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Organization and Finance of China's Health Sector: Historical Antecedents for Macroeconomic Structural Adjustment

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Abstract

China has exploded onto the world economy over the past few decades and is undergoing rapid transformation toward relatively more services. The health sector is an important part of this transition. This article provides a historical account of the development of health care in China since 1949. It also focuses on health insurance and macroeconomic structural adjustment to less saving and more consumption. In particular, the question of how health insurance impacts precautionary savings is considered. Multivariate analysis using data from 1990 to 2012 is employed. The household savings rate is the dependent variable in 3 models segmented for rural and urban populations. Independent variables include out-of-pocket health expenditures, health insurance payouts, housing expenditure, education expenditure, and consumption as a share of gross domestic product (GDP). Out-of-pocket health expenditures were positively correlated with household savings rates. But health insurance remains weak, and increased payouts by health insurers have not been associated with lower levels of household savings so far. Housing was positively correlated, whereas education had a negative association with savings rates. This latter finding was unexpected. Perhaps education is perceived as investment and a substitute for savings. China's shift toward a more service-oriented economy includes growing dependence on the health sector. Better health insurance is an important part of this evolution. The organization and finance of health care is integrally linked with macroeconomic policy in an environment constrained by prevailing institutional convention. Problems of agency relationships, professional hegemony, and special interest politics feature prominently, as they do elsewhere. China also has a dual approach to medicine relying heavily on providers of traditional Chinese medicine. Both of these segments will take part in China's evolution, adding another layer of complexity to policy.

Keywords

China, economic history, health insurance, macroeconomics, structural adjustment, health economics, precautionary savings, communism, health sector, economic development, health finance

The rapid rise of China on the world economic stage has been impressive. A nation of 1.4 billion people has transformed from a primarily poor rural society to a prosperous majority urban one. China has divisions and controls between rural and urban populations partly to stem development of urban slums. This helps explain wide disparities in income and separate national accounting conventions. Urban per capita disposable income was already 85% greater than rural income in 1985, and the gap is even larger now.[1] But both urban and rural populations have seen sharp gains with real urban per capita disposable income in 2013 at 765% of the 1985 level. Real rural incomes were 497% of 1985 levels. The World Bank placed China at $13 216 in purchasing power parity per capita income in 2014, just above South Africa ($13,046).[2]

This transition did not come easy. In 1912, China cast off the centuries-old Qing dynasty in an effort to modernize. Decades later, and after much tumult, communists consolidated power seeking economic growth and social advancement relying on a command economy. This approach was found wanting and replaced by a more market-friendly strategy. Economic growth has been brisk since 1979 and is only now decelerating for fundamentally structural reasons.[3] Growth has been fueled by movement of low-productivity agricultural workers to higher productivity manufacturing, construction, and service employment. It has also been underpinned by high levels of investment and exports. In addition,

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China, like other developing countries, benefits from the integration of a backlog of technologies readily available from the developed world. This approach inevitably exhausts itself as the rural population diminishes, higher wages and prices render manufactured exports less competitive, and higher productivity technologies become widely disseminated.

Structural adjustment away from manufacturing, investment, and exports and toward consumption and services, both public and private, is already underway. The Chinese leadership now emphasizes the quality of economic growth rather than its high rate and struggles to set expectations for a new normal where living standards increase at slower rates. The future also promises greater abundance of social amenities including better environmental quality and a stronger social safety net, of which health services are an important part.

The purpose of this article is to provide a narrative history of how China's health sector evolved since 1949. This story is of interest, but there are important secondary considerations. Increasing allocations to health insurance and health services are central to the transition toward consumption and services.[4] A multivariate analysis of savings rates is included premised by a hypothesis of expected health care cost–induced precautionary savings. The article posits that better health insurance coverage and health care access reduces precautionary saving and increases household consumption, an essential part of macroeconomic structural adjustment.[5]

Economic History and the Chinese Health Sector

Chinese history is deeply rooted with millennia of tradition and culture. China was well organized and productive for much of its history, achieving impressive levels of prosperity and population. Chinese medicine is part of that evolution with a rich legacy of theories, drugs, and procedures. Western medicine is a relative newcomer. Some trace it to Matteo Ricci in the 16th century and subsequent work by Christian missionaries. By the 20th century, both approaches coexisted with Western medicine linked to missionaries and universities. But overall, infrastructure was rudimentary, and traditional medicine served most of the population when the Communist Party prevailed in 1949.[6] Traditional medicine remains widely accepted throughout China.

1949-1978

Communist ascendency occurred in China while Stalin still presided in the Soviet Union. The Union of Soviet Socialist Republics (USSR) was a template. But unlike the Soviet Union where Lenin and Stalin sought proletarian transformation, Mao relied on a more rural and agricultural approach with formation of cooperatives as a key feature of early planning.[7] The Rural Cooperative Medical System was established to provide health care for much of the population. Like the Soviets, China quickly developed a command economy with guidance provided in the Five-Year Plan for 1953-1957. The first of the Five-Year Plans included nearly 500 projects with a focus on heavy industry.[8] They were capital intensive with little emphasis on household consumption. There was some attention to the health sector, however, with priorities of hospital and clinic construction, vaccine and drug production, and training of health care providers.[9] Many of the objectives of the first Five-Year Plan were met, although agricultural output lagged.[10] Public health was recognized as an important element of planning. China experienced marked improvements in public health and primary care by the late 1950s.

The Great Leap Forward from 1958 to 1961, an effort to induce small-scale industrial activity and collectivization, backfired and ensuing havoc in agriculture resulted in devastating famine. Soon after came the Cultural Revolution, with emphasis on purging social class.[11] It also shattered economic activity resulting in serious setbacks. The more pragmatic Deng Xiaoping set a different course for China once he consolidated power in the late 1970s.[12]

1979-2000

The late 1970s were watershed years in China. The shift to a more market-based system commenced and was outlined in the Sixth Five-Year Plan for 1981-1985.[13] It identified prices as key for resource allocation as opposed to command approaches.[14] It called for use of new technology and some banking reform. It also sought to shift resources toward consumption and away from investment, at least in relative terms. Environmental protection is mentioned as well. Health planning in the Sixth Five-Year Plan called for further hospital and clinic expansion as well as improvements in quality and competencies of staff. Increased drug output was included with considerable emphasis on improved quality. The plan also called for more and better integration of Western and traditional medicine, and it sought to intensify education of barefoot doctors who provided much of primary care during the Cultural Revolution, but were generally not well trained.

The decisive shift toward markets that propelled China to become one of the world's largest economies was much more managed than the collapse of central planning in the former Soviet Union.[15] The implementation of China's Five-Year Plans was already relatively decentralized by the 1990s. Further devolution of the locus of authority along with profit incentives animated both rural agriculture and state-owned enterprises to substantially higher levels of output.[16] This was combined with trade liberalization especially in some coastal regions that attracted Western direct investment.[17] Success in this approach led to more such reform and greater financial self-sufficiency among organizations.[18]

This impact of reform on the health sector was profound.[19] Rural residents who previously enjoyed some measure of access to health services through rural cooperatives were largely left uninsured.[20,21] Many urban residents, such as

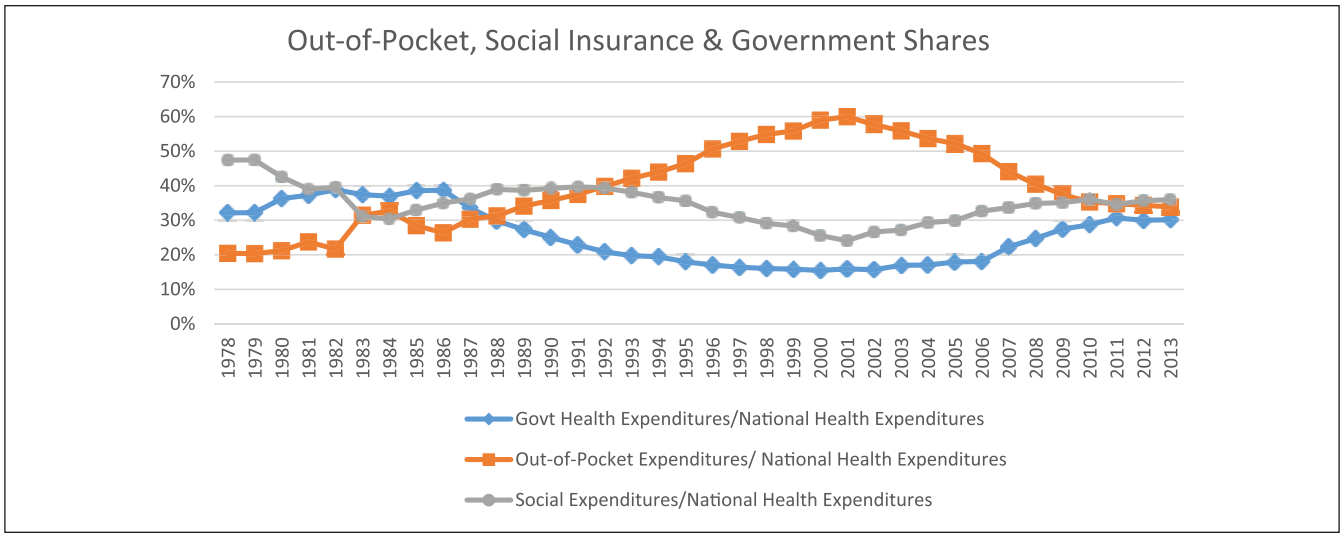

Figure 1. Distribution of household, social insurance, and government allocations in finance of national health expenditures.

those with employment in state-owned enterprises, did maintain coverage through social insurance plans for urban workers and state-owned enterprises, but others did not. Hospitals received relatively small and inadequate allocations of funds from the public sector and many turned to sales of drugs, devices, and newer procedures. The government permitted hospitals a 15% mark-up rate on drugs, except for those on the essential drug list with no mark-ups. Physicians, many employed at hospitals on modest salaries, also sought to supplement incomes with drug or device sales. Chinese households were aware of the financial impact of high hospital costs and many self-insured with precautionary savings. Nevertheless, financial ruin threatened when expensive health care was required.[22]

China's health sector grew rapidly in this period but not always as fast as gross domestic product (GDP). For example, nominal health spending nearly doubled from 1992 to 1995, but the share of GDP allocated to health fell from 4.1% to 3.6%. Growth of the health sector was increasingly financed from out-of-pocket household spending. Figure 1 illustrates the trend. Out-of-pocket spending exceeded spending by social insurance schemes by 1993. And both exceeded the relatively paltry allocation of about 20% from government. Government's spending share fell further to 15.5% in 2000. Out-of-pocket spending as a share of the total peaked in 2001 at about 60% of China's health spending.

The World Health Report 2000, a controversial ranking of global health and health systems, found China ranked 144 out of 191 nations in overall performance. Much of this poor performance was driven by equity indicators such as "fairness of financial contribution," a risk measure for household financial ruin, in which China ranked 188. Only Brazil, Myanmar, and Sierra Leone ranked lower. However, China achieved a middling rank of 81 on disability-adjusted life expectancy, just behind Romania and the Dominican Republic. Unadjusted life expectancy in China in 1999 was 68.1 years for men and 71.3 years for women.

2001-2015

By the turn of the century, there was growing consensus that organizational self-sufficiency in China's health sector in the absence of much more widespread insurance was problematic. There was also a serious public health scare with severe acute respiratory syndrome (SARS). China's public health infrastructure was found inadequate, and both domestic and international constituencies called for reform.[23] A middle ground had to be found between the public sector approach of the 1960s and reliance on out-of-pocket spending. But there was no international consensus on the appropriate role for the state in the health sector. So China opted for a 2-track approach of increasing state allocations to public health, public hospitals, and clinics as well as implementation of health insurance expansion to provide universal coverage. The latter effort began with the rural population in 2003.[24] Two urban schemes, the Urban Employee Basic Medical Insurance (UEBMI) and Urban Resident Basic Medical Insurance (URBMI) programs, were subsequently established. The former integrated the working population previously covered with social insurance, whereas the latter serves non-working populations.[25] The 12th Five-Year Plan for 2011-2015 emphasized improved basic medical insurance while also calling for improved hospital and clinic infrastructure including management, public health and medical education, and increased use of information technology in health. This Five-Year Plan also accords equal importance to traditional and Western medicine, underscoring the continued importance of this form of alternative medicine.[26]

Near-universal health insurance has been achieved though problems of rural migrants to cities remain.[27] It is also the

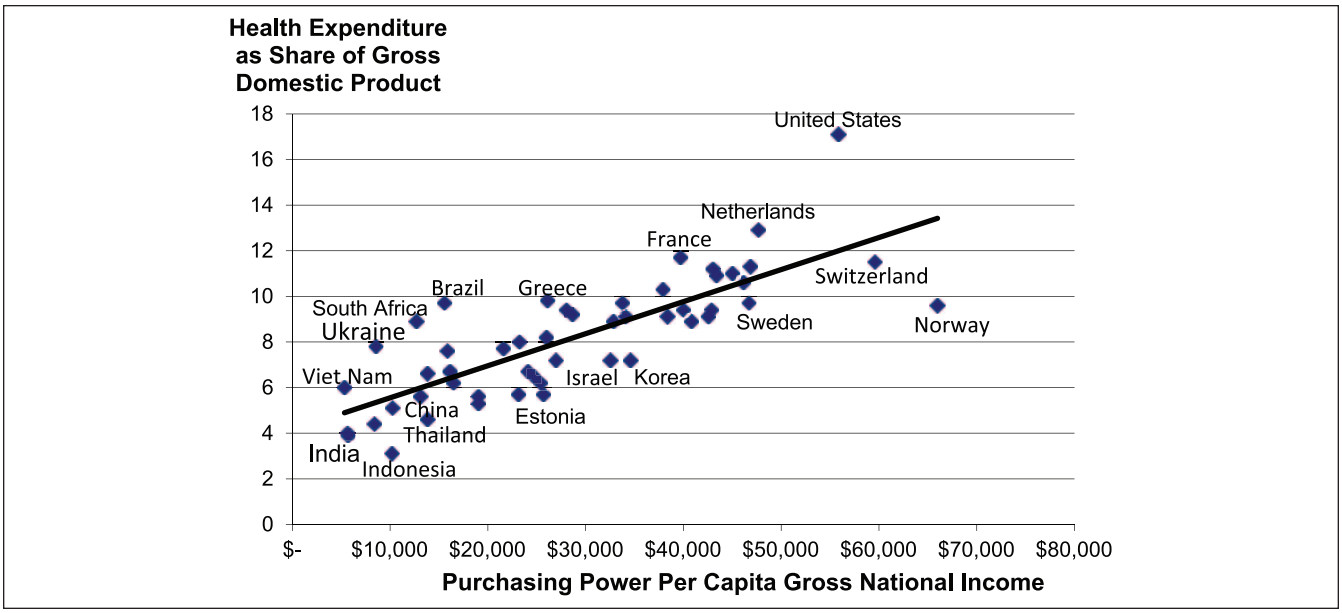

Figure 2. Cross-sectional comparison of health spending/GDP With per capita income.

case that coverage is shallow.[28] Coverage is focused on hospitalizations with annual limits on insurance expenditure and substantial cost sharing. The population remains vulnerable to catastrophic financial loss, especially as health care prices rise. This system is relatively weak but forms a foundation with which to provide more comprehensive and efficient coverage later.

Health Spending and Macroeconomics

Health spending is income elastic, and over the long run, the share of GDP allocated to health increases as per capita income rises. This is shown in Figure 2 using World Development Indicators from the World Bank. It shows the share of GDP allocated to health in 2013 and per capita income measured in purchasing power parity in 2014. China, where the health sector accounts for 5.6% of GDP, is very close to the trend-line. Rising per capita income is expected to drive up this share. The shift to services has important implications. Services, including those in health care, have historically shown relatively weak productivity growth, and more services, though a ready source of employment, threaten to lock in slower growth.[29] However, perhaps China can leapfrog other nations and transform its hospital and pharmacy centric system with the use of higher productivity mobile health applications and other new technologies. Past development in China has shown no conclusive leapfrogging, but the possibility exists.[30]

China's shift toward consumption and services has drawn the attention of the IMF.[31,32] Stability and integrity of the global balance of payments depend on orderly evolution of China's economy.[33] China has exceptionally low levels of consumption and high levels of savings as a share of GDP by global standards.[34] Household consumption accounted for just 37.7% of GDP in 2014.[35] By comparison, household consumption in the United States accounted for 68.4% of GDP. Lower consumption rates in developing countries are expected, but China's low consumption levels are extraordinary. Reduced savings rates and higher consumption rates are a central objective for China.[36,37] China would be on a more sustainable path, and higher consumption will drive imports, stimulating growth elsewhere. Barnett and Brooks of the IMF analyzed determinants of consumption and savings and found that precautionary savings for health were an important reason Chinese save more and spend less than others. Of course, other factors can drive savings, such as expected future education and retirement spending as well as home purchases. A related study found that consumption of durables such as washing machines and color TVs was positively related to the number and proportion of rural households with health insurance.[38] But not all studies support the hypothesis that wider and deeper health insurance increases consumer spending.[39,40] The low level of consumption in China's economy impacts savings, and inclusion of this can yield different results. To that end, this article addresses determinants of savings and includes rural and urban models with and without consumption/GDP as an independent variable.

Data and Methods

Narrative history is the primary approach used in this study, but multivariate analysis is also used as a supplement. Primary data sources include various editions of the *China Statistical Yearbook* and the *Chinese Health Sector Statistical Yearbook* for 1990-2012. These are

Table 1. Determinants of Household Saving: 1990-2012.

	Model 1 out-of-pocket health expenditure and health insurance payout						Model 2 out-of-pocket health expenditure, health insurance payout, residential house spending, and education spending					
	Urban			Rural			Urban			Rural		
	Coefficient	*t*	Significance	Coefficient	*t*	Significance	Coefficient	*t*	Significance	Coefficient	*t*	Significance
Out-of-pocket health expenditure	0.059	1.017	0.321	0.857	9.259	0.000***	0.326	1.982	0.063*	1.025	4.691	0.000***
Health insurance payout	0.965	16.758	0.000***	0.305	3.296	0.004**	0.712	3.704	0.002**	0.230	1.808	0.087*
Residential house spending							0.387	1.913	0.072*	0.026	0.247	0.808
Education spending							−0.328	−1.1855	0.080*	−0.191	−0.811	0.428
Adjusted R^2	.927			.811			.938			.799		
N	23			23			23			23		

Note. Significant at *.1, **.01, and ***.001 levels.

compendium of public sector data. The World Bank and the IMF are also important sources of secondary data.

Multivariate analyses use ordinary least squares analysis in SPSS version 16.0 and Excel for Windows 7 to study determinants of household savings. Urban and rural data are analyzed separately consistent with Chinese statistical accouting practice.

The first model includes only two independent variables: out-of-pocket health spending and health insurance payouts by insurers. The second model adds residential home and education spending. These models form the base case of the analysis. But urban and rural data are also augmented in separate models with consumption/GDP included as an independent variable. A disaggregation into two periods, 1990 to 2001 and 2002 to 2012, was also included. The general model specification is as follows:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots$$
$$+\beta_k X_{ki} + \mu i \quad i = 1, 2, \ldots, n.$$

The dependent variable (Y) is the urban or rural household savings rate. Independent variables (X_i) in the base case include out-of-pocket health expenditures, health insurer payout, residential house spending, and education spending. All of these variables are standardized as a share of per capita urban disposable income or rural income. For urban households, health insurance refers to the UEBMI and the URBMI schemes. For rural households, health insurance refers to New Rural Cooperative Medical System (NRCMS). Data for savings rates are derived from household surveys. Savings is the difference between per capita disposable income and per capita consumption expressed as a proportion of per capita disposable income. Data for the independent variable of out-of-pocket spending were obtained from national health expenditures accounts and measure per capita health spending as a share of disposable income. Data for payout of health insurers are used to measure these expenditures relative to per capita disposable income even though they are not part of disposable income. This helps to standardize this independent variable. Data for expenditures on residential housing and education are derived from surveys. These independent variables are constructed to measure shares of housing and education spending by households relative to disposable income. Sales prices are used for urban housing estimates, whereas building costs are used for rural areas.

Multivariate Results

Table 1 shows results of time series analysis of savings rates as a function of out-of-pocket health expenditure, health insurance payout by insurers, education and housing spending at the household level. Adjusted R^2 statistics are all higher than 0.79. The Durbin-Watson statistic ranged from 1 to 1.5. For urban households, results from model 1 show a statistically significant relationship between health insurance payout and urban household saving. Coefficients indicate sensitivity of the savings rate to a 1% increase in respective independent variables. Results from model 2 show that all four variables were statistically significant, at least at the 0.1 level. Increasing out-of-pocket health spending, health insurance payout, and residential house spending were positively correlated with household saving. Education spending was negatively correlated with household saving.

For rural households, results were somewhat different. The coefficient for out-of-pocket health expenditure and health insurance payout were both statistically significant. Residential home and education spending did not have statistical significance associated with household saving. The disaggregation into 2 periods, 1990 to 2001 and 2001 to 2012 (not shown) yielded a much higher urban level of statistical significance in each of the models for the positive coefficient associated with insurer payout in the years the health insurance safety net was implemented.

Results including household consumption expenditures as a share of GDP are not shown. But for urban households, only the health insurance payout had a positive relationship with household saving (0.67). For rural households, three variables showed statistical significance: out-of-pocket health expenditure, education spending, and rural household consumption/GDP. The coefficients were 1.36, −1.07, and −0.79, respectively.

Discussion: Health Insurance and Household Savings

Out-of-pocket health expenditure and health insurance payout have a positive relation with household precautionary saving for both rural and urban populations. The meaning seems clear in the first instance. Households save to account for expected out-of-pocket health expenditure. The second case is less obvious and seems to refute the notion of more health insurance reducing savings and increasing consumption. But perhaps increased health insurance payouts are a proxy for higher prices and increased health spending. Health insurance may also release pent-up demand, particularly in poorer rural regions. These effects may predispose households toward more precaution. Initial effects of health insurance may differ from the long run, especially if insurance becomes more comprehensive in an environment of relatively stable prices. Positive correlation with residential housing expenditure was expected. The Chinese save for home purchases to better living standards and as a form of wealth creation. But much of this phenomenon has been in the cities helping to explain differing levels of statistical significance. The negative relation with education was not expected. One explanation is that education spending, an investment in human capital, is seen as a form of savings in this Confucian-oriented society, especially in the cities. The payoff will ultimately be increased family income. Perhaps savings and education are substitutes.

The inclusion of consumption as a share of GDP washes out some of the impact of other independent variables. It was significant at the 0.07 level in rural China but only .24 in urban areas. The only other statistically significant independent variable in cities was insurance payout, and it remained positive. Residential building spending came close at 0.11. Out-of-pocket health spending remained very significant in rural areas with a positive coefficient. Education spending also remained significant and negative. This suggests that although out-of-pocket health expenditures for health and health insurance payout both have important effects on savings rates, policy toward boosting consumption as a share of GDP is also important.

Limitations

Per capita disposable income is a central data element in the analysis. Disposable income is commonly allocated toward some of the independent variables such as out-of-pocket health expenditures, housing, and education. This raises multicollinearity as a concern. Many important allocations of disposable income are not included such as consumer durables and nondurables. And payout of health insurers is not a constituent part of the allocation of disposable income. But to investigate, hysteresis, a notion of dependence on past inputs and output, tolerance and variance inflation factor tests were used. Results indicated that multicollinearity may be a problem for the urban model that included education and residential home spending as independent variables. This calls into question quality of the coefficients associated with the independent variables. Future research might better identify and address this issue. A second concern is the limited number of observations. We only use data from 1990 to 2012. Further research using additional data can help establish more robust findings. Third, this study only evaluates first-order effects. Analysis of second-order effects focusing on rates of change should be considered to develop a more nuanced understanding. Breaking the period down into 2 sub-periods does help though. Finally, there are concerns about urban health insurance data. Before the 2 urban medical insurance schemes were established, civil servants and personnel at public institutions were entitled to publicly funded medical care, and employees from firms were entitled to employer-based coverage. Now both are integrated into UEBMI. Our analysis only uses UEBMI data, and there are concerns about accuracy of urban insurance payout data, especially in the early 1990s.

Conclusion: Organization Theory and Evolution of Health Care in China

Transformation of China's health sector is underway. It is a critical component of macroeconomic structural adjustment. But it is subject to path-dependent trajectories. Economic and health planners are bound by prevailing organizational and institutional convention. Such has been the case in the United States, and an early assessment of American health care in the late 1920s and 1930s is instructive. This work, by the Committee on the Cost of Medical Care, recommended substantial organizational change to meet the challenges of the 20th century.[41] It called for restructuring in favor of more businesslike models of delivery and finance in spite of opposition from the American Medical Association that preferred to conserve individual and entrepreneurial physicians. The Committee's majority report advocated organizational delivery, salaried positions, and sound cost accounting with economically meaningful prices. In short, a case was made for corporatization of medicine. China today faces a myriad of organizational challenges some of which parallel those of the United States in this earlier era. One concern is professional control. It is premised on the notion that authority for delivering care must rest with the professional whose knowledge, skills, and socialization are required. The problem is that such control, constrained by norms and self-interest, may be resistant to change. Professional hegemony by physicians is

well-established in China and includes senior hospital management positions. This is unlikely to change soon. But it will be more difficult to sustain in increasingly complex environments, and encroachment by other influences can be expected.[42]

Organizational theorists have a range of traditional concerns, many of which are also issues in Chinese health care. For example, proponents of institutional approaches to organization theory argue that managerial behavior is substantially driven by conformance standards.[43] Change is difficult to effect and constrained by custom. The well-established role of traditional medicine in China, in spite of only partially proven effectiveness, underscores this. Other concerns involve agency relationships, which focus on disparate interests of providers, consumers, and others that can undermine efficiency with under-allocation or over-allocation of resources.[44] Overprescribing is one very important example. The power of interest groups is yet another concern, but more amenable to control in a one-party state when economic modernization maintains sufficient priority.[45] An associated issue is a relationship-driven economic activity. The term *guanxi* describes favored relationships rooted in family, community, or college ties. It is much more entrenched in China than many other countries and can be a source of inefficiency.[46] Finally, China is particularly prone to groupthink, control, and conformance standards. The health sector is no exception and organizational change will be challenging.[47]

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