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## **The impact of China's Zero-Markup Drug Policy on county hospital revenue and government subsidy levels**

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## **Abstract**

In 2009, the Chinese government passed the Zero-Markup Drug Policy, which strives to contain the costs of medicines and ultimately reduce the financial burden to the public, especially those in low-income settings. This study aims to evaluate the impact of the Zero-Markup Drug Policy on health care provision, revenue structures in county hospitals, and demand for fiscal compensation from the government. Our study employs a difference-in-difference model to measure the difference in several indicators between two hospitals, Ningshan County hospital, which implemented the policy, and Zhenping County hospital, which had not. The main indicators include health care provision, drug revenue as a part of total hospital revenue, and level of government subsidy. The data come from hospital financial statements and operation reports. The findings of the study show that, for Ningshan County hospital, the zero-markup policy led to an increase in health care provision and a sustained total hospital income despite a decrease in drug revenue. The enhancement in outpatient and inpatient visits also represents progress from the lens of the government, whose mission is to ensure greater access to care for the population. The study demonstrates that with minimal or no subsidy, the government can catalyze the zero-markup policy and potentially generate positive outcomes for county hospitals.

**Key words:** zero-markup drug policy; hospital revenue; fiscal compensation; difference in difference; health care reform; China

## 1. Introduction

China has initiated ambitious health reforms since 2009. At the heart of this movement has been the reconstruction of a national primary health care system as well as a bolstering of insurance programs targeting low-income citizens (Süssmuth-Dyckerhoff *et al.* 2010). Specifically, the New Cooperative Medical Schemes (NCMS) substantially increased the level of health insurance coverage for the poor. Furthermore, the Chinese central government declared that the development of a national essential medicines system was a top priority in the reforms (The State Council of China 2009). This effort was strengthened by the National Essential Medicines Policy (NEMP), which strives to make cost-effective medicines more accessible (WHO 2001).

Despite these efforts to broaden health coverage and availability of essential drugs, health goods and services remain largely inaccessible and unaffordable to the most vulnerable populations. For example, a recent study revealed health inequity in rural China, where inpatient care utilization has been largely pro-rich between 1993 and 2008 (Zhou *et al.* 2013). One of the primary drivers of this inequity is the cost of drugs, which can pose a significant burden on low-income people. As increasing empirical evidence shows, drug costs are the primary reason for medical impoverishment in rural China (Hu *et al.* 2007). This potentially impoverishing burden of drug costs is especially precarious for patients with chronic conditions, who need to make frequent visits to the hospital and can incur absorbent medication costs that are not covered under the NCMS, the predominant health coverage scheme. A study by Yip and Hsiao *et al.* found that among all rural poor households, 11.6% became impoverished as a result of outpatient expenses related to chronic disease (Yip *et al.* 2008). In an effort to address the financial burden experienced by patients in rural settings, the country strives to match its early success in ‘broadening’ health coverage with a major ‘deepening’ of health care (Eggleston 2012).

A fundamental component of ‘deepening’ health care is ensuring that essential drugs are affordable for even the most vulnerable patients (Gulliford *et al.* 2002). To achieve this, the Chinese government passed the Zero-Markup Policy for Essential Drugs, which sets ambitious goals to contain the costs of medicines and ultimately reduce the financial burden to the public, especially those in low-income settings. This policy can have far-reaching effects, and this paper specifically aims to explore the ramifications of the policy on hospital revenue structures as well as the extent of government involvement through subsidies.

The revenue of public hospitals in China mainly consists of fiscal compensation (subsidies from the government), medical revenue (medical fees, examination fees, test fees, surgery fees, bed fees etc.), and drug revenue (Yao et al. 2003). However, since the Reform and Opening-up policy, implemented in 1978, the proportion of the fiscal compensation out of total revenue in public hospitals has been decreasing year by year. In 2009, the proportion of fiscal compensation out of total revenue was merely 10% (Ministry of Health 2010). With the decreasing proportion of fiscal compensation primarily from 1986 to 2002 (National Bureau of Statistics of China 2004), drug sales gradually became the major source of revenue for hospitals. In China, hospitals are allowed to sell drugs at 15% markup. In 2009, drug revenue reached 43% of the total revenue in public hospitals, which is about 20% higher than the average percentage among the Organization for Economic Cooperation and Development (OECD) countries (OECD 2013). This phenomenon of “yi yao yang yi” – compensation for hospital medical costs through drug-selling profits – results in the rapid increase of medical costs for patients. From 1993 to 2008, the per-visit outpatient and inpatient expenses in public medical institutions had increased by 1126% and 442%, respectively (Center for Health Statistics and Information 1994, Center for Health Statistics and Information 2009). By the end of 2009, the per-visit outpatient and inpatient expenses were 155 Yuan and 5897 Yuan, respectively, in which the drug expenses accounted for 60% and 46%, respectively (Ministry of Health 2010).

“Yi yao yang yi” poses a great threat to achieving one of China’s overarching health system reform goals, namely, ensuring access to affordable care for all. In order to alleviate the phenomenon of “yi yao yang yi” and decrease the proportion of drug costs in medical expenses, the Chinese government issued “the Suggestions of CPC Central Committee and the State Council on Deepening the Reform of the Health care System” in April, 2009, which clearly stated that the policy of drug sale with additional markup should be gradually eliminated in public hospitals. In its place should be a policy of zero-markup in drug sales.

Since 2009, the zero-markup drug policy has been implemented primarily in primary health care institutions in China. A review of the literature shows that the policy of zero-markup in drug sales reduces the reliance of primary care institutions on drug revenue to compensate for the deficit in overall medical revenue (Li *et al.* 2008, He *et al.* 2011). A plethora of other recent studies has also shown that, at the level of primary health care institutions, the policy has led to several key advancements. Firstly, the policy has been shown to increase provision of outpatient services. Using data from 20 community health institutions, Tao’s study (2011) shows that the outpatient provision increased by 25% after the implementation of a zero-markup policy. Chen *et al.* (2010) also found that the zero-markup policy increased the outpatient provision in township hospitals and community health care centers. While increased health care provision represents progress, additional research has shown that perhaps one negative outcome of increased provision has been that it may actually result in decreased drug availability (Fang *et al.* 2013). Secondly, the zero-markup drug policy has led to changes in facility revenue streams. One study conducted by Jin *et al.* (2010) shows that as a result of zero-markup policies, revenue from drug

sales decreased in Shanghai's primary medical institutions; however, the total revenue remained relatively unchanged due to increased subsidies from the government. In addition, Chen *et al.* (2010) found an increasing trend of medical revenue for the community medical institutions after implementation of the zero-markup policy. Furthermore, Lang *et al.* (2010) indicated that, although the drug revenue decreased in the community medical institutions after the implementation of zero-markup policy, the drug revenue was still 63% of the total revenue. Thirdly, research has shown that zero-markup policy at the level of the primary care institutions did not change the number of medicines per prescription (Yang *et al.* 2012).

While the zero-markup policy has proven to be effective in primary health care institutions, the phenomenon of “yi yao yang yi” persists in public hospitals at the county level and higher levels. County public hospitals are the main provider of health care in rural China and they undertake the vital task of treating patients with common medical conditions. More than 48% of patient hospitalizations occur at county hospitals, according to the fourth National Health Service Survey. From a cost perspective, statistics from the Ministry of Health in China show that expenses incurred by county hospitals comprise approximately 40% of the total medical expenses among all medical institutions in the rural areas (Ministry of Health 2011). To curb the rising costs of health care in rural China, then, it would be strategic to focus on county hospitals. The policy of zero-markup in essential drugs has been piloted at some county hospitals in some provinces. In September 2011, Fuyang County and 28 other counties in Zhejiang were selected as the pilot sites to implement a zero-markup policy. Furthermore, in June 2011, Shaanxi province announced the initiation of a “Plan of Centralized Purchase of Medicine in Public Hospitals,” and piloted the zero-markup policy in county hospitals. The shift to implement the zero-markup policy in county hospitals is imperative and reflects efforts at ‘deepening’ health system reform in China.

However, scientific program evaluation has not been conducted to assess the impact of this policy on health care provision, revenue structures in public hospitals and the demand for fiscal compensation from the government. This study aims to evaluate the zero-markup policy from the perspective of county hospitals and the government. As mentioned, most research on the effect of the policy of zero-markup on drug sales in China has focused on the community-level medical institutions. This study, in contrast, assesses the zero-markup policy at the county hospital level in the following areas: 1) Analyzing the effects of the zero-markup policy on health service provision; and 2) Analyzing the effects of the zero-markup policy on hospital revenue and fiscal compensation.

This study aims to fill important research gaps. First, because nearly all prior research focuses on the community-level medical institutions, this study aims to contribute to the literature on evaluations of the zero-markup policy at the level of county hospitals. Second, most previous research only collected data in the treatment group to conduct pre-post comparison, which lacks scientific rigor in evaluating the policy. In order to overcome the limitations in the previous

research, the current study evaluates two public county-level hospitals, in which one hospital has implemented the zero-markup policy (treatment group), and the other has not implemented the policy (control group). In Section 2, the study methodology will be discussed. Section 3 will uncover the results, with specific attention to the impact of the zero-markup policy on health care provision and hospital medical revenue as well as fiscal compensation. The results are discussed and interpreted in Section 4. In this section, the limitations of the study are also presented. Lastly, Section 5 concludes with summary points and policy recommendations.

## **2. Methods**

### *2.1 Study design*

With the hospital as the unit of analysis, a difference-in-difference (DID) model was used to evaluate the effects of the zero-markup policy on several key indicators, including health care provision and hospital revenue. Variation in these variables was measured between the treatment-group hospital and control-group hospital in a pre-post manner. In addition, we used two methods to estimate the specific amount of government subsidy required to incentivize hospital implementation of the zero-markup policy.

In policy research, the availability of study samples is essential. Although this study measures change over only two years for two county hospitals, the DID method was selected as a more informative strategy than the case study method. Despite the limited sample size, the internal validity of the study design is enhanced by documenting the historical trend from 2007 to 2010 for both the treatment and control hospitals. This allows for an informative, although limited, causal inference about the effect of the policy.

### *2.2 Study fields*

The site selected for this study was Ningshan County Hospital in Ankang city, Shaanxi province. The zero-markup policy was implemented in Ningshan County Hospital on December 1<sup>st</sup>, 2010. At this hospital, 44% of essential drugs were selected to be subject to the zero-markup policy. From December 1<sup>st</sup>, 2010 to November 11<sup>th</sup>, 2011, the total cost of drugs purchased by Ningshan County Hospital was 7.88 million and the total revenue of the drugs sold by the hospital was 6.96 million. From this total, the cost and revenue of zero-markup drugs were 1.27 million and 1.1 million, respectively, accounting for 16.12% and 15.8% of the total cost and revenue.

Although the proportion of essential drugs was 44%, the revenue from essential drugs was less than 44%, indicating that the unit prices of essential drugs are lower than that of the other drugs.

Zhenping County Hospital in Shaanxi province was selected as the control group for several important reasons. First, both Ningshan county and Zhenping county are administrated by the

Ankang municipal government. As the pilot county, Ningshan county started to implement the policy of zero-markup in drug sale since the end of 2010, but Zhenping county did not implement the zero-markup policy until 2012. Other social policies made by provincial government and municipal government were similar in the two counties. Second, both Ningshan county and Zhenping county are located in similar mountainous regions. Ningshan county is located in the south foot of Qin Mountain and Zhenping county is located in the North foot of Daba Mountain. The existence of parallel terrains in the two counties suggests that rural residents face similar challenges in terms of access to health care. Third, the health resources in Ningshan county and Zhenping county are similar. There are 14 township health care centers, 98 village clinics, 275 beds for hospitalization, and 308 health care professionals in Ningshan county, compared with 12 township level health centers, 78 village clinics, 242 beds for hospitalization, and 199 health care professionals in Zhenping county. The numbers of hospitalization beds are similar in the two hospitals, which are 151 and 150, respectively. Fourth, the clinical departments of the two hospitals are similar.

### 2.3. Data

Data used in this study include the hospitals' basic facility information, the financial statements and the operation reports. The hospitals' basic facility information includes the hospital certificate, department names, number of staff, and number of beds in both Ningshan and Zhenping County Hospitals. The financial statements include the two hospitals' revenue, the composition of revenue, and expenditure from the year of 2007 to 2011. The operation reports include the two hospitals' outpatient and inpatient provision records from 2007 to 2011.

### 2.4. Analytical Methods

#### 2.4.1 Difference in difference

The difference in difference (DID) method was used to analyze the effects of the zero-markup policy (Wooldridge 2005). As seen in Equation (1) below,  $y_{1,0}$  is the evaluation indicator for treatment-group hospital in 2010,  $y_{0,0}$  is the evaluation indicator for the control-group hospital in 2010,  $y_{1,1}$  is the evaluation indicator for the treatment-group hospital in 2011, and  $y_{0,1}$  is the evaluation indicator for the control-group hospital in 2011. Therefore, the implementation effect of zero-markup policy is:

$$\beta = (y_{1,1} - y_{1,0}) - (y_{0,1} - y_{0,0}) \quad (1)$$

In Equation (1), the first subscript "1" means treatment-group hospital and "0" means control-group hospital; the second subscript "1" means the year of 2011 and "0" means the year of 2010. Coefficient " $\beta$ " indicates the effect of the zero-markup policy. DID is based on the assumption that the trends of target indicators between treatment-group and control-group hospitals are similar to each other without the policy intervention. This study will test whether the assumption is satisfied in the beginning of the results.

#### 2.4.2 Estimating the government subsidy

In order to answer the question of how much fiscal revenue should be allocated to implement the zero-markup policy, two estimation methods were employed in this study. First, as the current practice, the Chinese government estimates the appropriate hospital subsidy after accounting for the previous markup in drug retail prices by 15%. The information with regard to total drug revenue and the proportion of the revenue of zero-markup drug out of total drug revenue in 2011 was collected from Ningshan County Hospital. Equation (2) below shows how government subsidy is computed using this method:

$$\text{Government subsidy} = \text{total drug revenue} \times \text{proportion of revenue of zero-markup drug out of total drug revenue} \times \text{the markup rate in drug sale} \quad (2)$$

Second, it is critiqued in this study that the above method using the 15% markup principle neglects the fact that the zero-markup policy does increase hospital health care revenue. Alternatively, government subsidy could be estimated by the “natural growth principle.” Specifically, equation (3) was used to more accurately measure government subsidy:

$$\text{Percentage increase of health care revenue} = (\text{health care revenue in 2011} - \text{health care revenue in 2010}) / \text{health care revenue in 2010} \quad (3)$$

Setting natural growth of health care revenue at 5% annually, government compensates the hospitals if hospital health care revenue increases less than 5% after implementing the zero-markup drug policy; when the hospitals reach natural growth rate or exceed the rate, government does not subsidize the hospitals. This is the rationale for using the “natural growth principle” to determine whether the government should subsidize the hospitals.

### 3. Results

#### 3.1 Testing the assumption of DID

The difference-in-difference method is based on the assumption that, without the implementation of the intervention of interest, the trend of the outcome variables from treatment group and control group should be similar. Figures 1, 2, 3 and 4 show that, for per-visit outpatient expense, per-visit inpatient expense and inpatient service provision, the trend in Ningshan County Hospital is similar to that in Zhenping County Hospital from 2007 to 2010, thus substantiating the hypothesis of DID. Figures 1, 2, 3 and 4 also show that the trend for the treated county, Ningshan, was interfered by the zero-markup policy in 2011. Therefore, DID is a valid method to



be used in evaluating the effects of zero-markup policy on per-visit medical expense and medical service provision in these county hospitals.

[Figure 1 here]

[Figure 2 here]

[Figure 3 here]

[Figure 4 here]

From Figure 5 and Figure 6, we find that the trends of total health care revenue and the proportion of drug revenue in total health care revenue are similar in Ningshan and Zhenping County hospitals. However, after the implementation of zero-markup policy in 2010, the proportion of drug revenue in total health care revenue in Ningshan County hospital declined significantly, compared with the increase of the proportion in Zhenping County hospital between 2010 and 2011.

[Figure 5 here]

[Figure 6 here]

### *3.2. The effects of zero-markup on medical expense per visit*

From the results of difference in difference in Table 1, with the implementation of zero-markup policy in Ningshan County Hospital, the per-visit outpatient expense and the per-visit inpatient expense dropped by 19.02 Yuan and 389.11 Yuan, respectively.

[Table 1 here]

### *3.3. The effects of zero-markup policy on medical service provision*

Table 2 shows that the outpatient service provision increased in Ningshan County Hospital by 28.55%, from 33,967 visits to 43,666 visits between 2010 and 2011. The inpatient service provision increased 16.17%, from 2,729 visits to 3,185 visits in Ningshan County Hospital. The outpatient service provision was similar between the year of 2010 and 2011 in Zhenping County Hospital, and the inpatient service provision only increased by 1.31%. Following implementation of the zero-markup policy, outpatient and inpatient service provision in Ningshan increased by 9,697 visits and 398 visits, respectively.

[Table 2 here]

### *3.4. The effects of zero-markup policy on the health care revenue for hospitals*

There are three sources of revenue for county public hospitals in China: first, medical revenue, which includes medical fees, examination fees, test fees, surgery fees, bed fees etc.; second, drug revenue; and third, subsidies from the government. Health care revenue consists of medical revenue and drug revenue. It is analyzed whether the zero-markup policy could change total health care revenue, drug revenue and the proportion of drug revenue in total health care revenue and total hospital revenue.

#### *3.4.1 Drug revenue in total health care revenue*

Table 3 shows that Ningshan hospital's total health care revenue increased by 358.2 thousand Yuan, drug revenue reduced by 842.8 thousand Yuan, and the proportion of drug revenue out of total health care revenue reduced by 6.37%.

[Table 3 here]

#### *3.4.2 Drug revenue in hospital's total revenue*

The DID results in Table 4 show that, after the implementation of the zero-markup policy, the total hospital revenue increased by 901.2 thousand Yuan, the proportion of drug revenue in total revenue decreased by 5.61% and the proportion of subsidies in total revenue increased by 3.62%.

[Table 4 here]

### 3.5. Estimates of government subsidy

This study has the capacity to estimate the specific amount of government subsidy that was required to incentivize the hospital to implement the zero-markup policy. The subsidies from the government were 4,420 thousand Yuan and 5,550 thousand Yuan in 2010 and 2011, respectively, in Ningshan County Hospital, and the subsidies increased by 1,130 thousand Yuan from 2010 to 2011. How much fiscal revenue should be allocated to implement the zero-markup policy? Two results are estimated based on two different methods.

First, based on the “15% markup principle,” as the markup rate is 15% before the implementation of zero-markup policy, the government decided to compensate the hospital the lost 15% markup. In 2011, the total drug revenue was 7874.7 thousand Yuan (Table 3) and the proportion of the revenue from essential drugs in total drug revenue was 15.8% from hospital financial reports. Therefore, the government subsidy that should have been provided to the hospital is 186.7 thousand Yuan.

Government subsidy

= total drug revenue × proportion of revenue of zero-markup drug out of total drug revenue × the markup rate in drug sale

= 7874.7 × 0.158 × 0.15

= 186.7 thousand Yuan

This result is close to the hospital-reported loss due to the zero-markup policy in the year of 2011, which was 194 thousand Yuan.

Second, based on the “natural growth principle,” after the implementation of the zero-markup policy, the hospital health care revenue increased from 15,374.8 thousand Yuan to 16,755.3 thousand Yuan, by 1,380.3 thousand Yuan and by 8.98% from 2010 to 2011 in Ningshan County Hospital (Table 3). As the drug price declined, the per-visit outpatient expense and per-visit inpatient expense decreased. However, the outpatient and inpatient provision increased, which increased the health care revenue. Even if the natural increase of 5% is considered, the medicine revenue still increased by 5%. Accordingly, the government does not have to provide extra

subsidy to the hospital in terms of compensating any potential loss caused by the zero-markup policy.

## **4. Discussion**

### *4.1. Assumption of DID*

DID is based on the assumption that, without the intervention, the trends of outcome variables from treatment group and control group should be similar. In this study, that assumption is satisfied. For the outcome variables, including outpatient service provision, inpatient service provision, health care revenue and the proportion of drug revenue in total health care revenue from 2007 to 2010, data were collected to reveal the trends of these variables between treatment hospital and control hospital. It is demonstrated that the trends between two hospitals are similar to each other for all outcome variables in the time period prior to policy implementation.

### *4.2. Correlation of per-visit medical expense and health care provision*

Theoretically, after the implementation of the policy of the zero-markup in essential drugs, drug retail price will decline as a result of cancelling medicine markups, and therefore, the drug expense per outpatient visit and per inpatient visit, and the proportion of drug expense in total medical expense will be reduced. Furthermore, as drugs account for a higher proportion of total medical expense in the county hospitals than in other hospitals, the medical expenses per visit could be reduced substantially.

The results show that, with the implementation of zero-markup policy, the per-visit outpatient expense and per-visit inpatient expense decreased in Ningshan County Hospital in 2011. This is consistent with the results of Shen's study and Wang's study (Shen *et al.* 2013, Wang *et al.* 2013), which show an overall decrease in health care expenses with the implementation of the zero-markup policy.

Meanwhile, the zero-markup policy made the outpatient provision and inpatient provision increase by 28.8% and 14.6% respectively in Ningshan County Hospital. This is consistent with the studies in community-level medical institutions (Tao *et al.* 2011, Chen *et al.* 2010), which show increases in health care provision with the implementation of zero-markup policy. Those results are linked to each other through the understanding of price elasticity of demand for health care. Data from China's National Health Service Survey show that both the price elasticity of outpatient provision and price elasticity of inpatient provision in rural areas is negative, which suggests that the demand for outpatient service and inpatient service increases with the decrease of health care price (Zhou *et al.* 2011). Evidence from this study echoes Zhou *et al.*'s study, which shows, using nationally representative data, that the price elasticity of demand for health care is negative.

### *4.3. Hospital's revenue*

An important finding from this study is that for Ningshan County Hospital, the zero-markup policy led to a decrease in drug revenue. The proportion of drug revenue out of total health care revenue and the proportion of drug revenue out of total hospital revenue reduced by 6.37% and 5.61%, respectively. Despite this drop in drug revenue, the total health care revenue and total hospital revenue increased primarily due to the significant increase in outpatient and inpatient provision. This is consistent with the findings from a study conducted on primary medical institutions (Chen *et al.* 2010).

The zero-markup policy clearly impacted the level of drug revenue. However, as shown by Tables 3 and 4, the proportion of drug revenue in health care revenue and in total hospital revenue is still very high, at 47% and 35%, respectively. Efforts aimed at reducing drug revenue to an even greater extent may include a variety of tactics, including changes in drug pricing, drug circulation, and rational drug use.

### *4.4. The government subsidy*

Any effort to expand the zero-markup policy to other county hospitals will demand involvement by the government. As shown by the study, following implementation of the zero-markup policy, the government's actual subsidy increased by 1,130 thousand Yuan, according to the hospital financial records. However, according to the "15% markup principle," the subsidy-in-need from the government should have been 186.7 thousand Yuan. Based on the alternative analysis using the "natural growth principle," we found that the government would not need to subsidize the hospital at all. This is because the health care revenue increased by 1,576.6 thousand Yuan, which is a five percent increase.

If the "15% compensation principle" is applied, the government has to budget to subsidize the hospital, which is a suboptimum choice. If the "natural growth principle" is applied for fiscal subsidy, no additional government subsidy is necessary. By implementing zero-markup policy and the "natural growth principle" for subsidy, more patients utilize health care at lower price and the hospitals have increased revenue, even without government subsidy, which is the Pareto improvement from the societal perspective.

### *4.5. Limitations*

There are some important limitations in this study. First, the analysis of drug expenses was conducted with consideration of all drugs rather than specifically on zero-markup drugs. This

was necessary because it is impossible to distinguish zero-markup drugs from other drugs in a patient dataset. Another limitation is the generalizability of the findings. Given that the study evaluates the zero-markup policy over only one year, it is difficult to generalize this impact into the future. It is possible that the policy impact only persists for a short period and then returns to previous trends. Furthermore, while the similarities between the two county hospitals in the study was a strength for this type of analysis, the external validity of the study could be enhanced by exploring more representative samples.

## 5. Conclusion

The implementation of a zero-markup policy in a county-level hospital is advancement for the hospital. For the county hospital, while the policy led to decreases in drug revenue, it led to an overall increase in the total hospital revenue during the year of implementation. This was mostly due to the increase in health care provision resulting from lower drug prices. The enhancement in outpatient and inpatient visits also represents progress from the lens of the government, whose mission is to ensure greater access to care for the population. The study shows that with minimal or no subsidy, the government can catalyze the zero-markup policy and potentially generate positive outcomes for county hospitals. Efforts to advance health reform should strongly consider the expansion of the zero-markup drug policy to other county hospitals in rural China.

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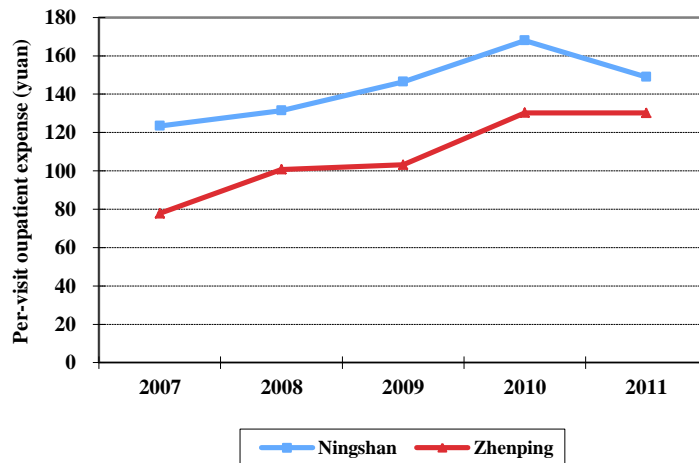


Figure 1. The trends of per-visit outpatient expense in Ningshan and Zhenping County hospitals from 2007 to 2011. Data source: Annual operation reports from 2007 to 2011 in Ningshan and Zhenping county hospitals.

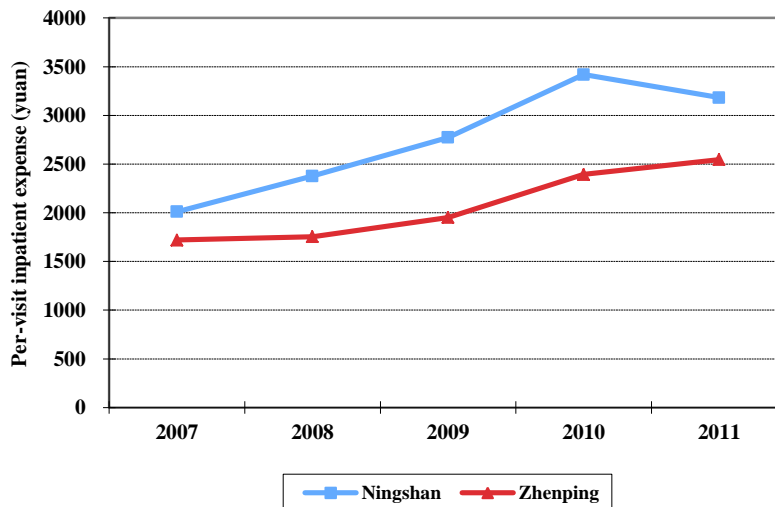


Figure 2. The trends of per-visit inpatient expense in Ningshan and Zhenping County hospitals from 2007 to 2011. Data source: Annual operation reports from 2007 to 2011 in Ningshan and Zhenping county hospitals.

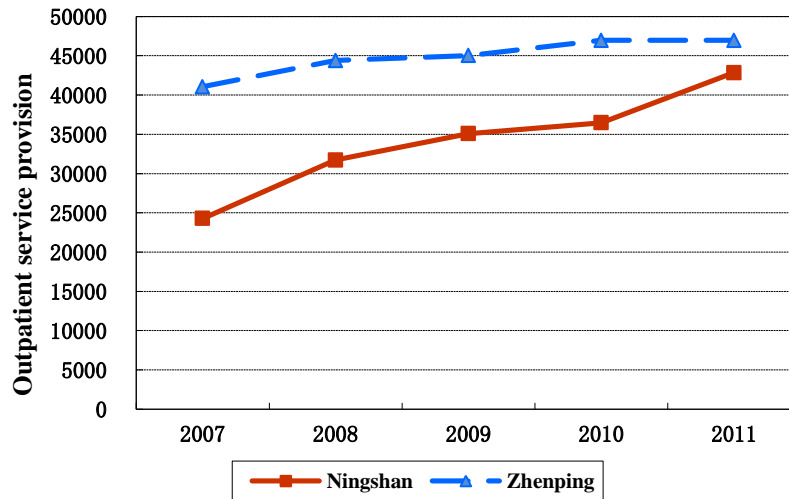


Figure 3. The trend of outpatient service provision from 2007 to 2011 in Ningshan and Zhenping County hospital. Data source: Annual operation reports from 2007 to 2011 in Ningshan and Zhenping county hospitals.

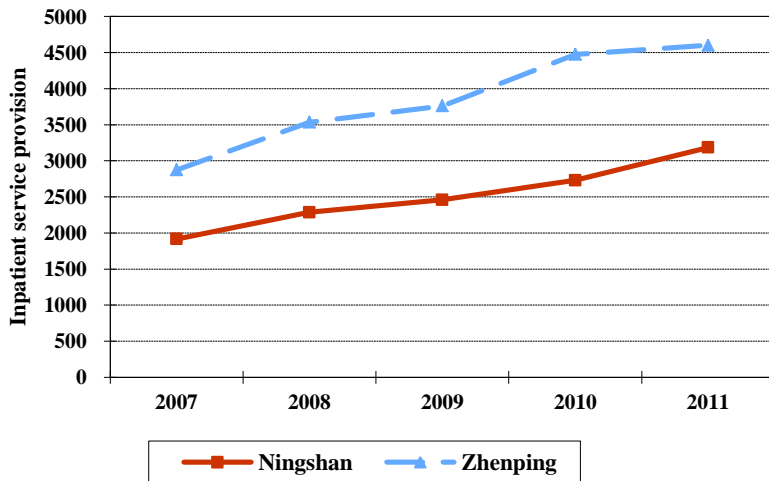


Figure 4. The trend of inpatient service provision from 2007 to 2011 in Ningshan and Zhenping County hospital. Data source: Annual operation reports from 2007 to 2011 in Ningshan and Zhenping county hospitals.

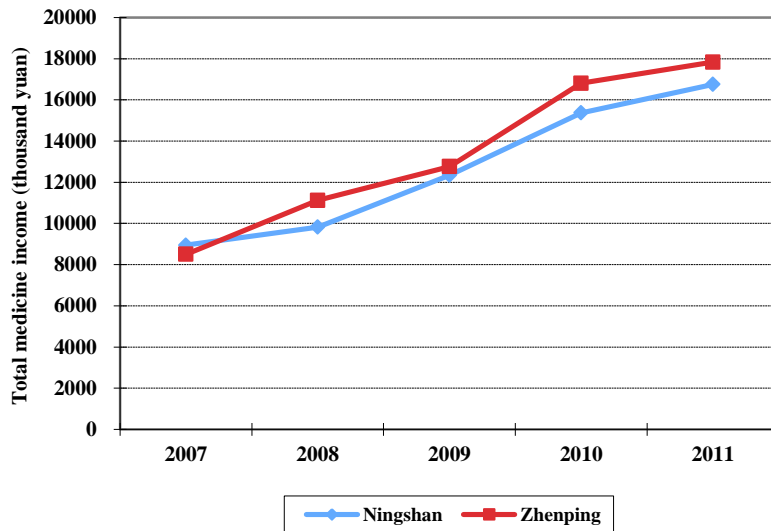


Figure 5. The trend of total health care revenue from 2007 to 2011 in Ningshan and Zhenping County hospital. Data source: Annual financial statements from 2007 to 2011 in Ningshan and Zhenping county hospitals.

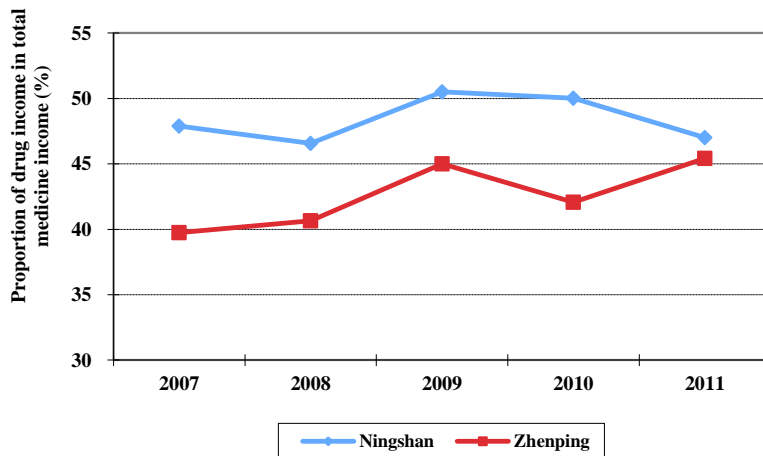


Figure 6. The trend of the proportion of drug revenue in total health care revenue from 2007 to 2011 in Ningshan and Zhenping County hospital. Data source: Annual financial statements from 2007 to 2011 in Ningshan and Zhenping county hospitals.

Table 1. The effects of zero-markup policy on per-visit outpatient and inpatient expense

	Per-visit outpatient expense (Yuan)		Per-visit inpatient expense (Yuan)	
	Ningshan	Zhenping	Ningshan	Zhenping
2010	168.00	130.25	3418.78	2394.03

2011	148.96	130.23	3182.81	2547.18
D1	-19.04	-0.02	-235.97	153.14
DID	-19.02		-389.11	

Note: D1 is the medical expense difference between the year of 2011 and 2010. Data source: Annual operation reports from 2010 to 2011 in Ningshan and Zhenping county hospitals.

Table2. The effects of zero-markup policy on outpatient and inpatient service provision

	Outpatient service provision		Inpatient service provision	
	Ningshan	Zhenping	Ningshan	Zhenping
2010	33,967	46,955	2,729	4,416
2011	43,666	46,957	3,185	4,474
D1	9,699	2	456	58
DID	9,697		398	

Note: D1 is the provision difference between the year of 2011 and 2010. Data source: Annual operation reports from 2010 to 2011 in Ningshan and Zhenping county hospitals.

Table3. The effects of zero-markup on total health care revenue, drug revenue and the proportion of drug revenue in total health care revenue

	Total health care revenue (thousand Yuan)		Drug revenue (thousand Yuan)		Proportion (%)	
	Ningshan	Zhenping	Ningshan	Zhenping	Ningshan	Zhenping
2010	15,374.8	16,812.3	7,691.3	7,073.0	50.03	42.07
2011	16,755.3	17,834.6	7,874.7	8,099.2	47.00	45.41
D1	1,380.5	1,022.3	183.4	1,026.2	-3.03	3.34
DID	358.2		-842.8		-6.37	

Note: D1 is the revenue difference between the year of 2011 and 2010. Data source: Annual financial statements from 2010 to 2011 in Ningshan and Zhenping county hospitals.

Table 4. The effects of the zero-markup policy on total hospital revenue and the proportion of drug revenue (subsidies) in total revenue

	Total revenue (thousand Yuan)		The proportion of drug revenue(%)		The proportion of subsidies (%)	
	Ningshan	Zhenping	Ningshan	Zhenping	Ningshan	Zhenping
2010	19,928.5	20,093.8	38.59	35.20	22.20	14.68
2011	22,467.1	21,731.2	35.05	37.27	24.70	13.57
D1	2,538.6	1,637.4	-3.54	2.07	2.51	-1.11
<b>DID</b>	<b>901.2</b>		<b>-5.61</b>		<b>3.62</b>	

Note: D1 is the revenue difference between the year of 2011 and 2010. Data source: Annual financial statements from 2010 to 2011 in Ningshan and Zhenping county hospitals.