



He, Biao

***Has NCMS improved equity in access to
healthcare for the Chinese rural population?***

--An assessment based on the framework “benchmarks of fairness”

Master’s thesis in the International Social Welfare and Health Policy

Oslo Metropolitan University

Faculty of Social Science

Abstract

Introduction: The collapse of the previous medical insurance made most of the rural population restricted to healthcare services. The launching of NCMS since 2003 has been expected to help change this severe situation. Based on the framework “benchmarks of fairness” from Daniels, Light, and Caplan (1996), this thesis aims to evaluate whether and how the new medical insurance scheme—NCMS—has been improving the equity in access to healthcare services for the rural population.

Methods: Of this framework, five benchmarks which aim to evaluate the dimension “equity” were chosen, and criteria for each benchmark were further refined in order to be measured practically. Findings from relevant existing empirical studies and officially registered statistics by governments were used as data sources for this thesis. Each benchmark for the case of NCMS was evaluated separately. Through a chronological review on evidence/material for each criterion, the change was caught to indicate each criterion.

Findings: NCMS has managed to cover over 98 percent of the rural population, despite its voluntary participation. NCMS has completed the universal coverage by 2008 without delay. The intercity reimbursement ratio has been still lower; The launching of NCMS has increased the density and qualification for the medical facilities and personnel. However, still fewer rural population has sufficiently known crucial information of NCSM; The benefits package of NCMS has covered more reimbursable medicine and services, such as more anti-cancer drugs. Inequalities on benefits and coverage in NCMS still exist, but lower deductible for reimbursement, lower coinsurance as well as higher payment cap might narrow these inequalities; The premium of NCMS is community-rated. As well, NCMS has been proposing ways to reduce some “back-ends” instantly like payment-cap and co-payment; Although the healthcare financing system in rural China has been still regressive, the situation has been improved, and NCMS could contribute to this improvement.

Conclusion: To some extent, NCMS has managed to equalise access to healthcare for the rural population by eliminating financial/nonfinancial barriers, expanding benefits coverage as well as sharing financial burden equitably. However, in each of those respects, NCMS has still much space to improve.

Key words: Healthcare, access, equity, fairness, NCMS, rural China

Oslo Metropolitan University, Faculty of Social Science

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Acronyms

CCC	Central Committee of the Communist Party of China
CHNS	China Health and Nutrition Survey
CHSI	Center of Health Statistics Information
CHSY	China Health Statistics Yearbook
CLHLS	Chinese Longitudinal Healthy Longevity Survey
CMS	Rural Cooperative Medical Insurance scheme
CNKI	China National Knowledge Infrastructure
CNY	Chinese Yuan
EML	the Model List of Essential Medicines (of WHO)
KI	Kakwani Index
KM	Kilometer
MCA	Ministry of Civil Affairs
MOH ¹	Ministry of Health
NBS	National Bureau of Statistics
NCEM	National Catalogue of Essential Medicines (of China)
NCMS	New Rural Cooperative Medical Insurance Scheme
NHC	National Health Commission
NHFPC	National Health and Family Planning Commission
NHSS	National Health Service Survey
OOP	Out-of-pocket money
SHI	Social Health Insurance
UEBMI	Urban Employee Basic Medical Insurance
UHC	Universal Health Coverage
URBMI	Urban Resident Basic Medical Insurance
WHO	World Health Organization

¹ Ministry of Health (MOH), National Health and Family Planning Commission (NHFPC), and National Health Commission (NHC) is the same ministry. NHFPC replaced MOH from 2013. Further, NHC replaced NHFPC from 2018.

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Chapter 1 Background and Motivation of this thesis

1.1 Introduction

World Health Organization (WHO) has viewed “Universal Health Coverage” (UHC) as a health-related goal for approaching the next Millennium Development Goals (MDGs) (WHO, 2013). The core policy objective of UHC is to ensure equal access to comprehensive and quality health services for every citizen in society and to protect all from financial hardship (WHO, 2010a). However, although most countries have been making efforts to approach the goal of UHC, more than half of the world’s more than 7 billion people still lack access to essential services. While over 800 million people spend at 10 percent of their household budgets to pay for health care, and over 100 million people are pushed into extreme poverty due to their health expenditures (WHO & World Bank, 2017).

To secure access to adequate healthcare for all at an affordable price, it will be necessary to increase the extent of prepayment and reduce the reliance on out-of-pocket money (Carrin & James, 2004, p. 2; Carrin, James, & Evans, 2005, p. 1). Of the methods to achieve this goal, social health insurance (SHI) has been commonly used among both high income and mid-to low-income countries (Carrin & James, 2005), and many have made some productive progress toward this goal (Van Minh, Pocock, Chaiyakunapruk, Chhorvann, Duc, Hanvoravongchai, Lim, Lucero-Prisno III, Ng, & Phaholyothin, 2014; Bayarsaikhan, Kwon, & Chimeddagva, 2015).

China has the largest population in the world, representing almost one-sixth of the total global number (World Bank, 2019a). Thereof, the rural population has been taking a dominant proportion for decades. From the 1980s to the 2000s, the portion of the rural population relative to the total number of China had been reaching up to 80 percent (World Bank, 2019b). Despite urbanization and massive rural-urban migration for those years, around half of the total population still live in rural areas of China (World Bank, 2019b). Furthermore, healthcare services are typically less available and of poorer quality than in semi-urban and urban settings (WHO, 2009a) and so is it for rural China. Providing all rural population with equal access to affordable and high-quality healthcare services will be an indispensable move toward the UHC for China, especially given under the background that China has proposed the health-related development goal as every one shall be the beneficiary of primary healthcare (The State Council, 2002).

To extend access to healthcare for all in the rural population and to reduce medical financial hardship, the Chinese central government² launched the New Cooperative Medical Insurance Scheme (NCMS) in rural areas from 2003. NCMS is organized by county-level governments officially, funded based on individual contributions, collectives, and the central, provincial and county-level government subsidies, and also formally based on voluntary enrollment (The State Council, 2003a). NCMS also plays a significant role in improving the supply of healthcare resources for rural areas, which aims to ensure better access also from the supply-side perspective. Then, after nearly 16-year continuous implementation, how is the performance of NCMS? Based on an assessment, this thesis aims to assess whether, and how effectively, the NCMS has been improving access to health care for the rural population.

1.2. Inequitable access to healthcare: what was the situation before NCSM?

Before the initiation of NCMS, the larger part of the rural population was facing a difficult situation with regard to access to healthcare.

First, a low coverage of medical insurance for the rural population. Due to the collapse of previous medical insurance in China—Cooperative Medical Scheme (CMS), most of the rural population had become uninsured. The number of the insured by any form of medical insurances had sharply declined, from around 93 percent of the rural population in 1976 to 6 percent in 1990 (Feng, Tang, Gerald, Malcolm, & Gu, 1995). As one of the outcomes resulting from the high uninsured rate, the rural population had been suffering from a heavy financial burden from medical expenditures. The 2nd China National Health Service Survey indicated that more than 87 percent of the rural population still did not have any medical insurance coverage around 1998, and had to pay full medical expenses through out-of-pocket money (MOH, 1999; Liu, Yuanli., 2004; Wang, H., Yip, Zhang, Wang, & Hsiao, 2005).

Meanwhile, from the 1980s the marketization in the healthcare sector further increased health cost in China. Healthcare costs had a sharp growth between the 1980s and the 1990s, with a deflated annual growth rate of percent (Wei, 1991). According to several estimates, 30 to 50

² In the thesis, the “Chinese central government” means the state council and ministries, and “local governments” include all governments except the state council and ministries. Province-level governments directly under the Central Government. The second tier refers to the county-level governments and the basic-level is the township governments. See also: http://english.gov.cn/archive/china_abc/2014/08/27/content_281474983873401.htm.

percent of rural households who lived under the poverty line became impoverished due to illness (Gu, X, 1991; Luo, 1991).

Following the substantial medical expenditure burden, the utilization of needed healthcare services had declined. Between 1985 and 1993 annual inpatient days per 1000 rural population experienced a 10 percent decline (MOH, 1994). Some surveys showed that by 1993, of rural patients who had refused to be hospitalised, nearly 60 percent reported an inability to pay as the main reason for disregarding the professional's hospitalization recommendations (MOH, 1994). This survey suggested limited access to healthcare for the rural population from a demand-side perspective. However, the inequity in access also emerged from a supply-side perspective.

Before the 1980s, CMS organized and financed a three-tier structure healthcare delivery network in rural China—At the first tier, “barefoot doctors” were providing both preventive and primary care services; when dealing with more severe illness, barefoot doctors referred patients to the second-tier provider—township health centers. If needed the patient could be referred further to the third and final tier, the county hospitals (Liu, Yuanli, Hsiao, & Eggleston, 1999). However, due to the failure of CMS, the number of barefoot doctors, the village health offices, the staff and facilities like hospital beds had all been decreased to a considerable degree. From 1980 to 1989, the number of township clinics went down by around 14 percent, and the figure of active primary healthcare workers in rural China even had a 36 percent decline (Liu, Yuanli et al., 1999). A study conducted in 30 poverty counties of China found that in 1979, 71 percent of surveyed villages had at least one health station. However, only 55 percent of villages had a functioning health station in 1993 (Liu, Yuanli, Hu, Fu, & Hsiao, 1996). The lack of physical supply of healthcare resources could worsen the already restricted access to healthcare services for the Chinese rural population.

All these situations produced an urgent demand for the rural population in China to again be covered by a medical insurance scheme. Correspondingly, the launching of NCMS was expected to play a significant role in fixing up these problems. As stated above, the purpose of this thesis is to investigate to which extent the implementation of NCMS has been successful in this respect.

1.3. NCMS in China—a historical review

1.3.1 Three phases in the development of medical insurance in rural China

Reforming the “medical security system” is one part of the whole “healthcare reform” in the Chinese context, and those two are not equal to each other. However, they are tightly connected. For every single instance, healthcare reforms involve, to a larger or lesser degree, the adjustment of medical security system arrangements (Lin, P., 2017). In rural China, since the 1950s the most important arrangement of the medical security system is “cooperative medical insurance”. Both the previous CMS and the present NCMS has been influenced or even directly targeted as part of past healthcare reforms.

With dramatic changes in the political and economic background for past years, the healthcare system in China has been going through several significant reforms, which consequently have produced several remarkable development phases for the “cooperative medical insurance schemes” in rural areas. Based on the literature, we may identify three periods for its development. They can be presented as follows:

1) The 1950s to 1970s: *the prosperous period for cooperative medical insurance.*

After the founding of new authority³ in 1949, the Chinese central government became concerned about the development of healthcare in rural areas. According to Lin, S. (2008), underdeveloped healthcare delivery, high prevalence of communicable diseases, and severe shortages of medicine and other relevant health resources seriously threatened the health status of the rural population. There was an urgent need to improve the healthcare situation for them. In 1955, a set of “primary healthcare stations” and “medical stations” were self-funded by local agricultural cooperatives⁴ in some provinces. The Mishan Village of Shanxi province innovated the form of “co-operative-style” medical stations, where joint-payment applied for the healthcare services—the member farmers contributed partly and the cooperative subsidized partly. This was supposed to eliminate the barriers to access to primary healthcare services (Wang, Shidong & Ye, 2004). In 1959, the Ministry of Health (MOH) reported to the State Council with the document *Opinions for several problems on healthcare works in People’s Commune*, in which the insurance scheme CMS was highly

³ “New authority” means “People’s Republic of China” established in 1949.

⁴ “Agricultural Cooperative” is the former collective economy organization in rural China, where the farmers share their resources like fields, working force and tools together and agricultural products are centrally distributed by the cooperative based on certain principles. The purpose of establishing agricultural cooperatives was to strengthen the productivity in rural areas (He, Liu, & Shen, 1990).

recommended. That was the first time that the term “CMS” emerged in any official document. Later in 1960, the Chinese central government forwarded the report to local authorities and required them to practice CMS accordingly. That was the first official policy issued by the Chinese central government about CMS, which played a significant role in directing the development of CMS in rural China (Cai, 2009).

CMS got moved on during the period of the “Cultural Revolution.” In 1968, the Chinese State Chairman Mao Zedong highly praised the advantages of CMS, and opinions from the country’s leaders were soon transferred as political mobilization, which pushed the implementation of CMS to the top of the political agenda. By 1976, 90 percent of the rural population had been formally included in CMS (Lin, M., 2002). The World Bank viewed the case of CMS set a classic example for developing countries about solving healthcare financing problems (World Bank, 1994).

Despite those achievements, CMS also exposed some defects. For example, one of the weaknesses was the small number of enrollees in most villages (the unit that organized CMS), which restricted the capacity of sharing health risks. Jiang (2010) claimed that the “success” of CMS was due to the particular political and economic background at that moment—collectivized economy organizations like agricultural cooperatives and people’s communes, as well as active political mobilization and other factors, provided some crucial supports for the maintenance of CMS.

2) The 1980s to 2002: *collapse and rebuilding of CMS.*

China started major economic reforms from 1978, which much affected the development of the whole Chinese society. The “household contract responsibility system” was born, due to the economy reforming and replacing the traditional collectivized economy system in rural China. By 1987, 98 percent of rural households had been included in the new economic system, which generally suggested the end of the former administrative unit *People’s Commune* (Cao, P., 2006). According to Jiang (2010), the “death” of the *People’s Commune* had destroyed the base of CMS. Add the reduction of political mobilization, mistakes of policy-making, and problems of management, and CMS was facing at a catastrophic collapse. By 1985, only 5 percent of all administrative villages had been implementing CMS (Wang, Shaoguang, 2003).

The collapse of CMS led to a dramatic growth of uninsured rural residents, and healthcare financing in rural China mainly depended on out-of-pocket money. Additionally, because of

the marketization reforms in the health sector during this period, the growth of health expenditure was faster than that of household incomes, which produced an even more onerous financing burden for rural residents—poverty resulting from illness had been a serious social problem (Lin, S., 2008). With this background, the Chinese central government tried to make efforts on rebuilding CMS, and in 1993 proposed to develop and improve CMS (CCCPC, 1993). However, despite various efforts, the recovery of CMS did not happen as expected. Only 17 percent of administrative villages and 10 percent of the rural population were getting in CMS in 1997 (Jiang, 2010). Even after 1997, the slow growth of household income and the principle of “voluntary participation” worsened the recovery of CMS (Shao, 2007). In 1998, only around 13 percent of rural residents were in at least one medical insurance program, and thereof, in CMS just 7 percent (Zhang, Q., 2003).

The Chinese central government tried to recover CMS. However, according to Jiang (2010), there was no clear plan or direction about how to make it happen on the ground. Besides, gathering money for CMS mainly depended on farmers contributions, and a meager household income that was the result of the weak economy in rural China made the rebuilding of CMS very challenging.

3) 2002-2016: *lighting the hope again—the start of NCMS*

The economic reforms in the 1970s enhanced the productivity in rural China, but the urban-rural gap on household incomes, maldistribution of health resources and social security arrangements was getting wider. Most of the rural population were faced with limited access and massive financing barriers to healthcare. According to Cai (2009), poverty due to illness threatens the quality of life for them to an unacceptable extent. Li (2004) claims that by 2004, around half of rural residents abandoned the necessary visit to the doctor due to the financial barrier.

In 2002, the Chinese government issued the document *Decisions on further strengthening the healthcare in rural areas*, proposing gradually to establish the New Cooperative Medical Insurance Scheme (NCMS) with the purpose of insuring major diseases and generally to insure all of the rural population by 2010 (The State Council, 2003a). The State Council in 2006 decided to increase the subsidies for NCMS from both central and local governments in order to speed up the pilot⁵ of NCMS (MOH, China Development and Reform Commission,

⁵ The pilot of NCMS was proceeding region by region between 2003 and 2008, and this was also the phase-in period of NCMS to universal coverage. The comprehensive implementation started since 2008 when almost all counties in China had been covered by NCMS. In the research methods literature, a “pilot study” usually refers

Ministry of Civil Affairs, ministry of finance, Ministry of Agriculture, China Food and Drug Administration, & State Administration of Traditional Chinese Medicine of the People's Republic of China, 2006).

Since 2003 when NCMS launched, the phase-in process has made much progress. By the end of September in 2007, 2448 counties reported having been implementing NCMS, with represented 86 percent of all counties of China. 726 million rural residents had been included in NCMS (Bai, 2007). Later in 2008, the number of enrollee in NCMS had increased to 815 million, with a breakthrough on participation rate with 92 percent (MOH, 2008a). And this rate has been still increasing. Launching NCMS relighted the hope for the medical security system for rural China, especially after suffering from the collapse of CMS.

1.3.2 Official conception of NCMS and crucial features

1.3.2.1 The official definition of NCMS

The state council defined NCMS in 2003 as “a mutually-aid medical scheme which is organized, conducted and supported by county governments, cooperatively funded by individual, collectives, and various-level governments and mainly reimburse the medical expenditures from major diseases treatment for the rural population, with voluntary participation” (The State Council, 2003a). In 2009, NCMS was defined as “a primary medical insurance system” and “a major part of the national medical security network” (The State Council, 2009).

1.3.2.2 Major features of NCMS

Chen and Zhang (2013) summarises and highlights six main features of NCMS:1) Governments take primary responsibility for operating NCMS rather than other organizations. 2) Voluntary participation. NCMS does not propose a mandatory enrollment and rural citizens are free to opt in or out. 3) County-level coordination. Shortly, a county, as a unit, is a risk-pooling unit. County-level government is working out the specific implementation of NCMS, including the collection of premium (contribution), designing the specific benefits package of NCMS, operating the reimbursement for insured rural residents, and so on. Compared with the former CMS which was mainly operated within local villages, NCMS increases the scale

to a small-scale try-out of a new idea in a limited number of settings. However, a “pilot study” and “pilot period” can also mean a larger-scale rolling-out of a new idea, for example the introduction of a new public insurance scheme in some counties or even regions, to see how it works before eventually implementing the idea at a national level. It is the latter meaning of “pilot” that is used in this thesis.

of risk pooling. However, though NCMS is a national scheme, it has not been an utterly nationally-operated insurance scheme, and the design of benefits package and the amount of individual contribution vary county by county. 4) Initially, NCMS was designed for reimbursing costly medical expenditure from inpatient services. 5) NCMS has established a set of management, operation, and supervision mechanisms. 6) A “medical assistance system” has been established simultaneously with NCMS. In order to cover the poor who could otherwise be excluded from NCMS, the Chinese central government proposed to launch NCMS and the “medical assistance system”, in which the central and local governments take responsibilities to subsidize poor families to enroll in NCMS, and waive the part of health expenditure below the deductibles⁶ for reimbursement, and offer extra assistance for those who would be still stuck in financial headship after reimbursement from NCMS.

1.4. Research Questions

Based on the background, purpose and significance of this thesis, I suggest the research questions here:

- 1) Under the framework of “benchmarks of fairness”, has NCMS changed the equity in access to healthcare for the rural population since 2003?
- 2) How has NCMS been changing equity in access, with improvement or deterioration?

1.5. Definition and operationalization of key concepts

1.5.1. “Equality of opportunity”, “equity” and “fairness”

There has been much discussion on the conception of “equity”, and many researchers have suggested various explanations of this concept in relation to health care. Here, I take as a starting point a definition from the World Bank. The World Bank (2005, p. 2) views “equity” as follows: “individuals should have equal opportunities to pursue a life of their choosing and be spared from extreme deprivation in outcomes.” Here, “equality of opportunity” emerges as a foundational criterium for “equity”.

In this way, the conception of “equity” is close to what Daniels et al. (1996) use and interpret as central for another relevant term—“fairness”. In their framework “benchmarks of fairness”,

⁶ In an insurance policy, the “deductible” is the amount paid out of pocket by the policy holder before an insurance provider will pay any expenses (O’Sullivan & Sheffrin, 2003)

Norman Daniels et al. (1996, pp. 18-20) clarified a foundation underlying the concern of fairness and justice—“equality of opportunity”.

They distinguish between two notions of “equality of opportunity”— “formal” equality of opportunity and “fair” equality of opportunity. Based on their framework, we have “formal equality of opportunity” when we insist that individual characteristics such as race, gender, age or disability should not play a role in determining our opportunity. But this only suggests a “negative” protection of equality of opportunity. As for “fair equality of opportunity”, when trying to protect it, we need to offer active assistance wherever unfair practices regarding race, gender, age or disabilities have led either to the mis- or underdevelopment of people’s capabilities. Fair equality of opportunity requires that access should be equal for persons with similar skills and talents, providing that people have had an equally fair chance to develop those talents and skills.

Turning to the area of health, disease or dysfunction affect the development of people’s talents and skills negatively, and restrict access to life’s opportunities. Health care, which can keep us functioning as close to optimal as possible, thus contributes to protecting our life’s opportunities by protecting our functional capacities. Here, those opportunities involve to gain access to education or jobs, as well as to carry out the kinds of goals or tasks in life that reasonable people may want to pursue. A commitment to fair equality of opportunity recognizes that we should not allow people’s prospects in life to be governed by correctable, morally arbitrary, or irrelevant differences between them, including those that result from disease and disability. By designing a health care system that keeps all people as close as possible to healthy functioning, given reasonable resources constraints, we can in one important way fulfill our moral and legal obligations to protect the equality of opportunity (Daniels et al., 1996, pp. 21-22).

In this framework, both “equity” and “fairness” emphasize the equal chance for every individual to pursue their life based on their choice. Further, within the account of “fairness”, Daniels et al. (1996) has specified the goal of “equality of opportunity” in relation to health care and stressed that a healthcare system can play a significant role in protecting equality of opportunity. These are arguments that we should keep a social obligation to provide equitable access to healthcare for everyone. In this thesis, I will use Daniels et al.’s (1996) detailed framework for “equality of access” to health care (to be further specified below) as the basic framework to operationalise and measure to which extent, and how far, the NCMS has led to a more equitable health care system in rural China.

Daniels, Flores, Pannarunothai, Ndumbe, Bryant, Ngulube, and Wang (2005) viewed “fairness” as a broad concept in health system. It includes “equity” in health outcomes, in access to all forms of health care and in health care financing, and it also involves “efficiency” in management and allocation, as well as “accountability”. “Fairness” is a conception related to “social justice”, since those two conceptions can be considered interchangeable (Daniels et al., 1996).

1.5.2. Access to healthcare services

Access has been recognized as a complex conception (Mcintyre, Thiede, & Birch, 2009; Gulliford, Figueroa-Munoz, Morgan, Hughes, Gibson, Beech, & Hudson, 2002) and there have various ways to interpret this conception from existing studies.

Someone tends to see the concept of access from a *supply-side perspective*. For example, Goddard and Smith (2001) regard access as a purely supply-side issue, which indicates the level of services which the health care system offers the individual. Based on this view, Goddard and Smith (2001) suggests four dimensions for access, as “availability” “quality” “costs” and “information”. Other researchers, such as Jutting (2001) and Falkingham (2004), interpret access as a *demand-side concept* relating to the affordability of, or ability to pay for services. Supplementing incomes of those needing care improve affordability to those in need and may increase the demand for the services (Mcintyre et al., 2009).

Donabedian (1973) and Penchansky (1977) emphasize the relationship (compatibility) between a healthcare system and individuals as the core of the access concept. Following this approach, McIntyre et al. (2009) further argue that access is not a passive concept but relates to the communicative interaction between individuals and the health care system, and that access to healthcare represents the empowerment of an individual to use health care and reflects an individual’s capacity to benefit from services. Based on this understanding, they suggest three dimensions for access, namely availability (or physical access), affordability (or financial access) and acceptability (or cultural access).

Based on similar ideas that access is defined as the opportunity to reach and obtain appropriate healthcare services in situations of perceived need for care (Goddard & Smith, 2001; Haddad & Mohindra, 2002; Waters, 2000; Oliver & Mossialos, 2004), and that access should be seen as resulting from the interface between the characteristics of persons, households, social and physical environments, and the characteristics of the health system, organizations and providers (Penchansky & Thomas, 1981), Levesque, Harris, and Russell

(2013) agree factors to consider both pertain to supply-side features of health systems and organization, to demand-side features of populations, and to process factors describing the ways in which access is realized (Daniels, 1982; Musgrove, 1986), and therefore Levesque et al. (2013) suggest a conceptualization of access to healthcare with several dimensions that integrate demand and supply-side factors, where they view access as the possibility to identify healthcare needs, to seek healthcare services, to reach, to obtain or use healthcare services, and to actually have a need for services fulfilled.

1.5.3. Social Health Insurance (SHI)

While there is no single standard definition of SHI, it can generally be perceived as “a financial protection mechanism, for health care, through health risk sharing and funding pooling for a larger group of the population” (WHO, 2003, p. 5).

According to this view, to be characterized as “social” SHI must have certain characteristics. Countries need to adopt a broad social policy and legislative framework, also determined by “society consensus”, ensuring: 1) solidarity across the population; 2) responsibility for paying contributions with proper organizational arrangements to collect regular income-related contributions from individuals and to allocate these funds (non-risk-related payments); 3) rendering social assistance to cover vulnerable populations. A country can be categorized as having SHI, only if the majority of the population are legally covered with designated third-party payer through non-risk-related pre-payment (contributions) that are separated from general taxes or other legally mandated payments (WHO, 2003, pp. 5-6). Some other terms like “national health insurance” “healthcare insurance” or “medical insurance” are also used. Given the similar properties and features, those terms are interchangeable in some cases. New Cooperative Medical Scheme (NCMS) in rural China has been recognized as one of the SHI programs in China, as it meets most of the above features for SHI. In this thesis, I preferably use the term “medical insurance” to define NCMS. “Medical insurance” and SHI will be used interchangeably in this thesis.

The above defines the basic concepts, as they are being used in this thesis. In the following chapter 2, I will give a more detailed presentation of the framework of “benchmarks of fairness” since this framework – as stated earlier - is the core approach I will use for investigating if and how NCMS has influenced equity in access to health care in rural China. Chapter 2 “*Benchmark of Fairness as a conceptual framework*” is following.

Chapter 2 Benchmarks of Fairness as a conceptual framework

This chapter will first discuss what a benchmark of fairness is, present the conception of benchmarks of fairness, its development and contents. Then the chapter will highlight central features of this framework, and provide some brief examples from developing countries about how this tool can be used to evaluate healthcare reforms. Finally, this chapter will introduce how the benchmark approach will be used in this thesis.

2.1. What is Benchmarks of Fairness?

The benchmarks of fairness framework for health sector reform represents a policy evaluation tool, or a flexible method for evaluating the overall fairness of health sector reform (Ndumbe, Daniels, Bryant, & Dean, 2003). The original “benchmarks of fairness” were developed to assess and promote discussion about comprehensive medical insurance reforms proposed in the United States in the first Clinton Administration (Daniels et al., 1996; Brock & Daniels, 1994; Daniels & Levine, 1995). To adapt the benchmarks for use in health system in countries at different levels of development (Daniels & J, 1998), teams from Colombia, Mexico, Pakistan and Thailand, using their own recent reforms as case studies, adapted the original benchmarks into a generic developing-country framework (Daniels, Bryant, Castano, Dantes, Khan, & Pannarunothai, 2000), which represent a “revised version” of the initial framework.

As stated earlier, Daniels et al. (2005) view “fairness” as an even broader concept.

Benchmarks represents a policy tool to analyze the fairness of healthcare reform, therefore “benchmarks of fairness” is actually a complex, and each of the benchmarks specifies a key objective of fairness through criteria that capture important objectives and means of achieving these objectives. Currently, the “benchmarks of fairness” approach commonly used in empirical studies is the revised version adopted by the international team for serving developing countries, and this version has some changes from the original version. Two versions of the *benchmarks* framework are presented in table 1. As we can see that the original version has ten benchmarks, while the revised version has nine. Both involve the evaluation of fairness in three dimensions: equity, efficiency and accountability; and each of

three dimensions include corresponding benchmarks. Moreover, every benchmark has its own criteria, and I have put in a table for those criteria in appendix 1 (see page 108).

Table 1. Contents of two versions of "Benchmarks of Fairness"

Dimension of Fairness	Ten benchmarks in the original version (1996)	Nine benchmarks in the revised version (2000)
Equity	B1. Universal Access—Coverage and Participation	B1. Intersectional Public Health
	B.2 Universal Access—Minimizing Nonfinancial Barriers	B2. Financial Barriers to Equitable Access
	B.3 Comprehensive and Uniform Benefits	B3. Non-financial Barriers to Access
	B4. Equitable Financing-Community-Rated Contribution	B4. Comprehensiveness of Benefits and Tiering
	B5. Equitable Financing-By ability to Pay	B5. Equitable Financing
Efficiency	B6. Value for Money-Clinical Efficacy	B6. Efficacy, Efficiency, and quality improvement
	B7. Value for Money—Financial Efficiency	B7. Administrative Efficiency
Accountability	B8. Public Accountability	B8. Democratic Accountability and Empowerment
	B9. Comparability	B9. Patient and Provider Autonomy
	B10. The degree of Consumer Choice	

2.2. Features of Benchmarks of Fairness

Compared with other frameworks to evaluate healthcare reform, “benchmarks of fairness” has some features.

It firstly widens our horizons to evaluate the fairness of the healthcare reform based on a broad conception of “fairness”. The breadth of benchmarks also justifies an interdisciplinary

team which consists of people with different training and work at various levels in the system to cross-disciplinary boundaries and reconcile their perspectives (Daniels et al., 2005).

Another feature that this framework emphasizes is to focus on what exactly happened in the healthcare reform. The benchmarks aim to reveal the complex pattern of the effects of the reforms on different aspects of fairness. Understanding this pattern is more informative for local-decision-makers than compressing information into an index (Braveman, Starfield, & Geiger, 2001; Navarro, 2000; Blendon, Kim, & Benson, 2001). Meanwhile, the benchmarks reveal the effects of healthcare reform based on empirical evidence. Developing countries implementing healthcare reforms need good shreds of evidence, based on local information, about the various effects of real reforms (Mackenbach, 2003). Such information suggests clues of what we should do for the next move of healthcare reform.

Moreover, this framework provides flexibility. The benchmarks permit more space for empirical evaluation. The generic benchmarks and criteria can be adapted to serve a specific purpose—the assessing team can refine the generic criteria and specifies indicators to the local conditions—this “adaption process” allows the benchmarks to be operationalized depending on which aspects of reform would be evaluated (Daniels et al., 2005). This flexibility makes it possible to use benchmarks at different levels within a system—not just for comprehensive national reforms, but for more specific reforms at the provincial or district level, or for some specific reform arrangements (Daniels et al., 2000).

The evaluation logic of “benchmarks of fairness” is that it asks how much reforms improve or worsen aspects of fairness within the health sector nationally and subnationally and through appropriate indicators, changes are measured and evaluated relative a baseline (the status quo at the time reforms are introduced) (Daniels et al., 2005). One thing needed before the application of the benchmarks is the scoring mechanism (Caplan, Light, & Daniels, 1999). The primary point of the scoring process aims to generate a clear fundamental set of rules of how to present the change of each criterion of benchmarks in an intuitional way. For example, when evaluating the reforms in the United States, a scoring system was adopted that took the status quo as a “0”, assigned a maximal positive outcome a “5”, and maximal regression form the status quo a “-5”. Experiences from Latin American countries and Thailand suggest that there is also space for designing locally-adapted scoring mechanisms (Daniels et al., 2000).

2.3. Previous studies of equity in the Chinese rural healthcare system

There have been numerous studies with purposes to assess if NCMS has improved the equity in access to healthcare. Generally, those existing studies can be categorized into four groups, with different researching interests (Zhou & Li, 2013).

Some studies tend to assess equity in healthcare financing under NCMS. For example, through an empirical study in Guangdong province between 2006 and 2007, Shen, Sun, Liu, and Zhou (2009) aimed to check the equity in individual contributions for NCMS premium, and they concluded that the contribution paid by the rural population was not equitable, and this financing mechanism was regressive because the premium collection of NCMS had not considered the ability-to-pay (ATP) among the rural population, and the access to healthcare for the poorer could get negatively affected.

Another focus of some existing studies is on the distribution of benefits from NCMS among different income groups. Ren and Jin (2007) studied the degree to which the rural population had benefited from NCMS and the degree of which their burden of Out-Of-Pocket money (OOP) had been alleviated among different income groups. They found that NCMS had effectively reduced the financing burden and promoted the utilization of healthcare services. However, they also pointed out that the benefits of NCMS mainly concentrated on the higher income groups while the lower income groups still suffered heavier financing burden and that the equity in access to healthcare had not visibly improved.

Some showed interests to study the equity in utilization of healthcare. For example, through a multi-stage hierarchical cluster random sampling method and with 2411 respondents from Tongxiang, Zhengjiang province, Wang, W. (2008) analyzed the change between 2003 and 2005 on the utilization of healthcare services before/after NCMS, and found that NCMS had the effect of improving equity in utilization, and the situation of lower use of healthcare among lower-income population could be improved with a certain degree.

Also, some researchers tend to investigate whether NCMS has effect to improve the equity in health outcomes among the rural population. By analyzing the data from the *Chinese Longitudinal Healthy Longevity Survey (CLHLS)* 2005 and 2008, Cheng and Zhang (2012) found NCMS effectively declined the portion of OOP from the rural population and increased the utilization rate of healthcare services which further improved health status.

Those studies have provided some clues for the performance of NCMS on improving the equity in healthcare for the rural population, in different ways. However, we need a broader review of the effect of NCMS. When we try to answer if NCMS could improve the equity in access, we need to consider all respects of equity together. Fewer studies have evaluated NCMS in this way. In order to fulfill this deficiency of existing studies, this thesis will use the framework of “benchmark of fairness” which provides a tool to evaluate the medical insurance scheme or other healthcare reform arrangements, integrating different goals of equity in access and financing, which could extend our the view on the equity in access from several respects. We will introduce this framework with more details in the next chapter (see chapter 2—*Benchmark of Fairness* as a conceptual framework).

Besides, existing studies only have evaluated the NCMS within a specified period. However, after 16-year implementation, it is necessary to do a chronological review on whether and how NCMS has changed the equity in access to healthcare for the rural population in 16 years. Unfortunately, fewer studies have not done this kind of cross-time assessment before. Therefore, this significance of this thesis is trying to, to some extents, make up for those academic “blank”.

2.4. How benchmarks are used in this thesis

It is important to clarify the number of benchmarks and discuss how to operationalize the chosen “benchmarks of fairness” with reference to rural China.

The first point relates to which version of “benchmark of fairness” that is fruitful to include. In table 1 two versions of “benchmarks of fairness” were presented, the original and the revised framework. For the purpose of this thesis, I will use the original one. The reasons are twofold. First, Daniels et al. (1996) only provides justifications of each criterion and each benchmark for their original version. Since I want to discuss how those criteria and benchmarks were produced as well as what rationales, principles and theories that are underlying those criteria and benchmarks, the original version is the most relevant one.

Second, some benchmarks from the revised version in table 1 go beyond the purpose of this thesis. For example, benchmark 1 of the revised version “intersectoral public health” is beyond the evaluating goal for this thesis. This thesis aims to assess a specific aspect of healthcare reform in rural China— namely the medical insurance scheme NCMS, and how NCMS has influenced access to health care for the rural population. However, NCMS rarely involve intersectoral areas. NCMS has not in itself put attention on influencing intersectoral

factors like housing, environmental factors, public safety, and violence reduction. While certainly important, investigating such intersectional factors would require one, or several, theses in its own right. Therefore, I have left out the benchmark “intersectoral public health”, as NCMS is not in itself designed to have effects in this area.

Besides, and related, I use the benchmarks to operationalise and evaluate the current medical insurance in rural China (NCMS), not to evaluate the whole of all ongoing healthcare reforms. For this reason, the evaluation will only choose the dimension “equity” of fairness in table 1. The dimensions of “efficiency” and “accountability” in table 1 will not be discussed here. This means that the thesis is limited to investigating these five benchmarks (from table 1):

- B1. Universal Access—Coverage and Participation
- B2. Universal Access—Minimizing Nonfinancial Barriers
- B3. Comprehensive and Uniform Benefits
- B4. Equitable Financing-Community-Rated Contribution
- B5. Equitable Financing-By ability to Pay

Fourth, the scoring mechanism in the original version is not used in this thesis. As mentioned earlier, the scoring mechanism (with a scale from -5 to +5) is meant to serve as an easy way to indicate the changes on healthcare reforms across each benchmark. However, it is not practical to design a scoring mechanism in all cases. It is possible to find a “baseline” or “status quo” for scoring on the healthcare reforms, but we probably will never know what will be the ideal situation that we can rate with 5.

For example, Benchmark 3 requires the medical insurance to provide a comprehensive benefits package, but how to explain “comprehensive”? People have different medical needs, and those needs are even changing over time. Without a final goal of comprehensiveness, we will fail to design a “scale” to measure accurately how well or badly the healthcare reform has improved the situation of access to healthcare. However, what we can do instead is to focus on the more limited question “if the reforms improve or worsen” comprehensiveness, rather than “how much” relative to an unspecified ideal end point.

A second reason why I have disregarded the scoring process is due to limitations of data. This thesis is based on joining together empirical material from several existing data sources. The problem is that existing data are not collected from the same samples, or the same research fields, which implies that I can often only make a rough comparison between data from different sources. It would be methodologically unsound to frame a set of data from different

sources into a precisely-designed scoring mechanism. Therefore, I have chosen to disregard the exact scoring process (-5/0/+5) in this thesis.

Chapter 3 Methodology

This chapter introduces the logic of the design of this study. I will first present the framework under which the study goes through. Then I will introduce details of what data I will use, the data sources and the process and principles of data, and finally how to analyze those data.

3.1. Study Design

To repeat, the goal of this thesis is to do an assessment of the current medical insurance scheme in rural China—NCMS—to see whether and how it has been changing the equity in access to healthcare services for the rural population within a 16-year implementation period, since the scheme was introduced in 2003 (see chapter 1). I will do this evaluation based on the policy assessing tool “Benchmarks of Fairness” (the original version) designed by Daniels et al. (1996). This tool will direct the data collection and analysis in this thesis. Another important point is that I will use existing data sources rather than attempting to do a separate empirical investigation – the latter would far exceed the resources available for a master thesis.

The logic of evaluation in this thesis is first to decompose each of the five benchmarks which evaluate the healthcare reform in respect of “equity”, and to extract assessing criterion from each of those five benchmarks (see table 1 in Chapter 2). Then, in order to make those criteria measurable, I define and refine specific indicator(s) for each of them. Following the presentation of indicators, I search for relevant empirical material to indicate the changes for each indicator in the period since 2003. Then with these results, I can make preliminary conclusions for each indicator, and finally, for the whole benchmark.

3.2. Data Sources

I use two types of data sources for operationalising and measuring the chosen indicators.

The first one is officially-published statistics which is counted and registered by government sectors or departments. Some indicators like “hospital beds” and “density of licensed doctor” can be found via such official channels. I obtain those statistics, for example, from the national statistics website, like *stats.gov.cn*. Data also come from governments reports like the serial of *China Health Statistics Yearbook (CHSY)* which reveals information about healthcare organizations, healthcare resources as well as health expenditure yearly. There are also other official reports that can provide statistics, like the *National Health Services Survey (NHSS)*.

The second type of data source is existing research literature. I need it because national statistics cannot provide empirical evidence for some criteria of some benchmarks. For example, with regard to benchmark 5 “Equitable Financing-By ability to Pay” (see table1), statistics from governments hardly suggests a direct way to measure changes for this benchmark. Instead, findings from existing empirical studies by academic scholars and others can provide material for the direction of change.

I mainly search for relevant literature from mainstream databases in China, such as CNKI, WANFANG DATA. However, other databases including Academic Search Ultimate and the search engine Google Scholar also applies and offers extra channels.

3.3. Data Collection

I use several principles for data collection.

Firstly, as stated earlier the benchmarks of fairness direct the later data collection and analysis. The criteria related to each benchmark are the key to tell me what data I need to collect, and the data refers back to indicate those criteria. In order to make the criteria measurable, I need to refine operational indicators for the criteria (see chart 1). Those refined indicators will suggest keywords for collecting data, telling what specific information I need to catch and narrow the search scale. For example, I have chosen “the *percent of licensed (assistant) doctor/registered nurse*” as an operational indicator to measure criterion 2 “education and training are sufficient and appropriate to supply the needed personnel” of benchmark 2 “Universal Access—Minimizing Nonfinancial Barriers” (see table 1 and chart above). Also, I use the “Kakwani Index (KI)” as an indicator to analyze the progressivity of the healthcare financing system in rural China in order to assess benchmark 5 “Equitable Financing-By ability to Pay”.

When searching for relevant and expected additional research literature, I synthesize a set of keywords according to each refined indicator. For example, in the case of benchmark 5,

keywords for the literature search include “New Rural Medical Insurance Scheme/NCMS+Health Financing System+Kakwani Index(KI)/equity/vertical equity/progressivity+rural China.” The above is only an example. Since benchmarks have different criteria, the keywords for the literature searches are set separately for each of the five benchmarks.

The second principle is to collect chronological data for each indicator. The research question of this thesis requires me to make cross-time comparison for each benchmark and accompanying criteria. This is consistent to the feature of measuring benchmarks of fairness—“the nature of the benchmarks requires extensive quantitative data for longitudinal comparison to demonstrate trends for improvement and cross-sectional comparison to facilitate ranking between subgroups of populations” (Pannarunothai & Faramnuayphol, 2006, p. 418). Therefore, once I get a reliable data source, the next move is to choose statistics with different time points, to produce a chronological comparison. While it is not necessary to collect data at exactly the same time points for all criteria.

A third principle when filtering the existing data is to ensure a sufficient quality of data, especially of the research literature whose findings will be used as evidence material. In this thesis, only empirical studies based on primary data sources that researchers conducted themselves, or on official databases like *China Health and Nutrition Survey (CHNS)*, or *China Health and Retirement Longitudinal Study (CHARLS)*, are included. One final principle behind the selection of empirical studies is that mostly we have preferred to include those studies whose findings can suggest the general situation in rural China nationwide.

3.4. Data Analysis

The crucial step to analyze the data is to materialize the cross-time comparison based on the available data which meets the requirements. For each benchmark, I will take a look at the details of data from different time points for each criterion and make a comparison. Following that, I will do a preliminary conclusion for each criterion, then for each benchmark. This is done in chapter 4: “*Has NCMS improved access to healthcare for the rural population.*” Finally – in chapter 5 – I do an summary based on all the benchmarks .

Chapter 4 Has NCMS improved access to health care for the rural population in China?

In this chapter, I will investigate whether and how effectively NCMS has improved the equity in access to healthcare for the rural population, based on the framework of “benchmark of fairness” and a chronological review of available data sources. I will split the discussion for each of 5 benchmarks, and within each benchmark, I will specify the discussion for each criterion. I will present the justification for each benchmark and criterion and point out the principle underlying them firstly. Secondly, I will combine those criteria with the NCMS context, which is supposed to justify the evaluation of NCMS with the framework “benchmark of fairness”. Then I will discuss and introduce how to refine operational indicators for each criterion. With those refined indicators, an empirical assessment of how equity in access to health care has developed since NCMS was introduced, can hopefully be made by a chronological literature review. Finally, a preliminary conclusion for each criterion is presented, adding up to a conclusion for each of the five benchmarks as a whole.

4.1. Benchmark 1: Universal Access— Coverage and Participation

Daniels et al. (1996) argue that the first step for a medical insurance scheme to achieve sound fairness is to ensure equity in access and provide universal coverage, and it means the scheme should include everyone regardless of their health conditions. In order to evaluate if a medical insurance meets this benchmark, Daniels et al. (1996) proposed three criteria:

- 1) the proportion of the population included in the insurance scheme, and whether it is mandatory;
- 2) whether universal inclusion is achieved as quickly as possible;
- 3) how flexibly and effectively the scheme provides access during change of jobs and living conditions.

In the following, I will do a detailed assessment of these three criteria, and how they have developed since the introduction of NCMS.

4.1.1. Criterion 1 “full coverage rate and mandatory participation.”

4.1.1.1. justification for criterion 1

With the account on protecting equality of opportunity, a fair medical insurance scheme should be one that covers all population, and this is the essential step for universal access (Daniels et al., 1996). Some groups like the disadvantaged and employees in informal sectors are more likely to be excluded by medical insurance, like in the U.S. where there has been 27 million population uninsured by any insurance schemes (CBO, 2017). This is the situation also in some other countries. Then full coverage requires the medical insurance to empower and actively get those vulnerable groups inclusive.

In addition, universal coverage also means the necessity to include those people who would opt out the medical insurance themselves. Those people could be having a good health status and low health risk, which would “justify” their opt-out. However this will often result in a situation of “adverse selection”⁷. Adverse selection implies that low risks cancel their insurance memberships while high risks stay on, forcing insurance providers to increase premiums to cover costs, leading to further exit from low risks, theoretically until premiums become so high that only the highest risks want to remain customers – at which point the insurance scheme collapses completely. Given a medical insurance scheme that permits voluntary participation, adverse selection could be a barrier for universal coverage, because it forces insurance providers to keep high risks out of the scheme (to remain attractive to low risks), or to differentiate premiums (making premiums prohibitively expensive for high risks). That is one of the reasons for mandatory participation in many medical insurance schemes.

4.1.1.2. Context of NCMS

China had 0.8 billion rural population in 2002, comprising nearly 60 percent of the whole population in China. Even by 2017, there were still 41percent Chinese living in rural areas (NBS, 2014a).

During the pilot period, the main task of NCMS was to phase in and enlarge the coverage of insurance. The phase-in schedule was: NCMS pilot expanding to 40 percent counties by 2006, 60 percent by 2007, and generally 100 percent counties by 2008, and covering almost all rural residents by 2010 (MOH et al., 2006). However, although NCMS had a clear plan to materialize universal coverage, it resisted formally “mandatory participation”—It allowed for rural residents to opt out of NCMS (The State Council, 2003b). So, has NCMS managed to

⁷ “Adverse selection” refers to a situation in which an individual who is a poor risk can conceal the fact from insurance company (Barr, 2012).

cover all rural population as expected in the proposal? Moreover, has voluntary participation been influencing the phase-in toward full coverage? We need investigation.

4.1.1.3. Refining indicator for criterion 1: “the enrollment rate of NCMS”

“Universal coverage” has been repeated over and over in criterion 1. However, the term “coverage” from Daniels et al. (1996) relates to a narrower conception than that from WHO. WHO defined “universal coverage” as “all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship” (WHO, 2019a). Taking a further step, Bayarsaikhan et al. (2015) reviewed the conception of “universal health coverage” from WHO and categorized this conception into three core policy dimensions as the extent of *population coverage* (breadth), *health services coverage* (depth), and *cost coverage* (height).

The “universal coverage” in criterion 1 tends to the dimension “population coverage”, as we can see, measuring how much population has been included in an insurance scheme. Correspondingly, Daniels et al. (1996) suggested the “participation rate” as an indicator to assess criterion 1. As for the case of NCMS, “the enrollment rate” is the official indicator to report the number of the rural population insured by NCMS.

Hence, I will adopt “the enrollment rate” as the indicator to assess criterion 1. Because firstly, above definition of “enrollment rate” and its calculation is the official standard for reporting relevant statistics. Secondly, this indicator could directly suggest the answer to criterion 1. With this indicator, I will have a chronological view to check how the enrollment rate of NCMS has been changing since 2003.

However, one more question in criterion 1 is if participation in a medical insurance is mandatory. This is a “yes-no” question, and we do not need a set of empirical materials to investigate it. NCMS has been defined as a voluntary-participated insurance scheme from the first day (The State Council, 2003b) and there have been no official documents that claim to change this property. Hence, I only need to admit that NCMS fails to meet this sub-criterion because of its “voluntary enrollment” for the rural population. However, it can be debated if mandatory health insurance participation should be a defining characteristic of “universal coverage”. Arguably, if 100 percent of the population is covered by medical insurance, then coverage is universal, even if participation is voluntary. It is an empirical question if coverage rates can be as high as 100 percent even if participation is formally voluntary. Hence in this

thesis, “universal coverage” is regarded as an empirical question, not something inherently related to the voluntary/mandatory dichotomy. So, the main focus of measuring criterion 1 is on assessing the change of enrollment rate in NCMS.

4.1.1.4. Investigation: A 10-year change of enrollment rate of NCMS

In order to figure out how the enrollment of NCMS has been changing, I have collected data from the serials of *China Health Statistics Yearbook (CHSY)*⁸. CHSY is an annual publication that reflects the development of health care and life in China and the health status of residents. This book contains the national and 31 provinces, autonomous regions and municipalities health service development and the current level of health statistics, as well as the history of the important national statistics. Now CHSY 2003 to 2018 are available. The data source for CHSY is mainly based on the annual health statistics reports from relevant departments and also on the results of sample surveys partly (CNKI, 2018).

Thereof, statistics about NCMS is produced under the “Statistics Investigation System of NCMS”. This investigation system aims to collect information about the enrollment of NCMS, the premium collection, distribution, and payout. This system collects relevant data from all counties implementing NCMS through a nationwide investigation. Every single county, as a unit, is to submit the local statistics to their superior-level department, say district/municipality/provinces, who take responsibility to review those statistics and deliver to the central government (NBS, 2014b).

One of the merits of CHSY is that the data is collected comprehensively nationwide, and data represent the whole population to a great extent. Moreover, the data in the serial of CHSY can be traced back to 2003, and it can provide a historical data set for a cross-time comparison, which perfectly meets our requirement in this thesis. However, official statistics is not be perfect. Errors like data missing or fake data from some basic-level authorities would lessen the quality of these data.

Now, back to the investigation material. Table 2 shows the number of enrollees and the enrollment rate of NCMS between 2004 and 2016, and suggests the changes in those two figures.

⁸ The name of *China Health Statistics Yearbook (CHSY)* has also been changed for several times since 2013. In this thesis, in order to keep it uniform, I will use the name *China health Statistics Yearbook (CHSY)* to represent the whole serial of this yearbook.

Year	the number of Enrollees (unit: 100 million persons)	Enrollment Rate (percent)
2004	0.8	75
2006	4.1	81
2008	8.15	92
2010	8.36	96
2012	8.05	98
2014	7.36	99
2016	2.75	99

Table 2. Enrollment of NCMS in 2004-2014. Sources: (NHFPC, 2017; MOH, 2009a)

Generally, there has been an up-trend for those 12 years. Especially during the pilot period (2003-2008), the more rural population were getting included in NCMS, which led to growth in the enrollment rate. Since 2008, the participation rate had been breaking through 90 percent, which meant a big step to the universal coverage. The enrollment rate even reached to 99 percent in 2016, which for most practical purposes must be regarded as full coverage. However, since 2016, the Chinese central government started to launch the rural-urban integration of medical insurance schemes. Therefore a large number of previously insured rural population by NCMS are no longer directly counted as enrollees of NCMS in those places. That resulted in a strong decline in the number of enrollees in NCMS from 2014, as shown in the left-hand column in Table 2. However, we can still find that NCMS has increased coverage of almost all who should be covered, as shown in the enrollment rate.

However, as we said, despite the materials coming from official data, there might be some errors which would weaken the solidity of this conclusion. For example, there could be an error emerging from the calculation for the enrollment rate. Some counties could use “the number of rural residents” currently living in this area to replace the “number of the agricultural population”. Due to the prompt rural-urban migration for those years, more rural residents have been moving for working and studying so that they are not counted in the number of rural residents any longer. However, if they still have family members staying at the original home county, then they have to enroll in NCMS forcedly due to the policy of “family enrollment” (see below). As a result, in the formula of calculating the enrollment rate, the numerator could be still large, but the denominator could be getting smaller. Thus in

reality, the enrollment rate that we can see in table 2. could be a bit higher than the actual situation.

4.1.1.5. Discussion

1) *Preliminary conclusion: NCMS has been covering almost all.*

Criterion 1 required a medical insurance to cover all the population with equitable access to healthcare as the first and essential step of fulfilling criterion 1. I use the indicator “the enrollment rate” to measure the proportion of the insured rural population by NCMS and to see if NCMS has been meeting this criterion. Table 2 showed that the enrollment rate of NCMS had continuously been increasing since 2003 and keeping it over 95 percent after 2010, which implies that almost all rural residents had been included in the medical insurance. However, some errors could happen when calculating the enrollment rate, which could lead to a higher rate being registered than the actual situation. Besides, NCMS fails to be mandatory which strictly means it does not meet criterion 1 as conceptualised by Daniels et al. (1996), although voluntary participation has not been slowing down the steps to universal coverage based on above material. The latter is in itself puzzling, and calls for a separate investigation (below).

2) *Discussion: Is NCMS a real voluntary-participated scheme?*

Adverse selection is a normal phenomenon in the insurance market, in which higher risk groups prefer to participate in insurance schemes while lower risk groups tend to opt out. Voluntary participation is one of the main reasons to lead to adverse selection and high cost, so that many researchers insisted on the mandatory participation for NCMS (Li, Q., 2010; Dong, 2004). However, given the chance of adverse selection due to voluntary participation in NCMS, why has the enrollment rate been keeping getting higher even after 2008? We need to deepen our understanding of “voluntary participation” in NCMS.

First, the official guideline regulates that participation must have the household as a unit (The State Council, 2003b). In another way, individual participation is not possible. In fact “household participation” is a way to reduce adverse selection and share the risks from diseases to a large degree (Liu, X., 2014). Household-based participation means NCMS gather family members with different health risks in the scheme, which “forces” the low-risk members to be inclusive and reduces the chance of adverse selection. Therefore, although the rural population can be free to opt in or opt out, once opting in, the whole family enrolls together. This could represent a “hidden mandatory” element in the voluntary scheme

according to some researchers (Sun, 2013). Secondly, government plays a predominant role in NCMS, which creates less space to choose from for the rural population. Although NCMS is a premium-based scheme, the subsidies from central and local governments share a significant proportion of the total premium. Highly subsidizing membership could be a boost to attract more enrollees, and that would influence the participation of rural residents.

Third, administrative mobilization forces the rural population to participate in NCMS and speeds up the enrollment rate. Although the central government forbade the local governments to push the rural population to enroll, the “enrollment rate” has been a hidden indicator for evaluating the performance of local governments, and this provides local governments with an incentive to increase the enrollment rate by some administrative ways (Gu, Xin, 2009).

Therefore, we can see that voluntary participation of NCMS, in fact, has been eliminated in some ways, and that hidden “mandatory participation” has, to some extent, replaced it.

4.1.2. Criterion 2 “high speed to phase in universal coverage.”

4.1.2.1. Justification for criterion 2

Criterion 2 relates to the speed with which the “phase-in” of reform or universal coverage takes place. Daniels et al. (1996) claims that fairness requires full participation as quickly as feasible, and especially resisted that the universal phase-in should be contingent on the reform savings until an “enough” level. According to them, depending on “savings” would contribute to make the burdens of containing costs inequitable on the one hand, while the increasing medical expense would make it unclear when there would be enough savings to afford coverage, on the other. Moreover, putting cost containment before universal coverage invites payers to save money by reducing access or coverage even more than at present, especially for those who are the sickest (high risks) and therefore need coverage the most. These reasons justify the swift universal coverage, according to Daniels et al. (1996, p. 38).

4.1.2.2. The context of NCMS

I have provided materials that NCMS spent only five years to achieve a 90 percent enrollment rate in criterion 1 (see table 2), and that it has been even closer to full participation in later years. NCMS seemed to manage to follow the initial schedule and was phasing in full participation step by step from 2003 to 2008. However, a question could be whether “five-year” is an acceptably-fast-speed to phase in the universal coverage? Compared with, for

example, Thailand, the Universal Coverage Scheme (UCS) was almost accomplished within only one year, in 2002 (Wagstaff, Adam & Manachotphong, 2012). In 2002, around 98 percent of the population had been included in this scheme (Hanvoravongchai, 2013). Compared to that, the phase-in of NCMS looks much slower. However, some would say this kind of comparison is tricky because two countries have different contexts, such as a different size of the population, different insurance policies and so on.

The Chinese central government always viewed the phase-in of NCMS as a long term project and insisted on a step-by-step approach, because there was nothing that could be copied by NCMS, so that the implementation of NCMS should be based on self-exploring and learning from own experiences from the pilot period (MOH, MOCA, MOF, MOA, MOE, National Development and Reform Commission, Ministry of Human Resources and Social Security, China Food and Drug Administration, State Administration of Traditional Chinese Medicine, & Office of Poverty Alleviation and Development, 2004). At least, it seems that we could find some justification for a longer phase-in period from the above official statement and we might, therefore, argue that it was not wrong for NCMS to be phased-in within five years due to the local Chinese situation.

The above brief comparison between China and Thailand illustrates that we should understand that there has been no uniform timetable for all countries to phase-in their medical insurance schemes to universal coverage, and therefore no a “gold norm” to assess the “speed” of the phase-in process, neither. The justification for prompt phase-in from Daniels et al. (1996) might be reasonable, but it is also acceptable for any country to have its own plans. Therefore, it would be hard to conclude whether the speed of phase-in of Thailand’s UCS was fast, or that of China’s NCMS was slow. Context matter for which speed that counts as “fast” or “slow”.

4.1.2.3. Refining indicator and measurement: “no contingencies and delay during phase-in.”

At this stage I would like to open a further discussion of criterion 2 before proceeding with the empirical evaluation. Because, as I said earlier, there is no standard for us to evaluate the speed of phase-in for any medical insurance scheme, it is difficult to find a reasonable indicator that make criterion 2 measurable.

When Daniels et al. (1996) assessed several medical insurance proposals in the U.S., they emphasized two keywords: contingency and delay. According to them, the phase-in depends

on a lot of decisions or negotiations from a board or a legislature which would result in a delay, while a phase-in connected to the sufficiency of saving money first would make the insurance scheme less likely to be initiated. They did not frame their assessment with a specific timetable, and “fast” for them could be interpreted as “no unnecessarily and unfair-delay”. This principle could guide a discussion of criterion 2 in the context of NCMS: has there been some negotiations from or within Chinese central government that has made the phase-in unnecessarily delayed? Moreover, has gathering “savings” of NCMS affected and slowed down the phase-in? I will try to answer those questions based on available empirical materials.

One point we need to notice is that, in fact, the “savings” in the context of NCMS could be better defined as contributed “premiums”⁹, because NCMS is a “pay-as-you-go” (PAYGO)¹⁰ system, and most part of the premium will be used to reimburse or “compensate” the medical expenditure during the same period as when the contributions are gathered (MOH et al., 2006). Therefore, the “savings” of NCMS is not meant the traditional sense as “surplus”, and refers to collected “premiums” instead. The annual premium (savings) of NCMS includes both the annual matching funds of central and local governments (annual tax money to finance the scheme), annual paid money by farmers (individual contributions), all interests on income generated this year of the whole premium, as well as funds raised from other channels this year (NBS, 2014c).

4.1.2.4. Investigation: There had been a smooth phase-in of NCMS.

In 2003, when the Chinese central government issued the official paper and decided to launch NCMS, the goal of “covering all rural population in NCMS by 2010” was set (The State Council, 2003a). However, there was no specific schedule for phase-in of NCMS until 2006, when the Chinese central government decided to speed up the pilot of NCMS with a clear plan—“covering 40 percent counties by 2006, 60 percent by 2007, and 100 percent by 2008, and generally insuring all rural population by 2010” (MOH et al., 2006). As we concluded in criterion 1, the phase-in of NCMS had been following this track and achieved goals on time. The Chinese central government is always the one who decides something and specify how NCMS should phase in. It could relate to the political system of China—One-party

⁹ Also defined as “the fund of NCMS” .

¹⁰ Pay-As-You-Go is normally relating to the pension system, where the pension is paid (usually by the state) out of current tax revenue, rather than out of an accumulated fund. It contrasts with a funded system, which means that the pension paid from an accumulated fund is built up over a period of years out of contributions from its members (Barr, 2004).

dictatorship. One of the merits of the political system might be to reduce the endless negotiations on some crucial decisions. It is difficult to empirically assess, since it is difficult to know, or investigate, eventual internal political conflicts that might have delayed the implementation of NCMS. However, at least during the phase-in of NCMS, we could not notice delays due to negotiations between political interests. Also, an implementation phase of five years may seem rather impressive in a country with a rural population as big as in China, and starting from a low level of coverage.

Then, has the process of gathering money affected or slowed down the phase-in of NCMS? Here, I will present figure 1 showing the changes of the premium of NCMS, and figure 2 which highlights the enrollment rate of NCMS since 2004.

Figure 1. Change of premiums of NCMS in 2004-2011. Source: (Chen & Zhang, 2013)

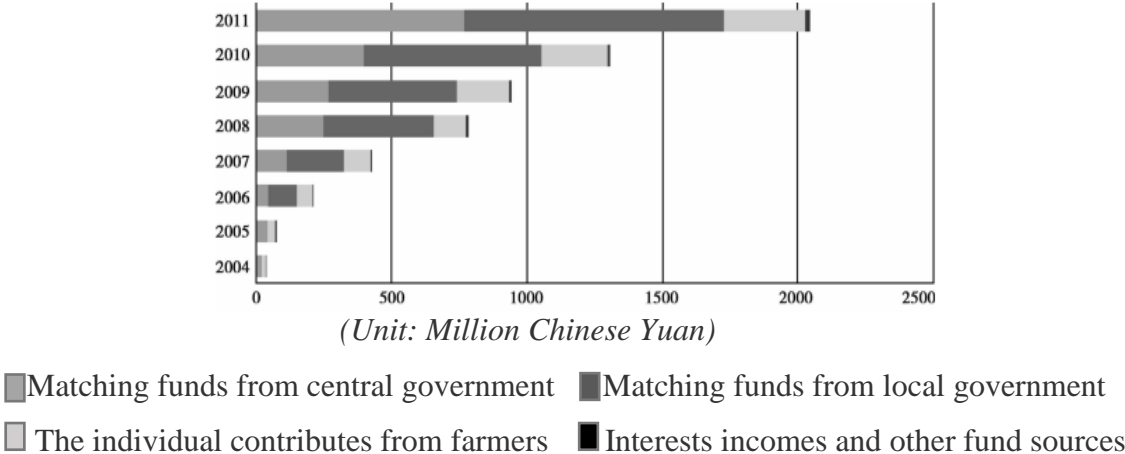
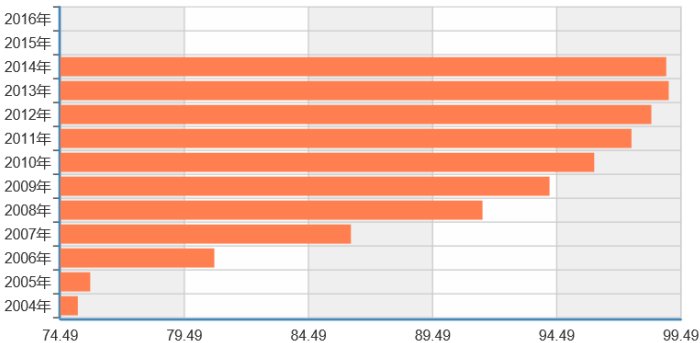


Figure 2. Change of enrollment rate of NCMS in 2004-2014. Source: Ibid



From the two figures we can find that both the enrollment rate and the total premium of NCMS had a sharper growth between 2004 to 2011. First, figure 1 tells us that the booming

growth of NCMS's premium began in 2008. The figure was rising from around 750 million to more than 2000 million CNY (Chinese Yuan) from 2008. Moreover, the scale of the premium was kept at a lower level before 2008. While from figure 2 we can see that the expansion of the enrollment rate (participation rate) happened in particular between 2004 and 2008. It means the expansion of enrollment rate, or phase-in process for NCMS, had mostly been completed before the growth of premium income, which suggests that the phase-in of NCMS did not depend on the scale of premium incomes and conversely that the accumulation of premium incomes has not necessarily slowed down the speed of phase-in. In fact, if the phase-in of NCMS had been depended on first the accumulation of its premium, there would have been a lower growth in the enrollment rate between 2004 to 2008. Rather, the two rise roughly parallel. This is as also expected when we remember that the "premium" does not refer to accumulated previous savings (since NCMS, as stated above, is a pay-as-you-go system), but rather to the sum of contributions each year from various sources. With more contributors (participants), the size of contributions (premiums) naturally also rises. Therefore, the universal coverage of NCMS had been moving forward without any delay due to any perceived "necessity" to accumulate a savings-fund first.

4.1.2.5. Preliminary Conclusion: the speed of phasing-in of NCMS was not slow.

To some extents criterion 2 cannot be measured, because differences among countries fail to produce a golden norm to measure what should count as a "fast" speed of phase-in for universal medical insurance. However, instead of refining a specific indicator, Daniels et al. (1996) tend to emphasize if there can be found some contingencies and delays to make the phase-in universal coverage slow down. Through the above investigation, I found the phase-in of NCSM had been achieved on time according to the initial schedules, and at least I could not find any clues suggesting a particular contingency or delay during the phase-in period. In addition, I checked if some provisions, like the scale of premium, had affected and potentially slowed down the phase-in. I found that the accumulation of premiums had no adverse relationship with the speed of phase-in, since the phase-in had been mostly done around 2008 while the accumulation of premiums of NCMS started to boom after that.

4.1.3. Criterion 3 "how flexibly and effectively does the insurance scheme provide access?"

4.1.3.1. Justification for criterion 3

Daniels et al. (1996) proposed the claim of equality of opportunity to justify the importance of medical insurance to provide flexible and effective access to healthcare. They claimed if health care coverage is to promote equality of opportunity, access to healthcare services must not be jeopardized when changing the jobs or geographic areas. The case from the US where there is an employment-based system of health care coverage makes the issue of portability and continuity of a medical insurance when changing jobs a primary concern. A point here might be that many US Americans could risk losing their medical insurance once they change the job. Here, we can understand that providing flexible and effective access, in fact, relates to the portability and continuity of an insurance scheme.

Further, Holzmann and Koettl (2014) proposed a definition of portability as the ability to preserve, maintain, and transfer vested social security rights (or rights in the process of being vested), independent of profession, nationality, and country of residency, as specified by two critical elements—the full receipt of vested and eligible social security rights and the full transfer of social security rights. And, here “security rights” involves also the benefits of a medical insurance scheme.

4.1.3.2. Context of NCMS

The portability and continuity is one of the problems challenging the fairness of NCMS. The targeted object of NCMS is the rural population, who constitutes the larger part of migrant workers in Chinese society. In 2017 China had 287 million migrant workers out of the rural areas, which means those rural residents has to work and live outside their original home region. In particular, 45 percent of those migrant workers did cross-province migration (NBS, 2018a). The access to healthcare for those migrant workers is tightly connected with the portability and continuity regulations of NCMS.

The basic rule is that the rural population must participate in NCMS at their original home, not where they are working and living temporarily. Also, to some extent, NCMS is still a locally-operated scheme, being coordinated and organized based on the county level government (below the provincial level government). Following the general guidelines from the central and provincial governments, local counties take responsibilities to specify the practical implementation, and consequently, this mechanism produces some differences on factors such as policy terms and benefits, among counties. The Chinese central government emphasized such locally-adapted implementation which, in fact, permitted those regional differences. Finally, there has been no utterly uniform insurance policy of NCMS nationwide.

The design of NCMS restricted itself to be more portable from the beginning. Rural populations, especially for migrant workers, would have troubles on getting benefits from NCMS when changing their location, which restrict the access for them to healthcare.

However, that is not saying that NCMS blocks all space for portability and continuity. In fact, NCMS has always been on the way to improve its portability and continuity despite those original defects. As early as 2004, the Chinese central government permitted the intercity¹¹ transfer for NCMS enrollees to seek healthcare services outside their original county.

However, those patients had to be approved in advance. Meanwhile, they also had to pay all medical expenditure by out-of-pocket money first and then return home for reimbursement with a set of procedures (MOH et al., 2004). A long and complicated process has not helped much improve the portability and continuity of NCMS.

Since 2009, the Chinese central government launched the pilot of “timely intercity reimbursement” for NCMS (MOH, 2009b). It means NCMS has been exploring some new possibilities for improving portability and continuity when moving across-jobs and regions. The rural population could have the opportunity to enjoy benefits from NCMS outside the coordinated county without a complicated procedure. However, one of the problems is about the intercity reimbursement ratio. As mentioned earlier, local provinces and counties have some spaces and autonomy to specify their policy of NCMS. Some well off counties where their local revenue could be sufficient to provide a better benefits package for NCMS, would be reluctant to share those benefits with migrants from other provinces or counties (Li, H., 2018). Therefore, the group of the rural population who would use medical services outside their coordinating county, say migrant workers, can not get their medical expenses reimbursed as much as what they could get from hospitals within their original county, because the intercity reimbursement ratio is different as the normal one, and usually much lower.

Hence, the portability and continuity of NCMS is still a challenge, though NCMS had been making efforts to make it better. With its next phase of implementation, it is necessary to check the changes in the portability and continuity regulations of NCMS. A further specification of the problem follows below.

4.1.3.3. Refined indicator: the intercity reimbursement ratio.

¹¹ “Intercity” in this thesis relates to a “cross-NCMS coordinating county” conception. For example, here “intercity transfer” means NCMS enrollees seek for healthcare services in the hospital outside their original county.

Daniels et al. (1996) do not propose some specific indicators to measure criterion 3. Further, according to Holzmann and Koettl (2014), generally, the objectives to support the full portability of social benefits can be summarised as two considerations on fairness and efficiency. Moreover, there are three criteria to assess if portability arrangements succeed in delivering on those two considerations: 1) no benefit disadvantage with regard to pension and health care for migrants and their dependents; 2) fiscal fairness for host and source countries; 3) bureaucratic effectiveness (Holzmann, Koettl, & Chernetsky, 2005).

Since the first criterion “no benefit disadvantage” for portability concerns equity or fairness, which is the topic of this thesis, I will go deep into the first criterion and keep it as the direction to assess the criterion 3 of benchmark 1. Specifically in the case of NCMS, if NCMS could have decent portability and continuity so that it would be able to provide a flexible access for people, then people will not have benefit disadvantage when they move outside their original county. Stated in another way, I will assess if the people who seek healthcare in another county would get the same benefits from NCMS as what they could get in their home county, to investigate criterion 3.

In short, the main purpose of NCMS is to reimburse total health expenditure that rural residents pay for using reimbursable medical services, with a specific ratio. For example, the reimbursement ratio could be up to 75 percent for using reimbursable inpatient services (MCA, MOF, & MOH, 2012). However, as we said that NCMS is locally autonomous, and the reimbursement ratio “75 percent” only applies within the local county, people who have to seek for medical services outside their original county cannot always get as much as “75 percent” compensation. So another concept follows—“intercity reimbursement”. Intercity reimbursement means people who use medical services outside their home county apply for reimbursement of their health expenditure on the spot. Intercity reimbursement rates are normally much lower than the ordinary reimbursement ratios. For example, the reimbursement ratio for the inpatient service in a county-level hospital within Sichuan Province was up to 65 percent in 2010, but if people need an intercity reimbursement from another hospital outside Sichuan Province, then the reimbursement was 35 percent after a deductible of 700 Chinese Yuan (Sichuan Department of Health & Sichuan Department of Finance, 2010). Now, we see there is a gap between local reimbursement and intercity reimbursement in NCMS—different deductibles and reimbursement ratios, and this gap, in fact, is suggesting a benefit disadvantage for the migrants. Given if NCMS had decent portability and flexibility, the ratio for local reimbursement and intercity reimbursement

would be same. Therefore, I will view the “intercity reimbursement ratio” as an indicator to investigate the gap representing the benefit disadvantage in NCMS, through which the degree of portability and continuity of NCMS will be suggested.

4.1.3.4. Investigation

I have searched the data about local and intercity reimbursement rates for inpatient service from two provinces, Henan and Hubei. Those data are available from the provincial document “Annual Compensation Scheme of NCMS” texts. “Annual Compensation Scheme” is issued officially by provincial governments and offers information like the standard of premium collection, the utilization of premium of NCMS, the ratio of reimbursement and other affairs. I selected those two provinces because the detailed policy terms of NCMS are produced by local provincial and county government and those policies vary, more or less, among regions—there is no uniform insurance policy for all counties. “Annual Compensation Scheme of NCMS” is the only source to provide information on the reimbursement ratio. In order to present the gap or “benefit disadvantage”, I compared the local and intercity reimbursement ratio as well as corresponding deductibles for each province. Meanwhile, in order to suggest the change over time, I also collected data for different time points. Relevant figures are shown in table 3.

Province	Years	County-level hospitals (deductibles/reimbursement ratio)	Outside-province Hospitals (deductibles/reimbursement ratio)
Henan	2010	300 CNY*/60%	1000 CNY/50%
	2012	400 CNY/80%	2000 CNY/65%
	2014 ¹²	500 <X≤1500 CNY/60%	2000 <X≤7000CNY/45%
		1500CNY< X/80%	7000 CNY<X/65%
Hebei	2009	200-400 CNY/60%-70%	800-2000 CNY/45%-60%
	2012	300-400 CNY/70%-78%	3000-4000 CNY/45%-55%
	2015	300-400 CNY/70%-85%	4000-5000 CNY/40%-45%

¹² There are two set of numbers for Henan province in 2014, because the reimbursement ratio varies depending on the sum of medical expenditure. “X” represents the sum of medical expenditure from reimbursable healthcare services.

Table 3. Deductibles/reimbursement ratio on intercity treatment in Henan and Hebei¹³

*CNY: Chinese Yuan.

Despite differences between the two provinces, they had a similarity—the intercity reimbursement rate was much lower while the deductible for intercity reimbursement was much higher, compared with the local reimbursement. Equally important, this situation has not improved over the years in both provinces. Given that a migrant worker insured by NCMS used inpatient service outside Henan province, and spent 3000 Chinese Yuan (CNY), then he/she could get a reimbursement of 1000 CNY in 2010, but only 450 CNY in 2014. At the same time, he/she could get 1620CNY and 2100 CNY reimbursement respectively in 2010 and 2014 if using treatment at local county hospitals. Comparing intercity with local reimbursement, much lower intercity reimbursement and much higher intercity deductible suggests a severe benefit disadvantage of NCMS. Through a chronological view, we can see that the gap between local and intercity reimbursement has not become narrower in this time period; it has even become wider. The above table 3 reflects that portability and continuity had not improved across time. The access to healthcare services for some rural migrant population had not been equalized, not even to some extent.

However, only a few provinces provide a serial of “Annual Compensation Scheme of NCMS” documents to the public. Therefore I could not collect data from more sites than Henan and Hebei, to make a comprehensive comparison for all regions. We should be aware that the conclusion is only based on two provinces, and does not necessarily reflect the situation for the whole country.

4.1.3.5. Preliminary conclusion: NCMS had not improved portability and flexibility

According to the framework constructed by Daniels et al. (1996) the first Benchmark of fairness, labeled “universal coverage”, includes the criterion 3 that requires medical insurance to provide portable and flexible health care access for the participants when they change the job or living locations. I have used the indicator “intercity reimbursement ratio” to check if the insured rural population by NCMS who move out their original county would suffer benefit disadvantage. Based on the above materials from two provinces, I found that NCMS

¹³ Sources: (Henan Department of Health, Henan Department of Finance, & Henan Administration of Traditional Chinese Medicine, 2013, 2011, 2009; Hebei Department of Health, 2008; Hebei Department of Health & Hebei Department of Finance, 2011, 2014)

had not been reducing the gap between local and intercity reimbursement ratio over the years. This finding suggests that there still is a benefit disadvantage once rural residents change their location or living place, and that the portability and continuity of NCMS has not been gradually improved during the implementation period. NCMS had not equalized the access to healthcare for the rural migrant population. However, this conclusion is based on data from only two provinces, hence it could be that it is not solid.

4.1.4. Summing up the three criteria that comprise an operationalisation of Benchmark 1, “universal access”.

We began by quoting Daniels et al. (1996)’s proposed three criteria for operationalising universal access: 1) the proportion of the population included in the insurance scheme, and whether it is mandatory; 2) whether universal inclusion is achieved as quickly as possible; 3) how flexibly and effectively the scheme provides access during change of jobs and living conditions.

To conclude the investigation of the first benchmark, NCMS has led to a gradual fulfillment of the first criterion, which is now close to being fulfilled; the speed of inclusion has not been particularly slow or hampered by visible, avoidable contingencies and delays (although this criterion is difficult to operationalise, since “as quickly as possible” is a context-dependent criterion where there is no agreed-upon international standard); but NCMS so far has failed to adequately fulfil the third criterion: to provide equal access also for those who change, or move between, counties or regions.

4.2. Benchmark 2: Universal Access-Minimizing Nonfinancial Barriers.

Universal medical insurance could help a lot to reduce financial barriers to health care access, but it can not by itself eliminate other crucial barriers. Equitable access happens when both financial and non-financial difficulties can be addressed. Again, the rationale underlying Benchmark 2 is to protect equal opportunities. A reasonable distribution and supply of social resources are crucial steps to improve access and equalize opportunity to healthcare among subgroups (Daniels et al., 1996).

However, some would say that NCMS, as a medical insurance scheme, could not have the effect or the function on influencing also non-financial barriers to healthcare resources.

However, we should know that more than an insurance, NCMS has also been a central part of healthcare reform in rural China. The Chinese central government has realized that there is a relationship between the success of NCMS and supply of relevant health resources, and for most NCMS documents the importance of a sufficient supply of healthcare resources to accompany the insurance scheme has been repeated over and over by the central government. It has been considered unlikely to succeed in extending access to healthcare with only an insurance proposal. There must also be health care services of an acceptable quality to be got by those who are insured, for them to want insurance in the first place. Hence, I would check the change of the supply of healthcare resource in rural China after the launching of NCMS.

Generally, there are four criteria to be considered when assessing this benchmark 2:

- 1) appropriate resources like personnel and facilities are offered and reachable when needed;
- 2) education and training are sufficient and appropriate to supply the needed personnel;
- 3) Health insurance proposals proposes to facilitate the use of medical services by people with different languages, cultures and class background;
- 4) adequate education and information are provided to facilitate negotiation of the system (Daniels et al., 1996).

I will combine last two criteria into one, as “If healthcare insurance proposes some effective steps are taken to facilitate the use of services and negotiation of the system” and the reason for this combination will be presented later (see below). As with benchmark 1, in the following, I will go through the assessment of the above criteria (that together constitute an operationalisation of benchmark 2).

4.2.1. Criterion 1 “appropriate resources like personnel and facilities are offered and reachable.”

4.2.1.1. Justification for Criterion 1

In a normal market, the supply of healthcare resources is commonly influenced by medical demands (Daniels et al., 1996). Based on the law of supply and demand, the relationship between demand and supply underlie the forces behind the allocation of resources. According to the law of demand, the growth of demands would lead to the rise in the price of a product. Meanwhile, the law of supply means that the higher the price, the higher the quantity of products supplied (Investopedia, n.d.). In short, supply increases following the demand for

more profits among suppliers. Similarly, in the case of healthcare resources, the group of people who can afford healthcare services would be more likely to release their medical demands and seek for relevant resources to meet their demands, and consequently, the supply of resources would concentrate at those people.

To some extent, a medical insurance can play an essential role in affecting the availability and distribution of healthcare resources. Because medical insurance can increase the medical demands from those previously underserved people, then the market would target the broader demands created by insurance coverage, and adjust the supply of resources to meet those demands (Daniels et al., 1996). However, “these effects take time, and they work imperfectly” (Daniels et al., 1996, p. 40). Therefore, often, although we have universal insurance, depending on a market to produce an equitable redistribution of services is not always the better choice. Also, if an insurance system is launched before there is adequate supply, people may lose faith in the system and cancel their insurance – in particular if insurance is formally voluntary, as in rural China. Instead, the government should take action to provide sufficient healthcare services.

4.2.1.2. Context of NCMS

China has been facing maldistribution of medical resources for years. Early, as when NCMS got launched, 70 percent of Chinese residents coming from rural areas shared less 30 percent of all medical resources. The shortage of medical resources in rural China led to limited access for the rural population to affordable, effective and efficient medical services (Fu, Li, & Zhang, 2004). As one of the major tasks, NCMS has responsibility to promote the utilization of medical services for the rural population. Moreover, in 2003 the Chinese central government did not only launch an insurance scheme but also correspondingly took actions to guarantee the supply of healthcare resources for rural areas, because they understood that available healthcare resources were tightly tied with the implementation of NCMS. Without providing adequate medical facilities, personnel and medicines on the ground, NCMS could not offer adequate insurance.

In the official document *Guiding opinions on further improving the pilot work of New Rural Cooperative Medical Insurance*, the Chinese government emphasized the importance of supply of health care resources: “...in order to keep a high-quality operation of NCMS...all local governments shall combine the whole healthcare reform and the launching of NCMS, making efforts to develop the three-ties healthcare delivery network, to improve the medical

infrastructure and better quality of medical services... to strengthen the education and training for the medical personnel in the rural areas...” (The State Council, 2003b, p. 1).

In 2006, the Chinese central government further decided to speed up the phase-in of the pilot of NCMS. In order to catch up with the fast phase-in process, the Chinese central government restated to strengthen the supply of healthcare resources:—“...all local governments shall continue to improve the supply of medicine for the healthcare providers in rural China...strengthen the construction of healthcare facilities in rural areas by setting up township hospitals, village healthcare points...provide professional training for medical personnel from rural areas for heightening the quality of medical personnel...” (MOH et al., 2006, p. 1).

Therefore, we see here that the Chinese government did not put the concern on healthcare resources aside when implementing medical insurances. Also, although NCMS might not have as the most critical obligation to improve the supply and distribution of healthcare resources directly, it has been pushing the government to consider the optimization of resources indirectly. So, back to the question: has the supply of healthcare resources been improving since the launching of NCMS?

4.2.1.3 Refining indicator: “density of medical facility/personnel and traveling time/distance.”

According to Daniels et al. (1996), both criterion 1 “*appropriate resources are where they are needed and are reachable by those who need them*” and criterion 2 “*education and training are sufficient and appropriate to supply the needed personnel*” aims to assess the “physical access” to healthcare services from the perspective of “availability”. In addition, they point out that “barriers” that can influence the “physical access” to health care include the supply of healthcare resources, transportation and “arrangements at work or home”. However, Daniels et al. (1996). did not provide a clear definition of the concept of “availability” and its relevant influential factors, which makes it a challenge to find accurate indicators for assessing these two criteria.

Intuitively, the way Daniels et al. (1996) view “availability” appears close to how Levesque et al. (2013) explain what “availability” means in their attempt to conceptualize the meaning of “access” to healthcare services. According to Levesque et al. (2013) “availability”, as a dimension of “access”, refers to the extent that health services (either the physical space or those working in health care roles) can be reached both physically and in a timely manner.

Availability constitutes the physical existence of health resources with sufficient capacity to produce services (existence of productive facilities) (Frenk, 1992). Availability may refer to at least four aspects: 1) the characteristics of facilities (e.g. density, concentration, distribution, building accessibility); 2) of urban contexts (e.g. decentralization, urban spread, and transportation system); 3) of individuals and their situation (e.d. duration and flexibility of working hours); as well as 4) the characteristics of providers (e.g. presence of health professionals, level of qualifications) (Whitehead M, 1992). Those four aspects provide a clear direction for assessing criterion 1 and 2¹⁴.

Back to measure “availability” in criterion 1, it is not practical to assess all of those four aspect within the limits of a master thesis. Instead, and also based on the availability of existing data, two aspects will be assessed here: the characteristics of facilities, and the characteristics of providers. The density of “Hospital Beds” has been widely used as an indicator of facilities, used also by WHO (2010b). With regard to characteristics of providers, “Licensed Doctor”¹⁵ and “Registered Nurse”¹⁶ are two types of important healthcare providers in China, who take major responsibilities on healthcare delivery in practice. The supply of those two types of healthcare personnel significantly influences the access for the rural population to healthcare services. Hence, the “density of Hospital Bed/Practicing Physician/Registered Nurse” will be an indicators for evaluating criterion 1.

Two more points should be clarified here. First, this evaluation mainly focuses on the healthcare resources in “township-level hospitals”. The Chinese central government tries to guide the distribution of patients to lower-level healthcare providers rather than higher-level hospitals by reimbursing more from NCMS for services at low-level providers. Therefore, township-hospitals will take a heavier burden to provide healthcare services and meet the increasing medical needs of the rural population. Accordingly, the adequacy and quality of healthcare resources at township level significantly influence the access to services for the rural population, as well as the use of NCMS. Therefore, accessing healthcare resources at

¹⁴ However, Daniels et al. (1996) may hold a more narrow definition of “availability”, where “availability” only refer to the “existence” of healthcare services and resources, not including those dimensions like “transportation system” or “work and home arrangements”. While Levesque et al. (2013) may have an even broader conceptualisation of “availability”. None the less, in this study I deem it sufficient to focus on a limited number of aspects.

¹⁵ “Licensed Doctor” refers to medical workers who have obtained the licenses of qualified doctors and have been practicing in medical treatment, disease prevention or healthcare institutions (NBS, 2018b).

¹⁶ “Registered Nurse” means personnel who practices nursing works and has officially-verified qualifications. The group of nurses who works in managing work are not included (NHC, 2018).

township-hospitals is likely to be more sensitive to the effects of NCMS on promoting supply of health care resources. Another relevant factor is “density” of services. I will use data from *China Health Statistics Yearbook (CHSY)* to evaluate criterion 1. Therefore, this thesis will follow the definition of density in CHSY. There, “density” refers to “the ratio of a specific healthcare resource(e.g. hospital bed) to 1000 population” (NHC, 2018).

These indicators of services availability reflect some, but not all, barriers and facilitators to access. One of the additional dimensions is travel time and travel distance, thus to measure the proportion of the population living within a specified travel time and/or distance from a health facility (WHO, 2010b). In fact, criterion 1 concerns not only “availability”, but also “reachability”. Therefore, in addition to measuring the density of facilities and characteristics of providers, I will also use indicators of how reachable healthcare providers are.

Accordingly, based on the availability of data and the suggestion from WHO, another indicator for criterion 1 refined here is: the proportion of the rural population who can reach the nearest healthcare providers within a certain traveling time/distance.

4.2.1.4 Investigation

1) A 12-year change on the density of medical facility and providers in rural China.

Year	Licensed Doctor	Registered Nurse	Hospital Beds
2004	1.04	0.50	0.76
2006	1.26	0.66	0.80
2008	1.26	0.76	0.96
2010	1.32	0.89	1.12
2012	1.40	1.09	1.24
2014	1.51	1.31	1.34
2016	1.61	1.50	/

Table 4. Change on the density of some facilities and medical personnel in rural China.

I got relevant data for Table 4 based on the serial of *China Health Statistical Yearbook* (NHFPC, 2017; MOH, 2009a; NHFPC, 2015). I have discussed the merits and weakness of this data source earlier (see above). Table 4 generally suggests that the density of hospital bed and medical personnel has been growing since 2003. The density of “licensed doctors” was changing from 1.04 per 1000 rural population in 2004 to 1.61 of 2016, and the numbers of “hospital beds” was increasing from 0.76 to 1.34 per 1000 rural population between 2004 and

2014. A much more outstanding increase belongs to the “registered nurse”, which was rising from 0.50 to 1.50 per 1000 rural population during those years. The growth in density suggests that rural residents have been enjoying more healthcare resources.

However, the density of “hospital bed” only indicates the supply of inpatient service, which might not be enough to suggest the availability of resources on outpatient services. Besides, there is no standard of “density” to suggest “adequacy” of healthcare resources, in either a global or national context (WHO, 2009b).¹⁷ Therefore, the above indicator is evidence that there have been gradually more resources supplied in rural China in the period under study, but it does not answer if resources have been getting “adequate” to meet rural residents’ medical demands.

2) A 10-year change of traveling time/distance to medical services in rural areas

Here, the indicator “the proportion of the rural population to the nearest healthcare provider within a certain traveling time/distance” is used to assess changes in the “reachability” of healthcare resources, which is another aspect of “availability”. Relevant data comes from *National Health Services Survey 2013* (CHSI, 2013), which provides a chronological set of data.

The *National Health Service Survey* (NHSS) is a program to monitor the health status of urban and rural residents, in order to understand the needs, demands, utilization, financial burden as well as levels of satisfaction with health services. This project started in 1993, proceeding every five years, and there have been five rounds by now. NHSS selects samples based on multi-stage, stratified random cluster sampling methods. The past five surveys followed the same research purpose, design, methods of sampling and data collection. Moreover, the number of samples has been increasing over the years. As for the latest round of survey in 2013, the whole country was divided into 6 areas, as eastern urban/rural areas, the mid urban/rural areas, and the western urban/rural areas. 26 counties (cities or districts) were sampled out of each of the 6 areas, and 156 counties (cities or districts) were selected. From each selected county (cities or district), 5 sample towns (streets) were taken, which produced 780 sample towns (streets). Then 2 villages (neighborhood committees) were selected from each sample town, resulting in 1560 villages (neighborhood committees) in total. From those sample villages, 93613 households with a joint population of 273688 were chosen for this

¹⁷ Yet again illustrating the problem of measuring access to health care using an aggregate scale with clear end points, such as between -5 and +5 in Daniels et al. (1996) (referred in chapter 2).

survey. The data collection was based on the in-house inquiry method, and trained surveyors took responsibility to ask the family members questions according to the designed questionnaire. Quality control and controlling methods were adopted during several phases. According to the methodological report, the response rate and the consistency rate of the results between the original survey and the countercheck was reasonably high. Collected data was analyzed based on urban-rural comparisons and the “eastern-mid-western” division, and then using a descriptive method to present the situation and the variation (CHSI, 2013).

The merit of NHSS relates to the large scale of samples, a comprehensive cross-province investigation, high response rate and systematic quality control. However, Center for Health Statistics and Information (CHSI) (2013) pointed out that one of the weaknesses is an overrepresentation of people of old age among the initial samples. Some teams might attempt to rectify that weakness by using population weights when analysing the data, but CHSI did not clarify this point.

Table 5. shows the situation of traveling time to the nearest health care provider for the surveyed rural households, and suggests the changes from 2003 to 2013. We can see that 85 percent of the respondents reported that they could reach the nearest medical services within 20 minutes in 2003, and this figure rose slightly to 89 percent in 2013.

	2003	2008	2013
% of rural household who can reach the nearest health care provider within 20 min.	85	85	89

Table 5. Travelling time to nearest healthcare provider for surveyed rural population¹⁸.

Next, let us check the reported distance for rural residents to the nearest healthcare providers from table 6.

% of the survey households to the nearest healthcare provider in rural areas within			
	2003	2008	2013
1 KM≤	61	58	57
1-2 KM	18	18	18
2-3 KM	9	10	12
3-4 KM	4	5	5
4-5 KM	3	3	3

¹⁸ Source: (CHSI, 2013).

≥ 5 KM	5	6	5
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Table 6. Travelling distance to nearest medical service provider for surveyed household¹⁹.

A visible change was happening on the reported distance to a healthcare provider within 1 kilometer (KM) 61 percent of the respondents reported that they could get the healthcare within 1KM in 2003, but this number declined to 57 percent in ten years. Meanwhile however, a larger percentage of the rural population reported a *longer* distance to the nearest healthcare provider between 2003 to 2013. For example, in 2003, 21 percent of the respondents reported a travel distance of 2 KM or more; that percentage rose to 25 in 2013.

Taken together, the above two tables produce a puzzle for us. Normally a shorter distance might suggest that people need shorter traveling time to a healthcare provider. These tables suggest that more a larger percentage of the rural population had to travel a longer distance to the nearest healthcare provider in 2013, but the traveling had not been increased. A likely possibility is that the transportation system in rural China has improved. Better road conditions and more widespread use of transporting tools like motorbikes or cars could be helpful for the rural population to reach a remote healthcare provider within a shorter time than in 2003. There may be other explanations, but unfortunately this study cannot further investigate this puzzle.

Back to the above tables. Due to the large sample, strict quality controls and a reasonable sampling method, these numbers from NHSS are likely to be of sufficient quality, thus results based on these data can also be regarded as reasonably solid. However, as I mentioned, since the samples tended to overrepresent people of old age, comparatively they could fail to give an accurate estimate on their traveling time and distance to the nearest provider when they answered those questions during the in-housing inquiry. CHSI might correct for known biases in the sample toward the old, by age-weighting the sample. But we are not further informed.

4.2.1.5. Preliminary conclusion: improving supply of medical resources in rural China

Universal access requires to minimize non-financial barriers, and to make appropriate healthcare resources of sufficient quality available within a reasonable distance is one of the conditions to achieve this. To assess if the “availability” and “reachability” of services in

¹⁹ Source: (CHSI, 2013).

criterion 1 have improved, indicators such as “the density of hospital bed/licensed doctor /registered nurse” and “the proportion of the rural population who can reach the nearest healthcare provider within a certain traveling time and distance” were used. The available empirical material showed that the supply of medical facilities and healthcare providers has increased since the launching of NCMS, and the rural population can enjoy more healthcare resources across time. Also, a larger percentage of the rural population report less time to the nearest healthcare provider, which may indicate that not only the availability but also the reachability of healthcare services has improved. However, the available empirical material also suggested that a large percentage of the rural population has to travel a longer distance to the nearest healthcare provider, which produced a paradox taken together with the previous finding of “shorter traveling time”. There may be many explanations for this paradox, but a possible reason is that this stems from the better transportation system (road quality, prevalence of motorbikes and cars) in rural China during this period.

4.2.2. Criterion 2 “sufficient and appropriate education and training to supply personnel.”

4.2.2.1. Justification for criterion 2

To repeat, both criterion 1 and 2 aim to assess the “availability” of healthcare resources. Therefore, the justification for criterion 1 also applies to criterion 2: Sufficient and appropriate education and training to supply health personnel.

In fact, the effect of “the supply of healthcare resources follows the medical demands”, might in itself result in an inequitable distribution of medical personnel, in respect of “quantity” of personnel as well as “quality” of personnel. For example, the urban population, having on average higher incomes, would be more likely to seek high-quality healthcare services and to afford those services because of, for example, the relationship between health status and higher income. Consequently, many urban hospitals would attract more qualified professionals than rural hospitals by providing a better salary, living and working conditions and welfare policies, thus being able to offer higher-quality services in order to meet medical demands of urban residents. Hence, a maldistribution of medical personnel could happen—more qualified personnel could concentrate in the urban areas than the rural areas.

Similarly, instead of relying only on a market which would hopefully adjust the distribution of qualified medical personnel somewhat when a medical insurance manages to extend the

demand to the poorer segments of the population, we may need to effectively and actively supply more qualified medical personnel to some underserved areas.

As for the Chinese context, the Chinese central government has realized that “low quality, limited amount, and unreasonable distribution” are major problems for the healthcare resources in China. Specifically, “low quality” for medical personnel has been indicated by “the proportion of physicians and nurse who have received sufficient education and training is still low” (The State Council, 2015, p. 1). Since the launching of NCMS, a lot of relevant documents have been emphasizing the significance of strengthening the qualification of medical personnel in rural areas, in order to carry out the implementation of NCMS (MOH et al., 2006; MOH et al., 2004). Hence, there is a rationale to assess if the qualification of medical personnel has been improved in rural China with the launching of NCMS.

4.2.2.2. Refining indicator: the number/proportion of licensed doctor/registered nurse at township hospital

Criterion 2 “education and training should be sufficient and appropriate to supply the needed personnel”, is difficult to measure directly. Because even though we might easily report and list the education and training that have been provided for medical personnel, it does not necessarily suggest that those medical providers have been adequately educated and trained.

Therefore, we need to know what and how much education the medical personnel has been provided with, in order to indicate if we are closer to “sufficient” education and training.

I here will use the indicator “professional qualification holder” to assess this criterion from an opposite side. A “qualification holder” is commonly viewed as a competently trained professional in a certain area. Only a person who has completed required studies and training can be accredited through being granted the certificate of a specific qualification.

For example, in Florida of the U.S., applicants to become a licensed Medical Doctor must meet either the requirements for Licensure by Endorsement or Licensure by Examination to proceed with the applicants process, while only people who have completed required education, training or practicing, and passed all national examination can be licensed by Endorsement (Florida Board of Medicine, 2019). As we can see, “Licensure by Endorsement” and “Medical Doctor” in Florida is exactly a qualification to accredit people who have sufficient knowledge and training to work in practice. Therefore, a “qualification” or “license” can be proof that medical personnel has been educated and trained sufficiently and appropriately.

Most of the medical personnel in China, including physicians, nurses and pharmacists, must hold the corresponding qualification to work in corresponding areas. “Licensed Doctor” refers to medical workers who have obtained licenses of qualified doctors and been certified practitioners of medical treatment, disease prevention or work in healthcare institutions (NBS, 2018b). For example, a person who has completed a medical bachelor degree and a one-year internship in medical providing organizations, can apply to take the exam of a “qualification of licensed physician”. Once passing the examination and completing the registration at the health department, he/she will be then accredited as a “licensed doctor”²⁰.

Similarly, the license of “nurse” in China is the “registered nurse certificate”, and this qualification holder is named as a “Registered Nurse”. “Registered Nurse” refers to the practicing nursing personnel with the certificate of registered nurses, excluding nurses engaged in management (NBS, 2014d). People who graduate from vocational schools in the nursing profession and complete an 8-month practical training, can apply to take a qualification exam which includes theoretical and practical parts. Those who pass the examination and complete registration at health departments will be granted with a “registered nurse” certificate, and permitted to provide nursing works²¹.

Doctor and nurse are two crucial medical personnel in China, and their qualification requirements tightly ties with the quality of medical services. To some extent, the quantity of “licensed doctors” and “registered nurses” can suggest if the sufficient and appropriate education and training has been proceeded to supply medical personnel. Since normally if more education is offered, more medical personnel would get appropriately educated and trained. Therefore, I will check the number of two types of medical qualification holders, as an indicator for assessing criterion 2. Moreover, in order to go even deeper into the qualification of medical personnel, I will also check the percent of “licensed doctor” and “registered nurse” among total medical technical personnel²², to shed light of the qualification level for whole teams of medical personnel.

Theoretically at least, if there are more qualified doctors and nurses across time this should improve the level of professionalism of the whole medical personnel team, at least to some

²⁰ See the Article 9, 12 and 13 in *Law of Licensed Doctor of People’s Republic of China*.

²¹ See the Article 7 and 8 in *Regulation of People’s Republic of China for Nurse*.

²² Medical Technical Personnel refer to the professional staff engaged in health care, including licensed doctors, licensed assistant doctors, registered nurses, pharmacists, laboratory technicians, imaging staff, health care supervisors and intern doctors, pharmacists, nurses, and technical personnel, excluding the medical technical personnel engaged in managerial jobs (NBS, 2014e).

extent. As with the evaluation in criterion 1, the “licensed doctor” and “registered nurse” are here from township-hospitals, the relevant reason for looking specifically at township hospitals has been clarified earlier (see above).

In summary, the indicator for criterion 2 is “the number and proportion of licensed doctors/registered nurses at township hospitals”, and how this has changed in the period under study.

4.2.2.3 Investigation: A 14-year change of licensed doctor/registered nurse at township hospitals

Years	Licensed Doctor		Registered Nurse		The total amount of Medical Technical Personnel at Township Hospitals
		% of Medical Technical Personnel		% of Medical Technical Personnel	
2004	402687	46	162999	18	881142
2007	396181	46	175713	20	863662
2010	422648	43	217693	22	973059
2013	434025	42	270210	26	1043441
2016	454995	41	318609	29	1115921

Table 7. The number/percentage of licensed doctor/registered nurse at township hospitals.

The above table 7 presents the number as well as the proportion of licensed doctors and licensed nurses registered from township hospitals between 2004 and 2016. Relevant data come from the serial of *Chinese Health Statistics Yearbook* (CHSY) (NHFPC, 2017, 2014a; MOH, 2008b, 2005).

Generally, both the number of licensed doctor and registered nurses had been growing. From 2004 to 2016, around 500 00 more licensed physicians have been supplying township hospitals of China. Moreover, an even sharper growth can be seen for registered nurses—around 150 000 more registered nurses have been distributed to township hospitals in this period. More qualified medical personnel suggest that more sufficient and appropriate medical education and training has been provided for rural China. Meanwhile, despite a slight

decline, the proportion of licensed doctor had been still dominant in total medical technical personnel for township hospitals.

Moreover, the proportion of registered nurse in total medical technical personnel had been continuously increasing. It means, more than the increasing number of qualified personnel in rural China, the structure of professional medical personnel had changed, and the overall team of medical personnel at township hospital had also been getting more professional: The combined percentage of certified doctors and nurses rose from 64 percent to 70 percent between 2004 and 2016.

Since the data from CHSY is based on nationwide registration, and there is a systematic mechanism to report and register relevant data, the above conclusion can be seen as reasonably robust, though there could be some errors, like missing or wrong data from some local statistics bureaus.

However, although using the number of a “qualification holders” can be seen as a reasonable indicator to realize if there has been a more appropriate education and training level provided for personnel in rural areas, this indicator does not as such suggest if the level of education and training are “sufficient”. In fact, for licensed doctors, some could complete “master degree” while some only have a bachelor degree.

More generally, the situation also with regard to this indicator is that we do not have an international or national norm about how much education and training that would be considered “sufficient” and “adequate” for meeting the needs at township hospitals.

4.2.2.4. Preliminary Conclusion: More qualified educated and trained medical personnel in rural areas.

Supply of medical resources is an indicator of quality, and sufficient education and training should be provided for improving the quality of medical personnel. The above empirical material suggests that increased education and training had been provided to produce more quality personnel in the rural areas of China, since the launching of NCMS. In short, NCMS had improved criterion 2 with regard to the second Benchmark. However, we do not know if this qualification is really “sufficient” to meet people’s medical needs. A further discussion about when we may reach “sufficiency” in the qualification of medical personnel with regard to determining when access to health care is equitable, can always be conducted.

4.2.3. Criterion 3 “effective steps taken to facilitate the use of services and negotiation of system.”

4.2.3.1. Justification for criterion 3

According to Daniels et al. (1996), non-financial barriers like language, culture and social class should be reduced, and efforts should be made to equalize people’s understanding about health issues as well as their information about health services, so that population disparities in those respects will be reduced. In this way, the purpose of those effects is to promote the utilization of the healthcare services from a *demand-side* perspective.

Levesque et al. (2013) also proposes a similar argument. They stress that with regard to access dimensions such as “availability” of “accessibility” of healthcare services, in addition to the physical existence of healthcare resources with sufficient capacity to produce those services on the *supply-side*, there are corresponding access dimensions such as “ability to reach” from the *demand-side*, which should also be investigated. “Ability to reach healthcare” relates to the notion of personal mobility and availability of transportation, occupational flexibility, and not least knowledge about healthcare services, that would enable a person to reach service providers when health care needs are felt. Restricted mobility of the aged and handicapped, or the inability of casual workers to be absent from work to consult medical providers, would be examples of barriers to access on the demand side (Levesque et al., 2013, p. 6).

Therefore, to improve the equity in access to healthcare resources and services, *demand-side* issues should also be considered, and relevant barriers relating to language, cultural background, and social class should be eliminated. We now turn to these non-financial potential barriers to access.

4.2.3.2. Context of NCMS

Many non-financial barriers as language, cultural or relevant problems may restrict the rural population to have the ability to reach healthcare services. These barriers may negatively affect them by not fully understand about illnesses, as well as not being informed about the healthcare system, resources, and services. Within the context of NCMS, if the rural population do not sufficiently receive and understand the information about this insurance scheme, like the operation mechanism, the benefits, and obligations, the ratio and procedures of reimbursement, their enrollment and use of this insurance scheme would be influenced,

which further may reduce the utilization of healthcare services and also the trust in this insurance scheme.

The rural population could face many non-financial barriers to NCMS and healthcare services. For example, *National Population Census* publish the illiterate rate for whole China. The rate was only 7 percent in 2000. However, 64 percent of this illiteracy was in the rural population (NBS, 2014a). Here, “illiteracy” can be viewed as a “non-financial barrier” for the rural population of China to make use of medical insurance and reach healthcare from a *demand-side* perspective. Because of illiteracy, a relatively high number of rural population could still feel it hard to understand what NCMS exactly is and what they can get from this insurance scheme, if they are on their own with regard to understand government documents, although radio or television may help. In any case, the government can play an essential role in helping the rural population recognize and understand vital information about NCMS.

In fact, the Chinese central government has been launching multi-forms of introductions to help the rural population better know and understand NCMS. During the pilot phase, all local governments were required to guide the enrollment among the rural population “...based on different types of introductions to make rural population know well about the way to participate in NCMS, the benefits and obligations as well as the procedure of reimbursing and management system, and to have them recognize the significance of launching this insurance scheme...” (MOH et al., 2004, p. 1). Going through the most relevant government documents, we can find that strengthening introduction of NCMS and making rural population fully understand through official introductions was one of the significant tasks during the pilot period (MOH et al., 2006; Ministry of Health, 2009a; Ministry of Health & Ministry of Finance, 2007; Ministry of Health & Finance, 2005).

Moreover, it has been shown that this kind of “official introduction” has been an important way to spread knowledge of NCMS for these years. Through simple random sampling methods that produced 2500 respondents from Wenjiang District of Chengdu, Huang, Jin, Liu, Du, Song, Wang, Su, Cao, Yang, Liu, and Zhang (2006) found around 98 percent of respondents depended on the “official introduction” organized by local governments and authorities as their dominant channel to understand NCMS. The effectiveness of the official introduction could greatly affect people’s understanding of NCMS.

This kind of “official introduction” could be a multifunctional and flexible solution to some non-financial obstacles. For example, this official introduction is normally organized and conducted by local governments and basic-level authorities. When local civil servants

introduce key information to the rural population, they can use local languages so that people can more easily understand. Therefore, the barrier from language could be eliminated to some extent. Similarly, the “in-house” introduction is widely used in some places. In this way, civil servants could clarify key information about NCMS more easily accessible, in order to counter eventual illiteracy among older people in particular. They could also get feedback immediately until the rural population sufficiently understands this insurance scheme. Therefore, the official introduction NCMS may represent an important step taken by Chinese governments to overcome several non-financial barriers. Moreover, correspondingly, the effects of this action would be related to the degree to which the rural population understands the insurance scheme and healthcare services.

4.2.3.3. Refine indicator: the percentage of rural population recognize the reimbursement ratio.

As we can see, criterion 3 “*effective steps taken to facilitate the use of services and negotiation of system*” represents, a refined criterion. It combines two original criteria— criterion 3 “*steps are taken to facilitate the use of services by people with different languages, cultures, and class background*” and criterion 4 “*adequate education and information are provided to facilitate negotiation of the system*” of the second benchmark. I combined those two criteria because the previous discussion clarified that the Chinese central government has taken steps to facilitate the use of NCMS by people with a different language, or culture background, and one of the important steps is the “official introduction”. This action aims not only to promote the enrollment of NCMS but also to promote the utilization of healthcare services more generally for the rural population.

However, although these are steps, it does not necessarily mean those steps are “effective”. A proposal could include many steps to eliminate those non-financial barriers, but only those “useful” and “effective” ways can help equalize access to medical services for the rural population. Therefore, it is not enough only to check if “there are some government initiatives taken” when assessing the original criterion 3. We need to look deeper if there are empirical indicators that if the relevant step, say “official introduction of NCMS by civil servants” is taken, this has really been effective in reducing non-financial barriers to access.

Coincidentally, when the official introduction provides information for the rural population to deepen the understanding of NCMS, it simultaneously provides a chance for the rural population to reflect, or to evaluate, or to judge, or to supervise and negotiate, this insurance

scheme based on that information and their increased knowledge. The more effective the official introduction, the more adequate information is provided for the rural population to negotiate the NCMS. Therefore, we can notice that, in the case of evaluating NCMS, the original criterion 3 and 4 in benchmark 2 can be combined, since both are related to the same thing: the effectiveness of the official introduction to NCMS.

However, it could be hard to check how effective those official introductions have been, in a direct way.

Ideally, an effective official introduction should manage to make “all” rural population understand this insurance scheme, to a “full” degree. Instead of a direct measure of the effectiveness of information provided through the official introduction, we may investigate the percentage of the rural population who are clear about the information of NCMS, and the degree of which they know that information. This could be used as the proxy indicators of the effectiveness of the “official introduction”. These two indicators could be reasonable because the feedback of “how many people understand NCMS” and “how much they understand” can be a “realized effectiveness” of official introductions. In the same way that we probably need some feedback from friends to judge if a proposed pain killer could be useful to relieve a headache, we also need the feedback from the rural population as a clue to check if the introduction organized by governments are effective. Moreover, it can be easier to measure in this way. Practically, the relevant data are more available.

Of the above two “proxy” indicators to assess the “realized effectiveness” of government information, I will mainly focus on the percentage of the rural population who are clear about the information of NCMS. That said, not all information of NCMS is equally important to influence the use of, and the negotiation of, NCMS by the rural population. Some key information like the amount of the individual contribution, reimbursable medical services and medicines, the ratio and the procedure of reimbursement, theoretically would be particularly of concern to the rural population. Thereof, information about the “reimbursement ratio” is selected as an indicator in the following. In conclusion, the indicator for the criterion 3 is the percentage of the rural population who has a clear knowledge of the reimbursement ratio.

4.2.3.4. Investigation

Data here comes from four empirical studies proceeded at different time points.

First, based on the data from the *Survey of Public Investigation and Public Services (SPIPS)*, Yi, Zhang, Luo, and Liu (2011) explored the situation of the understanding of the NCMS

project among the sampled rural population. Data from SPIPS was collected through multi-stage stratified random sampling—5 provinces were selected from nationwide, and then 5 counties were sampled from each of those provinces. Then each county produced randomly 2 towns, each of which produced 2 villages. 20 household were chosen from each village, and finally, 7969 rural residents were sampled. The questionnaire was delivered to collect data. Through the analysis of SPIPS data, Yi et al. (2011) found that 40 percent of the respondents could accurately answer the reimbursement ratio at township hospitals. According to the authors, this finding may suggest a bit lower knowledge of NCMS that respondents had in 2007.

Given the sampling scale was relatively large and covering several provinces, we may assume the findings to be reliable. However, more details about the quality of SPIPS data, for example, the age structure of the samples, the response rate and so on, were not presented in this study. Therefore, it might be risky to place too much confidence in the change over time. Yao and Chen (2008) also conducted another regional investigation about the understanding of knowledge on NCMS among sampled rural population. Multi-stage sampling method was adopted to select 180 samples from 2 villages in each of 3 selected towns from 3 cities of Guangdong Province. The in-house interview was used to collect data, in total 161 respondents of which 180 were valid. Their findings showed that about 61 percent of respondents claimed that they had explicit knowledge about the reimbursement ratio at township hospitals.

However, the number of samples was quite small. Secondly, samples were concentrated in the eastern regions of China, which may not represent the situation of middle/western China. Thirdly, samples tended to overrepresent younger ages—people over 56 years old were only sharing 16 percent of total respondents. Normally the young people are likely to have a higher education level and to be more capable of catching key information than the elderly, and have a broader media channel access to know NCMS. Therefore, we should be cautious about suggesting a general conclusion for the whole rural population based on this survey.

Next, I identified two similar studies conducted in 2011.

Wang, N. (2012) launched an empirical study for this topic based on Fenyang, Shanxi Province after NCMS had completed the pilot phase. The understanding of NCMS by rural population could be expected to get deeper after 8-year implementation. By simple random sampling method, he gathered 120 households from 6 villages out of 3 selected towns. The

questionnaire was designed and delivered for data collection. The reported response rate was reaching 100 percent, and 99 percent of them was filtered as valid responses. The finding of this investigation revealed that only 37 percent of respondents had explicit knowledge about the ratio of reimbursement.

Secondly, in Yantai, Shandong Province, Li, N., and Zhao (2011) used multi-stage stratified sampling methods to choose 1 town from each of 6 districts of Yantai city and randomly selected 2 villages from each town and then 8 to 10 households from above 16 villages. In-house inquiries according to the pre-design questionnaire was used to collect data. In total 97 responses of which 107 were valid. Their finding showed that only half of the respondents knew the reimbursement ratio accurately. Both studies suggested less half of respondents had the critical knowledge of NCMS. Even when NCMS had been implemented for many years. Those findings could be robust, due to the high response rate. On the other hand, again we have to be cautious to have very high confidence in these two because of the quite small number of samples.

Based on the findings of all the above four empirical studies, a rough conclusion could be the percentage of the rural population who revealed a clear understanding of NCMS (as indicated by knowledge of the reimbursement rate) had not been visibly improved since 2003. This may suggest that the official introduction conducted by governments had not been very effective to increase people's understanding about the insurance scheme in order further to promote the use of NCMS and corresponding healthcare services. I would caution, though, to make a similar general conclusion for a larger rural population, because of the weakness of the indicator and the limited samples in the four studies.

I would further identify the weakness for the indicator here. Firstly, the official introduction could be useful to eliminate some non-financial barriers, but not all. Even if a greater number of the rural population had known this critical information of NCMS, it does not necessarily mean that the effective introduction had managed to reduce all information barriers. Secondly, not all places are depending on the official introduction to recognize the workings of NCMS. Also, different people have different capacities to understand. Therefore, even a decent percentage of the rural population who know NCMS well does not necessarily attribute to the effectiveness of the official introduction. Many factors like education background, the capacity of using the Internet or being sensitive to information, would create differences in how people understand NCMS. Finally, a better understanding of NCMS does not always relate to increased utilization of healthcare services. This indicator at most only indicate if

people have some limited knowledge of NCMS, not whether they understand healthcare services and the role of insurance in granting them access. Those weaknesses of the available indicator for criterion 3 makes it necessary to only draw very cautious conclusions as regards how dominant lack of knowledge is as a barrier to health care access.

Some further limitations in the available studies also calls for caution when interpreting the results. Basically, the above four studies had quite small samples. Moreover, the quality of data in those studies varied. Besides, the findings were produced on different research sites and with different samples, as well as different methods on data collection and analysis. This makes it difficult to say anything reasonably certain about how the rural population's understanding of NCMS had been changing after 2003.

The Chinese central government could propose further steps to eliminate non-financial barriers, in order to increase the rural populations understand of NCMS, to promote the use of healthcare services through a better understanding of NCMS.

4.2.3.5. Preliminary Conclusion

Many non-financial barriers like language, cultural norms, education background, would affect attempts to equalize the understanding about healthcare insurance and information about healthcare services (Daniels et al., 1996).

NCMS, as a medical insurance, has as a goal to promote the utilization of medical services. However, the utilization of medical services is tightly tied with the level of understanding and knowledge of NCMS, which is in turn related to a set of non-financial barriers like low illiteracy or inability to capture information from social media. This is likely to restrict many in the rural population to sufficiently recognize NCMS. Official introductions by governments is a way to introduce NCMS to the population, and hopefully to equalize people's understanding of NCMS. The empirical material referred here suggest, however, that only a part of the rural population had explicit knowledge about key information of NCMS, perhaps indicating that the official introduction had not been very effective to help a larger part of the rural population to understand this insurance scheme.

4.2.4. Summing up the findings for Benchmark 2: Reduce non-financial barriers to access

I have used three criteria to assess benchmark 2, reduce non-financial barriers to access:

1) “appropriate resources like personnel and facilities are offered and reachable.”

2) “sufficient and appropriate education and training to supply personnel.”

3) “effective steps taken to facilitate the use of services and negotiation of system”.

In sum, I find that appropriate resources have been increased in rural China. Indicators for the ability to reach relevant facilities is more mixed, as reported travel time has increased while reported travel distance has increased. I further find a clear increase in the training of the medical staff in rural China (township hospitals), while I do not find a clear tendency that information among the rural population as regards core aspects of NCMS has improved in the period under study. However, the available data concerning the last criterion are very limited, so these findings should not be exaggerated. The lack of many high-quality studies do, however, suggest that it is important with more research on this criterion in the future.

4.3. Benchmark 3: comprehensive and uniform benefits

Fairness requires equitable access to an appropriate set of healthcare services. Thus it involves requirements on both access and services (Daniels et al., 1996). Given a health insurance reform is engaged in eliminating the financial and nonfinancial barriers for achieving the universal access, one more step is to make the insured population benefit in practice. Therefore, with equalizing the access, a fair health insurance should provide a range of healthcare services what the most insured population really need according to their medical demands.

Here, “a range of healthcare services” could make us recall the concept of “universal coverage” from WHO (2019a) that I have introduced in evaluating benchmark 1 (see page 22). Three core policy dimensions, say “*population coverage*”(breadth), “*health services coverage*” (depth), and *cost coverage* (height) relates to this conception (Bayarsaikhan et al., 2015). As we can see, benchmark 1 focuses on the dimension of “population coverage”, and here benchmark 3 tends to assess the dimension of “health services coverage” (depth).

What we should distinguish here is the difference between the quality of an insurance scheme and a relevant concern on the quality of healthcare services covered by insurance. Benchmark 3 aims to assess what kind of services have covered by an insurance, and this inclines to the quality of an insurance system. However, Daniels et al. (1996) also concerns the “efficiency” of a healthcare system, as one of three dimensions of “fairness”. Correspondingly they proposed two benchmarks to assess this dimension—benchmark 6 “value for money—clinical efficacy” and benchmark 7 “value for money—financial efficiency”. Those two benchmarks then, aim to assess the quality of the covered healthcare services. For example, one of the

criteria in benchmark 6 claims to check if a healthcare reform proposal would have a plan to design a systematic assessment of outcomes and minimize overutilization and underutilization of resources. However, since this thesis only involves the dimension “equity” of fairness, benchmark 6 to 10 will not be assessed.

Precisely, benchmark 3 concerns how and what a health insurance scheme should arrange if it is reaching sound fairness. Three criteria include:

- 1) “how comprehensive are the benefits?”;
- 2) “Are there constraints on inequalities in benefits and quality due to tiering?”;
- 3) “does the range of benefits depend on savings produced by reform?” (Daniels et al., 1996).

However, I consider to skip the criterion 3 in benchmark 3. Firstly, as I mentioned earlier, NCMS is a “pay-as-you-go” system, rather a funded-system. Particularly, NCMS is formally voluntary-participated. Therefore, from the beginning, NCMS has to give benefits back to the rural population for their individual contributions, in order to maintain the operation of the system as well as to attract the enrollment. In this way, the answer for criterion 3 may be rather obvious—yes. The range of benefits may be relied on the scale of premium in NCMS. Secondly, since the annual income (annual premium) for NCMS is not only coming from the individual contributions, but also from the tax money transferred from central government (and other government levels) to subsidize the scheme, which, however, is taking large part of the annual premium for NCMS. This makes it a hard task to assess whether there should be dependence between how much various actors pay-in for NCMS during a year and how much is paid out for expanding the range of benefits. A few pages in a master thesis might not cover a deep complex discussion for this task.

Therefore, in benchmark 3, I will mainly check the criterion 1 and 2.

4.3.1. Criterion 1: “how comprehensive are the benefits of NCMS?”

4.3.1.1. Justification for criterion 1

A comprehensive package of health insurance benefits does not necessarily mean more is better. Daniels et al. (1996) claims that there are many ways of maintaining people’s normal health functions. Health care service is not the only one. Also, healthcare should not be a “bottomless pit”, and hence unnecessary and less effective benefits could reasonably be

exclusive, while benefits that meet most of the people's needs should be included (Daniels et al., 1996). Here, we should notice the keywords: "meet people's needs".

4.3.1.2. Context of NCMS: more services added in the package of NCMS, but which?

Basically, NCMS became concerned with the range of covered services, or the benefit package, mainly after 2008. When the enrollment rate had reached over 90 percent, the Chinese central government started to increase the number of reimbursable medicines and treatment items in the benefit package of NCMS.

In 2009, due to extending pool of premiums to NCMS and with reference to meeting more medical demands from the insured rural population, the Ministry of Health (MOH) decided to adjust the list of reimbursable drugs and add more in the NCMS benefits package (Ministry of Health, 2009b).

In 2010, nine medical rehabilitation types, such as physical therapy (PT), were included in the benefits package (MOHRSS, National Health and Family Planning Commission, Ministry of Civil Affairs, Ministry of Finance, & China Disabled Persons' Federation, 2010). In 2012, 6 categories of major diseases, namely End Stage Renal Disease (ESRD), breast cancer, cervical cancer, severe mental illnesses, multidrug resistance TB, and opportunistic infections of AIDS were covered, while 12 others were covered as "pilot" of insured targets, including Hemophilia, Chronic Myelocytic Leukemia (CML), Orofacial Cleft, lung cancer, stomach cancer, esophageal cancer, Type 1 Diabetes, hyperthyroidism, acute myocardial infarction, cerebral infarction, colorectal cancer, and rectal cancer (MCA et al., 2012). Phenylketonuria in children and Hypospadias were also added (NHFPC, 2014b).

The benefit package of NCMS includes two types of healthcare services, inpatient and outpatient services. During the first years NCMS inclined to cover mostly inpatient services, since these are usually the most costly. However, with the expansion of the scale of insurance premiums, NCMS had been increasing its capacity to cover more services. Therefore, more outpatient services have been covered. We can see that NCMS has been on the way to a comprehensive package. Within each of those two types healthcare services, there is a list of "reimbursable medicines", such as relevant drugs for AIDS, and a group of "reimbursable treatment items" such as Hemodialysis.

4.3.1.3. Refined indicator: the coverage of anti-cancer medicine.

The above presentation remains rather broad and without much detail. In the following, we delve deeper into the coverage of a specific type of medicine, to get a more detailed perspective on changes in comprehensiveness.

In the Chinese context, assessing the coverage of “reimbursable medicine” is easy to find information about that of “reimbursable treatment items”. For every third year, the Ministry of Health updates the *National Catalogue of Essential Medicines* (NCEM). The purpose of NCEM is to guarantee the supply and use of subsidised essential medicine for the Chinese population. The important point is that NCMS must cover all medicines from NCEM (MOH, 2009c). Therefore, NCEM could represent the coverage of reimbursable healthcare medicines of NCMS.²³

To investigate if NCEM has added all essential medicines to treat a disease or related set of diseases, a standard is needed for comparing. Here, I choose the *Model List of Essential Medicines* (EML) from WHO. EML is published by WHO and is updated biannually. It contains the medicines considered to be most effective to treat a set of diseases. The list is frequently used by countries to develop their own local lists of essential medicines (WHO, 2019b). As for 2016, more than 155 countries have created national lists of essential medicines based on the EML (WHO, 2019c). This includes countries in both the developed and developing world (WHO, 2019b). The newest list is the 20th edition, amended in August 2017. Given the rule²⁴ on selecting “essential medicine” by WHO and that EML had been used as a guideline for making national lists of necessary medicines, EML can be used as a standard for assessing the coverage of reimbursable medicines in NCMS.

However, it is not practical within the scope of a master thesis to compare all medicines between the *National Catalogue of Essential Medicines* (NCEM) of China and the *Model List of Essential Medicines* (EML) from WHO. For reasons further elaborated below, I have chosen to look more closely at anti-cancer medicine as the example. Cancer is a major and growing health risk in China, as in many other middle-income countries; and is likely to increase further in the future. Between 2005 to 2016, the top three diseases that leads to death among the rural population in China were cerebrovascular diseases, cancer, and heart diseases (NHFPC, 2017;

²³ In contrast, there has not been a list of “reimbursable treatment items” published, and it would be hard to search what reimbursable services covered by NCMS. Hence, for measuring criterion 1, I have chosen the coverage from “NCEM”, to try to explore the comprehensiveness of benefits package of NCMS.

²⁴ Essential medicines are selected with due regard to disease prevalence and public health relevance, evidence of clinical efficacy and safety, and comparative costs and cost-effectiveness (WHO, 2019b).

MOH, 2011, 2006). Usually, the disease burden indicates the demands on drugs and other medical services, and can serve as a proxy for a specific health care needs. The high prevalence of cancer makes it fruitful to have look at the coverage of essential cancer drugs in NCEM. Therefore, as a refined indicator for criterion 1, I have chosen the coverage of cancer drugs in NCEM, and I will compare it with the list of essential cancer drugs from EML.

4.3.1.4. Investigation

An expert committee had recommended totally 41 essential anti-cancer medicines to be added to WHO's *Model Lists of Essential Medicines* (EML) by 2015 (Robertson, Barr, Shulman, Forte, & Magrini, 2016) (see Appendix 2, page 110).

As for China, there have been three editions of *National Catalogue of Essential Medicines* (NCEM) by now, the *edition 2012, 2015* and *2018*. From Appendix 2, we can see that there was no significant change in the coverage of essential anti-cancer medicines between NCEM *2012* and *2015*—both only covered 19 of 41 anti-cancer medicines recommended by WHO. In other words, NCMS did not provide a comprehensive coverage on the essential anti-cancer medicines because there were still many anti-cancer drugs that could not be reimbursable by 2015. The ratio stayed the same (0.46).

8 more medicines had been added as essential anti-cancer medicine in NCEM of China by 2018, and it resulted in that totally 27 of 41 essential anti-cancer medicines recommended by WHO has been promised to be reimbursable in NCMS benefit package (a ratio of 0.65). In summary, the medicine coverage of NCMS with regard to cancer treatment has been getting comprehensive, but only after 2015.

The epidemiological transition suggests that as a country move from low income to middle income, the prevalence of communicable diseases declines while the prevalence of non-communicable diseases (such as cancer) increases (Lindstrand, 2006). Hence it becomes gradually more important that NCMS has a comprehensive benefit package for all major and life-threatening non-communicable diseases. If we can assume (perhaps a big if) that the more comprehensive package of medicines for cancer treatment is representative for similar packages for other increasingly widespread and serious non-communicable diseases, then we can conclude that NCMS has gradually got a more comprehensive benefit package in the time period under study, but only fairly recently (after 2015). We must bear in mind however that there may be regional differences in the comprehensiveness of the NCMS package, as the

package is not fully standardized at the national level and there may also be local county differences.

4.3.1.5. Preliminary Conclusion

With the *Model List of Essential Medicines* (EML) from WHO as a reference/standard, the coverage of anti-cancer medicine in *National Catalogue of Essential Medicines* (NCEM) of China is a possible indicator to assess the coverage of healthcare services in the benefits package of NCMS. The study shows that from 2012 to 2015, NCEM covered 46 percent of those recommended cancer drugs by WHO, and the comprehensiveness increased further to 65 percent in 2018. Combined with the broader set of indicators presented in the introduction to this criterion, we may tentatively conclude that the benefit package in thus if this indicator holds more generally.

4.3.2. Criterion 2: “how uniform are the benefits of NCMS? Are there inequalities in benefits and quality due to tiering?”

4.3.2.1. Justification for criterion 2

Medical insurance aims at a reasonable comprehensive benefits package that is supposed to meet the needs for the insured. Does it mean that anyone will have equal access to healthcare services? Based on account of equal opportunity, Daniels et al. (1996) claimed that a fair health insurance proposal should hold less tiering and more uniformity in quality, because once more better-off purchases extra services that further enlarge the tiering, the more discriminatory the system, and the more their presence will drive up costs as lesser plans feel pressure to keep up.

Before answering this question, let us first specify the limits of this study. Our research question is to which extent, and how, the health insurance scheme for rural China (NCMS), introduced in 2003, has increased and equalised access to health care for the rural population. This means that two important types of tiering, or lack of uniformity, is outside the scope of this thesis.

First, eventual inequality an access to health care due to there being more than one major public health insurance scheme in China is outside the scope of the thesis. As mentioned earlier in the thesis, there are three major health insurance schemes in China, of which NCMS is only one, and the other two, Urban Employee Basic Medical Insurance (UEBMI) and Urban Residents Basic Medical Insurance (URBMI). We are not concerned in this thesis with

to which extent the benefit- and reimbursement packages across these three schemes are becoming more equal or equitable. That is a large research question in its own right, which we cannot go into given the page constraint in a master thesis.

Second, there is the question if there exist supplementary health insurance schemes “on top of” NCMS in rural China (including voluntary, private schemes), and if the existence of such schemes can be interpreted as an indicator of “tiering” or “lack of uniformity” with regard to health insurance in rural China.

This is also an interesting topic, but again it is not the research question in this thesis, which – as stated in 1.5 in Chapter 1 – is limited to investigate 1) Under various benchmarks of fairness, has NCMS changed the equity in access to healthcare for the rural population since 2003, and 2) How has NCMS been changing equity in access, with improvement or deterioration?

Therefore, instead of focusing on inequalities emerging from different tiers of healthcare systems, I will look at eventual inequalities on coverage and benefits only *within* NCMS.

4.3.2.2. *Context of NCMS*

As a starting point, we can say there is no inequality on benefits or coverage among rural population covered by NCMS. Government documents do not suggest any “privilege” for the better-off. All rural population, regardless of age, gender, household income or social status, participate in this insurance scheme the same way and must pay the same amount of individual contribution (although this way can lead to the regressive healthcare financing), and equally benefit from the same package of NCMS according to relevant regulations (although there are some differences between regions). Correspondingly, there are also no specific proposals clarified to eliminate inequalities.

However, empirical studies suggests that inequalities on benefits and coverage within NCMS among the rural population still exists. Meng, Jiao, Yu, Yan, and Tang (2008) found that the enrollment rate of NCMS from the poorest-fifth of the rural population was 5 percent lower than the average level at their research site. They also claimed that the lower-income had less access to medical resources and benefits from NCMS because of high deductibles and coinsurance rate as well as low payment cap in NCMS. Their study indicates that there are indeed some groups suffering from some inequalities on coverage and benefits within NCMS.

As I mentioned, the “deductible” is the amount paid out-of-pocket money (OOP) by the policy holder before an insurance provider will pay any expenses (O'Sullivan & Sheffrin, 2003). A higher deductible in NCMS means rural population needs to pay more OOP first before they get benefits from NCMS. And coinsurance refers to a percentage that an insured must pay against a claim after the deductible is satisfied (Investopedia, 2018). Then high coinsurance rate also means lower reimbursement ratio and more OOP for rural population. Therefore, my understanding to Meng et al. (2008), is that both high deductible and coinsurance make NCMS share little financial burden for the rural population. Further, the burden from OOP might suggest a larger financial hardship for the lower-income, which might restrict them to use healthcare services — then turning back, less utilization of services, less reimbursements from NCMS. Consequently, inequalities on benefits between the well- and poor remains.

So have there been any strategies or solutions to limit those inequalities on coverage and benefits in the period studied here? There might be. For example, when initiating the pilot of NCMS, the Chinese central government proposed to establish a system of “medical assistance”. The purpose of this “medical assistance” system is to cover and insure poor families and population who are not able to participate in NCMS. It requires local governments to help their enrollment through subsidizing their individual contributions (premiums) and to provide extra subsidies to further eliminate the medical financial burden for those families (MOH et al., 2004).

In addition, “payment cap” in an insurance means the limitation on the benefits the insurer will pay in a certain period, such as one year, while you are enrolled in a particular insurance plan (HealthCare, n.d.). As for the context of NCMS, the “payment cap” refers to how much of medical expenditure for rural population can be shared by NCMS. A low “payment cap” means NCMS shares less proportion of the medical expenditure and the rural population has to pay more out-of-pocket money. Comparatively, this financial burden for the lower-income population would be relatively heavier than that for richer groups, if the payment cap is low, which might influence the utilization of healthcare services for poor people.

NCMS has adjusted the payment cap upwards year by year, to relieve the financial burden of the poor and minimize inequalities on benefits among different income groups. In 2009, the Chinese central government increased the payment cap of NCMS to as much as 6 times of the average net income for local rural areas (Ministry of Health, 2009a). And in 2012, the

payment cap of NCMS was further raised, to 8 times of average net income for the local rural area (not less than 60 000 Chinese Yuan) (MCA et al., 2012).

With adjusting the payment cap upwards, the Chinese central government has also declined the coinsurance rate (a percentage that the rural population must pay against a claim after their medical expenditure reaches up the deductible for reimbursement). This is an opposite concept to “reimbursement ratio” that we have been seeing many times in the case of NCMS. When the deductible is reached up, the “reimbursement ratio” is the percentage that NCMS should pay for the total sum of reimbursable services bill minus deductible, while the rest would be “coinsurance”, which is the part that the insured residents have to pay themselves. When the rural population needs to pay less directly, they might increase the utilization of healthcare services, and accordingly, they might get more reimbursements from NCMS than before. In 2003, the actual reimbursement ratio for rural population in NCMS was 7 percent, while this number rose to 50 percent in 2013. It suggests the coinsurance had declined (CHSI, 2013).

4.3.2.3. Preliminary Conclusion

The assessing goal in this section has been to check if there are any inequalities on coverage, benefits, and reimbursements within NCMS, and if there are some solutions in NCMS proposals to reduce those inequalities potentially.

To conclude, inequalities on coverage and benefits within NCMS still exist among different income groups in rural China. Meanwhile, changes have been made in NCMS in the period under study that has increased the value of being insured from the point of view of poorer households. At least from 2009 the payment cap of NCMS has been increased and from 2003 the coinsurance rate has been reduced, and the ratio of reimbursement increased correspondingly. Plus, there has been a “medical assistance” system in place from the very onset of NCMS, that requires local governments to help the enrollment of poor households through subsidizing their individual contributions (premiums) and to provide extra subsidies to further eliminate the medical financial burden for those familie.

It may still be debated if rural higher income households benefit more from being NCMS members than rural lower income households, but changes in payment caps, reimbursement rates and coinsurance rates in the period under study are indicators that the direction of change has been toward increasing the benefit of low-income households to be members of NCMS.

4.3.3. Summing up the findings for Benchmark 3: Reduce non-financial barriers to access

I have used two criteria to assess benchmark 3 comprehensive and uniform benefits:

- 1) “How comprehensive are the benefits of NCMS?”
- 2) “Are there constraints on inequalities in benefits and quality due to tiering?”

In sum, I find that the comprehensiveness of benefits was limited in the first years but has increased steadily in the period under study. However, as with other indicators it is difficult to suggest some endpoint where comprehensiveness will be “totally” comprehensive. With regard to constraints on inequalities of benefits, there is not and has never been any formal “privilege” as regards access to the better-off in the rural population among members of NCMS, although there may be differences relative to region. However, payment caps and various co-payment rules may be factors restricting access more for low-income groups. But changes of lowering coinsurance and deductible might improve this situation. We go more into details with regard to such rules when considering Benchmark 4 and 5.

4.4. Benchmark 4 Equitable financing—community-rated contributions

Fairness concerns not only the benefits we are obliged to provide—equitable access to an appropriate set of health services—but also how we share the financial burden of meeting that obligation between those who are prone to need health care, and those who are less prone. In benchmark 4, an equitable healthcare financing system is supposed to share the burden between the well (low risks) and ill (high risks). If this benchmark is accepted, it requires the premium of a medical insurance should be community-rated (Daniels et al., 1996). The central point for evaluating this benchmark is on whether the medical insurance scheme gathers money (premium, contributions) from members independently, both directly or indirectly, of people’s health risks (Light, 1992).

Notice that the financial burden between high risks versus low risks is not the same as the financial burden between rich households and poor households. Theoretically, poor households can be low risks (have mostly health members) and rich households be high risks (have mostly members that are prone to illness and sickness). Granted, in practice, there is often an empirical correlation between being poor economically, and being at risk of poor health. But from an analytical perspective as well as from a financial perspective (financing

the health insurance system), rich/poor and high risk/low risk is not the same. That is an argument for keeping the issue of the financial burden between high risks/low risks as a separate benchmark (benchmark 4) for equitable access to health care.

Two criteria apply in this benchmark:

- 1) whether premiums themselves do not reflect health risks, but instead are based on the average costs of an insurance in as large an insurance pool as is possible, ideally the entire community;
- 2) whether the medical insurance system reduces other ways on which the sick are made to pay more for their coverage, including for example minimizing deductibles (Daniels et al., 1996).

4.4.1. Criterion 1 “whether premium themselves reflect health risks.”

4.4.1.1 Justification for criterion 1

There are different methods to calculate the insured’s contribution or premium.

Community rating is a concept associated with medical insurance, which requires the insurance providers to offer health insurance policies within a given territory at the same price to all persons without medical underwriting, regardless of their health status (Einsurance, n.d.) For example, private insurers in Australia are required by law to practice community rating. They are not allowed to differentiate their contribution rates by the age, sex or any other criteria of the applicant (including ill-health) (Neuhaus, 1995). This means that the insurance premium or contribution is not based on demographic characteristics, or on personal health risks.

The opposite concept is “risk rating”. “Risk rating” relates typically to actuarially determined health insurance premiums, when the actuarial contribution is based on the size of the benefits to be paid if the insured event (e.g., becoming ill) occurs, as well as on the probability of the event occurring (Barr, 2004). Risk rating requires the insurer to consider the cost and probability of those insured events based on characteristics such as age, sex, profession, as well as health conditions, when calculating the premium. Therefore, while risk-rated premiums place a higher financial burden on high risks, community-rated premiums do not.

From a normative point of view, we confront two different ideas of “fairness” here. Actuarial fairness (risk-related premiums) means that each member can expect to get back from the fund the same amount as what they have contributed or put at risk (Donnelly, 2015). In other

words, according to this idea, it is not “fair” if the high-risk population get comprehensive insurance coverage with only paying the average premium, since this implies they are being subsidised by the low-risk population.

In contrast to actuarial fairness, the alternative concept of “fairness”, which Daniels et al. (1996) adhere to, takes as a foundation that we, i.e. all of us, have a solidaristic obligation to provide appropriate health care to those of us that need care. We may label this fairness as solidarity. This implies that all people, regardless of their health risks, should be treated alike, which means the healthier support the sicker, and when they become sick, others support them in turn (Daniels et al., 1996). Since I build on Daniels et al. (1996)’s theoretical framework of benchmarks of fairness in this thesis, I use this solidaristic view of “fairness” as a basis for assessing the NCMS in this regard.

4.4.1.2. Context of NCMS

Is the individual contribution for NCMS based on health risk? The answer is “no”, and we can see from the following respects.

First, NCMS is social insurance. NCMS is social insurance when being government-sponsored, and risk transfer is based on “law of large numbers”²⁵, the combination between obligation and rights (Liu, X., 2014). Furthermore, social insurance requires a mandatory participation (Hou & Kong, 2008). Although NCMS is formally voluntary-participated, there is a “hide” mandatory enrollment for the rural population, which I have discussed in Chapter 1. Also, Social insurance strengthens the capacity of mitigating risks through a large risk pool²⁶, not through excluding higher risk groups or charging higher premiums from them. Social insurance does not require the high risky to pay more premiums based on risk level.

²⁵ The Law of Large Numbers (LLN) states that the larger the number of exposures considered, the more closely the losses reported will match the underlying probability of a loss. Under the LLN, the insurer knows from experience approximately how many policies will suffer a loss and how severe most of those losses will be. While actual experience may differ from expectation, pooling a large number of policies allows the company will be fairly accurate with its prediction (Health Insurance Online, n.d.). In the case of NCMS, chinese governments aim to enlarge the number of participates in NCMS through political mobilization, keeping family as an enrollment unit, and widening the coordinating level from village to county, in order to make LLN apply. This help enlarge the risk pooling and make the loss coming from the high risky residents more predictable.

²⁶ “Risk Pooling” refered to the sharing of risks across individuals/households who were willing to pool funds to deal with the financing of health care in times of need (WHO, 2003). It also applies where a group of people are mandatoy compelled by a government to pool their funds, as in tax-financed health care systems, or health insurance systems with mandatory contributions.

NCMS follows this principle. Though, the definition of social insurance varies among researchers.

Second, NCMS can also be conceived as a mutual-aid scheme. When launching NCMS in 2003, the Chinese central government made it clear that the property of NCMS is a “mutual-aid” scheme among the rural population (The State Council, 2003a). The mutual-aid aspect in NCMS can be shown as all rural population share the risk of catastrophic health expenditures. Mutual-aid, in fact, implicates the same meaning as what Daniels et al. (1996) calls the “European solidarity principle” that justifies community-rated contributions—the healthier supports the sicker and others help them when they become sick. In other words, the property of “mutual-aid” implies NCMS to be community rated, not risk-rated.

Furthermore, an essential point with a risk-rated premium system is the standard “medical underwriting practice,” including a “waiting period” (“waiting period” refers to a period of time specified in a health insurance policy that must pass from a person has signed up to the scheme before some or all of a health care coverage begins (Insurance.ca.gov, n.d.). It is commonly used to prevent people who already have an illness to sign up to the scheme in order to benefit from the scheme) and “medical check required”, through which the insurer determines the applicants’ level of risk in order to exclude those with high risk, or to claim a higher insurance premium (contribution) from them, or to offer them a more limited set of reimbursed health care services. When enrolling in NCMS, the rural population are never asked to take a health check or provide information about their health condition, and the waiting period does not apply either.

The above discussion show that NCMS gathers money based on community-rated premiums, meeting the criterion 1 here. It is unnecessary to go into further detail as regards measurement of indicators for this criterion, because the above points are already sufficient for a confident answer.

4.4.1.3. Preliminary Conclusion

Based on Daniels et al. (1996) conceptualisation of fairness, equity in the financing system requires a medical insurance scheme that share the financial burden equitably between different health condition groups. And one of the criteria in this regard is to make the premium community-rated and not based on the level of health risks (Daniels et al., 1996). Through the above discussion, we can confirm that NCMS is a community-rated medical insurance scheme both from theoretical and practical respects—the rural population in China

is not asked to pay different contribution rates according to their health condition, and the amount of individual premium is equal to everyone within the same region. Through the community-rated contributions, NCMS equalize the access to healthcare among the rural population to some extent, as everyone who signs up to NCMS has the same coverage of medical insurance.

4.4.2. Criterion 2 “If the proposal reduces possibilities that the sick need to pay more ‘back-end’?”

4.4.2.1 Justification for criterion 2

Even though medical insurance can insure all population regardless of their health risk, co-payments (a fixed out-of-pocket amount paid by an insured for covered services. Insurance providers often charge co-pays for services such as doctor visits or prescriptions drugs. Co-pays are a specified monetary amount rather than a percentage of the bill, and they are usually paid at the time of service (Investopedia, 2018)) or user-fees would also come out with heavier financial burdens for the sick. For example, the Clinton healthcare reform proposal in the US permitted that all health plans could vary their deductibles (the amount paid through out-of-pocket (OOP) by the policy holder before an insurance provider will pay any expenses (O'Sullivan & Sheffrin, 2003)), co-payments, coinsurance rate (a percentage that an insured must pay against a claim after the deductible is satisfied (Investopedia, 2018)), as well as payment cap (the limitation on the benefits the insurer will pay in a certain period, such as one year, while you are enrolled in a particular insurance plan (HealthCare, n.d.)). Such items could produce more costs for some groups who have to find a job as migrant workers, or who have severe medical problems so that they often have to visit hospitals (Daniels et al., 1996). A medical insurance should have some constraints to minimize those kinds of “back-end” costs, in order to equitably share the cost between those with high risk of (often) being sick or ill, and those with a low risk.

4.4.2.2 Context of NCMS

NCMS includes a set of “back-ends” costs, like deductibles, coinsurance rate as well as payment caps. For example, one of the features of NCMS is “low individual contribution, but high coinsurance rate” (Tian, Li, & Li, 2006, p. 16). A high coinsurance rate (a percentage that Chinese rural population must pay against a claim after their medical expenditure reaches up the deductible for reimbursement in NCMS) means more out-of-pocket money (OOP). NCMS manages to cover all population with the same and low individual contribution.

However, after enrollment, high coinsurance rate could still make the poorer population unable to afford healthcare services, which furthermore will keep them outside the benefits of NCMS.

Moreover, the “payment cap” (the limitation on the benefits NCMS will pay in a period of one year) would be another barrier for people with chronic illness. A chronic disease means a long-term treatment which normally results in larger medical expenditures, while a “payment cap” means NCMS only shares a fixed part of the cost burden for the sick, and they have to pay up the rest part themselves, by OOP. Those terms seem to make NCMS “unfair” the way Daniels et al. (1996) conceptualise fairness, and they may limit access to affordable health care for people with large health care needs.

However, there has been a change across time in these various “back-ends” costs, that indicate increased fairness across time, in the above sense.

First, the deductibles of NCMS (the amount paid out of pocket by the rural population before NCMS will pay any expenses) have been reduced year by year, or even removed in some regions. For example, in Jiangxi Province, the deductible before NCMS reimburses the expenditure of inpatient services at village-level hospitals was 100 Chinese Yuan (CNY) in 2012 (GOV.cn, 2012), but since 2015 the local government decided to remove this deductible (Huang, Jinjun, 2014). Besides, the payment cap (the limitation on the benefits NCMS will pay during a year) has been increased gradually. The cap line of reimbursement for inpatient services was 60 000 CNY per capita per year in 2012 (GOV.cn, 2012), and it had been changing to more than 100 000 CNY from 2015 (Huang, Jinjun, 2014).

Furthermore, the reimbursement ratio has been changed as well. The reimbursement ratio is the percentage that NCMS pays for the total sum of the reimbursable services bill, minus the deductible. A low reimbursement ratio means a high degree of coinsurance, i.e., that the patient must pay a large part of each service bill out of pocket (OOP). In short, in the case of NCMS, the “coinsurance” means the part paid OOP. The insured population in Jiangxi Province could get reimbursed up to 75 percent of medical expenditure in 2008. In 2015, they could get reimbursed 65 percent of the medical expense costing less 800 Chinese Yuan (CNY) (less than in 2008) , but as much as 90 percent of the rest part exceeding 800 CNY (Huang, Jinjun, 2014). This means that patients needing less expensive treatments must pay more OOP in 2015 than in 2008 (35 percent of the cost rather than 25 percent of the cost), but patients needing more expensive treatments (costing more than 800 CNY) only have to pay 10 percent of costs exceeding 800 CNY. Therefore, we can conclude that NCMS still keeps

some “back-end” costs, but that the direction of change has been toward creating more equity in access, in the sense that people in high demand of health care services have gradually been obliged to pay less for them.

Again, it is not necessary to investigate this criterion in further detail to reach the above conclusion.

4.4.2.3. Preliminary Conclusion:

According to criterion 2, a medical insurance shall minimize “back-ends” costs after covering all population. Some costs like deductible, payment cap, and high coinsurance rate are still applying in NCMS and may restrict access somewhat among some parts of the rural population, in particular large users of health care (high risks). However, in the time period under study NCMS has been making efforts to reduce those “back-ends” costs, such as increasing the payment cap and lowering coinsurance rate. Thus the direction of change has been toward greater access, also according to criterion 2.

According to criterion 2, a medical insurance scheme without deductibles, coinsurance rate, or any other sort of co-payment costs could be perfectly equitable in granting access to health care services. However, no deductibles or coinsurance rate could make the healthcare system financially unstable. In a context where the medical insurance covers fully, it means there is lower psychic loss from the insured event, and then fewer individuals have to bear the consequences of their actions and the less, therefore, the incentive to behave as they would if they had to bear the loss themselves. This is a fundamental problem with most types of insurance, known as “moral hazard” (Barr, 1992). One of the effects of moral hazard would be a gradual increase in the demand for medical services, which could affect the financial stability of the healthcare system.

In addition, no back-end costs may lead to overuse of the health care system. Overuse means, for example, that NCMS members who do not feel sick but only mildly worried, or simply feel lonely and would like a person to talk to (a sympathetic doctor a nurse), may ask for consultations and tests, which would not represent an efficient use of what will always be limited health care resources.

In order to reduce the probability of moral hazard and overuse, one of the devices is to impose some of the cost on the individual (Shavell, 1979). Therefore, the discussion on moral hazard as well as overuse would make us question the justification of absolutely no ‘back-end’ cost proposed by Daniels et al. (1996). If a medical insurance system cannot otherwise eliminate

the potential for moral hazard or overuse, then it would be risky to completely remove all “back-end” costs completely, as that might jeopardize the long-run financial sustainability of the health insurance scheme.

4.4.3. Summing up the findings for Benchmark 4: Equitable financing—community-rated contributions

I have used two criteria to assess benchmark 4—Comprehensive and uniform benefits:

- 1) “whether premium themselves reflect health risks?”
- 2) “If the proposal reduces possibilities that the sick need to pay more ‘back-end’?”

In sum, with regard to criterion 1, we find that the premiums in NCMS are community-based, not risk-rated, and this has always been the case. Hence the premiums (contributions) satisfies Daniels et al. (1996)’s fairness-criteria in this regard. One may however always discuss if alternative conceptualisations of “fairness” are possible, since risk-rated premiums may also be considered “fair” by some. With regard to the second criterion. NCMS has since its initiation in 2003 maintained several different “back-end” arrangements, such as deductibles, coinsurance and payment cap. These arrangements have tended to pose a higher financial burden for high risks (those who need a lot of health care services) relative to low risks (those who seldom need health services). However, in the time period under study these back-end payment arrangements have been modified, and changed in the direction of better shielding high risks, in particular, those who need expensive medical treatments.

4.5. Benchmark 5: equitable financing—by the ability to pay

4.5.1. Justification

A community-rated premium could be sufficient to share the cost between the well and sick (low risks and high risks). However, it is not enough to ensure equal access between the rich and the poor. One of the explanations is, according to Norman Daniels et al. (1996), that the lower-income population typically have less money left over for medical bills, health insurance premiums and any other expenses after paying for the taxes and basic living essentials, compared with the higher-income. Therefore, the next and last benchmark in Daniels et al. (1996)’s framework of equity in health insurance systems is on the ability to pay (ATP).

The point is that being rich or poor does not necessarily correspond to being a high risk (a large user of health care) and a low risk (a seldom user of health care). Thus a financial system that ensures access to health care for high risks (as was the theme with regard to benchmark 4), does not necessarily and in itself also ensure sufficient access to health care for poor members of NCMS. Because for poor members, even if they seldom use health care (i.e., they are low risks), may find the combined costs of the annual membership contribution (premium) and their co-payments (when they need health care) too high, given their limited budgets.

Healthcare financing system where the healthcare services are based on ability to pay can be a progressive healthcare financing system. Norman Daniels et al. (1996) refer to several theories to justify the idea of progressivity in the healthcare financing system. For example, the “justice as fairness” from Rawls (1971) permits the inequalities once it must work to make those who are worst off as well off as possible. “Utilitarian theory” reveals that the “decreasing marginal value” of extra money from the wealthy population whose desires have been satisfied by their first money would play a significant to help the poorer meet their desires. Both theories, from Daniels et al. (1996), stand the idea that the social goods could transfer from the best-off members of society to those who are worse off although those two theories do not imply it directly. Besides, the principle of equal opportunity justifies benchmark 5 (financing based on ability to pay) as well.

Typically there are four main types of financing sources for the healthcare system, namely taxation, social and private medical insurance contributions, and out-of-pocket payment (OOP). They are all parts of the financial burden for people to pay for their healthcare, directly or indirectly (Wan, Quan, Zhao, & Fang, 2003). In the case of NCMS, we deal with three of these sources of finance: tax money provided to NCMS from governments at different levels, the contributions (premiums) rural families must pay to be members of NCMS, and out of pocket money (OOP) from members when they become patients and use NCMS-related health care services.

Taxation from households mainly includes direct tax and indirect tax. Currently, income tax is the primary type of direct tax, while indirect tax mainly refers to value-added tax (VAT) (Cao, Y., Jiang, & Gao, 2015). Tax is transferred to government health expenditure in the form of tax revenue. Burden from social insurance mainly means the individual contribution (premium) of the social insurance scheme. OOP is what the family member has to pay for all used healthcare through cash payments (Wan, Quan., Zhao, Zhang, Tao, Huang, & Wang,

2004). The criterion for benchmark 5 is to assess the combined burden of premiums, payroll taxes²⁷, income taxes²⁸, tax deductions or credits, subsidies, and the back-end costs as well as OOP, against a measure of people’s ability to pay. In another way, this criterion is going to check the overall burden coming from the above health financing sources, related to NCMS.

4.5.2. The context of NCMS

Table 8 (NBS, 2014f) shows the change in the proportion for three primary healthcare financing sources, namely government health expenditure²⁹, social health expenditure³⁰ as well as out-of-pocket health expenditure³¹, out of the total health expenditure between 1999 to 2017. We can see that the percentage finances out of pocket has steadily declined during the period, from approximately 56 percent in 1999 to approximately 29 percent in 2017. The percentage coming from contributions has increased during most of the period, and appears to be still on the increase, from 28 percent in 1999 to 42 percent in 2017. The percentage coming from general tax revenues increased till 2011, but has stabilized thereafter.

Year	Total Health Expenditure (100 million yuan)	Government Health Expenditure (100 million yuan)		Social Health Expenditure (100 million yuan)		Out-of-pocket Health Expenditure (100 million yuan)	
			% of Total Health Expenditure		% of Total Health Expenditure		% of Total Health Expenditure
2017	52,598.28	15,205.87	29	22,258.81	42	15,133.60	29
2013	31,668.95	9,545.81	30	11,393.79	36	10,729.34	34
2011	24,345.91	7,464.18	31	8,416.45	34	8,465.28	35
2006	9,843.34	1,778.86	18	3,210.92	33	4,853.56	49
2003	6,584.10	1,116.94	17	1,788.50	27	3,678.67	56
1999	4,047.50	640.96	16	1,145.99	28	2,260.55	56

²⁷ Payroll taxes are taxes imposed on employers or employees, and are usually calculated as a percentage of the salaries that employers pay their staff (Simkovic, 2015).

²⁸ An income tax is a tax that governments impose on income generated by businesses and individuals within their jurisdiction (Investopedia, 2019).

²⁹ Here, government health expenditure was also taxation-based health expense. Government collects taxation from nationals directly and indirectly and transfers the taxation into public health section in form of revenue.

³⁰ Social Expenditure on Public Health refers to all inputs of society except the government in public health including the expenditures on social medical security, commercial health insurance, private expenditure on operation of medical and health care, social donation and contribution, and income from administrative fees etc. (NBS, 2014g).

³¹ Individual Cash Expenditure on Health refers to expenditure in cash on various health services by rural and urban residents, including self payments of residents within the system of multi-medical insurance (NBS, 2014h).

Table 8. The change of the structure of primary healthcare financing sources in China.

Although table 8 does not distinguish between rural and urban China, Zhao, Wan, & Du (2004) estimated that the share of government health expenditure was fluctuating around 17 to 18 percent between 1998 to 2002 for rural China, and the proportion of out-of-pocket money (OOP) was close to 70 percent for those years. That is, in fact, close to the trend showed in table 8 for the same years. Although we cannot be completely sure, it is reasonable to assume that table 8 also suggest the trend in the structure of healthcare financing sources for rural China as well, in the years after 2002. In particular: Increased reliance of contributions, less on OOP, with a moderate increase also in tax revenues.

Next, let us have a deeper look at the primary financing sources for healthcare in rural China.

Firstly taxation. Taxation is a progressive healthcare financing source in rural China (Yan, Yan, Gao, He, Qian, & Yang, 2012; Guo & Shi, 2012). However, in a long period and at least until 2001, taxation did not play a large role in healthcare financing. Some research even did not count it as one of the main financing sources (Wang, 2008). Its “minor” role and small proportion could, to some extent, explain why taxation did not “save” the equity of health financing despite taxation being progressive. However, the proportion of taxation has been growing at least up to 2012 from table 8. As an expectation, the increasing weight of taxation would influence the equity of health financing system in rural China.

As for “social health expenditure”, it mainly refers to the payment for healthcare through the medical insurance in rural China (CMS for pre-2003 and NCMS for post-2003).

Unfortunately, NCMS has not been a progressive healthcare financing source because the individual contribution is collected based on “equal amount”, regardless of the ability-to-pay among insured farmers. For example, the individual contribution in 2016 was 150 Chinese Yuan (CNY), equal to all rural population (NHC, 2016). It suggests a heavier financial burden for the lower-income than the richer groups.

Out-of-pocket money (OOP) has always been an important financial source for healthcare in rural China, especially during the collapse of CMS (see the brief historical sketch of health care in China in chapter 1). Strong reliance on OOP could restrict the utilization of medical services and directly lead to poverty due to catastrophic medical expenditures. In the period when OOP comprised most of total health expenditure, OOP significantly reduced the equity of the whole financing system due to it being regressive healthcare financing source.

However, again, as we have demonstrated earlier in this thesis the structure of healthcare financing sources in rural China has been changing, and the burdens of the various healthcare financing sources could also be changed. Therefore, there is a rationale to proceed with a chronological assessment, since the launching of NCMS in 2003.

But one more thing is, what is the relationship between NCMS and the equity of the health financing system in rural China? The implementation of NCMS has not involved a tax reform, and the individual contribution for premium has ignored the ability-to-pay (ATP).

However, the fact that NCMS has been expected may in itself have influenced the equity of the healthcare financing system. Wang (2008) has claimed that before 2003 out-of-pocket money (OOP) was a highly inequitable healthcare financing source in rural China. After 2003 the overall medical financial burden was for a long time still concentrating more on the poorer households due to two reasons: one was that rural population from poor families were slow to be insured by NCMS, which resulted that they could not be beneficiaries in NCMS and then had to shoulder many stresses from OOP. A second was that the benefits of NCMS were not concentrating on the poorer enrollees.³² Fewer benefits concentrating on the poor was because they used fewer healthcare services. Their less utilization of healthcare tightly relates to the financial structure of NCMS, discussed earlier: a high deductible and coinsurance rate, as well as a low payment-cap, implied that especially the poorer among the rural population, still had to pay a high proportion of their medical expenditure through OOP, although they were members of NCMS. In a longer time perspective, however, NCMS can have become better at providing also poorer households with (for them) affordable health care costs, since – as shown earlier – NCMS has gradually reduced “back-ends” costs.

So in short, theoretically NCMS might have served to gradually equalize healthcare financing between richer and poorer households, compared to the period before 2003 or compared to the first years of implementation. Since NCMS now covers over 95 percent of rural population and has constantly enlarged its benefits package after 2003, it is worth investigating if there has been any change in progressivity of the healthcare financing system in rural China.

4.5.3 Refining indicator and measurement: KIs for healthcare financing system/sources

³² Conclusion from criterion 2 of benchmark 3 can also indicate this point, see page 63-67.

I have clarified above that ability-to-pay (ATP) is related to the progressivity of the financial sources —people should share the financial burden from healthcare differently based on their different ATP. Then the criterion for benchmark 5 is to investigate the overall progressivity of all healthcare payments that goes into financing rural healthcare use.

A progressive healthcare financing system means a higher income is matched with a rising fraction of income being paid to the healthcare system, or shortly that the richer pay a higher percentage of their income than the poorer. In contrast, “regressivity” means that the poorer finally pay a higher proportion of their incomes compared to the richer. Finally, in-between a progressive and a regressive financial structure is a proportional financing structure, where poorer and richer pay the same percentage of their income to finance health care.

A related conception to “progressivity” is “vertical equity”, which means that those with dissimilar abilities to pay (ATP) should make a dissimilar contribution to financing health care (Wagstaff, Adam & Van Doorslaer, 1993).

The Kakwani Index (KI) (Kakwani, 1977) is the most widely used summary measure of progressivity in both the tax and the health financing literatures (O'Donnell, Van Doorslaer, Rannan-Eliya, Somanathan, Adhikari, Akkazieva, Harbianto, Garg, Hanvoravongchai, & Herrin, 2008; Wagstaff, A., E. van Doorslaer, S. Calonge, T. Christiansen, M. Gerfin, P. Gottschalk, R. Janssen, C. Lachaud, R. Leu, & Nolan, 1992; Wagstaff, Adam, Van Doorslaer, Calonge, Christiansen, Gross, & Gerfin, 1999). The Kakwani index is defined as twice the area between a Concentration Curve and the Lorenz curve (Kakwani, 1977). It is calculated as $\pi_k = C - G$, where C is the concentration index for health payments and G is the Gini coefficient of the ATP variable, and thereof the value of π_k , or the value of the Kakwani index, ranges from -2 to 1. A negative number indicates regressivity and a positive number indicates progressivity (O'Donnell, Van Doorslaer, Wagstaff, & Lindelow, 2008).

The progressivity of health financing in total can be measured by a weighted average of the Kakwani Indexes for the sources of finance, where weights are equal to the proportion of total payments accounted for by each source. Thus, overall progressivity depends both on the progressivity of the different sources of finance, and on the proportion of revenue collected from each of these sources (O'Donnell et al., 2008). This helps explain why taxation, as a progressive financing source, did not manage to improve the overall progressivity of the healthcare financing system year ago due to its quite small weight.

The overall progressivity for a healthcare financing system is calculated by weighting the Kakwani Index for each healthcare payment identified at the household level based on the proportion that each payment makes up of total healthcare expenditure at the national level (Wagstaff, Adam & Van Doorslaer, 1993; O'Donnell et al., 2008; Wagstaff, Adam & Van Doorslaer, 1992; Wagstaff, Adam, Van Doorslaer, Calonge, Christiansen, & Gerfin, 1999). Yan et al. (2012) present the formula for calculating the overall progressivity as:

$$K = (R_1/R) K_1 + (R_2/R) K_2 + \dots + (R_n/R) K_n$$

In this formula, R_n means the sum of one financing source, while R means the total sum from all those financing sources. K_n presents the KI value for one specific financing source.

In this thesis, I will not go to calculate the KI for the healthcare financing system in rural China myself, but do a literature search of studies that do.

So which Kakwani Index (KI) do I need to assess this criterion?

First of all I must search for studies that calculate the “overall KI” for the healthcare financing system in rural China, because this will be a direct answer for the criterion of benchmark 5: “assessing the combined burden of premiums, payroll taxes, income taxes, tax deductions or credits, subsidies, and the back-end, out-of-pocket money etc., against a measure of people’s ability to pay”.

However, although such studies may show if the KI has been getting better or worse across time on an aggregate level, we would not know which aspects of the changing financial structure that have affected this change.

Therefore, I will also search for studies that list the KI for each separate financing source for healthcare in rural China. Because this would help discuss if the KI for each financing source has been working out in a similar or different way in changing the overall KI, and thus help explore if NCMS has been playing an important role in equalizing the overall healthcare financing system.

In conclusion, I will refine the indicator “KIs for overall healthcare financing system and for three separate financing sources” to assess the criterion of benchmark 5.

4.5.4. Investigation

Through combining keywords “healthcare+financing (vertical) equity/(vertical) equity in financing+progressivity+rural China” I got 17 relevant studies from *China National Knowledge Infrastructure (CNKI)* database. By checking the sample scale, the research

methods as comparability among those studies, I selected two empirical studies, one from Xie (2010) and one from Cao, Y. et al. (2015), and I will refer to their findings in the following. I chose these two studies because both are based on the same dataset, *China Health and Nutrition Survey (CHNS)*. In addition, the two studies used different time points, which makes it possible to make a rough chronological comparison. A final reason for our choice is that these two studies used the same variables, indicators and methods to deal with data, which makes it more likely that their findings can be compared. For example, both studies used “Per capita household income” from *CHNS* to indicate ability-to-pay (ATP).

China Health and Nutrition Survey (CHNS) is designed to examine the effects of the health, nutrition, and family planning policies and programs implemented by national and local governments, and to see how the social and economic transformation of Chinese society is affecting the health and nutritional status of its population. The study population was drawn from the 9 provinces and autonomous cities/districts (extra 3 megacities and 3 provinces were added front-back since 2011). The authors used a multistage, random cluster process to draw the sample surveyed in each province. Counties in the surveyed provinces were stratified by income (low, middle, and high) and a weighted sampling method was used to select four counties in each province randomly. In addition, the provincial capital and a lower income city were selected when feasible, except that other large cities rather than provincial capitals had to be selected in two provinces. This sample is diverse, with variation found in a wide-ranging set of socioeconomic factors (income, employment, education, and modernization) and other related health, nutritional and demographic measures. By now, the survey had been conducted ten times, in 1989, 1991, 1993, 1997, 2000, 2004, 2006, 2009, 2011 and 2015 (UNC-CN, n.d.).

One of the merits of *CHNS* relates to its large samples and chronological data collection. Also, *CHNS* has been covering various regions from eastern to western China, and multi-stage stratified sampling method has been used, which makes the data highly representative (Xi, Chen, & Ma, 2011). However, the sample was mainly concentrated in middle and eastern China and the quality of tracking samples was not considered very high (Zhang, L., 2013).

Xie (2010) used *CHNS 2006* and Cao, Y. et al. (2015) used *CHNS 2011*. Both studies calculated KI for the healthcare financing system and also for each single financing sources in rural China. Relevant figures are shown in table 9.

From table 9, we can see that the overall Kakwani changed from -0.29 to -0.12 between 2006 and 2011. This means that the overall healthcare financing system in rural China had become

less regressive across time. However, since both figures were still negative, overall healthcare financing had been and still (as of 2011) regressive—the poorer rural population share a heavier burden against their ability-to-pay (ATP).

How about the different components in healthcare financing? Specifically, table 9 show that taxation had been a progressive financing source for healthcare in rural China, although the degree of progressivity has declined somewhat between 2006 and 2011. Kakwani Index (KI) for out-of-pocket money (OOP) had been very regressive, and this regressivity has been stable, KI being -0.46 in both years. Most importantly from the perspective of this thesis, however, is the importance of financing through NCMS. NCMS, the rural medical insurance, has been a regressive finance source, primarily because of its “equal individual contribution” requirement (see above). However, KI for NCMS had changed dramatically between 2006 and 2011, from -0.55 to -0.12. This suggests that its regressivity had been rapidly reduced. Based on these numbers, a conclusion could be that the healthcare financing system has been and still is inequitable, but that financial inequity had been reduced overtime. This conclusion can answer the criterion of benchmark 5: the combined burden from all relevant healthcare financing sources against the rural population’s ability-to-pay has been reduced between 2006 and 2011.

Author(s)	Title	Data	Results (KIs for Financing Sources)			
			Taxation	NCMS	OOP	Overall
Xie, E	The Redistributive Effect of Health Care Financing in China	CHNS 2006	0.35	-0.55	-0.46	-0.29
Cao, Yang, et al.	An empirical study on the redistribution effect of income from healthcare financing	CHNS 2011	0.21	-0.12	-0.46	-0.12

Table 9. Kakwani Index (KIs) for overall healthcare financing system and each financing source between 2006 and 2011 in rural China

However, those findings do not immediately answer the question: has NCMS been important in contributing to the improvement (i.e. the less regressivity) of the overall KI? Let us try to decompose the “0.17” reduction in overall regressivity (from -0,29 to – 0.12) in table 9.

According to O'Donnell et al. (2008), overall progressivity/regressivity depends both on the progressivity/regressivity of the different sources of finance, and on the proportion of revenue collected from each of these sources. Then that taxation has contributed to improving the overall Kakwani Index (KI), even though the progressivity of taxation has been going down

(from 0.35 to 0.21). Because back to table 8 we can see that the proportion of taxation (government health expenditure) did increase from approximately 18 to 31 percent between 2006 and 2011, in the structure of healthcare financing sources. It means that the weight of the KI for taxation in overall KI had also been raised accordingly. Therefore, even if the progressivity of taxation has lessened in the period, the fact that taxation makes up a larger share could still have resulted in a net positive effect on improving the overall KI between 2006 and 2011 (and at least the increased share has dampened what otherwise is a negative effect).

With regard to NCMS, the change in the period has unambiguously contributed to the reduction in overall KI regressivity. Because in this case, less regressivity as well as a large share of total revenues both works in the same direction, towards reducing total regressivity. From table 9, the absolute value of KI for NCMS has sharply declined, from -0.55 to -0.12. While NCMS (social health expenditure) has increased from approximately 33 to 34 percent of total health expenditure between 2006 to 2011 (see table 8). Due to the combined effect of decreased regressivity and larger share of total financing, NCMS is a factor than unambiguously has led to a reduction in regressivity in overall KI.

This becomes even clearer when we look at the contribution of overall progressivity or regressivity of out-of-pocket money (OOP). As Wang (2008) concluded, if the burden of OOP for the rural population was significantly reduced, the whole financing system could be more equitable. Both taxes and NCMS has contributed to reduce the share of OOP between 2006 and 2011 (table 8).

Back to table 9, we can find that the KI for OOP had not been changed, keeping -0.46. However, table 8 told us that the proportion of OOP in healthcare financing structure had been declining to a higher degree, from about 49 percent to about 35 percent between 2006 and 2011. As a result, its regressivity is not so deadly in 2011 as in 2006 because its weight in the overall KI has been lessening sharply. Thus OOP is also a factor in explaining the reduction in total KI: although the level of regressivity is the same, it means less due to the dramatic reduction in OOP's share.

From the previous analysis in this thesis, it is further highly likely that the reduction in OOP's share of total financing is due to the launching of NCMS, plus the gradual reduction in the OOP elements in NCMS that we have documented earlier in this thesis. Similarly basing the study on CHNS 2004-2011, Fan, Wang, and Chen (2016) found the OOP was mainly concentrated in the poorer population in rural China. However, they also found that this

situation had improved. OOP from rural residents has been sharply reduced, and NCMS had been playing a significant role—Fan et al. (2016) calculated that the contribution of NCMS for this improvement had changed from 0.31 percent in 2004 to 4.21 percent in 2011.

Therefore, launching NCMS has indeed helped to reduce the proportion of OOP in the healthcare financing system. The launch and further changes in NCMS over the years has contributed to reduce the weight of KI for OOP in the overall KI. Although OOP (out of pocket spending on health care) is still regressive, its decreasing weight reduces the negative effects of its regressivity. In this way, NCMS has contributed to improving the equity of healthcare financing system. This comes in addition to the reduction in the regressivity in NCMS financing itself.

In sum, the above discussion suggests that changes related to all of the three financing sources may explain some part in reducing the overall regressivity in total KI. And we have provided strong indications that the NCMS had been an important factor behind reducing the proportion OOP, implying that NCMS has had an important function to improving the overall progressivity (or, more accurately stated: reduce the overall regressivity) of healthcare financing in rural China.

4.5.5. Summing up the findings for Benchmark 5: Equitable financing—ability to pay

Benchmark 5 “equitable financing—ability to pay” has only one criterion of assessing “the combined burden of premiums, payroll taxes, income taxes tax deductions or credits, subsidies, and the back-end, OOP etc, against a measure of people’s ability to pay”, which aims to evaluate the overall progressivity/regressivity of a healthcare financing system. Using the Kakwani Index (KI), I found that while overall financing is regressive, the regressivity has markedly declined. Meanwhile, through the discussion, I deepened the assumption that launching NCMS had contributed to this improvement of reduced regressivity partly by reducing the proportion of OOP in the financing system, and partly by the reduced regressivity in the financing of NCMS itself.

Chapter 5 Summary

In this thesis, I have attempted a broad assessment of the contribution of the NCMS to equity of access in health care for the rural population in China. While there have been previous evaluations of this question (briefly referred in chapter 2), they have been based on a more limited number of indicators. My study has used Daniels et al. (1996)'s well-established "benchmarks of fairness" framework for assessing the role of NCMS in this regard, using 5 benchmarks in the assessment. Part of the novelty in this thesis has been to identify the criteria associated with each benchmark, in total 11 criteria. Part of the novelty has also been to search for operational indicators for each of these criteria, with reference to the role of NCMS across time. In total, I have identified – and discussed changes over time in the period under study – a large number of operational indicators for the 11 criteria comprising the 5 benchmarks. The main strength of this type of assessment is its broadness; we paint a broader canvas of factors influencing equity in access than if concentrating on a more limited set. Further, by using literature search strategies to identify operational indicators for each of the criteria that helps define a benchmark, we get a detailed "empirical handle" on how different benchmarks related to equity in access have changed over time. Appendix 1 lists the five benchmarks and the corresponding criteria we have used for each of them. In the following, I sum up the main substantive findings of this exercise.

5.1 Conclusion

This thesis has aimed to assess if the medical insurance scheme in rural China—NCMS—has been improving the equity of access to healthcare for the rural population. Based on the framework of "benchmark of fairness" and corresponding evidence from the existing studies and research literature, results of this evaluation suggested that NCMS has attained some remarkable achievements in extending access to healthcare in the 16-year implementation period, while there are still some goals that NCMS has not approached.

With the first 5-year phase-in, NCMS had managed to formally cover over 90 percent of the rural population by 2008, and the enrollment rate has been reaching up to 99 percent during recent years, even though it is formally a voluntary-enrollment scheme. The Chinese central government had set up a clear ambition to phase-in universal coverage, and this phase-in had been accomplished on time, without apparent delay. Those achievements suggested an essential requirement to equalize the access to healthcare had been reached. However, the

county-level autonomy has been restricting NCMS to be a portable and flexible insurance scheme, and consequently, NCMS had been failing to provide equitable access to healthcare for the rural population who are living or studying outside their home county.

Secondly, as a crucial part of healthcare reform in rural China, the launching of NCMS has also led to improvement of the distribution and supply of healthcare resources. After 2003, the density of medical facilities and personnel has been improving in rural China, while more sufficient and appropriate education and training has been provided to supply qualified health professionals. Moreover, the traveling *time* to nearest healthcare providers has been shortened. None the less, the traveling *distance* to nearest providers had gotten somewhat longer between 2003 to 2013. One of the possibilities of this apparent contradiction could be attributed to the better transportation system in rural China.

In any case, the above materials suggests that more healthcare resources is supplied physically and has become more reachable in time for the rural population. Access to healthcare services had improved as seen from the supply-side. However, although the Chinese central government has been making efforts to introduce NCMS through official introduction, to strengthen the understanding of NCMS with the purpose to promote the enrollment of NCMS and the utilization of medical insurance and healthcare services, only a small part of rural population had been sufficiently understanding the terms, benefits and other critical information about NCMS, which, to some extent, suggested that governments at various levels have not effectively minimized some non-financial barriers to extend access to healthcare from a demand-side perspective.

Since 2003, NCMS had always been on the way to provide comprehensive coverage of healthcare services. More essential medicines for treating major diseases, such as cancer, has been covered but could have included even more. Inequalities on benefits and coverage in NCMS still exist. However, changes have been made in the period under study. Establishing “medical assistance” system, lowering payment cap, coinsurance rate and deductible may have effects on eliminating those inequalities among different income groups.

NCMS has been improving the equity in healthcare financing system in rural China, which helped equalize access to healthcare for the rural population. Through the community-rated premium, NCMS did not abandon the high-risk groups. Meanwhile, NCMS has also proposed some ways to reduce the “back-ends” costs, avoiding the high-risk to share more financial burdens after enrollment in NCMS. Although the healthcare financing system in rural China has still be regressive, but the regressivity has been reduced. Launching NCMS can have a

contribution to this change through reducing the proportion of out-of-pocket in the healthcare financing structure.

Certainly, due to the limitation of data on the refined indicators, some conclusions must be somewhat rough and approximate. None the less, the above findings shed light of the considerable ability of NCMS on extending access to healthcare for the rural population in those 16 years, while also justify the necessity of further research and evidence on this topic.

5.2 Study limitations

This thesis has aimed at providing a relatively comprehensive evaluation on the effect of NCMS on improving the equity in access to healthcare for the rural population in China, involving different factors which could influence access, from the “enrollment rate” to the “coverage of reimbursable services” of the medical insurance. In a chronological way, this thesis has given an overview on how this effect has been changing within the 16-year implementation period. However, despite those features, some limitations also have been exposed through this thesis.

One of the study limitations is out of the framework “benchmarks of fairness.” Certainly, this framework is creative and useful evaluating the healthcare reform issues, but it is not necessarily a golden evaluation guideline. First, in some cases, the interpretation of “fairness” from Daniels et al. (1996) could be controversial. For example, in benchmark 1 “universal access—minimizing financing barriers”, they propose “high speed” and “prompt phase-in” as criterion. Their justification for this criterion seems reasonable on the one hand, but these criteria may be rather vague for empirical purposes. Because it could easily produce confusion—What kind of speed should be judged as “fast”? Given that we set “one year” as a standard, some would say “5 years” could also be acceptable because of the local context. We are less like to find an easy reconciliation between such criterion and a highly measurable indicator correspondingly; at least, such criterion must be defined according to local context, and may thus differ between regions or across time.

Moreover, Daniels et al. (1996) also do not provide a precise explanation for some critical concepts, like “access”, “coverage” and so on, in this framework. Further, they only propose rather broad criteria to assess healthcare reform issues, without more suggestions of specific indicators for each criterion. Then when using this framework, I have had to introduce refined indicators to measure these criteria. It has been a challenge to suggest refined accurate indicators since the framework does not explicitly state what some key concepts precisely

mean. On the other hand, suggesting such more refined indicators of the criteria used to operationalise the five overarching benchmarks can be considered the main new contribution of this thesis.

The next point is that, to some extent, the framework “benchmarks of fairness” inclines to evaluate a medical insurance change, or a health care “output”, rather than to focus on the empirical effectiveness of those “outputs” on actual health outcomes, such as changes in infant mortality, or decreased incidence and prevalence of various diseases. Whether or not improved equity in health care outputs (such as the doctor/client ratio) really results in better or more equal health care outcomes (such as less differences in infant mortality) is an empirical question in its own right.

As a different example, when using criterion 2 of benchmark 3 “are there constraints on inequalities in benefits and quality due to tiering” to assess several healthcare reform proposals in the U.S., Daniels et al. (1996) gave a moderate score for the Clinton health care bill because this proposal allowed for competition among plans that may charge different premiums, which probably lead to differences in quality and intensity of care, although it also suggested some provisions to balance services in its competitive design in order to reduce inequalities. This framework could be enough for discussing those suggested provisions. But the above “evaluative assessment” from Daniels et al. (1996). did not investigate the question if those ways to balance services in its competitive design in order to reduce inequalities proposed in the Clinton bill would be really effective to reach the goal. In an empirical evaluation we would need to explore the effectiveness of these “provisions”, simply stating that they were introduced in the bill is not sufficient to tell if they were appropriate in dampening an eventual difference in quality due to competition and differentiated insurance premiums.

I have mentioned these weaknesses of this framework because they, directly or indirectly, resulted in the challenges to find measurable, accurate, appropriate indicators for some criteria, or even in a failure to find any indicator.

Another limitation relates to some of the indicators refined in this thesis. Many factors influenced the process of refining indicators, such as the limitation of the framework “benchmarks of fairness” as mentioned above. Moreover, the data and empirical material used in this thesis were based on existing sources. The availability of data also, to some extent, restricted the attempts to find good indicators. Sometimes, it would have been easy to suggest a “perfect” indicator to assess some criteria, but there could not be found sufficient empirical

evidence for this indicator. Therefore, a compromise way used in this thesis has been to refine the indicator according to the available data. This way, however, can influence the ability to suggest a solid conclusion for the evaluation.

A related limitation of this study is tied to the data sources. Again, the existing data has been almost the “blood” controlling the fate of this study. The quality, availability and the reliability of those existing data significantly influence the quality of the conclusion in this study. One example was the assessment for criterion 3 of benchmark 2, where I used “the proportion of the rural population who have sufficiently understood the key information of NCMS” to assess if the governmental introduction has been effective to minimize some non-financial barrier in order to promote their utilization of NCMS and healthcare services. However, there was no existing source which could provide a chronological set of data about how sufficiently the rural population has understood NCMS. Instead, several separate empirical studies which have been done at different time points were selected. Undoubtedly, findings from these several studies with different research sites and different samples failed to be fully comparable. As a result, the conclusion suggested by comparing those findings is not very robust.

One more limitation of this study comes from the way in which data was analyzed. The data analysis in this thesis has largely ignored regional or geographic disparities *within* rural China, as well as changes in the urban-rural difference. The development between the eastern and the middle/western regions of China is unbalanced, while the urban-rural inequality remains broad. For example, the rather developed economy in eastern rural China could make local governments have more sufficient revenue to cover more reimbursable medicines and services in the benefits package of NCMS, than that in western rural provinces. Similarly, by 2016 the density of hospital bed in urban China was 3 times higher than in rural China (NHFPC, 2017). However, this thesis did not consider such region-based comparisons, mainly because no limited study can cover all aspect of equity of access. None the less, it is necessary to emphasise that the overall improvement in equity in access to health care in rural China (as investigated in this thesis) may “hide” some even deteriorating situations in underdeveloped and remote areas, where healthcare resources have been still quite scarce for the local rural population.

5.3 Suggestions for further research

Based on the above study limitations, and with the purpose of suggesting future research efforts to fix up these limitations, some possibilities are available for further researches.

For example, the above discussion has revealed the importance of the stability, the continuity and the traceability of the data source, especially for studies which aim to explore chronological changes of an intervention, for example, a new medical insurance scheme. In this thesis, the failure of finding traceable and chronological data sometimes led to a rough and sometimes low quality of conclusions. Constructing good time series data in this area is impractical and challenging to execute for most researches. However, there are now some valuable data sets available in China, such as *China Health and Nutrition Survey* (CHNS) and *Chinese Longitudinal Healthy Longevity Survey* (CLHLS). These datasets update a new round of investigation every several years, which could provide chronological and traceable data sets. Those databases design a comprehensive set of questionnaires which could cover a wide scale of information from the samples. For example, CHNS has completed 10 times of tracking investigation from 1989 to 2015, and the database is still under updating. The survey of CHNS has been proceeding in cross-region provinces, with a large number of samples. CHNS collects data based on a comprehensive set of questionnaires and surveys which could release many-sided information from the samples. For example, the “health services section” of CHNS contains detailed data on insurance coverage, medical providers, and health facilities, and questions about accessibility, time, travel costs, and perceived quality of care are also asked (UNC-CN, n.d.). In this way, databases like CHNS could provide a stable, high-quality, traceable data sources for further research which aims to initiate a more accurate and chronological evaluation on the effects of NCMS or other medical insurances in China in equity in access to health care.

In conclusion, I hope this thesis has contributed in the continuous search for valid indicators, and reliable data collection, in the research community’s joint attempts to characterize and operationalise the meaning of a gradual fulfilment of “access to health care services” in regions and countries, both in China and beyond.

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Appendix 1. Criteria for ten benchmarks from Daniels et al. (1996)

<i>Dimension</i>	<i>Benchmark</i>	<i>Criteria</i>
<i>Equity</i>	B1. Universal Access—Coverage and Participation	<ol style="list-style-type: none"> 1. “The proportion of the population included and whether their participation is mandatory”; 2. “How quickly universal inclusion is achieved”; 3. “How flexibly and effectively the scheme provides access through changes in jobs and living conditions”.
	B2. Universal Access—Minimizing Nonfinancial Barriers	<ol style="list-style-type: none"> 1. “Appropriate resources are available and reachable”; 2. “Sufficient education and training provided for supply the needed personnel”; 3. “Steps are taken to facilitate the use of services by people with different languages, cultures and class background”; 4. “Adequate education and information are provided to facilitate negotiation of the system.”
	B3. Comprehensive and Uniform benefits	<ol style="list-style-type: none"> 1. “How comprehensive are the benefits”; 2. “Are there constraints on inequalities in benefits and quality due to tiering”; 3. “Does the range of benefits depend on savings produced by reform.”
	B4. Equitable Financing—Community-rated contributions	<ol style="list-style-type: none"> 1. “The premium can not reflect health risks, but be based on the average costs of an insuree in as large an insurance pool as is possible”; 2. “Are there proposals to reduce other ways in which the sick are made to pay more for their coverage.”
	B5. Equitable Financing—By the ability to pay	<ol style="list-style-type: none"> 1. “Assessing the combined burden of premiums, payroll taxes, income taxes, tax deductions or credits, subsidies, and back-ends, out-of-pocket expenses against a measure of people’s ability to pay.”
<i>Efficiency</i>	B6. Value for Money—Clinical Efficacy	<ol style="list-style-type: none"> 1. “Healthcare reform proposals should emphasize on primary care and on public health and prevention”; 2. “Systematic outcomes assessment and resources utilization.”
	B7. Value for Money—Financial Efficiency	<ol style="list-style-type: none"> 1. “If a healthcare reform proposals have ways to minimize administrative overhead”; 2. “Proposals need to employ tough contractual bargaining with all providers and suppliers”; 3. “Minimizing cost shifting”; 4. “Have strong anti-abuse and fraud measure.”

<i>Accountability</i>	B8. Public Accountability	<ol style="list-style-type: none"> 1. "Explicit Public Procedures for Evaluation"; 2. "Explicit Democratic Procedures for Resources Allocation"; 3. "Fair Grievance Procedures"; 4. "Adequate Privacy Protection".
	B9. Comparability	<ol style="list-style-type: none"> 1. "The presence of a comprehensive budget for health care spending that would facilitate such comparisons."
	B10. Degree of Consumer Choice	<ol style="list-style-type: none"> 1. "The degree of which people can make full informed choices of their primary-care practitioners"; 2. "Of their medical specialists"; 3. "Of other licensed healthcare providers"; 4. "And of the procedures any of them wish to undertake."

Appendix 2. Anti-Cancer Medicine in EML and NCEM

<i>Essential Cancer Medicine from EML</i>		<i>NCEM</i>		
		2012	2015	2018
41 anti-cancer medicines (recommended by WHO)	Asparaginase	√	√	√
	Bleomycin	/	/	√
	Calcium folinate	√	√	√
	Carboplatin	√	√	√
	Chlorambucil	/	/	/
	Cyclophosphamide	√	√	√
	Cytarabine	√	√	√
	Dacarbazine	/	/	/
	Dactinomycin	/	/	/
	Daunorubicin	√	√	√
	Docetaxel	/	/	/
	Doxorubicin	√	√	√
	Etoposide	√	√	√
	Fluorouracil	√	√	√
	Hydroxycarbamide	√	√	√
	Ifosfamide	/	/	√
	Mercaptopurine	√	√	√
	Mesna	√	√	√
	Methotrexate	√	√	√
	Paclitaxel	√	√	√
	Procarbazine	/	/	/
	Tamoxifen	√	√	√
	Tioguanine	/	/	/
	Vinblastine	/	/	/
Vincristine	√	√	√	
All-trans retinoic acid	√	√	√	
Aromatase inhibitors	/	/	√	
Bendamustine	/	/	/	

	Bicalutamide	/	/	/
	Capecitabine	/	/	√
	Cisplatin	√	√	√
	Fludarabine	/	/	/
	Gemcitabine	/	/	√
	Granulocyte colony stimulating factors	/	/	/
	Imatinib	/	/	√
	Irinotecan	/	/	/
	Leuprolin class	/	/	/
	Oxaliplatin	√	√	√
	Rituximab	/	/	√
	Trastuzumab	/	/	√
	Vinorelbine	/	/	/
	No. of WHO-recommending anti-cancer medicine in NCEM	19	19	27
	Ratio of NCEM covered to WHO recommended medicines	0,46	0,46	0,65

* “√” means this WHO-recommending medicine has been covered by NCEM.

“/” means this medicine has not been covered by NCEM.