

Peking University, Beijing

I. Title of Proposal

The PKU-CMB Lab for Health Economics: Economics of Health Reform and Market Competition in China

II. Investigators

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III. Project Justification

The extent to which market forces define and affect sound healthcare systems has long been debated in both academic and policy arenas. In China, this debate has been an integral part of the state health reform since its inception in 2006. At this pivotal point in time as China pursues its 12th 5-Year Health Reform Plan, more information is needed to guide the future policy debates and decision making. Therefore, it is critical to conduct quality academic research on these issues to support and inform better policy making. Additionally, academic research in this area allows young scholars in China to utilize the unusual or semi experimental data generated during China's healthcare transition to make unique and insightful contributions to academic literature.

IV. Research Background

In his seminal paper written in 1963, economics Nobel laureate Kenneth Arrow provided a well-documented layout of healthcare market by distinguishing three major —unique|| features: uncertainty, asymmetric information, and government interventions (Arrow, 1963). Arrow's three features introduced new dimensions to the debate on the role of market competition in healthcare. As such, the field of economics has played a significant role in shaping the directions of health economic research and policy making worldwide.

In China, ever since 2006 when state healthcare reform came to the forefront of policy discussions, the role of market competition in shaping the reform has been a fiercely debated issue. The policy debate largely falls into two positions: pro-government and pro-market. First, based on the noted —unique|| features of the healthcare market, the pro-government doctrine argues for a strong government-led reform that focuses on pricing regulation, state drug policy, and public hospital control. In contrast, the opposing pro-market school of thought contends that the healthcare market is surely unique in some ways, but may not be to the extent that it can reject some fundamental economic principles, such as market competition and pricing mechanisms (Porter and Teisberg, 2007; Hsiao 2007; Liu 2009).

As it has in the past, the debate on the role of market competition will certainly continue to drive both health policy and research directions for years to come. It is, thus, a great responsibility and opportunity for scholars to pursue more in-depth research in this area. For Chinese scholars, such a task is even more pressing and important as China is transitioning its health system. However, our understanding of the issues is still far from satisfactory, offering little scientific research for policy making. Therefore, it is extremely critical in China to promote greater efforts in this research area. Through the CMB

Collaborating Programs, this application proposes to build a Peking University-based Lab for Health Economics, which would serve as a hub for health economists, both from China and around the world, to conduct China-focused health economic research under the supervision of the principle investigators. The principal approach to conduct policy research in this Lab will use modern economics to study how market competition might help better transform the Chinese healthcare system.

V. Research Agendas

Following China's Health Reform Roadmap released in 2009 and the State 12th 5-Year Health Reform Plan passed by the People's Congress in March 2012, three core reform agendas are to be carried out in the next four years by 2015, including 1) the universal health insurance system; 2) the state essential drug policy, and 3) the reform of public hospitals. Accordingly, the Lab will lead the collaborative research efforts in the three major areas as follows:

Area I: Universal Health Insurance System

a. Policy background

With the expansion of health insurance coverage in China, the three national health insurance programs — the New Rural Cooperative Medical Scheme (NRCMS), the Urban Resident Basic Medical Insurance (URBMI) and the Urban Employee Basic Medical Insurance (UEBMI) — have covered 95.7% of the Chinese population as of 2011 (Meng et al., 2012). However, China's health system is plagued by unnecessary medical care and excessive medical expenditures. Universal insurance coverage has led to several major problems unanticipated by policymakers; inpatient admissions doubled from 72 to 142 million between 2005 and 2010 and average inpatient and outpatient fees grew by 40%, a higher growth rate than most other East Asian countries (Ministry of Health, 2011).

According to conventional economic theory, individuals whose medical costs are wholly or partly paid by a third party (i.e. the insurer) may be subject to moral hazard; leading individuals to over-utilize medical resources and under-invest in self-protection. In China, insurance coverage expansion has also exacerbated physician-induced demand. Since Chinese hospitals largely use a fee-for-service payment method and employ physician dispensing, physicians have a financial incentive to take advantage of the mismatch in information between doctors and patients and prescribe unnecessary drugs and services. In light of these problems, this research agenda will investigate how Chinese physicians and patients alter their behavior in response to changes in payment policies within the universal health insurance system.

b. Literature Review

Numerous empirical studies have looked at the effect of health insurance on patient and physician behavior, and on both demand and supply-side moral hazard in particular.

Demand-Side Moral Hazard. Pauly (1968) formally proposes a model in which an insured individual facing a reduced marginal cost consumes more medical services than she would without insurance, demonstrating the concept of ex-post moral hazard. Nyman (1999) revisits the proposition and argues that Pauly's model overstates the loss of welfare because it ignores the affordability dimension. Further studies by Pauly (1974, 1986), Spence and Zeckhauser (1971) and Blomqvist (1997) argue that information and taxation subsidies are important for welfare improvement with health insurance.

With ex-ante moral hazard, an insured individual may reduce her efforts at self-protection and thus increase her risk of falling sick, a result of the buffer health insurance provides against unsupportable medical expenses (Ehrlich and Becker, 1972). Ex-ante moral hazard also arises when health insurance reduces the income difference between healthy and sick states and therefore, the benefits of investment in prevention (Dave and Kaestner, 2009). While previously most past studies have focused on out-of-pocket investment, recent research has looked at the effect of health insurance coverage on lifestyle decisions including smoking, drinking, obesity, and lack of exercise. However, empirical studies investigating the existence of ex-ante moral hazard have had conflicting results (Courbage and de Coulon, 2004; Lillard et al., 1986; Keeler and Rolph, 1988).

Supply-Side Moral Hazard. Moral hazard can also affect physician behavior when the patient is insured;

since physicians are better informed about the patient's medical condition than the insurer and the patient, they may prescribe unnecessary medical services to boost revenues. This physician induced demand will potentially drive insurance premiums above the effective level, leading to a higher number of uninsured. Evans (1974) proposes the possibility of physician induced demand in a utility maximizing framework, while Fuchs (1978) finds that an increased surgeon/population ratio (higher health care supply) leads to an increase in per capita medical utilization (higher health care demand) as well as an increase in local medical prices, suggesting that demand for operations shifts alongside changes in the number of surgeons. McGuire and Pauly (1991) establish a theoretical model to study physician responses to fee changes; meanwhile, Gruber and Owings (1996) test the effect of declining U.S. birth rates from 1970 to 1982 on obstetrician/gynecologist behavior, and find a strong correlation between states with decreasing birth rates and states with a rising number of Caesarean sections. Kim (2010) reaches a similar conclusion while studying the fertility rate decline in the U.S. from 1989 to 1999.

Empirical evidence in China. Although the moral hazard hypothesis has been exhaustively tested in developed countries, until recently research into its inner workings and dynamics within the Chinese health care system have been limited. Some studies have provided preliminary evaluations on the impact of universal health insurance coverage; Wagstaff et al. (2009a) finds that NRCMS participation among farmers significantly increases the number of outpatient and inpatient visits, while Lei and Lin (2009) show that although NRCMS enrollment tends to promote the use of preventive medical services among the rural residents, it neither significantly alleviates out-of-pocket medical costs nor encourages regular utilization of medical services. Furthermore, Wagstaff et al. (2009b) find that out-of-pocket spending increases among NRCMS enrollees. Currie et al. (2011) also find that antibiotic abuse in China is largely driven by supply-side moral hazard through doctors' financial incentives to overprescribe. Other studies find that the NRCMS expansion resulted in a rising number of Caesarean sections, supporting the physician induced demand hypothesis (Bogget et al., 2010; Long et al., 2012; Klemetti, 2010).

Research on the effects of URBMI on patient and physician behavior is relatively scarce. Lin et al. (2009) and Liu et al. (2011), using data from nine cities, preliminarily find that inpatient out-of-pocket payment for URBMI enrollees was significantly lower than those for uninsured urban residents, despite no significant overall expenditure differences (Yip et al., 2012). Meanwhile, URBMI enrollees had moderately higher rates of utilizations than their uninsured counterparts.

c. Research Agenda

In China's 12th 5-Year Plan, the government committed to enhancing health benefits through promoting reimbursement for outpatient medical costs and doubling insurance financing levels. However, these policies place an added burden on China's health care system; outpatient medical consumption is more price-sensitive (with higher price elasticity) than inpatient services, so it is highly likely that reimbursing outpatient costs will give rise to greater moral hazard. The higher insurance premiums proposed by the government will also exacerbate the problem, as the welfare loss created through moral hazard tends to grow alongside reimbursement levels.

In addition to the insurance coverage expansion, the fee-for-service payment system continues to be a source of concern for health care cost-control. Many regions in China have experimented to different degrees with alternate payment schemes (such as Diagnosis-Related Group-based payment, capitation, etc.) as potential solutions to the moral hazard problem. These alternate payment schemes are demonstrably effective in reducing over-utilization and over-prescription of medical care in many developed countries, such as the U.S. and the U.K. However, because these systems' effectiveness usually hinges upon health delivery arrangements and the internal dynamics of the health care system, further evaluation is necessary to gauge their potential effects on Chinese health care.

The Lab would present a systematic investigation into the effects of moral hazard on the Chinese health care system in light of the recent expansion in health insurance coverage and payment reforms in China. In particular, the establishment and expansion of new health insurance programs—including the NRCMS and the URBMI—has brought about rare opportunities of exogenous variation in insurance coverage. We will use information from these natural experiments along with the variations in each program's financing and reimbursement levels to conduct studies investigating how increased insurance protection changes the behavior of both patients and physicians. Payment reforms in China have taken on various forms in different regions as a result of the decentralized Chinese political system, providing additional opportunities for empirical investigations into the impact of local experiments with payment

reform.

Suitable data for research in these areas include the China Health and Nutrition Surveys (CHNS), the State Council URBMI household surveys, and China Health and Retirement Longitudinal Study (CHARLS). We may also conduct targeted field surveys and randomized control trials to study the heterogeneous impact of insurance on patient and physician behavior. Meaningful policy implications can be drawn from our research, regarding potential welfare loss in response to extended health insurance coverage as well as policy impacts from payment system reforms in China. Our research can be used to design feasible policy tools to solve this issue and to guide further reform efforts aimed at building a sustainable basic medical insurance system.

Area II: National Drug Policy

a. Policy background

Spending on pharmaceutical drugs represents more than 40% of total Chinese health expenditures. In order to decrease drug costs and increase rational prescribing, the Chinese government's 2009 health care reform and the 12th Five-Year Plan both identified the creation of a more rational pharmaceutical drug policy as a national priority and encouraged the implementation of nationwide pilot projects. Creating a rational pharmaceutical policy is imperative to building a sustainable Chinese health care system and improving population health. Two central issues surrounding China's pharmaceutical policy are to be focused in this research: 1) endemic overprescribing by Chinese health care providers, and 2) a lack of sound mechanisms for innovation in the Chinese pharmaceutical industry.

Overprescribing. Overprescribing is rampant in China. Pharmaceutical use made up 43.1% of inpatient spending and 51.3% of outpatient spending in 2010 (Ministry of Health, 2011). Numerous empirical studies show that physicians frequently prescribe drugs with little or no evidentiary basis (Li 2012, Dong 2010, Currie 2011, Meng 2005). These high levels of pharmaceutical drug expenditures and irrational prescribing largely result from China's irrational pricing and drug delivery system. Chinese hospitals must charge low, often below-market prices for many basic procedures, but may charge higher prices for technologically intensive procedures and include an up-to 15% mark-up on many types of drugs. In China providers both prescribe and dispense drugs; prescribing more drugs and more expensive drugs leads to higher provider revenues. Although the drug-mark-up policy helped providers generate revenue in the face of mandated low prices and falling subsidies, it has also created a perverse and system-wide incentive for physicians to overprescribe expensive drugs and under-provide basic services, leading to high drug prices and sub-optimal care. Overprescribing also has a serious effect on the health of Chinese patients. Several studies have shown high rates of antimicrobial resistance in China, likely linked to high levels of antibiotic prescribing (Zhang, 2006, Dong 2010). China has undertaken reforms in the past several years aimed at controlling drug prices and reducing irrational prescribing, but there is a lack of empirical evidence measuring these reforms' effectiveness. Research in this area will apply economic techniques to examine the effect of these policies on drug cost, availability and quality.

Innovation. Between 1986 and 2006, Chinese pharmaceutical firms invented only 40 new chemical medicines (Sun, 2008). Currently, Chinese pharmaceutical firms spend only 2% of revenue on research and development on average, compared with 14-18% at leading multinationals (Sun, 2008). China's pharmaceutical pricing policy is a major cause of the industry's lack of innovation. Since Chinese firms' market for finished pharmaceuticals (as opposed to active pharmaceutical ingredients) is almost entirely domestic, their incentive to invest in innovation is dependent on selling their new drugs profitably in the Chinese market. However, the Chinese pricing scheme rewards drugs with high production costs, not drugs with high medical value; prices are derived from a drug's manufacturing cost, with mark-ups added as a drug goes down the supply chain. Further, through a distorted pricing scheme physicians are incentivized to prescribe expensive drugs. Thus, even if firms' new drugs are medically valuable, production may be unprofitable, discouraging firms from allocating resources towards innovative research and development. This area of research initiatives will examine the effects of China's pharmaceutical pricing system on the innovation of its pharmaceutical industry.

b. Literature Review

Overprescribing. Overprescribing arises partly because drugs are a credence good; drug outcomes are stochastic and it is difficult for patients to ascertain a drug's effectiveness and necessity both before and after treatment (Darby and Karni, 2008) However unlike many credence goods where the seller has full

knowledge of a product's value, physicians' knowledge of the effectiveness of drugs for each individual patient is often imperfect. Studies have shown that physicians consistently prescribe irrationally (Hogerzeil, 1995, Schwartz, 1997). Although irrational prescribing happens for many non-economic reasons including patient-induced demand, lack of physician knowledge, and attempted inducement of the placebo effect, it is especially exacerbated in systems which allow physician dispensing. Physician dispensing introduces an economic incentive for physicians to overprescribe, an effect shown empirically in numerous studies (Izuka, 2007, Liu, 2009, Morton-Jones, 1995, Trap, 2002, Park, 2005). Systems with universal

insurance coverage and lower out-of-pocket costs may also increase overutilization of healthcare by decreasing patient responsibility for extra drug costs (Zweifel, 2000).

The health care systems of China, South Korea, Japan and Taiwan are all based around a universal national social insurance model and have long histories of physician dispensing. Since universal health care and physician dispensing both lead to increased demand for drugs, it is unsurprising that East Asian prescribing rates and drug expenditures as a percentage of overall health spending are generally higher than those in the West. South Korea, Japan and Taiwan achieved universal coverage earlier than China, and have already enacted pharmaceutical drug reforms to lessen the financial and health impacts of irrational prescribing on their health care systems. The results of these reform attempts are instructive for China as it begins its own reform process.

In 1997, Taiwan began a pilot separation policy in which some physicians lost their right to dispense medicine, but were compensated with higher consulting fees. Researchers found that physicians not using on-site pharmacists were less likely to prescribe drugs. However, there was no significant difference in the change in overall medical expenditures between reform and non-reform physicians (Chou, 2003). Similarly, in 2000, South Korea enacted a new reform separating prescribing from dispensing. To appease physician groups, the reform included a 72% increase in physicians' consulting fees, a 500% increase in prescription fees, and an increase in reimbursement rates for many procedures (Kim, 2008). The reform successfully lowered the prescription rates of antibiotics, steroids, and certain other drugs, but did not stop drug spending or overall medical expenditure growth. Post-reform, the market share of more-expensive brand name and imported drugs increased, along with the prices of hospital procedures not covered by insurance (Kim, 2008). Beginning in the early 1990s, Japanese policymakers enacted a gradual separation reform between prescribing and dispensing, slowly increasing the prescription fee rates of non-dispensing physicians and decreasing pharmaceutical mark-ups. Between 1996 and 2007, prescriptions filled in a pharmacy increased from 20% to 60% (Eggleston, 2012). Similarly the percent of physicians dispensing drugs has fallen from 87.2% in 1990 to 45.9% in 2005 (Umemura, 2011 p.32). However, pharmaceutical spending as a percentage of overall health spending has only fallen by several points, and remains above the OECD average (OECD 2010 Health Factbook).

Japan, South Korea and Taiwan all undertook drug policy reform which had differing degrees of success in controlling irrational prescribing and overall medical costs. In order to gain the approval of hospitals and physicians, each reform included new revenue sources to replace the revenue previously earned from dispensing drugs. As a result, even if the reforms were successful in increasing rational prescribing, they would not necessarily be successful in controlling overall medical costs. In the 12th Five Year Plan, the Chinese government encouraged the creation of local pilot projects for controlling drug costs. As local health departments begin formulating reform ideas, it is important that they heed the lessons of China's East Asian neighbors, and focus not only on reducing pharmaceutical spending, but also on creating a more comprehensive and rational overall payment system. Weaning providers from income generated through dispensing, must be done in a way that is sustainable for both medical providers and the entire health care system.

Innovation. Many OECD countries such as the United Kingdom and Australia have begun using value-based pricing as an alternative mechanism for pricing new drugs. In contrast to a cost-based model, which compensates pharmaceutical companies for costs incurred in production, a value based model sets a price based on medical value added over available treatments, often using cost-effectiveness models. Since pharmaceutical firms would earn a higher return on truly innovative and medically necessary drugs, and a lower return on —copy-cat products|| the adoption of value-based pricing would theoretically encourage pharmaceutical companies to increase their investment in true medical innovation (Jayadev, 2008). Although value-based pricing model theoretically increase incentives to innovate, because of the global reach of the pharmaceutical market and the long-term nature of innovation, little conclusive research has been performed on this topic.

c. Research Agenda

A sustainable pharmaceutical drug policy requires strong empirical evidence using rigorous economic analysis. The Lab will use economic methods to evaluate the effects of recent major reforms on prescription rates, prescription costs, medical expenditures and other cost and quality measures to provide relevant evidence for policymakers. Below we have included several avenues for potential research.

Beginning in late 2010, China created pilot projects in six cities throughout the country focusing on the elimination of physician drug mark-ups and the creation of a physician prescription fee (Yip, 2012). This policy has recently been expanded; earlier this summer the government instructed 311 counties and a smaller number of urban hospitals to begin experimenting with reforms centered on eliminating drug mark-ups in order to decrease overprescribing. Although the policy guidelines were created by the central government, the manner of implementation will vary by county; local governments have significant leeway in determining how to replace hospital revenue lost from banning mark-ups. This policy will create a major change in the incentive structure of county health care providers; the Lab could work with local institutions in both pilot cities and reform counties to analyze this policy's effect on drug costs, overall medical expenditures, and patient satisfaction among other variables using econometric models. Our results would provide essential information for policymakers preparing to further expand the no mark-up policy in the future.

In 2009, in an effort to decrease irrational prescribing and increase the availability and affordability of basic drugs, China launched its Essential Drug List (EDL). The EDL contains 307 medications, which patients can buy from primary health facilities without a price mark-up. The central government creates the primary EDL, but allows provinces and some municipalities to add drugs for use in local centers. The Lab could use data from local centers to undertake a comprehensive economic evaluation of the effects of the EDL on prescription rates, cost and availability. By examining province and municipal level differences in the EDL in collaboration with local governments, we would be able to analyze the effects of the EDL on drug usage and cost. This data would allow policymakers to better understand the EDL's effects on drug usage and access, allowing them to create better evidence-based policies in bidding, drug distribution, usage guidelines and drug selection.

Public hospitals in China are restricted in their ability to respond to market demand, and face little market pressure to decrease high drug costs. However, in order to increase their market share, private hospitals may be incentivized to offer patients a more rational pricing plan, pricing both basic services and pharmaceuticals at market prices. Moreover, for-profit private hospitals have recently been allowed to set their own prices for services instead of relying on government-set prices, increasing their ability to respond to market pressures. The Lab could examine how ownership type affects prescribing rates and drug expenditures by undertaking an economic analysis of pharmaceutical usage at public and private hospitals. If private hospitals prescribed more rationally than public hospitals with the same or lower costs, this could serve as a basis for future reforms of China's prescription drug policy.

Finally, as mentioned in the previous section, there is little literature on the effects of pharmaceutical pricing systems and long-term pharmaceutical firm innovation. Given the opportunity, the Lab would like to create a long-term analysis of the effects of China's pharmaceutical pricing scheme on pharmaceutical firm innovation. This analysis would be an on-going project and would create a useful database for future scholars studying the Chinese pharmaceutical industry.

China's pharmaceutical drug policy is at a critical stage. The decisions made by policymakers in the next decade will have long-lasting effects on the future of Chinese health care, and by extension, the entire Chinese economy. The Lab would work to provide Chinese policymakers with policy-relevant, economically rigorous literature to guide prescription drug policy and promote innovation.

Area III: Public Hospital Reforms

a. Policy background

Public hospital reform in China has had a significantly different starting point than that of upper-income countries such as the United States. Many countries set up public hospitals to address market failure in health care provision, especially in resource-limited areas where their private counterparts find providing care unprofitable. However, in China public hospitals dominate the health care market through government monopoly and entry barriers, especially in economically-developed regions.

Public hospitals form the key pillar of China's ongoing health reform process, not only because they are major health care providers in the Chinese health service delivery system—90% hospital beds are located in public facilities (Ministry of Health, 2010), but also because health service delivery is fundamental to the success of other reform interventions including health insurance reform and drug policy reform.

A common refrain in China—*kan bing nan, kan bing gui* (getting medical care is difficult and expensive)—best summarizes the major problems of accessibility and affordability in the Chinese health care system. The first two agendas, covering universal health insurance and state drug policies, mainly address the affordability issue, while this agenda focuses on greater accessibility through public hospital reform.

There are two major long-standing factors in health service delivery leading to accessibility problems—supply and structure. First, the supply of high-quality health services falls short of demand. Longitudinally, although China's total health expenditure was about 115 times greater in 2009 than in 1980 after controlling for inflation, hospital beds per 1,000 people and physicians per 1,000 people increased by only 51.1 percent and 98.6 percent during same time period (Ministry of Health, 2010). Cross-sectionally, the rate of beds per population is considerably lower in China than in most OECD and comparator countries such as Turkey, Japan, and Korea (the World Bank, 2010). Therefore, the shortage of healthcare supply is a main reason behind *kan bing nan* (getting medical care is difficult) and the resulting price inflation may also lead to *kan bing gui* (getting medical care is expensive). Increasing China's supply capacity has become a primary goal for policymakers.

Second, the structure of health service delivery in China is characterized by the inefficient distribution of medical resources, especially high-quality health workers, undermining patients' access to care. Chinese hospitals are unevenly distributed across regions and provinces (the World Bank, 2010), and higher-quality medical resources, especially physicians, are monopolized by large urban public hospitals, creating an inverted pyramid pattern of medical resource distribution (Liu, 2011a). This is exacerbated by the lack of gate-keeping or a general practitioner referral system and patients' long-standing distrust of the quality of care in primary health facilities. Therefore, patients with minor conditions may come to larger tertiary hospitals seeking medical care without a referral, leading to long queues in large hospitals and relatively few patients in primary facilities or county-level hospitals. This is a vastly inefficient system; most patients would be more efficiently served by going to local clinics for minor conditions, county-level hospitals for most common major diseases, and large hospitals for difficult diseases requiring high levels of technical treatment (Liu, 2011a).

In sum, the major problems in health service delivery in China are lack of supply and an inefficient distribution of health care resources. An increase in supply and a more efficient allocation between public and private hospitals would lead to an increase in social welfare by leveraging the comparative advantages of each ownership type. Public hospitals, because of their commonweal nature, have a comparative advantage in providing basic health care to everyone at low prices and with a high quality of care, while private hospitals have comparative advantages in financing (by reducing government financial burden), responsiveness (to meet the diversified demand for care beyond the basic), and efficiency (Liu, 2011b).

Defining the best path to meet rising health care demand, while maintaining high quality of care and low costs is a multi-faceted and long-term research agenda. As such, this research agenda will use the classical economic principle of comparative advantage as a theoretical basis to guide the empirical analysis of hospital outcomes and performance in different public/private settings, as well as the evaluation of various public hospital reform interventions.

b. Literature Review

There are extensive empirical studies on performances of public versus private hospitals in cost, efficiency, and quality of care. In the US, a systematic review of empirical literature comparing medical costs in public and private hospitals finds no systematic differences among hospital ownership type (Shen et al., 2005). Little cost differences between public and private hospitals are also found by a government report in Australia (Australian Government, 2009).

There is some evidence that for-profit private hospitals have higher efficiency, except in cases where hospitals are competing on new technologies (Becker and Sloan, 1985; Zuckerman et al., 1994). When

private hospitals are entering a new market, previous studies suggest that they will be more responsive to changes in market conditions, potentially expanding supply capacity more quickly. Chakravarty et al. (2006) develop a theory where for-profit firms should be quicker to enter and exit a market, and verify this prediction through an analysis of U.S. hospital data. In addition, Tiemann (2011) find that privatization is associated with higher efficiency.

Outside of health care, Kornai (1980) argues that government-owned firms may have softer financial incentives than private companies, which makes government-run firms less responsive to changes in market demand and takes away their incentives for cost-efficiency; a hypothesis verified empirically by Duggan (2000).

There is mixed evidence on the effects of for-profit, non-profit, and public hospitals on quality of care, so supply expansion may have to balance cost-efficiencies with incentives to improve quality (Shortell and Hughes, 1988; Keeler, 1992; Mark, 1996; Sloan et al. 2001; Liu et al. 2009).

An Australian government report finds higher performance in infection control in private hospitals (Australian Government, 2009). Liu et al. (2009) analyzed a multiyear statistics at provincial level in China, and they find a lower cost with private facilities than with the public counterpart at both inpatient and outpatient settings. Their findings remain consistent after controlling for the conditions of patients and providers. Eggleston et al (2008), using similar methods as Shen et al. (2005), compare 31 important studies on health care quality in US hospitals since 1990, and find the relationship between hospital ownership and quality depends on a study's data source, time period examined, and region covered, though studies representing US as a whole tend to find lower quality among for-profit private hospital than private nonprofits.

As demonstrated above, large body of the literature reviewed has been focused on Western health care systems, where large hospital markets like the U.S. do not have the same extent of public provision as the Chinese health care market. Therefore, establishing a clear understanding of the Chinese health care provision system, with its high number of public providers, is important to the success of Chinese health care reforms.

c. Research Agenda

China's 12th 5-Year Plan has made further commitments to reform public hospitals and expand the pilot projects for public hospital reform throughout China. Targeted at building a sustainable mechanism to improve China's health service delivery system, public hospital reform focuses on two aspects.

The first type of reforms are meant to lead existing public sector institutions to increase health care production efficiency and redistribute medical resources—these reforms include hospital governance reform, multi-site practice reform, and county-level hospital reform. Hospital governance reform separates government regulatory roles from management functions in order to increase management autonomy and incentivize the increase of supply capacity. Multi-site practice reform allows physicians to practice outside of their site of registration with minimum opportunity cost in order to break the monopoly on high-quality medical workforce held by large urban hospitals. County-level hospital reform involves training backbone physicians in collaboration with tertiary hospitals as well as building integrated referral systems with the goal of retaining 90% of local patients within the county health system.

The second type of reforms is focused on the private sector. These reforms include optimizing entry conditions for private care to further the goals of public hospital reform and improving regional health planning to give an equal weight to, if not favor, private investment. The implementation of these reforms are integral to addressing current limitations to health care supply, especially because the amount of hospital beds and service volume accounted for by the private sector are forecasted to account for 20% of the Chinese total by 2015 according to the 12th 5-year plan.

As a part of our Health Economics Lab, we would like to focus (but not limit) our research to the above policies, as well as conduct empirical evaluations of these public hospital reform interventions. In particular, hospital governance reforms carried out by local Chinese governments have used a number of different strategies, creating fertile ground for policy research. For instance, the cities of Shanghai, Wuxi, and Suzhou have set up new organizations as non-profit entities, public service units, or corporatized structures to run public hospitals independent from government agencies, Chengdu has created a new government hospital management agency independent of the city health department, and Weifang has conducted reforms within its health departments where two separate and independent

groups were given control over hospital management and regulation. As hospital governance reforms are gradually rolled out throughout China, these —natural experiments|| provide us with an opportunity to evaluate the effects of different methods of public hospital governance reforms.

Multi-site practice reform has also begun in a number of provinces and municipalities throughout the country. Kunming City and Guangdong province were selected as the locations for the first city and provincial-level pilot projects, respectively, followed by Hainan province, Beijing and Chengdu. In July 2011, as part of the overall public hospital reform initiatives, the government committed to broadening the dual practice pilot to cover all provinces, autonomous regions, and municipalities, providing us with an opportunity to evaluate the impacts of regulated dual practice reform as part of public hospital reform.

The data suitable for these research topics include state and local published statistics, institutional data of hospitals and physicians, reimbursement data from local health insurance agencies, patient-level data such as CHNS, CHARLS, and URBMI household surveys, among other data sources. If the budget permits, we will also conduct field interviews to collect qualitative data and/or targeted household surveys or patient surveys to collect quantitative data. We may also conduct experiments to study the different impacts of different interventions centered on public hospital reform. Based on our studies, meaningful policy recommendations could be made regarding the public hospital reforms, which can be used to design feasible policy instruments to guide further reform efforts.

VI. The PKU-CMB Lab for Health Economics in China

PKU Facilities (Guanghua School of Management and Health Science Centers)

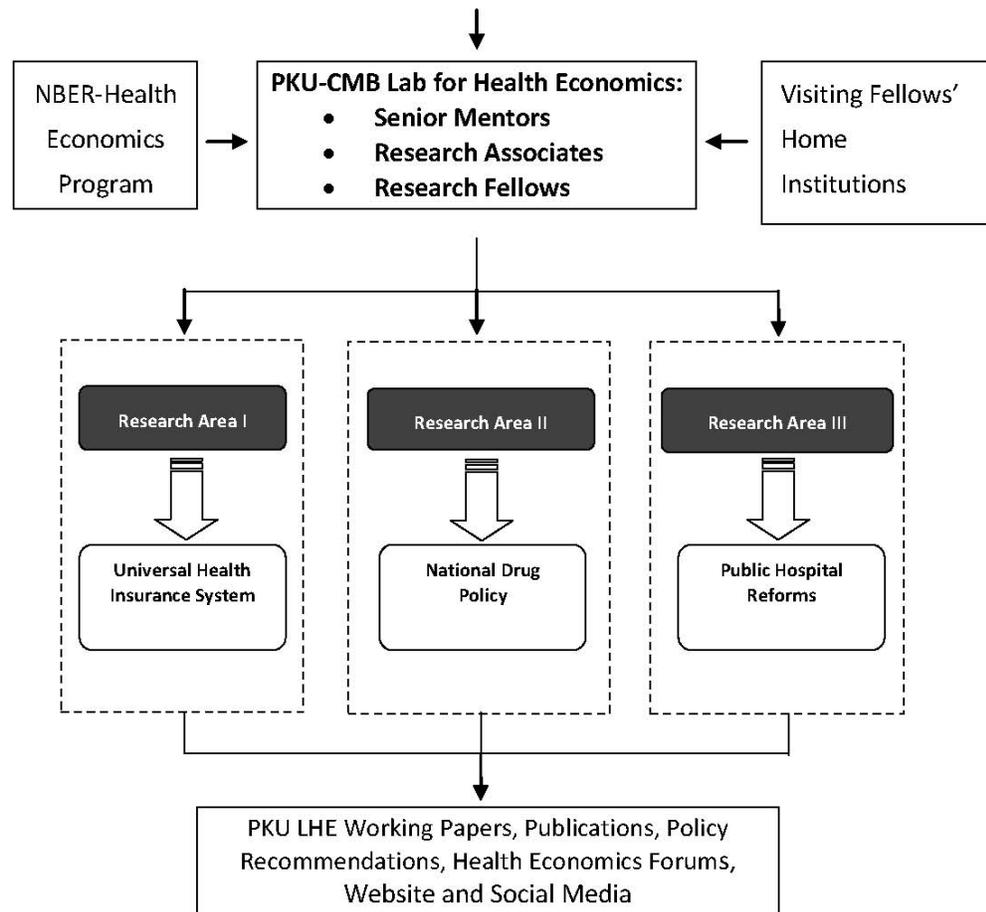


Figure 1: Proposed Structure of PKU-CMB Lab for Health Economics

Over the next fifty years, China's population will grow increasingly older and wealthier, leading to a rapid increase in health care demand. Creating and maintaining a health care system that provides comprehensive, high quality, and affordable medical care to all citizens in the face of growing demand will remain a national priority for the foreseeable future. The PKU-CMB Lab for Health Economics (LHE) will address the challenges presented by this growing demand in two ways. First, we will provide long-term, high-quality, economics-based, policy-relevant research to assist policymakers in developing effective Chinese health care policies as outlined in the previous section. Second, we will help develop the next generation of Chinese health economists by inviting foreign and Chinese scholars to the Lab, where they can participate in important health economic research and become part of a collaborative network that will allow them to continue to engage in China-focused research even after returning to their home institutions.

The Lab will be associated with a number of academic and economic research institutions both within China and abroad. At Peking University, the Lab will draw its resources directly from the PKU Guanghua School of Management and the PKU Health Science Center, through the leadership of Drs. Gordon Liu and Yang Ke, the two PIs for the Lab. The Principal Investigators of the Lab also have an a close relationship with the National Bureau of Economic Research (NBER) Health Economics Program led by Professor Michael Grossman, which has stated an on-going desire to become further involved in Chinese health economics research. Additionally, the Lab through its visiting scholars will have access to academic institutions throughout the world, broadening our network of potential collaborators, funding sources, and data. Essentially, the Lab will act as a hub, mobilizing the resources of Peking University, the National Bureau of Economic Research (NBER) Health Economics Program, and visiting fellows' home institutions to perform high-quality, collaborative health economics research focused on China. The anchors of the Lab will be the Senior Mentors, led by Drs. Liu and Ke as the Lab PIs, who will create the general research direction for the Lab, provide guidance to younger visiting scholars, and collaborate with senior visiting scholars.

The Lab will invite visiting scholars from inside and outside of China to apply to come to Beijing and work on research topics as identified above. The Lab will employ a two-tiered system; depending on research experience visiting scholars will enter the lab as either —research fellows|| or —research associates.|| The Lab may provide partial or full stipends to the visiting fellows depending on the strength of their research ideas, funding needs, and other budgetary and time-related factors. Young visiting scholars, including graduate students and junior faculty can join the Lab as research fellows. The research fellows will work on the identified research topics under the guidance of the Lab's senior mentors. Upon completion of their stay at the Lab, research fellows are expected to have completed a working paper in collaboration with the senior mentors for possible publication in an international academic journal. After returning to their home institutions, research fellows will not only be better prepared to carry out rigorous health economics research, but will also have a stronger understanding of the Chinese health care system and hopefully, a continued desire to conduct research on Chinese healthcare in the future.

Senior university faculty and established health economists working in government or private sector may join the Lab as research associates. The research associates will work in conjunction with the Senior Mentors at the Lab on the identified research topics. Research associates may participate in the Lab's research projects or initiate their own projects, preferably focusing on the three major research areas identified above. A research associate is welcome to apply for both short-term or long-term visit stay in the Lab for their research. Research associates will also be expected to help mentor the Lab's research fellows; this will provide research associates with additional manpower to conduct their research and will provide research fellows with valuable research experience.

The Lab will emphasize collaboration. Visiting scholars will be encouraged to collaborate with one another on research and frequently discuss their research problems and results with the Lab colleagues. The Lab will also actively collaborate with other public health and health economic groups throughout China, further widening the research fellows' and research associates' network. One of our goals is that our visiting scholars leave the Lab with a strong network of fellow health economic researchers for future collaboration. Indeed, we expect all visiting scholars to continue contributing to Chinese health economic research long after they leave the Lab.

The work performed in the Lab will make on-going, long-term contributions to improving the Chinese health care system. The Lab will produce working papers, branded as PKU LHE-Working Papers, to share preliminary research results with policymakers and other scholars. The working papers will be freely available online, and will work to stimulate discussion on a number of important policy issues. The Lab will also transform our policy research into publications in academic journals, allowing for further

dissemination of our results. From our research, we will create recommendations for Chinese policymakers, helping to generate real positive changes in the Chinese health care system.

In order to increase the visibility of our research, spread information about Chinese health care, and provide a venue for discussions of Chinese health care reforms, we plan to create a lab website and build a social media presence. The website will host all working papers and research results produced by our Lab, facilitating easy access for outside scholars. We may also consider creating a blog on Chinese health care, which we hope will become one of the main sources of information for academics, journalists and others interested in the Chinese health care system and Chinese health care reforms. To increase our blog's visibility, the Lab may build twitter and weibo accounts to spread information about new research and facilitate interactive conversations with interested social media users. Finally, the Lab will host a yearly China Health Economics Summer Institute, possibly in partnership with the National Bureau of Economic Research (NBER) Health Economics Group to showcase important new health economics research on the Chinese health care system.

Our unique combination of high-quality personnel, extensive data, web presence, summer institute and strong collaborating institutions will make us the natural destination for researchers seeking to perform health economics research in China. It is our hope that after several years the Lab will be the first place researchers inside and outside of China turn to when conducting China-focused health economics research.

As China's demand for health care continues to expand with the aging and increasing affluence of its population, the proper management of an increasingly complex health care system will become a national priority. Thus, the development of the next generation of Chinese health economists and foreign health economists with an interest and investment in Chinese health care is integral to the long-term development of the Chinese health care system. The China-focused PKU-CMB Lab for Health Economics will help develop this new generation of health economists by providing young scholars from China and across the world with access to high-quality Chinese health care data, as well as the opportunity to enhance their research skills through conducting essential policy research in conjunction with leading Chinese researchers and connecting with a collaborative network of global health economics scholars. Such an investment in the future of China's young health economists will provide invaluable returns for the future of China's health care system, and for Chinese society as a whole.

VII. Budget

Funding Request: \$300,000

Funding Duration: 3 years

Budget Description:

Budget Category	Year 1	Year 2	Year 3	Total
Visiting Scholars (includes stipend and travel expenses)	\$10,000	\$10,500	\$11,025	\$31,525
Operating Expenses (office rental, office supplies, website, etc)	\$22,000	\$23,100	\$24,567	\$69,667
Conferences	\$30,000	\$31,500	\$33,075	\$94,575
Research Expenses (data collection, data analysis, analytical equipment, travel)	\$33,000	\$34,650	\$36,383	\$104,033
Overhead	\$0	\$0	\$0	\$0
Grand Total	\$95,000	\$99,750	\$104,738	\$300,000

Our total budget of \$300,000 is broken into several components. To support our visiting scholars we have requested a total of \$31,525 over three years. This money will be used to reimburse some or all of a scholar's expenses while working at the Lab. The percentage

reimbursed will depend on the situation of each individual scholar. We have requested a total of \$69,867 over three years to support the operation of the Lab. This money will be used to subsidize an office, purchase office supplies, maintain a website, and support other operational activities. To support the Lab's research activities we have requested a total of \$104,033 over three years. This funding will pay for the creation of databases through field and household surveys, purchasing data from third parties, data analysis, and travel expenses. This money will also be used to purchase research-related equipment and software. Finally, we have requested \$94,575 over three years to finance an annual health economics conference to be held at Peking University. We will use these funds to rent conference space, provide small stipends to presenters, and pay other conference-related costs. After three years, we anticipate that the Lab begun with these funds will have become a productive contributor to the Chinese health care debate and a major center for health economics research in China.

VIII. Research Capacity

After serving as a health economist for years in the United States at USC and UNC, Dr. Liu returned full time to Peking University in 2006, where he founded the PKU China Center for Health Economics Research (CCHER). Over the years at CCHER, he has trained over 60 young scholars through the PKU Young Health Economist Fellowships out of his research grants. He also actively conducts collaborative research with other leading scholars. In particular, he has successfully completed a CMB funded policy project with Dr. Ke Yang that delivered many valuable findings and databases for further research. Dr. Liu has also had an ongoing relationship with the National Bureau of Economic Research (NBER) Health Economic Program led by Dr. Michael Grossman. In 2011, both Drs. Ke and Liu were appointed to sit on the State Council Health Reform Advisory Commission, which offers them other unique opportunities to conduct more policy-oriented projects. Combining their training backgrounds, track records, capacities and top policy advisory roles, Dr. Liu together with Dr. Ke Yang will make a unique team with strong credibility to achieve the stated goals of this study proposal with the support of CMB-CP.

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