means 'progressive' taxation, where the rich pay more than the poor.

[b] Fraction of total health expenditure from National Health Accounts

Source: Prakongsai, et al., 2009

2.5.2 Study on Horizontal Equity in Healthcare Utilization of Thailand

During the economic crisis period from 1996 to 2001, the outpatient visits of healthcare service have reduced from 2.87 to 2.84 visits/capita/year (Vasavid et al. 2004). From the table below, the shift from private healthcare users to public healthcare users can be observed. The amount of people using the public healthcare in year 1996 to 2001, increased from 11.35% to 32.30% respectively. And the private healthcare users decrease from 26.9% to 17.7% respectively to year 1996 to 2001 (National Statistical Office 1996, 2001). The table below also shows the increase of health seeking behavior among the population from the year of economic crisis towards year 2003 which is one year after the UC implementation. And the overall healthcare service users also increase from year 1991 to year 2003.

Table 12. Health care seeking behaviors (%).

Healthcare seeking behavior	1991	1996	2001	2003
Not seeking healthcare	16.75	7.10	5.10	5.70
Traditional healing	5.25	3.40	2.35	2.75
Self-medication	37.75	37.20	25.75	22.50
Health center (public)	9.85	14.05	13.90	17.70
Public hospital	12.95	11.35	34.55	32.30
Private clinic/hospital	17.45	26.90	17.70	22.45

Sources: Reports of Health and Welfare Surveys 1991, 1996, 2001 and 2003 (National Statistical Office 1991, 1996, 2001, and 2003).

After the implementation of UC, the opportunity for healthcare has greatly increase for the poor population who could not afford healthcare treatment (Prakongsai et al., 2009). The table below shows the negative Concentration Indexes which indicates that the healthcare service utilization favors the poor. The district hospital supports the majority of poor people towards access of healthcare due to its proximity to the rural area, which contains the majority of poor people (Prakongsai et al., 2009); and the transportation costs is also minimal. While the private hospital shows no improvement in horizontal equity towards healthcare utilization. There is also inequity reduction in admission services.

Table 13. Concentration Index of Healthcare Utilization by Providers, 2001 and 2003

Provider type	Ambulatory service		Hospitalization	
	2001	2003	2001	2003
Health center	-0.2944	-0.3650	NA	NA
District hospital	-0.2698	-0.3200	-0.3157	-0.2934
Provincial hospital	-0.0366	-0.0802	-0.0691	-0.1375
Private hospital	0.4313	0.3484	0.3199	0.3094

Concentration index (CI) < 0 indicates concentration of the economically worse off

Source: Prakongsai et al. 2009

2.5.3 Studies of Catastrophic Health Expenditure in Thailand

Healthcare expenditure is considered to one of the necessity of every household (Xu, 2005). High healthcare spending can worsen the lifestyle of the population. So the high amount of healthcare spending or catastrophic health expenditure should be minimize as much as possible. With the implementation of UC in Thailand, there are a lot of changes that occurred toward the pattern of catastrophic health expenditure among the households. The diagram below compares the alteration in the headcount of catastrophic payments from year 2000 (pre-UC) to year 2002 and 2004 (post-UC periods). It can be observed that the incidence of catastrophic health expenditure reduce from the year 2000 to year 2004. So the evidence indicates that the UC scheme help reduce the catastrophic health expenditure incidence due to the out-of-pocket payment on healthcare service (Somkotra & Lagrada, 2008).

Figure 4 . Incidence of catastrophic health expenditure in Thailand
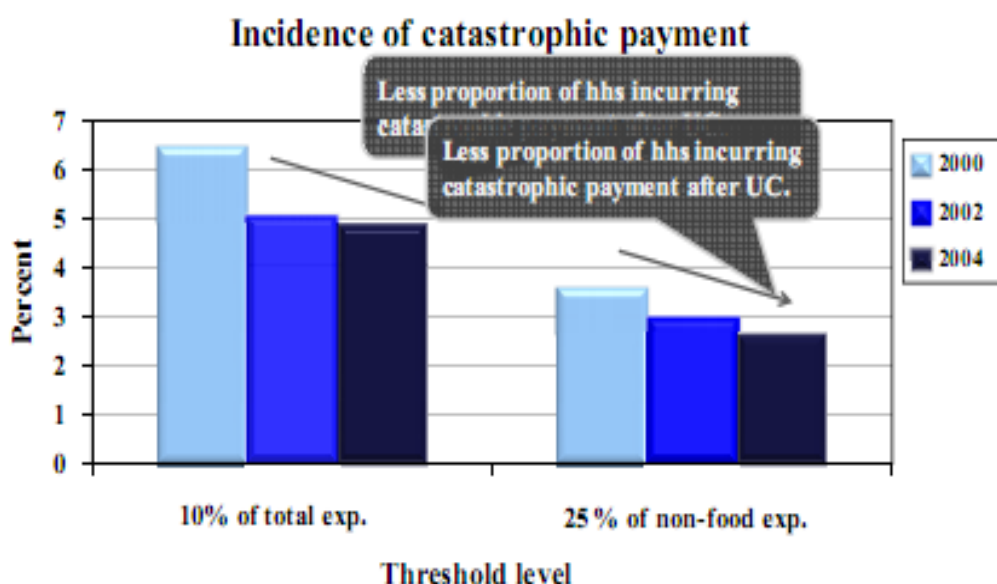
Source: Somkotra & Lagrada, 2008

The incidence of catastrophic health expenditure by consumption expenditure is shown in the table below. The table below indicates that there is minimal incidence of catastrophic health expenditure; in this case it is defined according to out-of-pocket payment for healthcare service exceeds 10% of the total household consumption expenditure. The catastrophic incidence for all quintiles is reduced from 5.4% to 2.0% in year 2000 to 2006 for all households after the UC implementations. Both the richest and the poorest quintiles experience the reduction of catastrophic incidence, but a larger reduction is evident in the poorest quintiles (Tangcharoensathien et al., 2010).

Table 14. Incidence of Catastrophic Health Expenditure by Quintile of Consumption Expenditure

Consumption expenditure	2000	2002	2004	2006
Quintiles 1	4.0%	1.7%	1.6%	0.9%
Quintiles 5	5.6%	5.0%	4.3%	3.3%
All quintiles	5.4%	3.3%	2.8%	2.0%

Source: Prakongsai P. et al., 2009

CHAPTER 3

METHODOLOGY

3.1 Conceptual Framework:

The first three boxes indicate the progressivity of healthcare finance. The difference of out-of-pocket payment concentration index with the gini coefficient of income inequality with respects to the living standard of income ranking determines the Kakwani Index. The negative Kakwani Index indicates that the healthcare financing system is regressive, or meaning that the poor receive more financial burden than the rich population. Policy adjustment for healthcare is required to create a more equitable healthcare financing system for the poor population.

In the middle three horizontal box, the horizontal inequity is defined if the lower income population groups receive lesser medical care than the higher income group when they become sick. The illness concentration curve and the expenditure concentration curve will be defined. The lower income receives lesser medical service than the rich population might be because of the health insurance policy and healthcare system is more favorable towards the high income population.

The last three boxes indicate the catastrophic health expenditure, there are two ways of defining catastrophic health expenditure. One way is to define the catastrophic health payments in the relation to total household income. For Thailand, if the out-of-pocket expenditure exceeds 10% of the total household income (S. Limwattananon et al., 2007). But this method will leave out households that cannot afford to meet the

catastrophic payment. So another method of calculation is done in order to obtain more clarification on expenditure trend of Thai Health System. So the next method for calculating the catastrophic health expenditure is by defining it according to the capacity to pay. So catastrophic health expenditure with respect to capacity to pay is equal to or exceeds 30% of the capacity to pay for Thailand (S. Limwattananon et al., 2007).

Conceptual Framework for Calculations of:

1. Vertical Inequity

Vertical Inequity in Healthcare Finance

OOP health payment – Gini Coefficient < 0

2. Horizontal Inequity

Outpatient

Horizontal Inequity: Expenditure – Illness > 0

Inpatient

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┌─────────────────────────────────────────────────────────────────────┐
│  3.  Catastrophic Health Expenditure                                  │
│                                                                       │
│   ┌─────────────────────────┐        ┌─────────────────────────┐     │
│   │ OOP health exp >= 10% of │        │ OOP health exp >= 30% of │     │
│   │       total income       │        │    capacity to pay       │     │
│   └─────────────────────────┘        └─────────────────────────┘     │
│                          ↘            ↙                                │
│              ┌──────────────────────────────────────┐                 │
│              │   Catastrophic Health Expenditure     │                 │
│              └──────────────────────────────────────┘                 │
│                                                                       │
└─────────────────────────────────────────────────────────────────────┘
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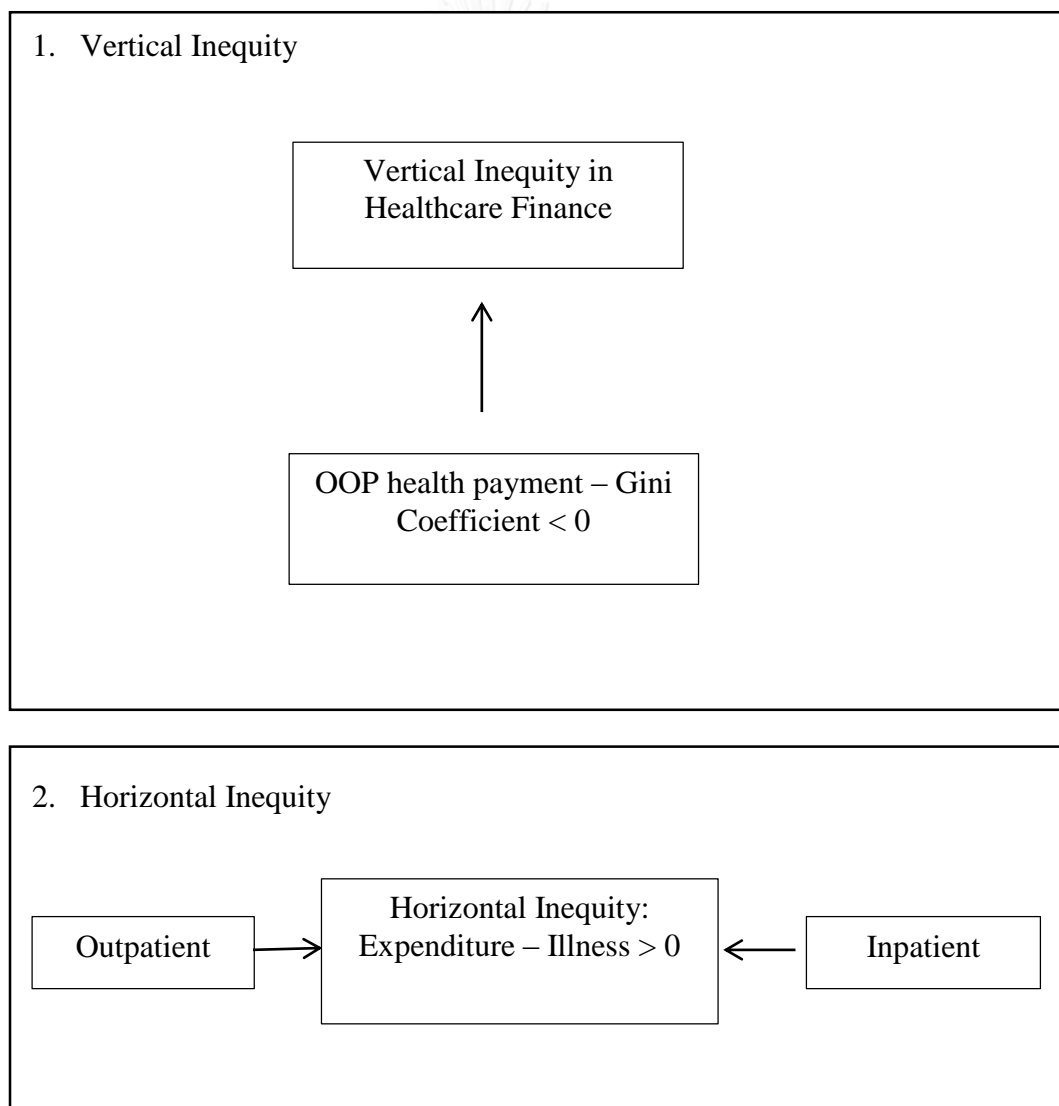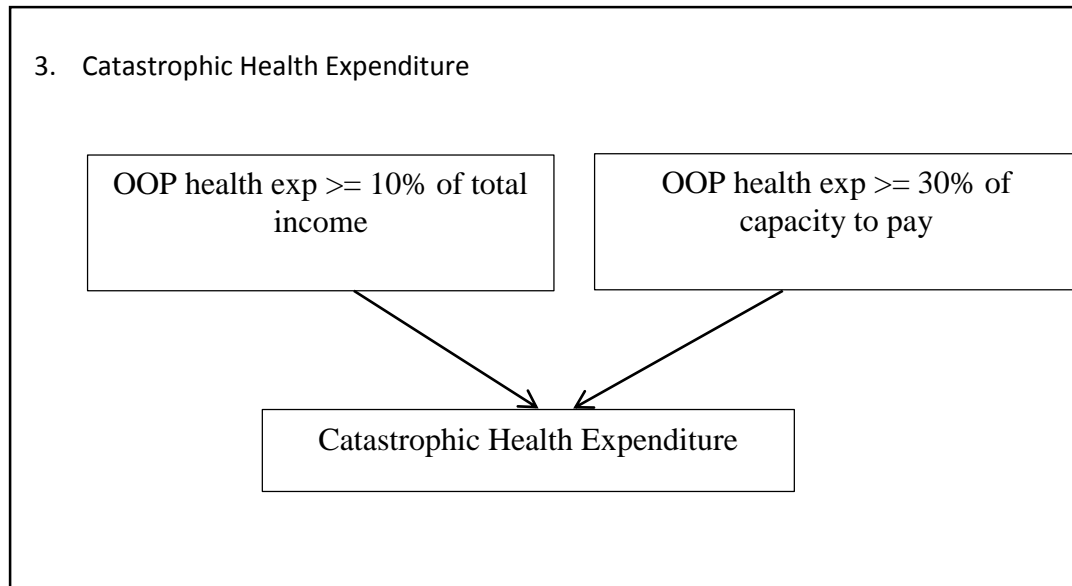
3.2 Study design:

This study is categorized as a quantitative study using cross-sectional household survey data. This quantitative research uses secondary data of Household Survey Datasets from the National Statistical Office (NSO) of Thailand. The data will be from Socio-Economic Surveys of year 2013, annually implemented by the NSO, and Health and Welfare Surveys of year 2013, which is implemented one time within two years. The survey of household income which is included in Socio-Economic Survey would be done in every two years ending with odd number.

This research uses the study of year 2006 from the study of UC impact (Tangcharoensathien et al., 2010) as a benched mark line to analyze the health equity achievements of the Thai health system. The out-of-pocket expenditure, household income, household expenditure, frequency of illness and number of visits would be used to study the vertical inequity, horizontal inequity, and catastrophic heath

expenditure in Thai Health System. The software Stata 12 will be used to analyze the data of this research.

3.3 Population of the study:

The Thailand Socio-Economic Survey 2013 was conducted from 126,261 individuals in 42,738 households that started from January to December in 2013. And the Health and Welfare Survey of year 2013 consists of 71,533 individuals from the survey time period of January to December.

The Socio-Economic survey contained a variety of questionnaires about socio-economic status of each household, and also information on household expenditure, household income, and the weighted value. Frequency of illness and the healthcare expenditure of inpatient and outpatient on every visit are also accounted as well in the Health and Welfare Survey.

3.4 Sampling Design

The sampling design of the two Survey (Socio-Economic Survey and Health and Welfare Survey) uses the sample survey method with the randomize process of stratified two-stage sampling. With the province as stratum of total 77 stratum, and in each stratum (province) it is separated into two sub stratum which are urban and rural area. With the Enumeration Area (EA) in urban area and the village in rural area as the first stage with total 4,100   EA household. The personal household is considered as a second stage sampling, with a total of 38,000 households (NSO, 2013).

The SES and HWS 2013 acquire almost 100 percent response rate. This high response rate was a major indicator of high quality survey achievements.

Households

Usually, there are three to four family members residing in one household in Thailand. Households head are usually male or mostly the father. After the marriage, the male have to take care of the female as well as her families. The family income and expenditure are sometimes separated. The NSO take the survey with regards to the tentative family members and keep record of the divorce and the pattern of income and expenditure within the households. So there would be some information with regards to individuals and also according to the households within the dataset.

Variables and Indicators

The Socio-Economic Survey is done annually with the national sample of households and household members, the interview that is done by the NSO on Socio-Economic Survey are about the economic status, education, transportation, consumption, insurance, and health expenditure. And for the Health and Welfare Survey there are information on number of hospital visits, medical insurance, healthcare expenditure for inpatient and outpatient, and healthcare utilization of private and public hospitals. However, there are no information on the concentration index for OOP payment, income, insurance premium, and illness which had to be calculated with the following dataset. And there are also no information with regards to the poverty line, subsistence expenditure (expenditure on necessity) and household's capacity to pay. So the vertical and horizontal equity would be calculated using the method proposed by (Wagstaff & Van Doorslaer, 2000) and catastrophic health expenditure using the method proposed by (Xu, 2005).

From the **Socio-Economic Survey of Year 2013, the** following need to be extracted:

Household Income (hhinc): consists of all the monthly income for all the population ranging from poorest household to richest household.

Household Expenditure (hhexp): comprises of all the monthly expenditure and is the total sum of all the expenditure including consumption, non-consumption, and food consumption expenditure.

Out-of-Pocket Health Payment (OOP): the expenditure that is not covered by any insurance and the people have to be whether it is outpatient service, inpatient service, or self-treatment. These payments include traditional medicine, modern medicine, hospital service, and consultation fees.

Food Expenditure (foodexp): refers to the consumption expenditure on foods and drinks by households and home-made food supply are also included. The beverages and tobacco are also included.

From the **Health and Welfare Survey** of Year 2013, the following need to be analyzed:

Household income per adult (hhinc_ad): The monthly average income from employment and investment for grouping the population into quintiles from poorest to richest.

Frequency of Illness (opd_ill): The frequency of sickness that the people experience during the last month.

Outpatient Health Expenditure (opdexp): The latest total out-of-pocket payment for outpatient service.

Number of visits for Inpatient Service (ipd_ill): The number of inpatient service care of the sample population during the last 12 months.

Inpatient Health Expenditure (ipdexp): The expenditure for inpatient healthcare service of the last month.

Determining the Main Source of Income for each Quintiles

The indication of main source of income for the poorest and richest quintiles can help pin point the problem of money flow towards the poor and aid them with adjustment towards their source of income. First, the proportion of income needs to be calculated from the total income. In order to do this, the source of income should be divided by the total income. With the help of Stata 12, the command can be written as follow:

gen newVar = source of income/total income

Then the quintile for total income is generated by:

xtile income_quintile = total income, nq(5)

This will rank the household according to their income. Now the proportion of source of income can be observed according to the population quintiles.

sum newVar if income_quintile == 1

Vertical Equity of Payment

In order to determine whether the financial burden of healthcare payments are on the rich population or the poor population, vertical equity need to be determined. Firstly, the inequity distribution of income in the specific economy need to be determined, and then the inequity in source of finance need to be analyze. Finally the relationships between these two indicators need to be assessed through Kakwani Index which will be explained in the methodology section.

Finding the Lorenz Curve of Income Inequality

The Lorenz Curve of Income Inequality is mainly used to compare the degree of inequality with the diagonal line or the line of equality (45 degree line). The diagonal line indicates equal distribution of income. In order to find the Lorenz curve, first the population has to be ranked according to income quintile(p or q). After that, the total income of economy is calculated. And then the cumulative percentage of income for each quintile from the lowest to the highest quintile is calculated. The cumulative % of income at each quintiles are the point L(p) that forms the Lorenz curve (Wagstaff & Van Doorslaer, 2000).

The figure below demonstrates the Lorenz curve of income inequality. The closer the Lorenz curve is towards the diagonal, the lesser the inequality in income distribution. But if the Lorenz curve is further away from the diagonal line, the greater the inequality.

Figure 5. Lorenz curve of Income Inequality
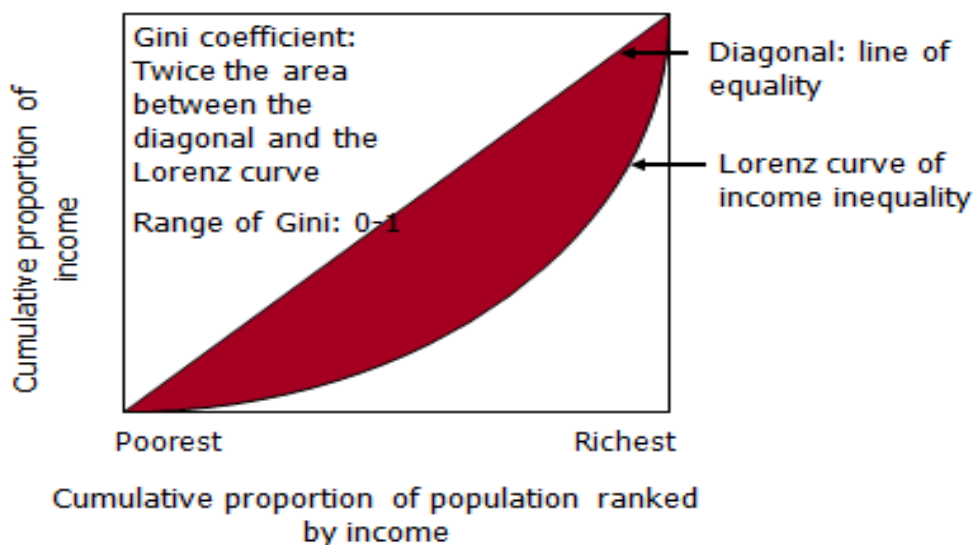
Calculating the Gini Coefficient of Income

Gini coefficient is derived from the Lorenz curve of income inequality. The gini coefficient is twice the area between the line of equality and the Lorenz curve. The formula for calculating the gini coefficient is the same as the formula for calculating the concentration index:

$$C = (p_1L_2 - p_2L_1) + (p_2L_3 - p_3L_2) + \ldots + (p_{T-1}L_T - p_TL_{T-1})$$

The p in this formula is known as the percentile or quintile in some case, and L is the concentration curve (Wagstaff & Van Doorslaer, 2000). The Gini coefficient is used to measure the inequality of income distribution among population. The range of gini coefficient is from 0 to 1. Zero value indicates perfect equality situation, meaning everyone has the same share of resources, and the Lorenz curve will also be diagonal. Whereas if the Gini coefficient is one, it means one group takes all the resources, or it is also called perfect inequity situation (Wagstaff & Van Doorslaer, 2000).

Concentration Curves and Indices for Vertical Equity

The concentration curve is similar to the Lorenz curve but the difference is that, the concentration curve is use to find the degree of inequality in tax, oop, and insurance premium. But the Lorenz curve only analyzes the inequity of income. So for this reason, the concentration index is used to find the degree of income-related inequality with respect to distribution of the health variable.

The concentration curve has to be constructed first, and then the concentration index can be calculated.

First, in order to obtain the concentration curves, two variables; the health variable and the other variable regarding living standards; should be defined. For this study, out-of-pocket payment is defined as the first variable and household income as the second. Secondly, rank the population according to income quintile (q), calculate the total out-of-pocket payment. Then calculate the cumulative % of OOP for each person from lowest to highest income, L(p). And finally the point L(p) would make the concentration curve according to the income quintile.

The figure below shows the degree of inequality from the concentration curve in comparison to the line of equality. If the concentration curve is below the line of equality, it shows that the rich people contribute more of their payments than the poor (progressive system), and the concentration index will show a positive number. And if the concentration curve is above the line of equality, the poor people would receive more financial burden than the rich people, and the concentration index would be a negative number.

Figure 6. Inequality in healthcare payments
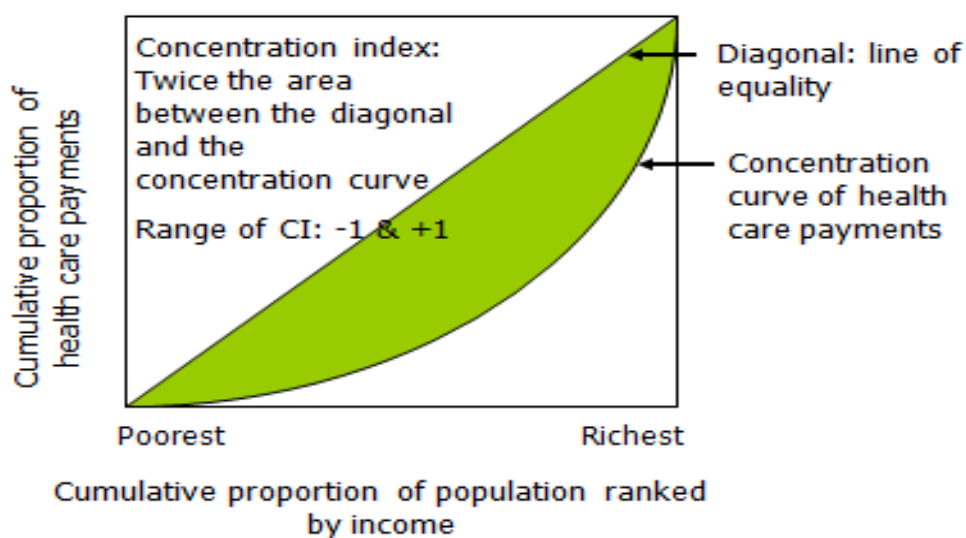
Source: Wagstaff & Van Doorslaer, 2000

$$C = (p_1L_2-p_2L_1) + (p_2L_3-p_3L_2)+\ldots+(p_{T-1}L_T-p_TL_{T-1})$$

The formula above can be used to calculate the concentration index where p is the ranked percentile or quintile of income. And L is the cumulative % of OOP for each person from lowest to highest income,

The concentration index ranges from -1 to +1, the negative number indicates a regressive healthcare payment system meaning that the poor people pays more than the rich people. While positive number indicates that the rich received the financial burden more than the poor population. And if the number almost rich the value +1, it means that the system is highly progressive, meaning that almost all financial burden are transferred to the rich population (Wagstaff & Van Doorslaer, 2000).

Using Stata 12, the concentration index can be found by using the convenient covariance formula. The calculation of concentration index is done by finding the covariance between the health variable and the fractional rank in the distribution of

living standard such as income (Jenkins 1988; Kakwani 1980; Lerman and Yitzhaki 1989).

$$C = 2/\mu cov(h,r)$$

The concentration index relies only on the relationship of the health variable and the living standard ranking and not only in the rank of living standards. Adjustments in degree of income inequality need not affect the concentration index of income-related health inequality (O'Donnell & Wagstaff, 2008).

Calculating the Kakwani Index for Vertical Equity

The Kakwani Index is the summary indicator of inequity. It also combined the information based on the inequality of income and inequality of healthcare payments. The Kakwani Index can be calculate and observed with the revenue sources separately or jointly (Wagstaff & Van Doorslaer, 2000). Kakwani index indicated on the extent to which tax, insurance premium, out-of-pocket expenditure and other source of finance – departs from proportionality (Wagstaff, Van Doorslaer, & Paci, 1989).

From the figure below, the progressive finance occurs if the concentration curve is below the Lorenz curve of income inequality, and the value of Kakwani Index would also be greater than zero or positive number. The regressive finance system occurs when the concentration curve is above the Lorenz curve, and the value of Kakwani Index is a negative number. And the system is proportional when both the Lorenz curve and the concentration curve coincide (Wagstaff & Van Doorslaer, 2000).

Figure 7. Kakwani Index of Vertical Equity
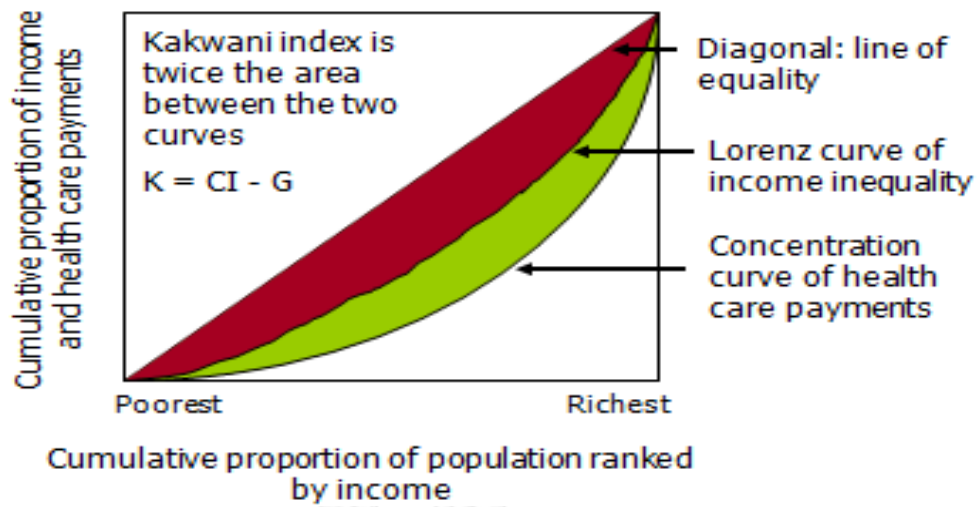
Source: Wagstaff & Van Doorslaer, 2000

The Kakwani Index is two times the area between the Lorenz curve and the Concentration curve. The value of Kakwani Index ranges from -2 to +1, and in order to calculate the Kakwani Index, the difference between the concentration curve of payment and Lorenz curve of income inequality need to be found. If G_{pre} is equal to the Gini Coefficient of pre-payment income, C_{pay} is equal to the concentration index of payment, then the Kakwani's index of progressivity, π_k, is equal to:

$$\pi_k = C_{pay} - G_{pre}$$

If the Kakwani Index results in a negative number, it means that the system is regressive, or the financial burden are more towards the poor than the rich. And if the Kakwani Index is positive number, it indicates that the system is progressive, or the rich received more financial burden than the poor population (Wagstaff & Van Doorslaer, 2000).

Horizontal Equity of Healthcare Utilization

In the reality, very few people have the same amount of income among others. So the concept of Horizontal Equity means that the individual with equal need of healthcare service should receive the same standard of treatment, regardless of their socio-economic status, gender, age, and racial profile. It would be undesirable if the rich people with equal need receive a better treatment than the poor people. So the factor of income-related inequality is considered in the assessment of horizontal inequity in the delivery of health care. So the illness concentration curve and index, expenditure concentration curve and index, and the income as living standard ranking will be used to analyze the horizontal inequity in this study.

Illness Concentration Curve and Index

The illness concentration curve identifies the concentration of disease burden whether it is among the rich or the poor population. This curve indicates whether the poor people are more sick than the rich or vice versa (Wagstaff et al., 1991). The poor people may become sicker due to lack of education, hygiene factors, or poor preventive healthcare policy for the poor. Or the rich people may become sicker due to too much financial burden on the rich population and the healthcare policy favoring the poor.

The graph below, show that the illness concentration curve is above the line of equality and the area between these two curves are more concentrated among the poor quintile. So from the graph, it can be observed that the poor population experience more sickness than the rich population.

Figure 8. Illness Concentration Curve with Disease Burden on the Poor
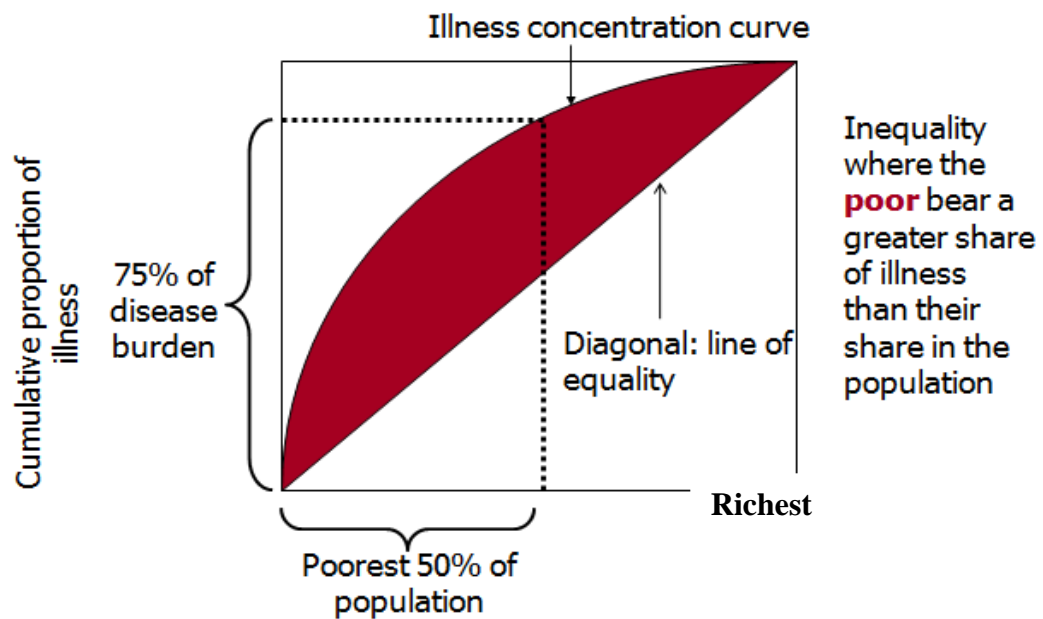
Source: Wagstaff et al., 1991

And if the disease burden is more towards the rich population than the poor population, the illness concentration curve would be like the graph below. The graph below shows that the illness concentration curve is below the line of equality and the area between the two curve of the poor population is lesser than the rich population. It indicates that the rich population experience more illness than the poor population.

Figure 9. Illness Concentration Curve with Disease Burden on the Rich
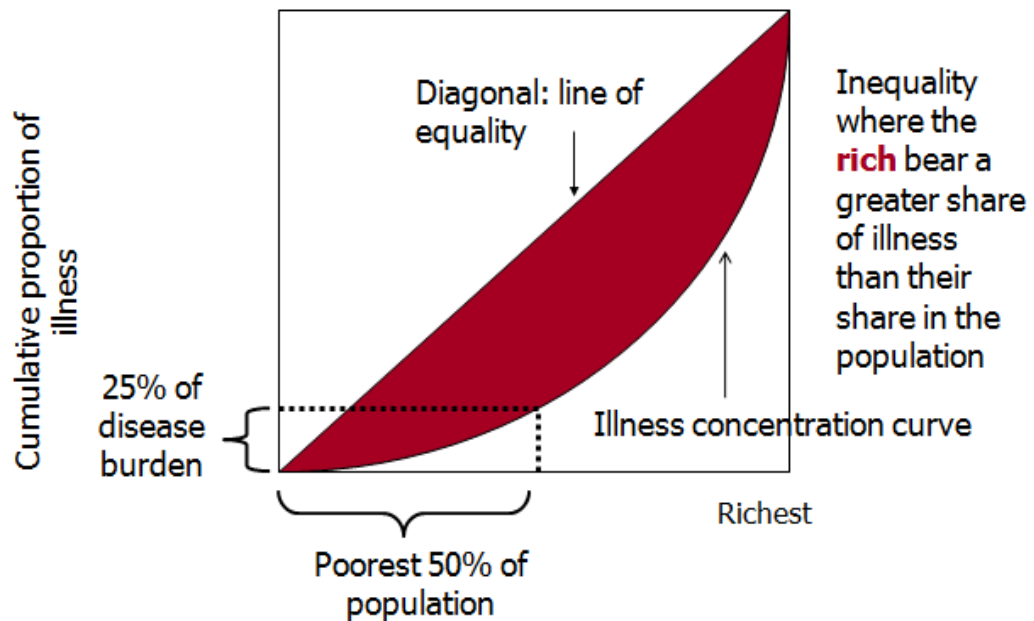
Source: Wagstaff et al., 1991

The illness concentration index is depended upon the illness concentration curve. The illness concentration index ranges from -1 to +1. Negative concentration index indicates that the illness is more concentrated towards the poor, and the illness concentration curve will be above the line of equality. Positive concentration index indicates that the illness is more concentrated towards the rich, and the illness concentration curve will be above the line of equality.

Expenditure Concentration Curve and Index

The expenditure concentration curve indicates whether the amount of financial burden falls on the rich or the poor population. According to the graph below, if the expenditure concentration curve is below the line of equality, the inequity is favorable towards the rich. And if the expenditure concentration curve is above the line of equality, the inequity is favorable towards the poor.

Figure 10. Standardized expenditure concentration curve.
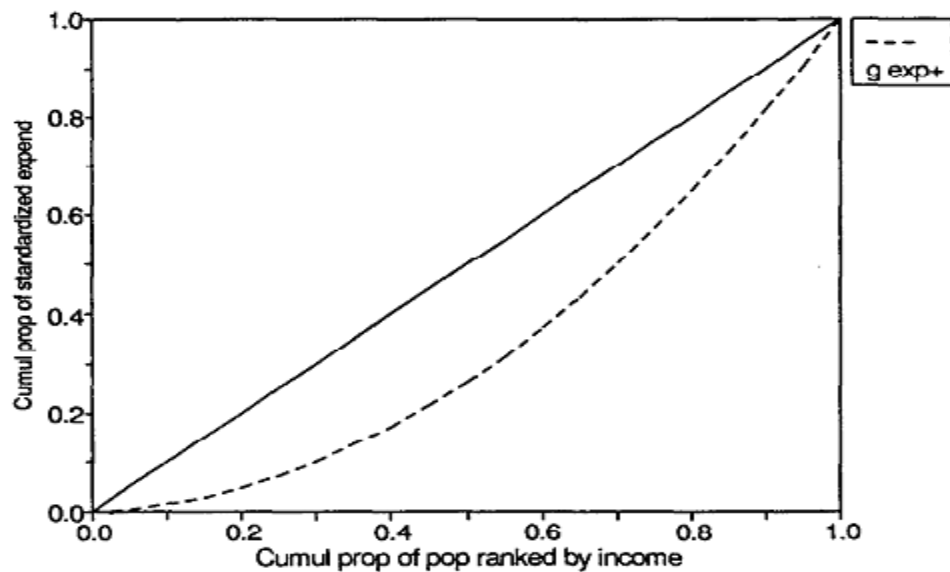
Source: Wagstaff et al., 1991

The expenditure concentration index corresponds with the expenditure concentration curve. The range of expenditure concentration curve is from -1 to +1. The positive expenditure concentration curve indicates that the inequity is favoring the rich, and the expenditure concentration curve will lie below the line of equality. The negative expenditure concentration curve indicates that the inequity is favoring the poor, and the expenditure concentration curve will lie above the line of equality.

Horizontal Equity Index

The index of horizontal inequity (HI) indicates the fairness between the relationship of the illness and the expenditure between the rich and the poor population. So firstly, the households have to be rank according to their income, beginning with the poorest. Then the illness concentration curve is constructed with the ranking of income against the proportions of persons with illness. The illness concentration curve is then compared with the expenditure concentration curve. The expenditure concentration

curve is ranked with the income against the proportions of individual's expenditure. According to the figure below, the lower income group experience more sickness and uses healthcare services more than the higher income group, so both the expenditure and illness concentration curves will lie above the diagonal. So according to the figure below, the expenditure concentration curve lie below the illness concentration curve meaning that the lower income groups receive lesser healthcare when they are sick than those in higher income groups (Wagstaff et al., 1991).

Figure 11. Illness and expenditure concentration curves.
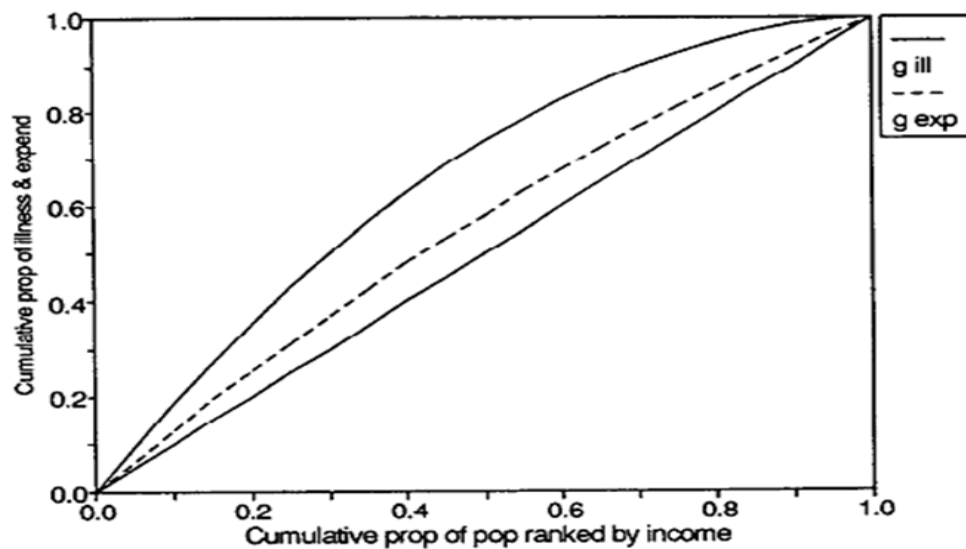
Source: Wagstaff et al., 1991

And if the healthcare expenditures are distributed across income groups in proportion to their share of total illness, the two concentration curve will coincide. And if the high income group receives lesser medical care than the low income group, the expenditure concentration curve will be above the illness concentration curve. The index of Horizontal inequity is twice the area between the illness and expenditure concentration curves. If C_{ill} is the concentration index for illness, and C_{exp} is the concentration index for expenditures, then the formula for Index of horizontal inequity (HI) is equal to:

$$HI = C_{exp} - C_{ill}$$

The range for Index of horizontal inequity (HI) is -2 to +2, the positive value indicates that the service favors the rich (the expenditure concentration curve is below illness concentration curve), while the negative value indicates that the service is

favoring the poor (the expenditure concentration curve is above illness concentration curve) (Wagstaff et al., 1991).

Calculating the Household Catastrophic Health Expenditure

With Thai Health Insurance Scheme, the Thai Household should be protected from the catastrophic expenditure of medical expense. In order to find the catastrophic health expenditure, the subsistence expenditure, poverty line, and capacity to pay need to be determined.

Finding the Household Subsistence Expenditure

The subsistence expenditure is the least amount of expenditure required for sustaining the life, or the basic necessities expenditure. According to the method of (Xu, 2005) the poverty line is used along with the equivalent size of households to calculate the amount of catastrophic health expenditure. More information about the poverty line and equivalent size of household will be discussed below.

Household size must be adjusted into economic scale of household consumption, or in other word it is called equivalence household size (eqsize). The formula for generating equivalent household size is:

$$eqsize_h = hhsize_h^{0.56}$$

The hhsize means the household size. The exponential value of 0.56 towards the household size are calculated from the WHO's previous study of household survey data from 59 countries (Xu, 2005).

In order to find the poverty line, the equivalent food expenditure need to be calculated. The equivalent food expenditure can be calculated by dividing the food expenditure of household by the equivalent household size. The poverty line is calculated by using the weighted average of equivalent food expenditure in the 45th to 55th percentile range of the share of food expenditure, which also gives the subsistence expenditure per (equivalent) capita (Xu, 2005).

The following is the formula for subsistence expenditure (se) where pl is the poverty line and eqsize is the equivalent household size:

$$se = pl * eqsize$$

Household's Capacity to Pay (CTP)

After the subsistence spending is calculated, the capacity to pay can now be determined. When one of the houehold's member is sick, the effective income remaining after spending on basic subsistence needs is the financial ability to pay for health care services. There are two steps to calculate household's capacity to pay according to the study of (Xu, 2005): First, if subsistence expenditure is lower than or equal to household food expenditure, CTP equals to household expenditure subtracted by subsistence expenditure. The second step is if subsistence expenditure is greater than household food expenditure, CTP equals to household expenditure subtracted by food expenditure.

$$CTP = hhexp - se \text{ if } se \leq foodexp$$

$$CTP = hhexp - foodexp \text{ if } se > foodexp$$

Catastrophic Health Expenditure with Respect to Capacity to Pay

Catastrophic health expenditure occurs when a household's total out-of-pocket healthcare payments is more than 40% of their capacity to pay according to the WHO guideline (Xu, 2005). The threshold could be changed according to countries' specific situation, for Thailand context, threshold 30% was used. The dummy variable of catastrophic expenditure with value 1 indicates a household facing with catastrophic health expenditure, and 0 is without catastrophic health expenditure.

$$\text{Catastrophic Health Expenditure} = \text{OOP/CTP} \geq 0.3\%$$

Catastrophic Health Expenditure with Respect to Income

In order to find the Catastrophic health expenditure with respect to income, the amount of total out-of-pocket expenditure is required along with the total income. Catastrophic health expenditure occurs when a household's total out-of-pocket healthcare payments is more than 10% of their income in Thailand (S. Limwattananon et al., 2007). The dummy variable of catastrophic expenditure with value 1 indicates a household facing with catastrophic health expenditure, and 0 is without catastrophic health expenditure.

$$\text{Catastrophic Health Expenditure} = \text{OOP/Total Income} \geq 0.1\%$$

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Results

Descriptive Statistics

After cleaning the data and eliminating extreme values in the variables, a number of 42,590 households with 125,774 individuals from SES are analyzed by statistics program called Stata 12. Descriptive statistics is done to analyze the expenditure and income of the household. Table 15 shows the quintile for source of income and the average total income per month. Quintile 4 and Quintile 5 contribute the most to the total income which their main sources of income are from salary, 49.6% and 52.2% respectively, and the profit from business comprising of 23.5% and 22.7% respectively. While majority of income for Quintile 1 and Quintile 2 came from their main source of income which are income from salary, farming, elderly and handicap pension, and funding received from rich people.

Table 15. *Quintiles for Source of Income*

Quintiles	Salary	Business	Farm	Funding	Eld. pens
Q1	14.45	6.20	21.39	36.32	19.93
Q2	36.66	17.31	19.22	20.85	4.39
Q3	46.21	20.95	16.72	11.07	02.27
Q4	49.69	23.48	15.06	06.35	1.33
Q5	52.24	22.75	13.43	04.01	0.83

Table 16 shows the average expenditure per household, which the percentages of food expenditure are higher in the population of quintiles 1 and 2. The high percentage of food expenditure in quintiles 1 and 2 indicates that poor people pay high percentage of their income towards food and necessities, which are 49.7% and 46.5% respectively, whereas the people in quintiles 4 and 5 contribute most of their payments on non-food consumption expenditure, which are 12% and 14.6% respectively.

Table 16. Quintiles for Household Expenditures

Quintiles	Consumption	Food	Non-consumption	Total
Q1	44.32	**49.67**	6.004	100
Q2	45.59	**46.46**	7.94	100
Q3	46.75	42.80	10.436	100
Q4	50.88	37.05	**12.06**	100
Q5	58.48	26.96	**14.559**	100

Source: Author's calculations

Table 17 indicates the socio-economic status of the population in 5 regions of Thailand. Most of the rich people which are in quintiles 4 and 5 are located in Bangkok and around Bangkok region. And the poor people which are in quintiles 1 and 2 are located in North and Northeast of Thailand.

Table 17. Socio-economic status across 5 regions of Thailand

Quintiles for Income	Region					Total
	1	2	3	4	5	
1	296	1,896	2,245	1,957	1,311	7,705
2	129	1,948	3,077	3,086	1,102	9,342
3	271	2,075	2,207	2,815	1,189	8,557
4	528	3,021	1,527	1,834	1,352	8,262
5	1,261	3,358	1,362	1,569	1,322	8,872
Total	2,485	12,298	10,418	11,261	6,276	42,738

Source: Author's calculations

Table 18 indicates the household spending and income across urban and rural areas, average monthly expenditure per capita is higher in urban (8535.99 baht), than in rural which is 6160.244 baht. The average monthly expenditure per capita across the country is 7617.543 baht. And the average monthly income per capita of urban area which is higher than rural is 11073.75 baht and for the rural area is 7939.468 baht. The average monthly income per capita across the country is 9862.059 baht. The out-of-pocket expenditure on health per household for urban area is 277.1742 baht which is higher than rural area (203.0397 baht). The out-of-pocket expenditure across the country is 248.5143 baht. The capacity to pay per household is also higher in urban area (16836.76 baht) than in rural area (11761.18 baht) due to a higher amount of income. The capacity to pay per household across the country is 14874.58 baht.

Table 18. Distribution of Household expenditure and income across rural and urban area

	Urban	Rural	Total
Avg monthly exp per cap	8535.99	6160.244	7617.543
Avg monthly income per cap	11073.75	7939.468	9862.059
Out-of-pocket expenditure	277.1742	203.0397	248.5143
Capacity to pay per HH	16836.76	11761.18	14874.58

Source: Author's calculations

Table 19 indicates the household spending and income across regions, the average monthly expenditure per capita is higher in Bangkok and Central region is higher than in North, Northeast, and Southern area. The average monthly income per capita is also higher in Bangkok and Central region, and is lower in North and Northeast region. The out-of-pocket expenditure is highest in Bangkok region which is 640.6533 baht and lowest in the Northeast region which is 166.3509 baht. The capacity to pay per household is also highest in Bangkok region (32704.26 baht) and lowest in north and northeast region which are 11039.89 baht and 11071.07 baht respectively.

Table 19. Distribution of Household expenditure and income across regions

	Bangkok	Central	North	Northeast	South	All
Avg monthly exp per cap	13150.53	8862.271	6261.623	6052.564	8056.883	7617.543
Avg monthly income per cap	17670.75	11141.66	8319.03	7711.829	10695.99	9862.059
Out-of-pocket expenditure	640.6533	272.2201	205.8562	166.3509	265.5367	248.5143
Capacity to pay per HH	32704.26	17026.97	11039.89	11071.07	16817.17	14874.58

Source: Author's calculations

Since income in urban area are much higher than in rural area, the capacity to pay will also be higher in urban area than in rural area. The out-of-pocket expenditure is highest in the Bangkok region because of the advancement in technology and the people in Bangkok region has high capacity to pay for the out-of-pocket expenditure.

Table 20 shows the percentage of the population with healthcare insurance across quintiles using individual dataset. Universal Coverage Scheme covers population across all quintiles but the majority of people are from quintiles 1 and quintiles 2, which are 37.13% and 22.59% respectively. The richer quintiles also uses

Universal Coverage Scheme and compose of approximately 10%. The Government Welfare or CSMBS Scheme and the Welfare from Employer covers only population in quintile 5 which are 16.16% and 0.85% respectively. The social security insurance covers from quintile 3 to quintile 5 which are 2.21%, 14.42%, and 8.14% respectively. These results show that people from quintile 1 and 2, have adequate access to medical care from the UC card. And for private health insurance, only 5.57% from quintile 5 are using the benefit of this insurance scheme.

According to the quintiles, many poor and rich people use the service from public hospital which accepts the policy of Universal Coverage Scheme; this would result in the crowdedness and long waiting queue in public hospital. And very few people use the private health insurance scheme. This may be due to the lack of knowledge about alternative insurance scheme or insufficient income for buying the private health insurance.

Table 20. Type of Health Insurance System in Thailand across quintiles

	CSMBS	UC	SSO	Priv. HI	Emp. Welf
Quintile 1	-	37.13	-	-	-
Quintile 2	-	22.59	-	-	-
Quintile 3	-	17.83	2.21	-	-
Quintile 4	-	11.85	14.42	-	-
Quintile 5	16.16	10.59	8.14	5.57	0.85

Progressivity of Healthcare Financing

Lorenz Curve and Gini Coefficient of Income Inequality

The gini coefficient according to the National Statistic Office of Thailand for year 2013 is 0.367 (NSO, 2013). The NSO has cut some of the outliers to make the gini coefficient value more realistic for its population. As for the calculation of gini coefficient for this study, some of the outliers are also drop out to make the value more realistic. The value of the average monthly income from the SES dataset has the closest value to the calculated average monthly income that the NSO did which were 25,194, so the variable Average Monthly Income from the SES dataset was used to find the Gini Coefficient of the sample population income.

Table 21. Summary of Total Household Income Variable

Variable	Observations	Mean	Std. Dev.	Min	Max
AMI	42590	25115.45	31721.04	567	966300

For computing the Gini index of income inequality, the following covariance formula was used to calculate by Stata 12:

Gini = 2/μcov(inc,r)

The 'inc' in the formula above represents the total household income, and the 'r' represents the ranking of living standards by quintile base on household income. The gini coefficient that was calculated by this formula is equal to:

Gini index = 0.465

The gini index is 0.1 point higher than the value that was calculated by the NSO, this is because the value below 560 was drop in this study. The researcher chose the value 560 because this is the minimum amount of the elderly pension. And the maximum value was reduce to below 1 million baht of income per month.

The table below shows the total income for each quintile starting from poorest to richest quintile. After the percentile of income is calculated, the cumulative percentage of income is then calculated with the addition of previous quintile towards the richer quintile. The value is then used to plot the graph in Microsoft Excel.

Table 22. Quintile Ranking for Concentration Curve of Income

Rank	Income	%-tile	%inc	cum %inc
0	0	0	0	0
1	148088.01965	0.2	0.000261	0.000261
2	19529133.37200	0.4	0.034384	0.034645
3	63120231.30800	0.6	0.111133	0.145778
4	119068804.44000	0.8	0.20964	0.355419
5	366101394.32000	1	0.644581	1
totals	567967651.45965			

The figure below is plot by the quintile ranking for concentration curve of income table with the line of equality which is the diagonal line. The quintile was used to plot the x-axis and the cumulative percentage of income was used to plot the y-axis. The graph shows that the Lorenz curve is further away from the line of equality which indicates that there are some degrees of equality in the income of population.

Figure 12.The Lorenz Curve of Income Inequality
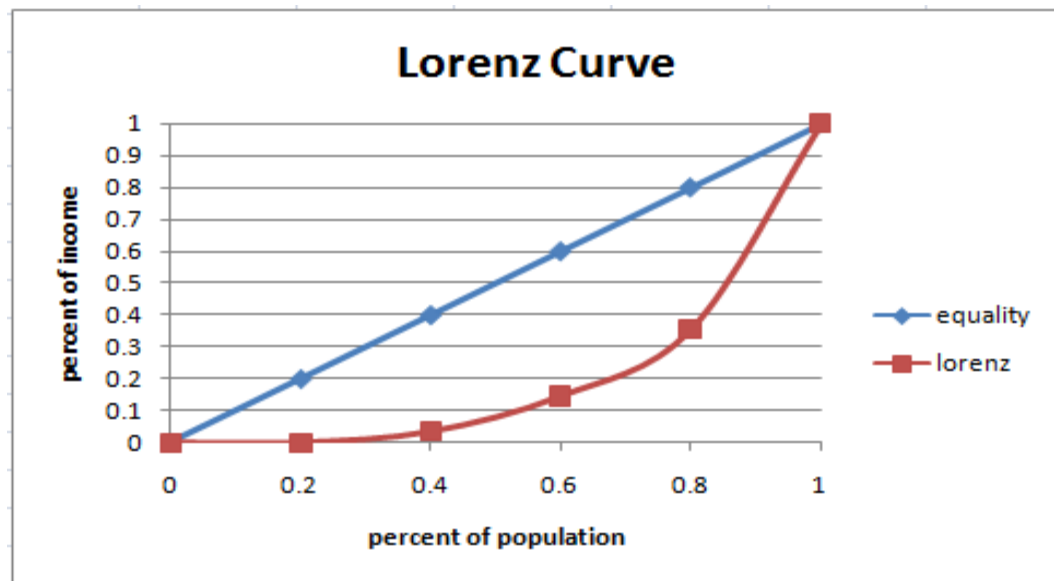
Concentration Curves and Index for Out-of-Pocket Health Payments

The concentration curve for OOP payment can be constructed by calculating the cumulative proportion of OOP payment against the ranking of household income. This can be done by first ranking the income quintile, and then OOP payment according to those quintiles. Then the cumulative percentage can be found by the incremental addition of OOP payment along the quintiles starting from the poorest (quintile 1) to richest quintiles (quintile 5) and then divided by the total OOP payment along each quintile. The incremental result, L(p) will be used to plot the concentration curve for out-of-pocket payment. With huge dataset, the concentration curve could be plot by the program called Stata 12 using the weighted value to make the result accurate. The concentration curves are shown below for the out-of-pocket payment along with the Lorenz curve of income inequality.

Figure 13. Concentration curve of OOP along with Lorenz Curve
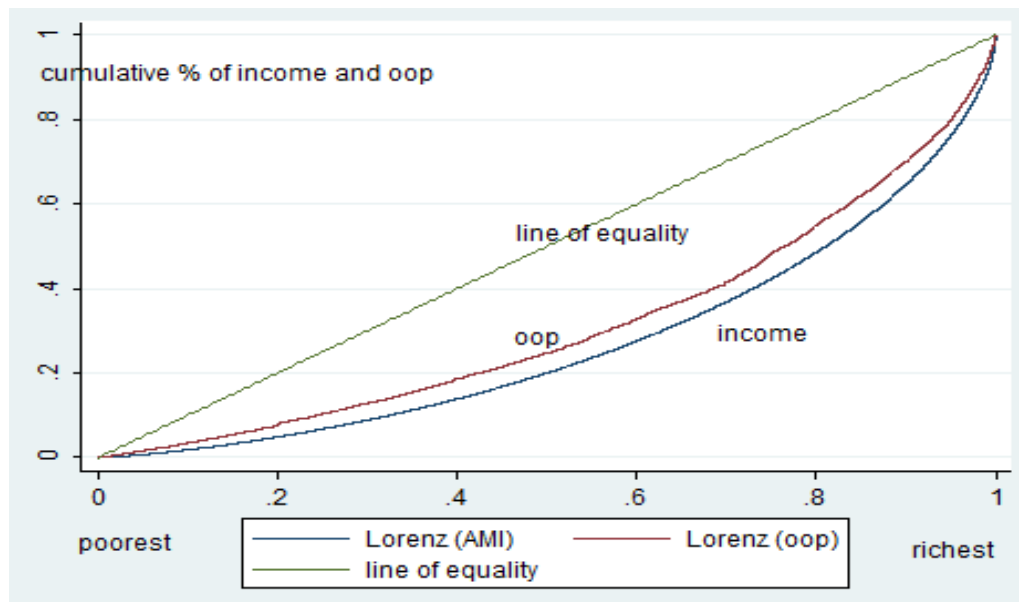
The graph above shows a regressive pattern for the healthcare financing system among household in Thailand. The cumulative proportion of oop payment is higher than income. There is vertical inequality from out-of-pocket payment or in other words, the poor experience more financial burden of healthcare payments than the rich population. The concentration curve is calculated by the formula:

$$C = (p_1L_2 - p_2L_1) + (p_2L_3 - p_3L_2) + \ldots + (p_{T-1}L_T - p_TL_{T-1})$$

But in this study, the concentration index of oop payments is calculated by the convenient covariance formula:

$$C = 2/\mu \, cov(h, r)$$

Where h is the health variable, or in this case the source of finance (oop), and r is the ranking of living standards by income. The concentration index for oop is:

$$\text{Concentration index of oop} = 0.379$$

Even though the concentration index of oop is positive, but it is quite far from +1, the concentration index value of 0.379 indicates that small burden is carried by the rich population.

Vertical Equity of Payment

The vertical equity of payment is assessed by the Kakwani Index. The Kakwani Index will tell the degree of progressivity or the regressive that the Health Financing System of Thailand faced. The range of Kakwani Index is from -2 to +1. The negative sign indicates a regressive system, and the positive sign indicates a progressive system (rich carries more burden of health payment than the poor). From the Kakwani Index formula where C_{pay} is equal to OOP and G_{pre} is the gini coefficeint:

$$\pi_k = C_{pay} - G_{pre}$$

The Kakwani Index is equal to: 0.379 - 0.465 = -0.086. It shows that the healthcare financing system in Thailand is regressive, or the poor receive more financial burden than the rich population.

Health Care Utilization

The Health Care Utilization data from Health and Welfare Survey shows that for last 30 days, 18.10% of individuals have reported to be ill. Table 7 show people living in rural area have slightly more sickness than people living in urban area. Majority of people get treatment for their illness (73.95%).

Both rural and urban area people seek care from public hospitals more than private hospitals. For rural area the percentage of people seeking care in public hospitals

are 14.21% and for private hospital its 3.04%. And for urban are the percentage of people seeking care in public hospitals are 11.71%, and for private hospital 3.43%.

Table 23. Healthcare Utilization

Indicators	Urban	Rural	All
Percentage of illness	15.72	21.04	18.10
Percentage of no illness	84.27	78.96	81.89
Percentage of ill patients who gets treated	75.28	72.73	73.95
Percentage of ill patients who gets untreated	25.01	27.27	26.04
Public healthcare providers	11.70	14.20	12.82
Private healthcare providers	3.43	3.04	3.25

Source: Author's calculations

Horizontal Equity Curve of Healthcare Utilization for Inpatient

The Health and Welfare Survey datasets contain the data for number of inpatient visits and the out-of-pocket expenditure for inpatient visits. The concentration curve for both the illness and expenditure is found by the software Stata 12 with the adult income as a ranking of living standard.

Figure 14. Concentration Curve of Illness and Expenditure for Inpatient
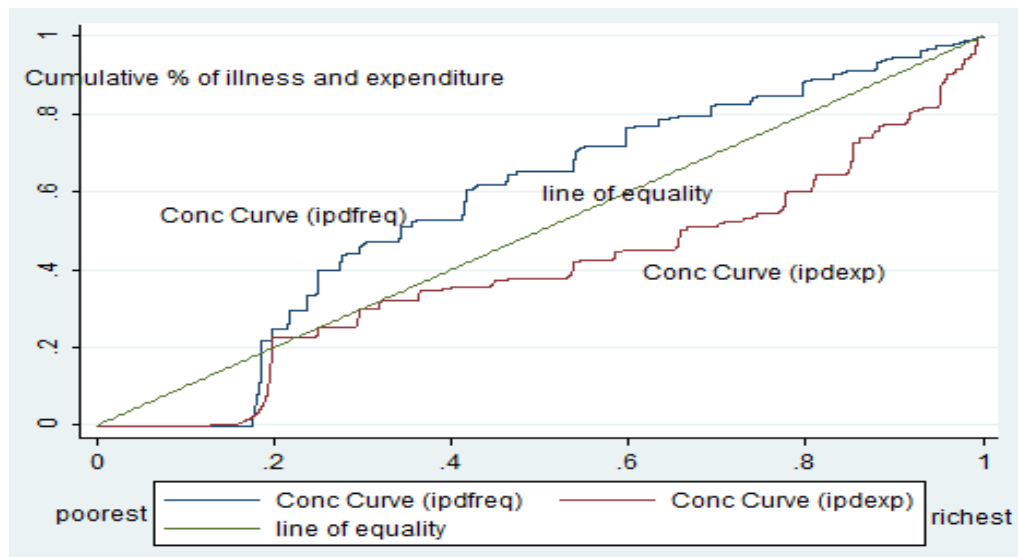
The graph above shows that the concentration curve of illness (ipdfreq) is above the line of equality, this indicates that the poor are in need of more healthcare service than the rich population. The expenditure concentration curve (ipdexp) is below the line of equality, this indicates that the inequity is favoring the rich. The expenditure curve lying below the illness curve indicates that the lower income population receives lesser healthcare service than the rich income population. So the graph shows that healthcare service favors the rich.

For the calculation of index of horizontal inequity, the illness and expenditure concentration index need to be determined. The covariance formula is used to find these two concentration indices:

$$C = 2/\mu cov(h,r)$$

Illness Concentration Index: -0.371

Expenditure Concentration Index: 0.283

The index of horizontal inequity (HI) ranges from -2 to +2. Positive result indicates that the service favors the rich, and negative result indicates that the service favors the poor. The index of horizontal equity, HI = 0.283 − (-0.371) = 0.654. The inpatient healthcare service is favorable towards the rich population.

Horizontal Equity Curve of Healthcare Utilization for Outpatient

The HWS also have the data for outpatient expenditure and the frequency of illness. The concentration curve of illness and expenditure will be constructed by Stata 12 using the adult income as a ranking of living standards.

Figure 15. Concentration Curve of Illness and Expenditure for Outpatient
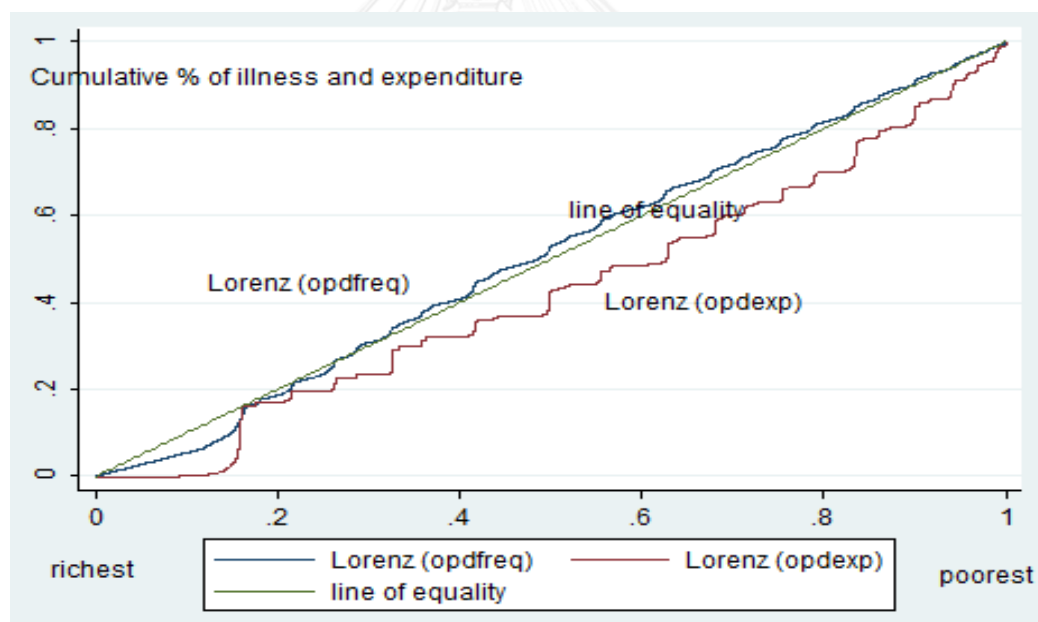
The figure above shows that the (opdfreq) curve or the illness concentration curve is slightly above the line of equality, it indicates that slightly more poor people are sicker than rich people. The expenditure concentration curve (opdexp) lying below the diagonal line indicates that the service is more slightly incline to favor the rich. The

expenditure curve lying below the illness curve indicates that the lower income groups receive lesser medical service when ill than the richer income groups.

For the calculation of index of horizontal inequity, the illness and expenditure concentration index need to be determined. The covariance formula is used to find these two concentration indices:

$$C = 2/\mu \text{cov}(h,r)$$

Illness Concentration Index: -0.059

Expenditure Concentration Index: 0.0454

The index of horizontal inequity (HI) ranges from -2 to +2. Positive result indicates that the service favors the rich, and negative result indicates that the service favors the poor. The index of horizontal equity, HI = 0.0454 − (-0.059) = 0.104. The outpatient healthcare service is slightly favorable towards the rich population. This means that the insurance policies for poor people are still somewhat effective for outpatient services.

Incidence of Catastrophic Health Payments

Table 24. Incidence of Catastrophic Health Expenditure across Quintiles

CHE	Income Quintiles					
	1	2	3	4	5	Total
30% cut off (ctp)	0.90	0.94	0.81	0.83	0.76	0.84
10% income cut off	5.87	3.60	2.75	2.61	2.47	3.34

The table above indicates that, for catastrophic health expenditure of 30% for out-of-pocket spending as share of capacity to pay, the poorest people that face this problem are 0.90% of population. And for the richest quintile, only 0.76% face this problem. For catastrophic health expenditure of 10% for out-of-pocket spending as share of total income, 5.87% of poorest population faces this problem. The richest quintile only 2.47% faces catastrophic health expenditure. It indicates that the richer people face lesser catastrophic health expenditure.

Urban area people face more problems with catastrophic health expenditure than rural people. This may be because the expense of medical treatment in urban area is higher than in rural area.

Table 25. Catastrophic Health Expenditure across Urban and Rural Area

Catastrophic Spending	Area		
	Urban	Rural	All
30% cut off (ctp)	0.90	0.76	0.84
10% income cut off	3.64	2.88	3.34

Source: Author's calculations

Different types of health insurance can help decrease the financial load of the population towards healthcare spending. The research found that catastrophic health expenditure varied across different schemes. Only 3.35% of the members with UC scheme faced the 30% Catastrophic Expenditure for out-of-pocket spending as share of capacity to pay. For the 10% threshold of the Catastrophic Expenditure for out-of-pocket spending as share of total income, only 1.77% of UC members faced this problem. And for the uninsured population, 5.58% are faced with the 30% catastrophic

expenditure as respect to the capacity to pay. And 2.71% of the uninsured populations are faced with the Catastrophic Expenditure with respect to total income at the threshold of 10%.

Table 26. Individual Data of Catastrophic Health Expenditure by Insurance Protection Scheme

CHE/ insurance	CSMBS	UC	SSO	Priv. Ins	Emp Wel	Uninsured
30% cut off	2.77	**3.35**	3.07	2.21	1.08	**5.58**
10% income cut of	1.85	1.77	2.43	2.15	0.55	2.71

Source: Author's calculations

Incidence of Catastrophic Health Payments with Increasing Threshold

The table below presents measures of the incidence of catastrophic payments for healthcare in Thailand estimated from the 2556 Household Survey. Catastrophic payments are defined for health payments as a share of both household total income and capacity to pay, using various threshold budget shares. As the threshold is raised from 5 percent to 25 percent of total income, the estimate of the incidence of catastrophic payments (Head Count) falls from 8.58% to 0.59%.

Table 27. Incidence Pattern of Catastrophic Health Payments with Increasing Threshold

oop/income	5%	10%	15%	25%
Head Count	8.58%	3.12%	1.53%	0.59%
oop/ctp	**15%**	**25%**	**30%**	**40%**
Head Count	3.69%	1.28%	0.84%	0.34%

Source: Author's calculations

For a given threshold of table below, both the head count and the overshoot are higher, as they must be, when catastrophic payments are defined with respect to health payment relative to capacity to pay. This is also illustrated graphically in the figure below, which shows the health budget share curves for both definitions. For any budget share, the OOP/[Capacity to Pay] curve is always to the right of the OOP/[Total income] curve. For instance, for more than 15 percent of households, health spending was at least a quarter of capacity to pay, but health spending was a quarter of total income for only 3 percent of households.

Figure 16. Relationship of CHE with Respect to CTP and Total Income
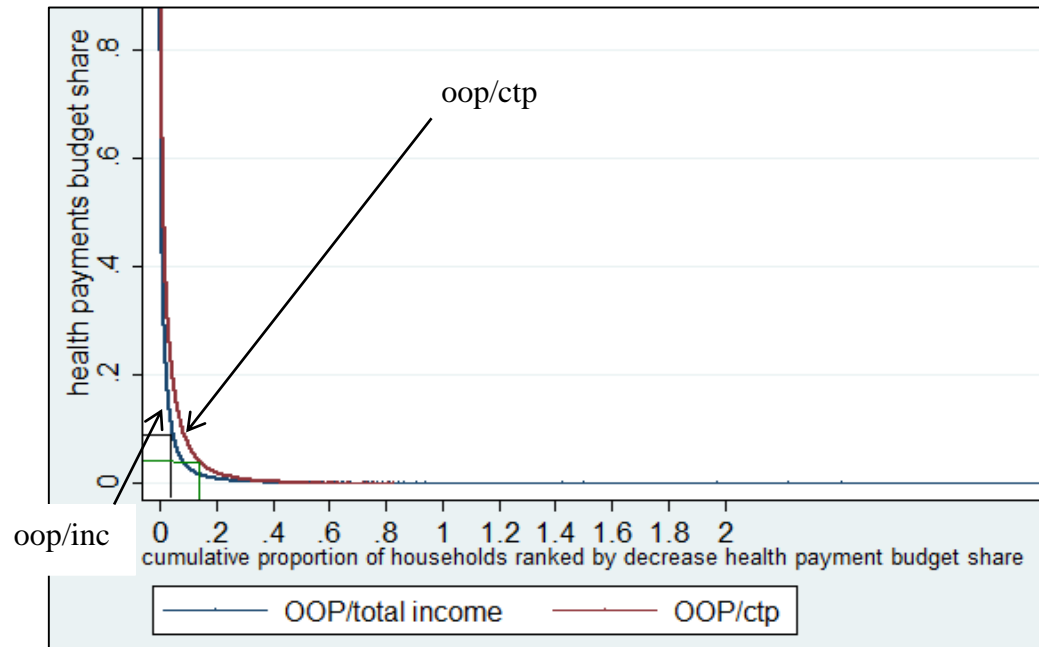
4.2 Discussion

From the study of Prakongsai et al. in the year 2009, the health insurance scheme provided a more equitable healthcare system for the population of Thailand. But from this study it can be observed that in the long run, the equity of Thailand Health System declined. The healthcare seeking behavior increases from year 1996 – 2003 (Pachanee & Wibulpolprasert, 2006), this might be the results of healthcare policies that open the opportunities for those who cannot afford healthcare treatment to be able to use them.

According to this study, the urban area has more expenditure than the rural area, and at the same time the urban area also have more income than the rural area due to more job opportunities. The gini coefficient calculated from this study is 0.465, which is higher than the gini coefficient calculated by the NSO which is 0.367 (NSO, 2013).

The value 0.465 that was calculated in this study indicates that the income distribution among the rich and the poor population have some degree of inequality, almost half of the population have an uneven distribution of income.

The concentration index for out-of-pocket expenditure in this study which equals to 0.379 indicates that the financial burden for healthcare payment are on the rich population. Comparing with the study of Tangcharoensathien et al., 2010, the concentration index for out-of-pocket payments keep declining, which means that the rich population are contributing towards the healthcare payment in a declining rate. The Kakwani Index of Vertical Inequity also results in a negative number which is equals to -0.086, but the value is very small, so there is a slight degree of regressive in Thai Healthcare Financing System. If policymaker consider to minimize the benefits of insurance policy due to the shortage of resources which would cause the poor people to pay more resulting in a regressive financing system. But comparing with other countries such Nepal, Indonesia, and Bangladesh, Thailand still have a much more progressive healthcare system (Bhatia et al., 2009).

The Index of Horizontal Inequity in this study indicates that the healthcare service favors the rich. The Index of Horizontal Inequity for Inpatient is equal to 0.654, which is a high positive number which indicates that the healthcare service in inpatient care is favorable towards the rich population. This might be because the expenditure of inpatient service in hospital is much larger than the outpatient service, and the healthcare services reach the urban area population where there are more hospitals than the rural area due to economies of scale. Since the HWS survey of 2013 combined all

the hospitals, so the distinction between the private or public hospital could not be determined the favorability towards the rich or the poor.

The Index of Horizontal Inequity for outpatient has a slightly mild degree of favorability towards the rich population (0.104). Since the outpatient service does not take much expenditure like the inpatient service, so the insurance policy can aid the poor, allowing them more access towards healthcare utilization. However, the outpatient service still favors the rich.

The catastrophic health expenditure is calculated by two ways: The first way is calculated by using the out-of-pocket expenditure divided by capacity to pay (Xu, 2005). The threshold that Thailand uses is 30% (S. Limwattananon et al., 2007). The amount of households with Catastrophic Health Expenditure are reduced with the increments of quintiles, it shows that poor people faces catastrophic health expenditure more than the rich people. And the second way is calculated the Catastrophic Health Expenditure with respect to the share of household resources, which is the income in this case. The calculation is done by using the out-of-pocket expenditure divided by the total income, the threshold that Thailand uses is 10% (S. Limwattananon et al., 2007). The 10% income cut off shows the same pattern of incidence reduction as the previous calculation. There is a decreasing incidence of population experiencing catastrophic health expenditure as the quintile increases. And the poorest quintile of 5.87 which is a significant amount experience catastrophic health expenditure. It shows that the Thailand Health Policy along with the Insurance Policy need to be adjusted in order to prevent poor households from experiencing Catastrophic Health Expenditure.

But surprisingly urban people faces more catastrophic health expenditure with the respect of both capacity-to-pay and total income. This is because of poor people residing in urban area must use the service of hospitals near their home, and the hospital located in the urban area are more advance and expensive than the hospital located in rural area.

The Health Insurance Coverage does protect the household from Catastrophic Health Expenditure. From the results calculated in previous section, the uninsured population, have higher incidence of catastrophic health expenditure than the insured population. It shows that the Health Insurance Policy is protecting its population from the catastrophic health expenditure. But there are still some incidences of catastrophic health expenditure in the low income population.

The incidence rate of catastrophic health expenditure with respect to total income according to the incremental of threshold 5-25%, shows a reducing trend of head count along the increments of threshold. The rate of CHE or catastrophic health expenditure is similar to the finding of Vietnam (Wagstaff & Doorslaer, 2003), where the first threshold 5%, the incidence is very high (33%). The households of Thailand and Vietnam face catastrophic health expenditure at low thresholds. It means that the basic healthcare service which comes along with a significant amount of healthcare expenditure has to be attained by almost every household, and the poor households are most likely to face catastrophic health expenditure.

4.3 Limitation of Study

A similar study was done by Prakongsai et al., 2009, using the Socio-Economic Survey and the Health and Welfare Survey to monitor equity of access and financial

risk protection. Thus the limitation is that the insurance premium could not be found from the Socio-Economic Survey and Health and Welfare Survey.

The National Statistics Office separates the Households survey into SES and HWS, so the healthcare utilization could not be merged with the Socio-Economic Survey.

The HWS survey is done every two years, and the income data collection is done in odd numbers of year. And the private and public hospital data on healthcare utilization are combined so the analysis between public and private healthcare service cannot be done.

The living standard classification cannot be done with Health and Welfare Survey data but can be done with Socio-Economic Survey data. However, these two data cannot be merged.

It cannot be concluded that the insurance scheme is ineffective due to the result that healthcare service favors the population with better socio-economic status, because without the insurance scheme, the situation might be even worse.

CHAPTER 5

CONCLUSIONS

5.1 Conclusions

The study on health inequity among households under Thai health system in Thailand year 2013 was carried out to find the inequity in healthcare payments in population with different socio-economic status, inequity in healthcare service delivery among the population, and the catastrophic health expenditure from healthcare services. The study was also done to indicate the health insurance protection towards the households from catastrophic health expenditure. The results and findings are discussed in previous chapters which will be concluded in this specific chapter. This chapter will summarize the empirical findings and answer the research questions of this study.

The main sources of income for poor people are from farming, funding, and pension. And the main sources of income for rich people are from business and salaries. The gini coefficient indicates that income inequality among the Thai Households, or in other words, it distinguishes the degree of variations for income among its population. The gini coefficient of income inequality calculated from this study is equal to 0.465 which means that almost half of the population experience uneven income distribution. The study from the NSO year 2013 observed that their calculated value of gini coefficient decreases from year 2011 to 2013 from 0.376 to 0.367 respectively (NSO,2013). It indicates that there are improvements in equity of income distribution among the population. The calculated value from NSO which is equal to 0.367 of year 2013 is different from the value calculated by this research. The value calculated by

this research which is 0.465 indicates more inequities in income than the NSO calculated value (NSO, 2013).

From the literature review found that the country with UC consists of high income country like Hong Kong and Taiwan have a more equitable health care system than middle income country like Thailand (Bhatia et al., 2009). Thailand and Sri Lanka both have an effective healthcare system that makes healthcare for the poor affordable (Bhatia et al., 2009). Thailand and Mongolia are the only two countries within the social health insurance financing countries which comprise of: Mongolia, China, Thailand, Krygyz, Phillipines and Indonesia, that have achieved universal coverage, this enables the poor people to have more access towards healthcare utilization but the system is far from progressivity (healthcare financing system that fully favors the poor). But for non-UC country like Nepal, Bangladesh and India are still far from achieving the equity in healthcare service (Rannan-Eliya, Somanathan, Adhikari, & Van Doorslaer, 2011).

According to Tangcharoensathien et al., 2010, the concentration index for year 2006 is equal to 0.471 which indicates a progressive payment in healthcare system. But the concentration index calculated in this study of year 2013, has declined to 0.379, it indicates that richer are contributing lesser payments towards healthcare payment but the financial source is still progressive.

This study of Thai Household indicates that for vertical equity in healthcare payment, the financial system is regressive meaning that the poor suffers more burdens from healthcare payment than the rich population. This results indicates lesser equity among the households in Thailand and the sick people will not receive medical treatment because they cannot afford it, it will result in more financial burden for them

when their sickness progress into serious conditions. Health is the backbone of the country's economy, with lesser healthcare service available for the poor population, there would be economic crisis and the health profile of the country will decline. It also indicates that the health insurance coverage is not fully beneficial towards the poor population this might be due to the extra expenditure that are excluded from the coverage for specific treatment (Tangcharoensathien et al., 2010).

For healthcare utilization of Thai Households, the healthcare seeking behavior increases after the implementation of the universal coverage (Pachanee & Wibulpolprasert, 2006). It indicates that more people are using healthcare service because the health insurance policy makes the healthcare service affordable for the population. The index of horizontal inequity ranges from -2 to +2, if the result is positive it means the service favors the rich. And if the result favors the poor the value would be negative. However, the access of healthcare services is still favorable towards the rich population. For inpatient service, the index for horizontal inequity is equal to 0.654 which indicates that the service is favorable towards the rich population. For outpatient service, the index of horizontal inequity is equal to 0.104, which indicates that the service is still slightly favorable towards the rich population. The universal coverage and other public insurance covers a lot of medical expenses for outpatient service because the outpatient service requires less medical expense than inpatient service. The horizontal equity measurement indicates a major adjustment in healthcare insurance policy in order to make the healthcare service favors the poor population. The horizontal inequity on private and public hospital is not done because the dataset combined the data of these two sectors.

The study of Kwon, 2009 indicates a reduction in catastrophic health payment of Taiwan in the year of UC policy implementation (1995), while the South Korea experiences no reduction in catastrophic health payment according to the UC policy implementation year (1989). This is because the structure of economy in both country and because of the insurer effects.

In case of Thailand with UC policy implemented in 2001, according to the results of this research, the health insurance scheme of Thailand does help protect its population from catastrophic health expenditure. The uninsured population experiences a higher incidence of catastrophic health expenditure than the insured people among Thai household. The urban area population faces more CHE than the rural area population due to the proximity of expensive healthcare treatment. The study also indicates that the poor population faces more catastrophic health expenditure (0.84) as compared to the study of S. Limwattananon et al., 2007. The policymakers should consider their strategic policy in order to reduce catastrophic health expenditure among Thai households in urban area that have low income.

For the incidence of catastrophic health payments, the study from Prakongsai et al. in year 2009 indicates the reduction of catastrophic health payments after the introduction of UC. This study indicates that the incidence of catastrophic health payments year 2013 regardless of the UC policy for quintile 1 which is the poorest population as compared with the study of Tangcharoensathien et al., in year 2010 there is a reduction in incidence of catastrophic health expenditure, 0.9% to 0.76% respectively. And for quintile 5 there is also a reduction in the incidence of CHE from

3.3% to 2.47%. It indicates that there is improvement of UC in protecting the household from CHE.

In conclusion, it may seem that the Thai public health insurance is reducing the inequity among households, but the financial burden is still concentrated among the poor population and healthcare service still favors the rich population. The financial problem that the poor population faces will lead them to the reduction of access towards healthcare utilization and cause more illness problems among the poor population. The Thai insurance health system does protect its population household from catastrophic health expenditure, but there are still some incidences of catastrophic health expenditure among Thai households. Further adjustments of policy towards health insurance are required in order to make healthcare service more equitable for its population.

5.2 Policy Implications

The findings from this study can be evidence in order to adjust the policies in order to reduce catastrophic health expenditure. From the results of this study, the healthcare system still favors the rich even after the implementation of universal coverage policy, but the impact of UC cannot be concluded due to the limitations of this study. However, the Thai Health Insurance Scheme does help reduce the incidence of Catastrophic Health Expenditure. This should be suggested that the government should review not only the accessibility but also the quality of services is important due to the effect of services.

The policy should be adjusted so that the vertical equity of healthcare financing and horizontal equity of healthcare utilization should also be beneficial towards the

poor. The government should increase risk pooling and more contribution of financial support from the middle and high income class to reduce catastrophic health expenditure and impoverishment among the low income group. So the government should develop a policy in order to reduce the high out-of-pocket payment and to provide healthcare coverage with adequate treatment towards the poor population.

From this study, urban area dwellers also face catastrophic health expenditure due to high health care costs in urban area. This suggests that policy makers should increase awareness towards health insurance scheme and monitor the high out-of-pocket expenditures that the populations are facing. The policymaker must also consider how people living in rural area can use healthcare facility, one of the solution might be to use referral system.

The Universal Coverage Scheme is an insurance scheme that is equitable and covers most of its poor population (Tangcharoensathien et al., 2010). However, the scheme needed more contribution of financial source from the rich population in order to provide adequate financial resource for healthcare service and increase benefit package for the poor population. Education on health and personal hygiene should be available for the poor so that they would become less ill and reduce healthcare expenditure among the poor.

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APPENDIX

INDEPENDENT VARIABLES

1. Sex

Sex	Description	Freq.	Percent	Cum.
0	Females	66,408	52.60	52.60
1	Males	59,853	47.40	100.00
Total		126,261	100.00	

The table above describes the dummy variable of sex. It showed that the total number of individuals used in the survey is 126,261. This comprises of 52.60% females and 47.40% males. The proportion of female is higher than that of males.

2. Age Group

Age group	Description(Years)	Freq.	Percent	Cum.
1	0-4	6,863	5.44	5.44
2	5-9	7,953	6.30	11.73
3	10-14	8,912	7.06	18.79
4	15-19	8,241	6.53	25.32
5	20-24	6,376	5.05	30.37
6	25-29	7,074	5.60	35.97
7	30-34	8,169	6.47	42.44
8	35-39	9,206	7.29	49.73
9	40-44	10,271	8.13	57.87
10	45-49	**10,961**	8.68	66.55
11	50-54	10,357	8.20	74.75
12	55-59	9,468	7.50	82.25
13	60-64	7,271	5.76	88.01
14	65-69	5,195	4.11	92.12
15	70-74	3,879	3.07	95.20
16	75-79	3,059	2.42	97.62
17	80-84	1,727	1.37	98.99
18	85-89	897	0.71	99.70
19	90-94	271	0.21	99.91
20	95-99	111	0.09	100.00
Total		126,261	100.00	

The above table describes the age group in 5 years categories. The total sample of the population is 126,261 people comprising of males and females in the ages of 0 to 99 years. The highest proportion of individuals in the sample belongs to the age group of 45-49 years, comprising of 8.68%. Individuals of the ages of 50-54 and 55-59 years have percentages of 8.20 and 7.50 respectively.

3. **Region**

Region	Description	Freq.	Percent	Cum.
1	Bangkok Metropolis	7,512	5.95	5.95
2	Central (Exclude 1)	**34,823**	27.58	33.53
3	North	29,007	22.97	56.50
4	Northeast	**35,658**	28.24	84.75
5	South	19,261	15.25	100.00
Total		126,261	100.00	

The table above describes the categorical variable of region ranging from 1-5 regions. Northeast has the highest individuals involved in the study comprising of 28.24% of the sample. North and South have 22.97% and 15.25% respectively while Bangkok Metropolis and Central (Exclude 1) have 5.95% and 27.58% respectively.

Variable	Obs	Mean	Std.Dev.	Min	Max
Urban/rural	126261	1.409469	.4917378	1	2

4. **Urban/Rural**

Area	Description	Freq.	Percent	Cum.
1	Urban	74,561	59.05	59.05
2	Rural	51,700	40.95	100.00
Total		126,261	100.00	

The table above describes the dummy variable of place of residence which could be urban or rural, and it is labeled area. The urban area has the largest proportion of the sample population with value of 59.05% while the rural area is 40.95%.

5. **Education Attainment**

Education	Freq.	Description	Percent	Cum.
0	10,882	No Education	8.62	8.62
1	5,759	Pre-primary Education	4.56	13.18
2	61,071	Primary Education	48.37	61.55
3	31,914	Secondary Education	25.28	86.82
4	16,402	Higher Education	12.99	99.82
5	233	Other Education	0.18	100.00
Total	126,261		100.00	

The table shows the categorical variable of education. The percentage of people with higher education is lower than primary and secondary education. Individuals with higher education constitute 12.99% of the population while the individuals with primary education contribute the most percentage which is 48.37%. Individuals with secondary education comprise of 25.28% of the population. Individuals with no educational attainment have a proportion of 8.62% and those with pre-primary education are 4.56%. Other educational program are those with short course training, Islamic study, and schooling but unknown education level which contributes only 0.18%. The total population is 126,261 individuals.

6. Marital Status

Maritals	Description	Freq.	Percent	Cum.
0	Memb<15Yrs.	23,728	18.79	18.79
1	Never married	22,325	17.68	36.47
2	Married	65,707	52.04	88.52
3	Widowed	9,908	7.85	96.36
4	Divorced	2,040	1.62	97.98
5	Separated	2,542	2.01	99.99
6	Married but unknown status	11	0.01	100.00
Total		126,261	100.00	

The table above describes the categorical variable of marital status. The married population has the highest proportion which constitutes 52.04% of the sample population. The never married or single population is 17.68%. The populations of individuals who are divorced, separated , and married but unknown status have the lowest percentage which are 1.62, 2.01, and 0.01. Members who are less than 15 years old and widowed individuals constitute 18.79 and 7.85 respectively.

7. Household Size

Number of household members including servant

HHmembinclserv	Freq.	Percent	Cum.
1	7,743	18.12	18.12
2	**11,640**	27.24	45.35
3	9,571	22.39	67.75
4	7,089	16.59	84.33
5	3,754	8.78	93.12
6	1,792	4.19	97.31
7	811	1.90	99.21
8	197	0.46	99.67
9	83	0.19	99.86
10	30	0.07	99.93
11	12	0.03	99.96
12	8	0.02	99.98

13	3	0.01	99.99
14	3	0.01	100.00
15	1	0.00	100.00
23	1	0.00	100.00
Total	42,738	100.00	

The table above describes the number of household members including servant. The most frequent household member size is 2 members per household which is 27.24%. The second highest frequency of household member size is 3 members per household which contributes 22.39%. The household with 1 individual and 4 individuals contributes 18.12% and 16.59% respectively.

8. Employment status

Employ _status	Description	Freq.	Percent	Cum.
0	For members < 15 yrs. and others	**23,395**	18.53	18.53
1	Employer	2,428	1.92	20.45
2	Children, elderly person*	9,745	7.72	28.17
3	Illness, disabled person*	1,951	1.55	29.72
4	Looking for a job*	443	0.35	30.07
5	Unemployed*	637	0.50	30.57
6	Others*	1,502	1.19	31.76
7	Own-account worker	**25,252**	20.00	51.76
8	Contributing family worker	14,154	11.21	62.97
9	Government employee**	7,495	5.94	68.91
10	State enterprise employee**	533	0.42	69.33
11	Private company employee**	**23,542**	18.65	87.97
12	Member of producers' cooperative	32	0.03	88.00
13	Housewife*	7,695	6.09	94.09
14	Students*	7,457	5.91	100.00
Total		126,261	100.00	

The table describes the grouped employment status of individuals in the sample. Individuals employed in the informal sector are employer, own-account worker, contributing family worker, member of producers' cooperative. Own-account worker contribute the most percentage which is 20% in the informal sector. Formal sector comprise of government employee, state enterprise employee, and private company employee. Private company employee contribute the most percentage which is 18.65% in the formal sector. The unemployed individuals and individuals looking for a job comprises of 0.85%.

9. Socio-Economic Status

Socio-class	Description	Freq.	Percent	Cum.
1	Poorest	8,791	20.57	20.57
2	Poorer	8,384	19.62	40.19
3	Middle	9,069	21.22	61.41
4	Richer	9,144	21.40	82.80
5	Richest	7,350	17.20	100.00
Total		42,738	100.00	

The above table describes the socio-economic status of the population. It is divided in to quintiles 1 to 5 ranging from poorest to the richest. The poorest constituted of 20.57%; poorer 19.62%; middle 21.22%; richer 21.40% and richest 17.20%.

10. Sex of Household Head

sexHHH	Description	Freq.	Percent	Cum.
1	Males	26,773	62.64	62.64
2	Females	15,965	37.36	100.00
Total		42,738	100.00	

The table above describes the dummy variable of Household Head gender. It showed that the total number of individuals used in the survey is 42,738. This comprises

of 62.64% of males and 37.36% of females. The proportion of Males Household head

is higher than that of Females household head.

11. Age of Household Head

agegrpHHH	Description	Freq.	Percent	Cum.
1	10-19	359	0.84	0.84
2	20-29	2,711	6.34	7.18
3	30-39	5,587	13.07	20.26
4	40-49	9,725	22.75	43.01
5	50-59	**10,794**	25.26	68.27
6	60-69	7,485	17.51	85.78
7	70-79	4,381	10.25	96.03
8	80-89	1,536	3.59	99.63
9	90-99	160	0.37	100.00
Total		42,738	100.00	

The above table describes the age group in 10 years categories. The total sample

of the population is 42,738 people comprising of males and females in the ages of 10

to 99 years. The highest proportion of household head individuals in the sample belongs

to the age group of 50-59 years, comprising of 25.26%. Individuals of the ages of 40-

49 and 60-69 years have percentages of 22.75 and 17.51 respectively.

12. Marital Status of Household Head

MSHHH	Descriptions	Freq.	Percent	Cum.
0	Members<15 Yrs. of age	13	0.03	0.03
1	Never married	4,628	10.83	10.86
2	Married	**28,058**	65.65	76.51
3	Widowed	7,412	17.34	93.85
4	Divorced	1,188	2.78	96.63
5	Separated	1,435	3.36	99.99
6	Married but unknown status	4	0.01	100.00
Total		42,738	100.00	

The table above describes the categorical variable of marital status of Household Head. The married population has the highest proportion which constitutes 65.65% of the sample population. The widowed population also has a significant proportion of 17.34%. The single or never married population constitutes 10.83%. The proportions of individuals who are divorced and separated have the lowest frequency with percentages of 2.78 and 3.36 respectively.

13. Highest education level of HH head

Education	Freq.	Description	Percent	Cum.
0	2,481	No Education	5.81	5.81
1	1	Pre-primary Education	0.00	5.81
2	**24,834**	Primary Education	58.11	63.92
3	8,775	Secondary Education	20.53	84.45
4	6,550	Higher Education	15.33	99.77
5	97	Other Education	0.23	100.00
Total	42,738		100.00	

The above table shows the categorical variable of education. The percentage of people with primary education is comparatively higher than all other educational levels. The secondary education and higher education constitutes 20.53% and 15.33% respectively. People with no education constitutes 5.81%. The total population is 42,738 individuals.

14. Number of member age < 15 yrs

Memb<15 yrs	Description	Freq.	Percent	Cum.
1	0 yr old	26,480	61.96	61.96
2	1 yr old	10,253	23.99	85.95
3	2 yrs old	4,827	11.29	97.24
4	3 yrs old	961	2.25	99.49
5	4 yrs old	171	0.40	99.89
6	5 yrs old	32	0.07	99.97
7	6 yrs old	9	0.02	99.99
8	7 yrs old	3	0.01	100.00
9	8 yrs old	1	0.00	100.00
10	11 yrs old	1	0.00	100.00
Total		42,738	100.00	

15. Number of member age ≥ 60 yrs

16. Total number of disabled person in Households

TDP	Descriptions	Freq.	Percent	Cum.
0	Not disabled	40,091	93.81	93.81
1	Physical disability at the time of birth	2,348	5.49	99.30
2	Intellectual disability at the time of birth	229	0.54	99.84
3	Both physical and intellectual disability at the time of birth	45	0.11	99.94
4	Physical disability after birth day	19	0.04	99.99
5	Intellectual disability after birth day	4	0.01	100.00
6	Both physical and intellectual disability after birth day	1	0.00	100.00
7	Other	1	0.00	100.00
Total		42,738	100.00	

People with disability at the time of birth constitutes 5.49%. Most people are not disabled which constitutes 93.81%. The total sample population is 42,738.

17. Government/ state enterprise's welfare

GovtWelfare	Description	Freq.	Percent	Cum.
0	No	112,025	88.72	88.72
1	Yes	14,236	11.28	100.00
Total		126,261	100.00	

The above table shows the individuals who receive government/ state enterprise's welfare. The people who is covered in this welfare are 11.28%, and the individuals not covered are 88.72%. The total population is 126,261 individuals.

18. Number of member receiving welfare from government or state

enterprise

Membrecgovt	Description	Freq.	Percent	Cum.
0	Does not receive	**35,842**	83.86	83.86
1	One member	2,441	5.71	89.58
2	Two member	**2,677**	6.26	95.84
3	Three member	988	2.31	98.15
4	Four member	555	1.30	99.45
5	Five Member	170	0.40	99.85
6	Six member	49	0.11	99.96
7	Seven member	15	0.04	100.00
8	Eight member	1	0.00	100.00
Total		42,738	100.00	

The above table describes the number of members receiving welfare from government or state enterprise. Out of 42,738 individuals, 35,842 (83.86%) of individuals are not covered by government welfare. The most frequency amount of household member that receive government welfare are two members per household

which constitutes 6.26%, and the second frequent is one member per household which constitutes 5.71%.

19. Number of member having the universal health card

MembUC	Description	Freq.	Percent	Cum.
1	Does not receive	8,117	18.99	18.99
2	1 member	7,736	18.10	37.09
3	2 members	**9,664**	22.61	59.71
4	3 members	7,619	17.83	77.53
5	4 members	5,069	11.86	89.39
6	5 members	2,630	6.15	95.55
7	6 members	1,213	2.84	98.39
8	7 members	483	1.13	99.52
9	8 members	120	0.28	99.80
10	9 members	58	0.14	99.93
11	10 members	13	0.03	99.96
12	11 members	3	0.01	99.97
13	12 members	8	0.02	99.99
14	13 members	2	0.00	99.99
15	14 members	2	0.00	100.00
16	23 members	1	0.00	100.00
Total		42,738	100.00	

The above table describes the number of members in a household having the universal health card. The total number of sample population is 42,738 individuals. The most frequent percentage of members receiving UC is 2 members per household which constitutes 22.61%.

20. Number of member having the social medical card

MembSSO	Descriptions	Freq.	Percent	Cum.
0	Does not receive	**33,105**	77.46	77.46
1	1 member	6,159	14.41	91.87
2	2 members	2,950	6.90	98.77
3	3 members	413	0.97	99.74
4	4 members	94	0.22	99.96
5	5 members	14	0.03	99.99
6	6 members	3	0.01	100.00
Total		42,738	100.00	

The above table describes the number of members having the social medical card. The total number of sample population is 42,738 individuals. Most of the population does not receive the social medical card which consists of 33,105 individuals which constitutes 77.46%.

21. Number of member having the private health insurance

MembPriHI	Descriptions	Freq.	Percent	Cum.
0	0 member	**40,343**	94.40	94.40
1	1 member	1,321	3.09	97.49
2	2 members	649	1.52	99.01
3	3 members	246	0.58	99.58
4	4 members	124	0.29	99.87
5	5 members	41	0.10	99.97
6	6 members	10	0.02	99.99
7	7 members	3	0.01	100.00
8	15 members	1	0.00	100.00
Total		42,738	100.00	

The above table describes the number of member having the private health insurance. The total number of sample population is 42,738 individuals. Most of the

population does not receive the private health insurance which consists of 40,343 individuals which constitutes 94.40%.

22. Number of member receiving welfare from employer

MembWelfEmp	Description	Freq.	Percent	Cum.
0	Does not receive	**42,376**	99.15	99.15
1	1 member	220	0.51	99.67
2	2 members	109	0.26	99.92
3	3 members	19	0.04	99.97
4	4 members	12	0.03	100.00
5	5 members	1	0.00	100.00
7	7 members	1	0.00	100.00
Total		42,738	100.00	

The above table describes the number of members receiving welfare from employer. The total number of sample population is 42,738 individuals. Most of the population does not receive the welfare from employer which consists of 42,376 individuals which constitutes 99.15%.

23. Universal health coverage card (30 baht)

UC	Descriptions	Freq.	Percent	Cum.
0	No	30,437	24.11	24.11
1	Yes	95,824	75.89	100.00
Total		126,261	100.00	

The above table describes the dummy variable of one type of insurance called universal health coverage card. Out of the sample population of 126,261 individuals, 95,824 (75.89%) are being covered by universal healthcare coverage which are almost all the sample population. The remaining 24.11% or 30,437 individuals are not covered by the universal health coverage card.

24. Medical card (social security)

SS	Descriptions	Freq.	Percent	Cum.
0	No	112,499	89.10	89.10
1	Yes	13,762	10.90	100.00
Total		126,261	100.00	

Most people are not covered by the social security insurance (89.10%) according to the sample population above. Only 10.90% or 13,762 individuals are covered by the social security insurance out of the sample population which consists of 126,261 individuals.

25. Private health insurance

PrivHI	Descriptions	Freq.	Percent	Cum.
0	No	122,107	96.71	96.71
1	Yes	4,154	3.29	100.00
Total		126,261	100.00	

Most people are not covered by the private health insurance (96.71%) or 122,107 individuals according to the sample population above. Only 3.29% or 4,154 individuals are covered by the private health insurance out of the sample population which consists of 126,261 individuals.

26. Welfare by employer

EmpWelf	Descriptions	Freq.	Percent	Cum.
0	No	125,706	99.56	99.56
1	Yes	555	0.44	100.00
Total		126,261	100.00	

Most people are not covered by the welfare from employer (99.56%) or 125,706 individuals according to the sample population above. Only 0.44% or 555 individuals

are covered by the welfare from employer out of the sample population which consists
of 126,261 individuals.

VITA

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