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Provider Payment Reform for Chinese Hospitals:
Policy Transfer and Internal Diffusion of International Models



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CONTENT

Introduction	5
Conceptual Framework and Working Hypotheses	6
International Models and Degree of Transfer	8
Internal Diffusion and the Scope of Change	10
4.1 The UEBMI	11
4.2 The NRCMS	12
4.3 The Scope of Change	13
i Conclusion	15
References	16
Appendix: Data Report	18
1 How Did We Collect the Data?	18
2 How Did We Define a Case?	20
3 How Did We Code the Data?	20
4 How Did We Guarantee the Quality of Measurement	25
References	26
3 3	Conceptual Framework and Working Hypotheses International Models and Degree of Transfer Internal Diffusion and the Scope of Change 4.1 The UEBMI 4.2 The NRCMS 4.3 The Scope of Change Conclusion eferences ppendix: Data Report 1 How Did We Collect the Data? 2 How Did We Define a Case? 3 How Did We Guarantee the Quality of Measurement

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Abstract

There are opposing views in the literature regarding the degree to which China's public administration adopted international models of administrative reform. Prospective payment systems constitute a formidable case for examining this question in the field of public hospital funding. In China's decentralized and fragmented health insurance system, different localities have chosen different approaches to replace retrospective with prospective payment models. Based on a relational case database, we analyzed how international payment reforms were introduced in a Chinese context as models with varying degrees of transfer and scopes of change. Furthermore, we reconstructed the process of diffusion, which was driven more by horizontal learning in the Urban Employees' Basic Medical Insurance (UEBMI), and more by hierarchical delegation in the New Rural Cooperative Medical Scheme (NRCMS). The two insurances were administered by different ministries, whose preferences facilitated the spread of different models of provider payment. Overall, the mainstream of reforms only achieved a limited displacement of retrospective payment: local governments often dropped the prospective payment aspect altogether or limited its application. In the NRCMS, more ambitious reforms were limited by state capacity, whereas the use of Medical Savings Accounts (MSAs) limited the potential of reforms in the UEBMI.

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1 INTRODUCTION

The question whether and to what extent China has adopted administrative reforms inspired by international practices since 1979 is subject to no small debate. Much of it has focused on New Public Management (NPM) practices in the public administration proper. Many studies focusing on the management of civil servants find a strong influence of NPM approaches with far-reaching consequences, but also distinct limitations (Gao 2015; Heberer & Trappel 2013; Mei & Pearson 2017). Others see NPM and other foreign ideas merely as a symbolic legitimation for *de-facto* domestic policy options (Dong, Christensen & Painter 2010; Lim & Horesh 2016).

Beyond the core of public administration, the health sector has been particularly affected by state retrenchment and commercialization (Duckett 2011). Budgetary support for public hospitals declined massively (Wong 2009; Wu, Ramesh & Yu 2017), and hospitals primarily relied on profits from user fees (Allen, Cao & Wang 2014). As a result, health costs have continued to grow rapidly (Tang, Tao & Bekedam 2012). Since the late 1990s, the central government established three new health insurance programs (Zheng, Jong & Koppenjan 2010), which provide a decentralized patchwork of basic protection (Li 2014; Qian & Mok 2016). The Urban Employees' Basic Medical Insurance (UEBMI) covers employees in the formal sector and is funded by contributions from employers and employees. The New Rural Cooperative Medical System (NRCMS) and the new Urban and Rural Residents' Basic Medical Insurance (URRBMI) cover citizens not employed in the urban formal sector and are mostly funded through tax revenues. The combination of public budgets and user fees typical for developing countries (Barnum, Kutzin & Saxenian 1995) was thus amended.

Cost control has been a long-standing concern of Chinese policy makers in healthcare, who looked abroad for successful practices. Many industrialized countries introduced provider payment reforms to restrain hospitals' and doctors' cost-driving behavior. Traditional fee-for-service (FFS) payment facilitates such induced demand, for every service item is priced and paid for independently, and the information asymmetries inherent to medical markets prevent simple and effective monitoring of doctors' treatment behavior. Provider payment reforms aim at giving hospitals incentives to raise the efficiency of treatment by changing the basis of accounting from individual service items to more aggregated units, such as bed-days; and by shifting from retrospective reimbursement of patients' expenditures to prospective payment of lump sums to hospitals. As those lump sums are oriented to average costs of treatment, they remove incentives for hospitals to add expensive service items. However, they may also have adverse effects on access and treatment quality, for example if hospitals refuse to treat complicated cases or keep patients in the hospital longer than necessary.

Since the introduction of health insurance in the late 1990s, several localities were reported to engage in provider payment reforms (Jian et al. 2015; Yip & Eggleston 2004; Yip, Hsiao, Meng, Chen & Sun 2010), as well as more idiosyncratic measures of cost control (He & Qian 2013; Hussain 2016). The reports are however ambiguous regarding the degree to which supply-side reforms are inspired by international models, as opposed to indigenous public administration practices; the degree to which they really displace FFS payment; and the degree to which they have been implemented across China (Cf.: Bali & Ramesh 2017; Milcent 2018, 63–65).

This study aims at shedding light on those questions through a comprehensive analysis of Chinese academic studies, newspaper articles and administrative documents, as well as some expert interviews and fieldwork data. We primari-

ly used the China Academic Journals database, the APABI full text newspaper database, and the Laws and Regulations database of Peking University, searching for different search words associated with provider payment reforms. Overall, 476 documents from those databases contained important empirical information and were selected, along with various monographs and policy reports, official documents from international organizations, internal materials, as well as data from fieldwork. We organized the data in a relational case database in MS Access, the details are described in the data report (see Appendix). Methodologically, our study relies on institutional analysis and process tracing, and it reports some complementary statistics.

The remainder of the article is organized as follows: the second section outlines the con-

ceptual framework, which draws on diffusion and policy transfer studies; and develops working hypotheses based on the literature. The third section takes a policy transfer perspective, analyzing the degree to which different provider payment models in China resemble international models. It contrasts the ideal-typical international models with the real types of reforms. The fourth section analyzes how different provider payment models diffused within different health insurance systems in China and assesses the degree to which retrospective payment was replaced by prospective payment. The results indicate that international models of provider payment reform have broadly diffused in China, but due to small-scale or superficial implementation, the overall displacement of FFS has so far remained limited.

2 CONCEPTUAL FRAMEWORK AND WORKING HYPOTHESES

This study asks for the extent to which foreign models of hospital payment reform have diffused and displaced FFS in China, which models have been adopted, and which factors facilitated their spread. There are two dominant frameworks to analyze the spread of policies across jurisdictions and countries: policy diffusion and policy transfer. The former often works with quantitative analysis of large-n samples and policies assumed not to change — so they can be coded binarily – to identify influential factors; also, process tracing is increasingly applied to establish causality (Starke 2013). The latter analyzes qualitatively how policies change while travelling in a small-n sample. The sample size in our database is in-between, with 62 cases for the UEBMI and 87 cases for the NRCMS. In order to maximize the analytical leverage of our data, we combine both perspectives, which are briefly introduced in this section. We then contextualize them in the political economy of Chinese health reform and summarize our expectations in working hypotheses.

Policy transfer studies largely focus on a core endogenous variable – the degree of transfer (Dolowitz & Marsh 2000; Rose 1993, 119-142). It is high where international models are adopted as direct copies, or adaptations only adjusted slightly to the new context; it is low for inspirations that display the spirit but lack the substantial foundation of the original model, or for reinterpretations (Dong et al. 2010) of domestic approaches as representing international models. Intermediary degrees of transfer are found with hybrids that make substantial changes to fit a model into a new context; and with syntheses that combine elements of different models. The degree of transfer depends on various factors, including high technical complexity of a policy, and a high difference in available resources between sending and receiving jurisdiction. These exogenous variables are detrimental to a high degree of transfer as a result of policy learning. In the transfer of provider payment reforms from socio-economically more developed areas to China, we would thus expect a high degree of

transfer for comparatively simple models; and a low or medium degree of transfer for complex models, which may require some simplification. Another endogenous variable is the *scope* of change, defined here as the degree to which prospective payments replace FFS in insurance reimbursements. We expected a high degree of transfer to coincide with a high scope of change.

Diffusion studies mostly focus on four ideal-typical mechanisms – learning, imitation, competition, and coercion (Shipan & Volden 2008). The diffusion framework was refined for internal policy diffusion in China with its particular interplay of vertical coercion and horizontal competition (Ma 2017; Zhu 2017). Policy experimentation plays a crucial role, with pilots denoting experiments delegated by higher authorities to prepare expansion, and policy innovations denoting local initiatives. As a rule of thumb, policies that raise local revenues can diffuse through horizontal policy learning, whereas (re-)distributive social policy requires coercive intervention or subsidies of higher levels of government (Heilmann 2008; Zhu & Zhao 2018). The policy characteristics of provider payment reforms place them in an ambiguous position: on the one hand, they are part of social policy and require some coercion; on the other, they are tools of cost containment that prevent overspending, so local governments can have intrinsic incentives to adopt them. We would thus expect them to diffuse either through horizontal policy learning ("enlightenment model", see Zhu 2017), or through the more coercive designation of pilot programs and their subsequent extension through central authorities.

Our analysis focuses on the UEBMI and the NRCMS, which are comparatively well-documented. They display interesting differences regarding the political economy of health insurance. Until 2018, these insurances were under the jurisdiction of competing ministerial bureaucracies with different policy preferences. The NRCMS was under the Ministry of Health (MoH) and its line bureaucracy, which also manages public hospitals and constitutes a vehicle for the

political representation of the medical profession. The MoH commands the expert knowledge necessary to implement complex provider payment policies, but it is seen as reluctant to contradict the interests of its public hospitals. Conversely, the Ministry of Human Resources and Social Security (MoHRSS, former Ministry of Labor and Social Security) is closer to the interests of employees and labor unions, but it lacks the expert knowledge to implement complex policies (Hsiao 2007). We thus expect the MoH to prefer technically complex policies that require its core competencies, but also a small scope of change; and the MoHRSS to prefer technically simple measures with a large scope of change. At the local level, the stability of the funds is of paramount importance; and differences in administrative capacity between regions and insurance systems affect the effectiveness of strategic purchasing (K. Liu & He 2018; Zhang et al. 2010). The exogenous variables of ministerial and local policy preferences and administrative capacity should facilitate a high scope of change in the UEBMI, and a low scope of change in the NRCMS.

As noted above, the scope of change means the degree to which prospective payments replace retrospective ones in insurance reimbursements. Outcomes in terms of cost control and treatment quality furthermore depend on the share of insurance reimbursements in the hospitals' revenues. As of 2017, only 9.24 % of public hospitals' revenues were budgetary support by the government, while 57.01 % were service revenues and 31.14 % drug revenues. Total per capita health costs were RMB 3,783.83 (about USD 560) in 2017, of which on average RMB 1,832.18 (about USD 271) were spent in public hospitals. Discounting RMB 169.29 in budgetary transfers leaves an average per capita amount of RMB 1,662.89 in service and drug revenues. This sum is partly paid for from health insurance funds, and partly out-of-pocket. The insurance systems differ massively in terms of financial capacity: the total average per capita expenditures of the UEBMI could theoretically cover 187.75 % of the RMB 1,662.89. The NRCMS only reached 34.11 %. Therefore, the exogenous variable of insurance financial capacity renders prospective payment much more effective in the UEBMI than in the NRCMS (figures calculated from: CHFP 2018; MoHRSS 2018).

Based on these considerations, we put forth the following working hypotheses:

1 Provider payment reforms in China are technically simple models with a high degree of transfer, or simplified versions of complex international models with a lower degree of transfer.

- **2** The provider payment models diffuse within China through policy learning and coercion.
- **3** Reforms in the UEBMI are dominated by technically simple measures with a high degree of transfer and high scope of change that strongly reflect the preferences of the MoHRSS.
- 4 Reforms in the NRCMS involve more complex measures with a small degree of transfer and a small scope of change that reflect the preferences of the MoH, and which are severely limited by local state capacity.

3 INTERNATIONAL MODELS AND DEGREE OF TRANSFER

The previous section formulated four working hypotheses, based on the prevalent conceptual frameworks and literature about Chinese health reforms. This section takes a policy transfer perspective on provider payment models in China, linking them to international practices. It assesses the degree to which Hypothesis 1 matches our empirical findings through institutional analysis. Table 1 provides an overview of the findings. We grouped our selection of models by the level of aggregation in payment, as well as the basis of accounting - individual services, diagnoses, bed-days or hospitals. As a rule of thumb, more aggregated forms of hospital payment tend to be less data-intensive, and thus less complex. They create incentives to decrease the amount of medical services provided, which may both decrease costs and affect the intensity and quality of treatment. More disaggregated forms require more data. They create incentives to increase the intensity of treatment, which may raise costs. Each of these methods has specific advantages and disadvantages. However, in recent years, DRGs have increasingly become a standard of hospital funding among OECD members, as well as some newly industrialized economies in East Asia (Gilardi, Füglister & Luyet 2009).

FFS (Type A in Table 1) is the mainstream of hospital payment in China, and it constitutes the extreme end of disaggregation: it separately

Table 1: Overview of basic hospital payment mechanisms in the PRC

	Type A:	Type B: case-based payment [an bingzhong fufei]				
Payment mechanisms	fee-for-service (FFS) [an xiangmu fufei]	B1: revenue cap [dan bingzhong xianjia]	B2: fixed price [danbing-zhong ding'e]	B3: diagnosis-related groups (DRGs) [zhenduan xiangguan zu]		
Prospective payment	No	No	Yes	Yes		
Degree of transfer		Low (inspiration)	High (adaptation)	High (adaptation)		
Potential scope of change		None	Some to mostly	Some to mostly		
Aggregation of payments	Low	Low	Low to Medium	Medium		
Model complexity		Low	Medium	High		

Based on: Berki 1983; Busse et al. 2011; authors' database

counts and charges every unit of medicine and every service item applied during treatment. The Mandarin term for FFS is "an xiangmu fufei" [payment by item]. This payment method is associated with incentives for doctors and hospitals to over-provide healthcare – most notably profitable drugs and services. In the PRC, service prices in public hospitals are largely set by the government. Setting prices that appropriately reflect the costs of production for thousands of service items is a complex task, which requires medical and accounting knowledge and a broad basis of accurate micro-level data. Service prices in the PRC are characterized by an imbalance between under-valued regular service items. and high profit margins for drugs and diagnostic services (B. Yu et al. 2012). The prevalence of FFS and distortion of prices have been major cost drivers (Tang et al. 2012). Therefore, strategic purchasing has a lot of potential in the PRC.

One strategy to improve hospital payments is aggregation on a case basis (Type B). The prevailing terminology in Chinese research refers to it as "payment by disease type" (an bingzhong fufei). This umbrella term somewhat obliterates the degree of transfer, most notably the distinction between prospective and retrospective payment. A well-known case-based payment model is the DRGs approach (Type B3), which creates a system of relational groups. They cover most inpatient cases, and hospitals are compensated by fixed amounts for each group that can be further differentiated, for example according to severity of the case or patient age. The use of prospec-

tive payments creates incentives for hospitals to lower the costs of treatment, as they can retain a potential surplus, but also must assume costs surpassing the fixed amount. DRGs are difficult to implement: case groups should be both economically and clinically homogeneous and are often oriented towards international classification standards for illnesses, such as ICD-10. They require standardized and accurate cost accounting and patient discharge data, the collection of which creates considerable costs in human resources and cost accounting. This constitutes a challenge in developing countries with limited administrative capacity (Busse, Geissler, Quentin & Wiley 2011; Langenbrunner, Cashin & O'Dougherty 2009).

Proper DRG systems are rare in China, but there are simplified syntheses between case-based payments and global caps (see below), such as Case-based Relative Value Payment (an bingzhong fenzhi fufei, Type B4). They follow similar principles as DRGs and achieve a large scope of change with a medium degree of transfer. Yet more simplified forms of case-based treatment are even more widespread. They typically focus on individual illnesses and thus imply a smaller scope of change of the FFS system. Two groups of practices are dominant: revenue caps (dan bingzhong xianjia; Type B1) assign a cost limit to a given illness while accounting by service items; and fixed prices (dan bingzhong ding'e; Type B2) assign fixed standard prices to a given illness. Revenue caps constitute an inspiration (low degree of transfer) with no change re-

	Тур	e C:	Type D: global budget [zong'e yusuan]		
B4: case-based relative value [an bingzhong fenzhi fufei]	per diem [an chuangri fufei]		D1: retrospective global budget [zong'e kongzhi]	D2: prospective global budget [zong'e yufu]	
Yes	No	Yes	No	Yes	
Medium (synthesis)	High (adaptation)	High (adaptation)	Low (reinterpretation)	Low (reinterpretation)	
Some to mostly	None	Some to mostly	None	Mostly to full	
Medium	Low	Medium	Low	High	
Elevated	Low	Elevated	Low	Low to medium	

garding FFS. Fixed prices are an *adaptation* (high degree of transfer), but the scope of change depends on the share of services they cover. Most implementations are rather small-scale in nature. *Inspirations* and small-scale *adaptations* are more manageable for local governments with low administrative capacity, which facilitates their diffusion.

The per diem approach (Type C) pays for inpatient services based on patients' bed days. It is usually associated with a prospective payment system, but Singapore constitutes a precedent for using it as a revenue cap (Ramesh 2008, 69); and Hong Kong charged minor user fees on a per diem basis, while the bulk of hospital funding came from global budgets (Chu 1992; Yuen 1999). In China, prospective and retrospective variants of per diem exist, and both display a high degree of transfer, while the scope of change differs.

Global budgets (Type D) are the most aggregated form of hospital payment. In their purest form, they are based on historical averages of the total costs a hospital requires to provide a specific set of services to a specific population in a defined jurisdiction. As an aggregated prospective payment approach (Type D2), they allow hospitals to flexibly allocate the transferred sums, and to keep the surplus of their operations, which creates incentives to decrease the number of services. However, global budgets can also result in a general decrease of the quality of care, or in denial of treatment to difficult cases. They are less sophisticated and data-intensive than DRGs,

and thus more fungible in a development context (Langenbrunner et al. 2009). The degree of transfer of global budgets in the PRC is generally low, because there are similar domestic budgeting practices and the idea was not new to China. The term for a prospective global budget (zong'e yufu) can be interchangeably used with more general domestic budgeting concepts like baogan, which typically denotes the fixed-amount quality of a budgeting item (Hussain 2012, 194–240). Furthermore, there is also a retrospective variant of global budgets called "global caps" (zong'e kongzhi, Type D1). They retain FFS payments in the insurance and usually define spending caps for individual hospitals. Both variants of global budgets are reinterpretations, but the prospective variant can achieve a large scope of change.

The findings only partially confirm Hypothesis 1. Technically simple models dominate as expected, but they do not always feature a high degree of transfer. Furthermore, there are simplified versions of complex models, especially in the case-based family, but they feature a high degree of transfer if the simplifications have been developed outside mainland China. Furthermore, where simplified models lack the prospective payment component and are implemented as caps, the scope of change is non-existent as expected. But even where the degree of transfer is high, the scope of change still depends on the breadth of the application. These findings also affect Hypothesis 3 and 4: their assumptions regarding the connection between the degree of transfer and the scope of change are void.

4 INTERNAL DIFFUSION AND THE SCOPE OF CHANGE

The previous section partially confirmed Working Hypothesis 1, but it also highlighted the complex relationship between the *degree of transfer* and the *scope of change*. This section applies a process tracing approach to analyze internal policy diffusion. All data is taken from our database, unless otherwise indicated. Sub-sections

4.1 and 4.2 analyze the diffusion of different provider payment models in the UEBMI and the NRCMS. The focus is on well-documented cases, which provide robust results. The spread of the

¹ See: Appendix: Data Report, Point 3.2.

models is assessed by statistical data from published and internal reports. Finally, Sub-section 4.3 assesses the *scope of change* achieved in the sample through a crude valuation of the cases in the database, which is based on a separate analysis of the reported provider payment methods for the inpatient and outpatient funds.² Taken together, these inquiries assess the degree to which Working Hypotheses 2 to 4 are matched by the data.

The diffusion and transformation of hospital payment models on the Chinese mainland largely occurred in the wake of the expansion of health insurance since the late 1990s. But the diffusion of DRGs (Type B3) started earlier. In 1988, the Hospital Management Research Institute in Beijing began developing a DRGs system, and by 1994, it had created 345 groups based on 100,000 patient files from Beijing, which leaned on the group-building standards of the US AP-DRGs system. Some other localities and organizations engaged in similar projects at the time, but a broad application of such complex and data-intensive schemes was impeded – among other things – by the lack of standardized and accurate hospital data. In 1992 the MoH launched an initiative to develop quality standards for 102 illnesses in Chinese hospitals, which became a foundation of case-based payment in the PRC. Price caps (Type B1) first appeared in 1988 in a hospital in the city of Jinzhou in Liaoning province, and their creators described them as inspired by the DRGs approach in the US. These early developments confirm the MoH's preference for technically complex, case-based approaches (Type B) and their simplified application in accordance with Hypothesis 4.

4.1 THE UEBMI

The early adopters of hospital payment methods in the PRC were large coastal cities. In 1989, the State Council selected Shenzhen and Hainan

province to pilot comprehensive social insurance reforms, which led to the creation of the UEBMI in 1998. For hospital payment, Shenzhen adopted *per diem* revenue caps (Type C) as practiced in Singapore. The local bureau of health managed both insurance and hospitals, and had a hard time controlling the costs of treatment, as hospitals raised their profits by over-treating insured patients. Conversely, Shanghai and Hainan province adopted domestic versions of global budgets (Type D2). As international economic centers, these early adopters were particularly exposed to international ideas.

In 1994, the central government selected the prefecture-level city of Zhenjiang in the coastal province of Jiangsu as a pilot for the UEBMI. The bureau of labor managed the insurance, unlike in Shenzhen. It had less tight connections to the hospitals and chose a tougher approach to cost control. In 1995, the insurance started funding hospitals via per diem payments (Type C) – arguably implemented as revenue caps – but did not manage to control costs well in the first two years. In 1997, the administration added annual global reimbursement caps for public hospitals to control insurance expenditures (Type D1). But many public hospitals surpassed these limits and reacted to financial sanctions by decreasing the quality of services and turning patients away. In 1999, the city arguably shifted towards prospective global budgets (Type D2), for which little detail is provided in the literature. In 2001, Zhenjiang then switched to fixed prices for 82 diseases (Type B2). The approach was arguably inspired by the public health insurance introduced in Taiwan in 1995 (J. Liu 2001), and matched a similar trend from per diem caps to fixed case-based payments in Singapore in the late 1990s (Ramesh 2008, 70f.). This approach stabilized, and by 2018, the number of case-based fixed prices had grown to 113. The instability of the early years highlights Zhenjiang's problems in adapting existing reform models to its local context.

In 1998, the UEBMI was officially enacted under the jurisdiction of the new Ministry of Labor and

² See: Appendix: Data Report, Point 3.3.

Social Security. Prospective payment reforms focused on inpatient services, and the ministry promoted global budgets and DRGs from early on. The city of Beijing subsequently initiated a second project to develop a system of DRGs involving Beijing University. In cooperation with the Hospital Management Research Institute, they finalized the Beijing-DRGs system in 2008. The system displayed influences of the Australian AP-DRGs. In 2011, Beijing implemented 108 DRGs for UEBMI reimbursement in six pilot hospitals (Type B3), and subsequently extended DRGs to several local NRCMS systems, where they were coupled with per diem payments for inpatient services. The Beijing-DRGs constitute an adaptation of an international model; but while the scope of change only remained partial in the UEBMI, FFS in the NRCMS projects was mostly displaced. Beijing had laid important foundations for the further spread of DRGs. Our database lists 25 localities that announced such reforms since a recent call of the State Council (Guobanfa 2017, 55). Some applied the competing C-DRGs model developed by the Commission of Health and Family Planning (CHFP, former MoH), and some attempt to improve DRGs through big data applications.³

The city of Huai'an (Jiangsu province) created another influential model: a *synthesis* of global caps and case-based payments based on the ICD-10 classification (Type B4) — without the complex calculation of DRGs. This case-based relative value approach assigned weighted value points to 892 illnesses as of 2013. It divides the insurance funds among public hospitals according to their point value. The creation of the system in 2003 was a response to overspending in the UEBMI funds. Similar DRG-inspired systems in Russia and Japan may have provided some inspiration (Isakova, Zelckovich & Frid 1995; Matsuda, Fujimori, Kuwabara, Ishikawa & Fushimi 2011). The implementation of similar approach-

3 Interview with a Chinese professor in Shenzhen, November 29, 2018; Interview with a Chinese professor in Beijing, August 18, 2018.

es in the UEBMI was for example reported from Zhongshan City (Guangdong province) in 2010 and Nanchang City (Jiangxi province) in 2013. The B4 approaches proved more fungible and more effective in displacing FFS payment than the Beijing-DRGs.

In 2011, the MoHRSS issued guidelines that defined global budgets and global caps as the mainstream approach for the UEBMI, but also promoted case-based approaches (Renshebufa 2011, 63). Overall, however, FFS remains the dominant method of public hospital payment until today. An internal report indicated that by 2015, 85 % of the (as of 2011) 481 health insurance pooling districts applied global caps. Their simple application and their effectiveness for stabilizing insurance funds made them attractive for local administrators. Some form of casebased payment was applied by 71.5 %, but the scope of change remains unclear. Our findings confirm Hypothesis 2, as we find a mixture of policy learning and central intervention, with horizontal policy learning being dominant and ministerial guidelines applying a low-scale coercive pressure. Hypothesis 3 is only partly confirmed: the UEBMI is dominated by technically simple measures, but they do not always display a high degree of transfer as described in Section 2.

4.2 THE NRCMS

The diffusion of hospital payment reforms in the NRCMS differed substantially from the UEBMI. Until recently, the NRCMS was under the jurisdiction of the MoH/CHFP, whose line bureaucracy is also in charge of public hospital administration. This created divided loyalties regarding cost control in public hospitals. Furthermore, the MoH was a cooperation partner for health-related projects of international organizations like the World Bank (Duckett 2019). The extension of the NRCMS occurred between 2003 and 2010 in successive waves of implementation. It partly overlapped with the World Bank's Health VIII program (1998–2007) that supported rural health insurance development (World Bank 1998). The

subsequent Health XI project (2008–2016) had an explicit focus on hospital payment reforms in rural health insurance (World Bank 2008). As this section shows, World Bank projects facilitated the diffusion of international models of hospital payment in rural China.

In 2004, the MoH called for piloting case-based payments (Type B) in seven provinces (MoH 2004). Zhen'an County in Shaanxi province was a project site for both Health VIII and Health XI, had piloted the NRCMS in 2003, and now adopted a case-based payment approach similar to that of Zhenjiang (Type B2). Fixed prices were introduced for the NRCMS, and their number grew from an initial 15 to 68 in 2014. The MoH promoted the approach and encouraged other local administrations to send delegations there to copy the approach. Another line of reforms was more hospital-based. It originated in the revenue caps (Type B1) described above. In 2011, Type B2 fixed prices and Type B1 price caps had been implemented in 926 and 597 of the 2126 NRCMS counties respectively. Their low complexity made these approaches manageable for understaffed rural insurance administrations, which explains much of their quick diffusion alongside the extension of the NRCMS. However, the scope of change mostly remained small due to smallscale application and/or lack of prospective payment. Comparable to the UEBMI, 71.64 % of pooling districts used some form of case-based payment. Conversely, only 38.83 % of the pooling districts used global caps, which is much less than in the UEBMI; and 17.36 % used global budgets, mostly for outpatient services (D. Yu 2013).

A third line of reform emerged from Lufeng county in Yunnan province. It was in the first cohort of NRCMS pilots and directly monitored and supported by the central level. Since 2007, Lufeng implemented a prospective *per diem* system for inpatient services (Type C) in combination with prospective global budgets for outpatient services, which fully displaced FFS payments in the NRCMS. But this approach required complex calculations and close administrative

monitoring, which limited its fungibility in rural China. Some localities simplified the model, implementing it as mere per diem revenue caps not displacing FFS (Müller 2016; 2018). Others found it too complicated altogether and instead opted for a domestic version of global budgets for cost control (Hussain 2012, 194-240). As of 2011, only 100 out of 2126 NRCMS counties reported the implementation of per diem payment (D. Yu 2013). Lufeng was subsequently integrated in the Health XI program, and developed a rural DRGs system (Type B3). In 2013, it tested 264 DRGs, which were subsequently re-grouped and brought in line with the ICD-10 standard. The model's elevated complexity renders its fungibility lower than that of the per diem model. Overall, the prevalence of single-disease caps and fixed prices suggests that FFS remained dominant in the NRCMS system.

The analysis confirms Hypothesis 2: provider payment reforms in the NRCMS display a comparatively strong hierarchical intervention of the MoH and the World Bank. Furthermore, Hypothesis 4 is partly confirmed: the case of Lufeng directly illustrates the MoH's preference for technically more complex provider payment reforms, which also fit the World Bank's policy portfolio. But overall, simple and small-scale applications of case-based payments (Type B1 and B2) dominated among NRCMS offices with low staff numbers and high reliance on part-time staff. They lacked the capacity for more complex approaches.

4.3 THE SCOPE OF CHANGE

Neither academic studies nor policy reports usually assess the degree to which retrospective payment has been replaced with prospective payment. We thus employ a crude but effective method of valuation to assess the *scope of change* for the cases in our database. We used an ordinal scale of 4 levels ("full", "mostly", "partial" and "none"). The classification of cases utilizes the basic structure of health insurance funds, conducting a separate analysis of the payment

methods for inpatient and outpatient funds. In the NRCMS, inpatient funds usually constitute 67 % to 80 % of the total funds. In the UEBMI, the official division is 52.5 % for the inpatient funds and 47.5 % for the MSAs (Barber & Yao 2011). However, the actual share of MSAs in healthcare expenditures is reduced by several factors: various social groups and types of enterprises are relieved from paying into MSAs by local regulations; MSAs are often used to fund other protective measures, such as long-term care insurance; and they are informally used for non-medical shopping (Xiangrikui Baoxianwang 2012). In both insurances, most health-related expenditures are thus conducted via inpatient funds.

The descriptions of the provider payment models thus point to the share of spending they cover. Full displacement requires prospective payment to cover all inpatient and outpatient reimbursement. UEBMI systems cannot achieve this due to MSAs, and only Lufeng county achieved this with the NRCMS. FFS is *mostly* displaced if more than 50 % of reimbursements are paid prospectively. This is usually achieved through full coverage of inpatient services, either via global budgets (Type D2) or combinations of case-based payments with global budgets (Type B3) or with per diem payment (Lufeng model, combination of Type B2 and Type C). Partial displacement points to a small-scale use of prospective payments, which cover less than 50 % of reimbursements. Displacement is *none* if a locality merely applies caps (Type B1, Type C, and Type D1), which do not involve any prospective payment. For a detailed valuation protocol, see the data report (Appendix).

Table 2 illustrates the estimates for the scope of change in the UEBMI and the NRCMS in the sample. We considered cases up until 2017, largely excluding the recent drive towards DRGs. The number of cases with information sufficiently detailed for analysis was 62 for the UEBMI, equaling 12.89 % of its 481 pooling districts; and 87 for the NRCMS, roughly equivalent to 4.09 % of its 2126 pooling districts. We expect this sample to be biased rather than representative, with ambitious

and successful localities being over-represented as they are more open for fieldwork. Overall, the UEBMI featured a higher share of pooling districts with FFS being *mostly* or *fully* displaced than the NRCMS, but also a higher share with no displacement at all. Yet in both insurances, more than 50 % of the pooling districts engaged in partial displacement, leaving more than 50 % of insurance payments on an FFS basis.

Table 2: Estimated Scope of Change in the UEBMI and the NRCMS in the database

FFS displace-	UEBMI Cumulative		N Cases	RCMS Cumulative share
ment	Cases	share	Cases	Share
Full	0	0.00 %	1	1.15 %
Mostly	13	20.97 %	15	17.24 %
Partial	34	54.84 %	54	62.07 %
None	15	24.19 %	17	19.54 %
N =	62	100.00 %	87	100.00 %

Source: authors' database

We conducted a Pearson's Chi² test for the hypothesis that there are differences in the scope of change between the UEBMI and the NRCMS in the sample. With an error probability of 5%, the test hypothesis was rejected. 4 Therefore, the data in the sample negated the working hypotheses 3 and 4 insofar as the UEBMI does not display a higher scope of change than the NRCMS. These findings support studies calling into question the MoH's reputation as a bad purchaser (He 2012) and indicate that differences in outcome between the insurances are primarily related to their different financial capacity. But these conclusions may not be generalizable due to the bias in the sample. However, due to the nature of the bias, we expect the scope of change in the sample to be above average, meaning that the categories none and partial are under-represented. Therefore, we argue that FFS remains the dominant form of payment both in the sample and in China more generally.

⁴ The test produced an empirical Chi² value of 1.666, which was lower than the critical value of 7.815.

5 CONCLUSION

This study asked for the extent to which foreign models of hospital payment reform have diffused and displaced FFS in China, which specific models have been adopted, and which factors facilitated their spread. Based on the conceptual frameworks of diffusion and policy transfer, it put forth four working hypotheses. To verify them, we created a relational case database with data from Chinese academic publications, newspaper articles, expert interviews and fieldwork. We focused on a qualitative analytical strategy, giving priority to well-documented cases, and reporting some complementary statistics. We found that FFS remains the dominant method of provider payment in China, even after several decades of reforms.

Regarding the four hypotheses, we report the following results: first, technically simple models dominated as expected, but did not always feature a high degree of transfer. Second, horizontal learning and vertical coercion were key mechanisms in the internal diffusion of provider payment models. Learning dominated in the UEBMI, whereas hierarchical delegation dominated in the NRCMS. We found no strong role of local competition, but more fieldwork-based research is needed to shed light on this matter. Third, we found differences in the prevailing models of provider payment reforms in the UEBMI and the NRCMS, which corresponded to the preferences of the ministries that managed them. However, there was no significant difference regarding the scope of FFS displacement in the sample. Fourth, as expected, we found local administrative capacity in the rural areas to have hampered the MoH's preference for technically complex measures – as well as the World Bank's agenda of provider payment reforms.

Our findings provide important background information for future research on Chinese hospital payment reforms, which feature drastic changes in the policy context. In 2016, the central government decided to integrate the NRCMS into the URRBMI. The process was nearing completion in 2017, when 383.5 million citizens were insured through the UEBMI, 873.5 million through the URRBMI, and only 133 million through the NRCMS – formerly by far the largest system (CHFP 2018). The URRBMI quickly developed from a niche system to the largest one, and little is known about its approach to provider payment. In 2018, the central government centralized jurisdiction over health insurance and pricing in the new Department for Health Security, which now coordinates 30 national pilot cities in developing DRG systems based on common standards (Yibaobanfa 2019, 36). In the coming years, we thus expect increasingly coercive mechanisms of diffusion and a gradual shift towards DRGs (Type B3).

Furthermore, our findings shed new light on policy learning and the adoption of international practices in China. From a policy transfer perspective, provider payment reforms encompass the entire continuum of degrees of transfer, from superficial inspirations to thorough adaptations. Overall, China is gradually moving away from technically simple and small-scale measures towards more complex DRG systems that resemble international practices. More research is needed to clarify whether such trends apply to other fields of policy and administration as well, and whether higher levels of socio-economic development also facilitate higher degrees of transfer in administrative learning and diffusion.

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APPENDIX: DATA REPORT

In order to support the argument presented in this paper, the authors created a case database of hospital payment reforms in the PRC. We used the software MS Access, and relied on the support of several research assistants.

1 HOW DID WE COLLECT THE DATA?

Our data stems from the following sources:

1.1 ARTICLES FROM JOURNALS AND ACADEMIC MAGAZINES

A core part of our sources was taken from the China Academic Journals database (zhongguo xueshu qikan). We collected the articles throughout the year of 2018 and updated the database in early 2019 to have all articles published until the end of 2018. We searched for articles published between 1979 and 2018, and the vast majority of them were published after 2000. In the description of cases, mainland research articles unfortunately tend to be brief and selective. Reference to cases is very common, but one article rarely provides a complete analysis of a case. Rather, they include general indications about the "model" applied there, often focusing only on a specific period of time or a specific aspect. Some articles are so superficial that it is difficult to assess what kind of hospital payment practices they describe, and a few even seem to provide inaccurate analyses. Our challenge was to move towards dense descriptions from the pieces of information we could collect, and to triangulate the information to increase its validity, while at the same time keeping the workload manageable. We therefore selected the search option "core journals" (hexin gikan) to focus on articles with higher academic quality and to reduce the number of results.⁵ In doing so, we decreased the number of results from several thousands to a total of 524 articles, of which 220 appeared in searches for more than one keyword. Among the 524 articles, a total of 411 articles contained empirical information about local cases or background information about provinces that was used for the database.

⁵ To test this assumption, we collected non-core articles for the search term "zong'e kongzhi." The results created a large number of cases with a low or very low density of description, while only two cases of relatively recent models were described in more detail. We ignored the information of such articles, unless the cases were already documented by valid sources from the core journals.

We used the following search terms in order to generate results:

- 1 *zhifu fangshi gaige*, provider payment reform: 242 articles
- 2 zong'e yufu, global budget: 83 articles
- 3 zong'e kongzhi, global cap: 86 articles
- **4** an bingzhong fufei, case-based payment: 150 articles
- **5** *dan bingzhong fufei*, single disease payment: 104 articles
- 6 an rentou fufei, capitation: 62 articles
- 7 an chuangri fufei, per diem: 7 articles

The final searches were conducted around February 14, 2019.

1.2 NEWSPAPER ARTICLES

Furthermore, the authors collected newspaper articles from the APABI full-text newspaper database (baozhi ziyuan quanwen shujuku) at the National Library in Beijing on October 1st and 2nd, 2018. Findings in this database are most abundant for the previous decade, when many newspaper databases appear to have been digitalized. There were many newspaper articles mentioning hospital payment reforms, but the number containing empirical information about specific cases was rather small. Furthermore, many articles appeared in multiple newspapers either in the same form, or with slight changes. Table 1 illustrates the search options we used. In order to create a manageable number of meaningful results, we searched for specific hospital payment reforms in the headlines and some

qualifying words in the full text. For the most part, this was healthcare. The search for "provider payment reforms" created more than 1,000 results, so we reduced it to articles also mentioning the term "prepayment". In a similar way, we reduced the results for "by illness" to results mentioning the UEBMI, as there already were many articles in the CAJ about such practices in the NRCMS or as individual hospital policy. Altogether, we analyzed 282 articles, among which 53 included some empirical information about local cases or background information about specific provinces.

1.3 ADMINISTRATIVE DOCUMENTS OF LOCAL GOVERNMENTS

We furthermore collected administrative documents from the Laws and Regulations database of Peking University (falü fagui, www.pkulaw. com), the search was conducted on September 30, 2018 at Peking University. We used the search term zhifu fangshi gaige and received 96 results, among them 47 results from prefectural and county-level jurisdictions or a provincial-level city.⁶ Unfortunately, only 12 of them were issued before 2017, when the State Council launched a major initiative about hospital payment reforms. Projects initiated following the 2017 document are still too recent, as in the absence of academic articles or other sources, it is difficult to verify whether and how the envisioned reforms were implemented. Many experiments fail, but such failure is rarely reported or explicitly discussed.

Table 1: Search options for newspaper articles

Headline		Text		
Pinyin	English	Pinyin	English	Number of results
zong'e yufu	Global budget	yiliao	Healthcare	65
zong'e kongzhi	Global control	yiliao	Healthcare	79
an rentou	Capitation	yiliao	Healthcare	74
an bingzhong	By illness	zhigong yiliao baoxian	UEBMI	49
[DRG]	DRG	yiliao	Healthcare	5
zhifu fangshi gaige	Provider payment reform	yufu	Prepayment	62

⁶ The remaining documents were issued by the territorial provinces.

Furthermore, there is some regional concentration. For example, there were 8 documents from Liaoning province alone. In sum, the collection of local documents does not provide a representative overview of hospital payment reforms, but it makes a valuable complement.

1.4 OTHER SOURCES

We also collected various case studies from relevant book publications, both English and Mandarin. Furthermore, we included information from internal sources, presentations in conferences, and field trips of one of the authors between 2011 and 2018. Books mostly include Chinese monographs and edited volumes about major health reform initiatives, such as the NRCMS or county hospital reforms, which include chapters about hospital payment reforms. Furthermore, there is an edited volume specifically dealing with cases of hospital payment reforms, and a monograph about the development of DRGs in Beijing. Finally, a few World Bank studies contained brief descriptions of hospital payment reforms, as well as some international publications in social scientific health studies, which were also considered here. The grey literature includes internal documents and working papers about hospital payment reforms. These can be project reports of international organizations and their partners in the PRC (especially about the Health XI project). There is also one case of fieldwork observations and one presentation at a conference on the Chinese mainland that directly delivered data for the database. Case studies in books played an important role for the database, because they are often more detailed than case studies in academic papers.

2 HOW DID WE DEFINE A CASE?

The definition of a case is not very straightforward due to the fragmented and multi-level structure of China's public administration of social protection. Most insurance funds are pooled on the county level, while there is on-

ly a small risk-fund or adjustment fund at the prefectural/city level to balance risks between jurisdictions. But a substantial number of jurisdictions also raised the level of pooling from the county to the prefecture/city level, especially in the UEBMI. The level of pooling can thus differ between the different insurance programs in the same locality. In order to cope with these challenges, we created separate binary counter variables for the UEBMI and the NRCMS. These counters were set from 0 to 1 when a case included valid and meaningful information sufficiently detailed to allow an assessment of the local provider payment model (see also: Point 3.2 and 3.3 below).8 We ultimately used 63 UEBMI cases and 87 NRCMS cases in the analysis. The vast majority of cases are at county or prefectural level, but we treated the provincial cities (like Beijing and Shanghai) as cases when they pursued integrated policies in their territories (like Beijing for its DRG system in the UEBMI).

3 HOW DID WE CODE THE DATA?

In order to code the models used in a locality, we created binary variables for the different degrees of transfer and hospital payment mechanisms illustrated in Table 2 in the paper. As the coding section of the Lufeng case illustrates below, we largely relied on dummy variables to capture the different practices of hospital payment reported about each case in the sources. Furthermore, we assessed the density of description and the degree of displacement of feefor-service and operationalized them as ordinal variables.

⁷ Also, the jurisdiction for hospital payment may be shared across administrative levels. For example, the NRCMS bureau at county level determines hospital payment for county hospitals, while the provincial health administration determines hospital payment of the NRCMS at provincial hospitals.

⁸ We excluded, for example, cases with only non-core journal sources, or with very recent administrative documents as sources.

3.1 CODING SECTION OF THE CASE DATABASE (LUFENG COUNTY)

Province	Yunnan	Socio-economic	rural-county ~	☑ Global_budgets (zong'e yufu)	☑ DRG (or dianshufa)	☑ Health_XI
City	Chuxiong Yi Autonom	ous Prefecture		☐Zong'e kongzhi	☐ Danbingzhong_Ding'e	Zhibiao
County/District	Lufeng county	Counter	1	Global_budget_unclear	☑ Danbingzhong_xianjia	Zhineng_shenhe
					□ DRG_unclear	
ID 288		Counter_UEBMI	0	☐ Baogan_Budget	clinical_pathway	
Area_detail [ow 🗸	Counter_NRCMS	1	✓ prospective_payment	☑ Bed-days (chuangri)	
Density_description	Very high	~	onal_influence_mentio		☐ Capitation (an rentou)	
YEARS documented				2003; 2004; 2005; 2006; 2007; 20	008: 2009: 2010: 2011: 2012: 20	013: 2014: 2015: 2016: 2017 V
				2000, 200-1, 2000, 2000, 2007, 20	500, 2003, 2010, 2011, 2012, 20	13) 2014) 2013) 2010) 2017
Insurance_coding_uncl	ear UEBMI_F	FS_displaced	unknown	✓ NRCMS_FFS_displaced	full	UR(R)BMI_FFS_displaced
0	UEBMI_d	legree_DRG-line	unknown	NRCMS_degree_DRG-line	full	unknown
Abstract	UEBMI_drgr	ee_Global_Budget-l	ine unknown	NRCMS_Global_Budget-line	full	

3.2 DENSITY OF DESCRIPTION

We created an indicator "density of description" to roughly assess the amount of detail of each case. The indicator differentiates between the following values, which are strongly but not exclusively influenced by the number of sources available for the case. 9 The density of description was rated "very high" if there were more than 20 sources on a locality; "high" with more than 10 and less than 20; "medium" with 3 to 10 sources; and "low" for less than 3 sources. Sources with a low density of description were excluded as case studies from the paper. However, they are important for putting the more detailed cases into context. Chinese researchers can provide detailed studies when they get good access to the field, and access tends to be better in urban areas in East China (Shanghai and Beijing in particular). Such places are characterized by better access to international knowledge, exceptionally high state capacity, and therefore an exceptionally high quality of implementation. As a consequence, provincial cities, provincial capitals, vice-provincial cities or special economic zones like Shenzhen in East China must be treated as best-case scenarios. They constitute the tip of an iceberg that is bottom-heavy, both in terms of density of description and quality of implementation. Our database thus provides a sufficiently diverse – yet above-average – sample to assess the situation in the PRC as a whole.

3.3 SCOPE OF CHANGE: VALUATION PROTOCOL

We also created indicators for the displacement of fee-for-service payment in each insurance (as well as for the case-based and global-budget-based lines of reform under the NRCMS and the UEBMI). We used an ordinal scale of 4 levels ("full", "mostly", "partial" and "none"; plus one category for "unknown", in such cases the counter was set to 0). These levels refer only to insurance funding for health services, and do not incorporate individual (out-of-pocket) payments.

Table 2: Density of description and distribution of cases across macro-regions for the UEBMI and the NRCMS

	UEBMI / Macro-region			NRCMS / Macro-region			Total:	Total:
Density of description	East	Center	West	East	Center	West	UEBMI	NRCMS
Very high	4	0	0	1	0	1	4	2
High	3	1	0	0	0	1	4	1
Medium	14	6	6	9	6	7	26	22
Low	8	12	8	17	23	22	28	62
Total	29	19	14	27	29	31	62	87

⁹ Beyond the quantitative number of sources, the degree of detail also played a role, especially when adding monographs with more extensive descriptions to the sources. But as a rule of thumb, the number of sources is the decisive criterion in the vast majority of cases.

In the UEBMI, full displacement thus means that the bulk of total hospital expenses is not paid for on a FFS basis, whereas in the NRCMS and the URRBMI, it may be just around one third. We chose an ordinal scale for the operationalization of the scope of change because the data does not allow for a more fine-grained analysis. The classification of cases regarding the scope of change utilizes the basic structure of health insurance funds, conducting a separate analysis of the payment methods for inpatient and outpatient funds. We do not take into account cross-jurisdictional payments in these calculations, because it would render the analysis too complex.¹⁰

In the NRCMS, just like the URRBMI, inpatient funds nearly always include a larger share of the total insurance funds than outpatient funds. The inpatient pooling funds in the NRCMS usually constitute between 67 % and 80 % of the total funds, with the remainder usually being allocated to outpatient pooling funds (Müller 2016; 2018). MSAs existed in the early years of the NRCMS, but they have been largely abolished since 2008. Therefore, when a prepayment method is applied to all inpatient services, FFS payment is considered to have been "mostly" displaced.

The UEBMI still operates with MSAs for outpatient services, which do not allow for prepayment due to the lack of social pooling. Therefore, there is no full displacement of FFS in the UEBMI, and "mostly" is the highest level that can be attained. The official division of the revenues is 52.5 % for the pooling funds, and 47.5 % for the MSAs (calculated from: Barber & Yao 2011). While the difference according to formal regulations is smaller than in the NRCMS, the real-life difference is significant-

10 In the NRCMS, for example, local governments increasingly allowed reimbursement of payments in other jurisdictions in recent years, especially in localities with many out-migrants. Such payments do not necessarily follow the normal provider payment regulations of the sending place, because the hospital belongs to another jurisdiction. But migration flows and inter-governmental cooperation patterns cannot be reconstructed with the data we collected.

ly bigger for several reasons. First, there are numerous exceptions, often regulated at local levels, for specific groups of people or enterprises for which no MSAs are established. These can include civil servants, the self-employed, and elderly citizens (such as former SOE workers); small and rural enterprises, foreign-invested enterprises, or enterprises with financial difficulties. Due to such exceptions, the size of the inpatient pooling funds is larger than indicated by the formal regulations, which increases the scope of change of prospective payment for inpatient funds.

Second, MSAs are often used for non-medical expenditures on a formal or informal basis, so they do not fully count for insurance expenditures. One common approach is to use MSAs to fund other social security measures. Some cities allow the insured to buy additional commercial insurance with their MSAs; others use MSAs to fund experimental long-term care insurance projects. Furthermore, due to informal practices, a substantial share of MSA funds is spent on general shopping, rather than medical expenditures. As early as 2002, the MoLSS called for stricter controls of MSA expenditures to restrain such practices (Laoshetingfa 2002, 6), but this was not effective and the outflow of funds continues (Xiangrikui Baoxianwang 2012). While the combined effect of these formal and informal practices is difficult to quantify, they clearly reduce the relative share of UEBMI expenditures for healthcare from MSAs vis-à-vis pooling funds. Therefore, they increase the scope of change connected to provider payment reforms.

The effects of outpatient pooling reforms in the UEBMI were less straightforward than in the NRCMS. In the NRCMS, outpatient services are today usually reimbursed from pooling funds, which have replaced the MSAs formerly in use. In the UEBMI, there are experiments with outpatient pooling as well, but they are usually implemented alongside MSAs. Their effect on the balance between pooling funds and MSAs depends on the details of local regulations, and their interaction with different provider payment mod-

els is somewhat idiosyncratic. They thus require a separate assessment for each case.

Table 3 provides some typical examples of different valuations in the UEBMI and the NRCMS.

Table 3: Typical cases of classification

	UEBMI	NRCMS
Full	Non-existent due to usage of MSAs	Bed-days (Type C) and some case-based fixed prices (Type B2) for inpatient services; Global budgets for outpatient services (Lufeng model)
Mostly	Global budgets for inpatient services (Type D2); Comprehensive case-based payment for inpatient services (Type B3), maybe paired with bed-days (Type C); or with capitation for outpatient services	Large number of case-based fixed prices (Type B2), along with prepayment for outpatient services; Case-based fixed prices plus bed-days (Lufeng model, inpatient part)
Partly	Some DRGs for inpatient services (Type B3)	Some case-based fixed prices for inpatient services (Type B2)
None	Global caps for inpatient services (Type D1)	Case-based price caps (Type B1)

As noted above, this mode of classification is somewhat crude. First, we cannot take full account of the time dimension over the last decades for every case. While a few are very well documented, many only have a few years of observation – typically the time between the introduction of a new mode of provider payment and the publication of an article about it. So we classify the highest documented departure from FFS for each case over time. Second, the unclear use of language in some cases complicates the assessment. Models are often referred to with umbrella categories encompassing both prospective and retrospective modes of payment; and sometimes there are several alternative terms to describe models such as global budgets. Where multiple sources on a case are available, the different perspectives usually provide a clearer picture. But in cases with a low density of description, the ambiguous use of language can be problematic. Third, some categories on the ordinal scale are easier to distinguish than others. The category "full" requires inpatient and outpatient services to be comprehensively covered by prepayment.¹¹ The category "none", conversely, requires all provider payment policies to be on a cap basis; as we code conservatively, an absence of clear indicators for prepayment of any kind would also be classified as "none". The categories "partly" and "mostly" are more difficult to distinguish, as they include an assessment regarding whether the scope of prospective payment is above or below 50 %. As noted above, the fund structures provide a good guideline for the assessment. But when the density of description is low, there may be some ambiguity.

Table 4 and 5 present a detailed overview of the scope of change and the density of description in the UEBMI and the NRCMS. A substantial part of the UEBMI and NRCMS cases display a low density of description. Of course, the density of description focuses on the number of sources available for that case, and thus does not perfectly capture the quality of the data it delivers. In order to deliver a conservative valuation, we prioritize avoiding false positives over false negatives. This means that in case of doubt, we would rather tolerate a case being ranked too low than too high on the scope-of-change scale. To validate the valuations of "mostly" in some cases, we thus engaged in some additional online research beyond what was described above. 12 Cases in which a rating of "mostly" corresponds to a low density of description are presented below with a brief argument for the valuation.

¹¹ Some part of the funds will probably still be spent on a FFS basis even in this category, for example if people seek treatment outside the pooling jurisdiction.

¹² In order to ensure that the data for the cases are comparable, though, we only adopted this strategy selectively.

FFS DISPLACEMENT, DENSITY AND POTENTIAL FALSE POSITIVES

The UEBMI

Table 4: FFS displacement and density of description in the UEBMI

Density of		FFS displacement						
description	full	mostly	partial	none	Total			
Very high	0	2	2	0	4			
High	0	3	1	0	4			
Medium	0	5	14	7	26			
Low	0	3	17	8	28			
Total	0	13	34	15	62			

Critical cases

- 1 Wuhai City (Inner Mongolia): Wuhai implemented a global budget (Type D2) after implementing the UEBMI in 2000. The total sum of the pooling funds was divided up among hospitals on a capitation basis, which displaced more than half of FFS payments. We thus coded displacement as "mostly".
- 2 Zhongshan City (Guangdong): There is only a small number of sources, but a detailed description of different provider payment methods for inpatient services, outpatient services and outpatient services for catastrophic illness. The focus is on a mixture of casebased payment and global budget (Type B4) for inpatient services. Outpatient services are paid for via capitation. Together, this should "mostly" displace FFS.
- 3 Pingxiang City (Jiangxi): The city used a combination of global budgets (Type D2), beddays (Type C) and capitation, which is unusual but should achieve a high rate of displacement for inpatient and outpatient services. Displacement is thus classified as "mostly".

The NRCMS

Table 5: FFS displacement and density of description in the NRCMS

Density of		FFS displacement						
description	full	mostly	partial	none	Total			
Very high	1	1	0	0	2			
High	0	0	1	0	1			
Medium	0	6	11	5	22			
Low	0	8	42	12	62			
Total	1	15	54	17	87			

Critical cases

- 1 Yuxi City (Yunnan): Yuxi adopted a DRGs approach (Type B3) very similar to that of nearby Lufeng, which should displace most of FFS. There was no information on outpatient service reimbursement though, so we coded displacement as "mostly".
- 2 Danyang City (Hubei): Danyang adopted the Yiyang approach, which is in between case-based fixed prices (Type B2) and DRGs (Type B3) because it adds on clinical pathways and a valuation of points for different types of hospitals. Furthermore, Danyang adopted a capitation approach for outpatient services. Together, this should displace most of FFS payments, and we thus coded displacement as "mostly".
- **3** Anqiu City (Shandong): Anqiu implemented a global budget (Type D2) for inpatient services in the NRCMS. This should displace most of FFS, so we coded displacement as "mostly".
- 4 Jalaid Banner (Inner Mongolia): The Jalaid Banner implemented the Lufeng model of bed-days (Type C) and case-based fixed prices (Type B2) for inpatient services. This should displace most of FFS payments in the NRCMS.
- 5 Gannan County (Heilongjiang): Gannan implemented the Lufeng model of bed-days (Type C) and case-based fixed prices (Type B2) for inpatient services; it also was a project county in the World Bank's Health XI project. We

thus coded FFS displacement in the NRCMS as "mostly".

- **6** Huaiyin District (Jiangsu): Huaiyin District implemented the Lufeng model of bed-days (Type C) and case-based fixed prices (Type B2) for inpatient services. This should displace most of FFS payments in the NRCMS.
- 7 Linkou County (Heilongjiang): Linkou replaced FFS for inpatient services in the NRCMS with a system of graded capitation payments, in which there are fixed amounts for each hospital discharge the value of which depends on the hospital type. This should displace most of FFS payments, so we coded displacement as "mostly".
- 8 Majiang County (Guizhou): Majiang is reported to operate a prepaid global budget on a case basis (Type B4) in the NRCMS. That should displace more than half of FFS payments in the insurance, so we coded displacement as "mostly".

4 HOW DID WE GUARANTEE THE QUALITY OF MEASUREMENT

We adapted our analytical strategy to the data situation in order to optimize the quality of measurement. To be precise, we chose a qualitative rather than a quantitative research strategy, which allowed us to focus on cases with better data quality. And, we gave analytical priority to cases featuring dense descriptions, which allowed us to triangulate multiple data sources. These strategies help us to increase the objectivity, reliability and validity of the findings.

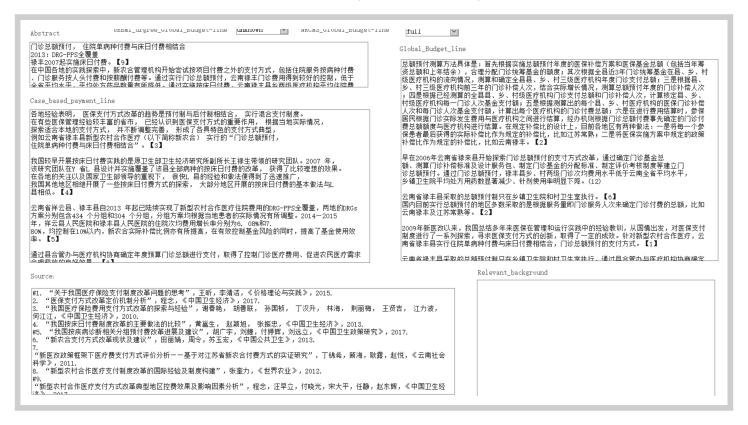
We strove to render measurement and analysis as objective as possible. With regard to measurement, this mainly included minimizing the influence of our research team on the data. In data collection, the investigators and research students filled the database by copy-and-pasting, rather than rephrasing the relevant passages in the documents we analyzed. One investigator studied each case of the database several

times for coding. The investigator also checked back with the original sources where there was lack of clarity, as well as for all cases used for the process tracing.

In order to be able to reproduce the results, we relied on a precise system of documentation. The database contains systematic references to the sources from which the copy-pasted text stems, and we kept lists of the articles and documents we used. We expect a retest to support the conclusions we have drawn, while there may be differences regarding the cases with a low density of description – especially those depending on a single source – and more recent cases. For example, switching from the "core journals" to the "all journals" option in the CAJ search considerably increases the number of sources. However, those sources will disproportionally add to the number of cases with a low density of description. Their analytical role for the paper is limited, as we focus on well-documented cases. For such cases, the changes in the search strategy may provide some additional detail, but most likely no fundamental changes. Our research design is thus robust to slight alterations in the search options as well as the availability of new material.

Our study focuses strongly on the diffusion of specific models of hospital payment reform, as well as the types of transfer that apply in it. Therefore, one of our main concerns was with correctly coding the practices. The main challenge to this was occasionally vague or inconsistent vocabulary in Chinese newspaper or journal articles. The use of umbrella terms in some studies obliterates crucial characteristics of hospital payment systems - especially whether they are prepayment systems or not. In well-researched studies or well-documented cases, this is less of a problem, because either the concepts are explained, or one can make a robust guess from the empirical data or in the context of other sources. However, in cases with a low density of description, this is rather difficult. To assess a broader diffusion of models, we thus also relied on policy reports and internal documents summarizing the situation at national level.

DATA ENTRY SECTION OF THE DATABASE (LUFENG COUNTY)



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