

Is China a Leviathan?

ZE ZHU AND BARBARA KRUG

ERIM REPORT SERIES <i>RESEARCH IN MANAGEMENT</i>	
ERIM Report Series reference number	ERS-2004-103-ORG
Publication	Updated version February 2005
Number of pages	36
Email address corresponding author	zzhu@rsm.nl
Address	Erasmus Research Institute of Management (ERIM) Rotterdam School of Management / Rotterdam School of Economics Erasmus Universiteit Rotterdam P.O.Box 1738 3000 DR Rotterdam, The Netherlands Phone: + 31 10 408 1182 Fax: + 31 10 408 9640 Email: info@erim.eur.nl Internet: www.erim.eur.nl

Bibliographic data and classifications of all the ERIM reports are also available on the ERIM website:
www.erim.eur.nl

REPORT SERIES
RESEARCH IN MANAGEMENT

ABSTRACT AND KEYWORDS	
Abstract	To address the problem why China, as a communist country, moves in the opposite direction when the public sector has undergoing a continuous growth in most Western economies since the World War I, we offer a new approach that the <i>de facto</i> fiscal decentralization curtails government size in transition China according to Leviathan theory. Meanwhile, by combining time series and cross-section regression analysis and various variables used by previous empirical studies, this paper tests the Leviathan hypothesis for vertical decentralization, horizontal fragmentation and intergovernmental collusion at national and provincial level, respectively, based on the new data set of China. Our empirical results not only explain Chinese shrinking government size, but also lend support to Leviathan hypothesis, especially, under the condition of absence of traditional democratic electoral constraint.
Free Keywords	Leviathan, Fiscal decentralization, China, Transition Economy

Is China a Leviathan?

ZE ZHU

Rotterdam School of Management, Erasmus University

PO Box 1738, 3000 DR Rotterdam

The Netherlands

Phone: +31 10 408 2261

Fax: +31 10 408 9015

Email: zzhu@rsm.nl

BARBARA KRUG

Rotterdam School of Management, Erasmus University

PO Box 1738, 3000 DR Rotterdam

The Netherlands

Phone: +31 10 408 2736

Fax: +31 10 408 9015

Email: bkrug@rsm.nl

Abstract. To address the problem why China, as a communist country, moves in the opposite direction when the public sector has undergoing a continuous growth in most Western economies since the World War I, we offer a new approach that the *de facto* fiscal decentralization curtails government size in transition China according to Leviathan theory. Meanwhile, by combining time series and cross-section regression analysis and various variables used by previous empirical studies, this paper tests the Leviathan hypothesis for vertical decentralization, horizontal fragmentation and intergovernmental collusion at national and provincial level, respectively, based on the new data set of China. Our empirical results not only explain Chinese shrinking government size, but also lend support to Leviathan hypothesis, especially, under the condition of absence of traditional democratic electoral constraint.

Keywords: Leviathan, Fiscal decentralization, China, Transition Economy

JEL Classifications: H11, P24, P35

1. Introduction

Starting transition since 1978, China has achieved a stirring economic success with average GDP growth rate of 8.3 percent (World Bank, 2000) and accounting for 25 percent share of global economic growth in 1995-2002 (Economist, 2003). Remarkable economic performance boosted the per capita GDP by about 22 times of 379 RMB in 1978 to 8184 RMB in 2002. Contrary to Wagner's Law, which suggests that public sector augment in accordance with increasing economic growth and per capita income, government expenditure relative to total GDP in China is, yet, shrinking. As shown in Figure 1, the ratio of government expenditure¹ to GDP dropped from 31% in 1978 to the rock bottom of 12% in 1995 and 1996 despite recent recovery of 21% in 2002. It remains, yet, strikingly lower compared to the average level of 28 OECD countries, 41%, and even the lowest member, Korea, of 25% (OECD, 2002). An interesting question arises, especially, when the public sector has undergoing a continuous growth in most Western economies since World War I, why does China, a communist country, moves in the opposite direction?

[insert figure 1 about here]

Following Adolph Wagner, volumes of works exist to deal with the trends, causes, and effects of expanding public sector in Western economies, such as Peacock and Wiseman (1961), Musgrave (1959; 1969), Bird (1970), Meltzer and Richard (1981), Krusell and Rios-Rull (1999) and Dudley and Witt (2004), etc. However, few researches pay particular attention to China's odd trend of shrinkage of government size except that some only touches upon this point. Based on our related literatures review, several possible explanations might be raised. Firstly, the demand side approach attributes to the transition process of China from a central-planned to a market economy resulting in the fade out of excessive government intervention. Naturally, the government expenditure is cut down thanks to massive private saving and investment in various economic fields. Secondly, from the supply side, the reform of budget system changes the structure of government revenue source and then constrains government financial capacity. Unlike pre-reform budget system mainly relies on profit remittance from state-owned enterprises, tax collection now is the major means to finance government activities. While an undeveloped tax administration and lack of voluntary tax compliance severely hamper levies of government revenue. A third argument might be the problem of statistic technique in that a large size of extrabudgetary, even off-budgetary, expenditure is not shown up in official statistic data². Thus, the *de facto* government size should be larger than that in Figure 1.

¹ Chinese public budget system includes extrabudgetary revenue and expenditure, originated in 1950 as a supplementary to the budgetary part. The data of the extrabudgetary revenue and expenditure only started in 1982 since the statistic reporting scheme was established then. Hereafter the government revenue and expenditure refers to the budgetary one.

² See footnote 1.

In addition to preceding three plausible explanations, we argue that fiscal decentralization also induces a smaller government in transition China. In contrast with traditional public finance theory modeling government as a benevolent despotic agency subject to public interests, Brennan and Buchanan (1980) depict the government as a monolithic Leviathan to maximize its revenue by exploiting tax base to the maximum extent. From such perspective, they claim that the fiscal decentralization is a powerful institutional constraint on the reach of the state. Thus, an implication is that “total government intrusion into the economy should be smaller, *ceteris paribus*, the greater the extent to which taxes and expenditures are decentralized...” (p.185).

Considering numerous empirical tests on Leviathan hypothesis have been conducted but with conflicting results, we intend not only to address the problem why government size is curtailed in China, but also to offer a new window to examine the Leviathan hypothesis by analyzing time series and cross section data of China due to following reasons: i) a *de facto* fiscal decentralization in China is accredited by numerous scholars and researchers (e.g. Montinola *et al*, 1995; Qian and Weingast, 1996,1997; Weingast, 1995); ii) the absence of representative democracy lends a great opportunity for testing whether fiscal decentralization is another effective institutional arrangement to curb government expansion; and iii) China’s sheer size permits a cross-section analysis on subnational level.

The paper will proceed as follows. Next section sets out the three possible explanations of a shrinking Chinese government. Section 3 presents a survey of empirical literature on Leviathan hypothesis and our approach to China case, followed by the section of methodology and data. Section 5 provides the empirical results of time series and cross section analysis. The final section draws the conclusion.

2. Changing public sector in transition China

2.1 The demand side

Given the transition nature, the developing market economy forces government to retreat from most economic fields (e.g. Walder, 1996; Naughton, 1995). Price liberation and privatization have toppled traditional dominance of government in economy and unleashed dramatic growth of non-state sector. In 1999, the non-state share of gross output value of industry (GOVI) increased more than 3 times of the 1980 level from 24% to 74%. And the non-state percentage of fixed investment also expanded from only 18% in 1980 to 47% in 1999 (Figure 2). As a result, to meet the shrinking demand for government intervention in economy, the government expenditure on economic construction scaled to GDP has steadily declined since the transition. Dropped from 20% in 1978, it hit the bottom of 5% in 1996, which mainly contributed to the descent of government outlay in GDP. Meanwhile, the successive cut of expenditure on national defense from 5% in 1978 to 1% in 1996 was also responsible for that. Recently, a slight rise of expenditure on all functions, such as economic, social, cultural and education, administration and miscellaneous, pulled the

government share back from the bottom of 12% in 1995 and 1996 to 21% of GDP in 2002 (Figure 3).

[insert figure 2 and 3 about here]

2.2 The supply side

A series of fiscal reforms have rebuilt revenue structure of government indicating the transformation from a socialist “owner-state” (Campbell, 1996) surviving upon controlled resources to a modern “tax-state” (Schumpeter, 1918) subject to its tax capability to extract surplus from economic sectors. Before the transition, Chinese government revenue largely relied on state-owned enterprises (SOEs) who not only remitted their profits, but also paid taxes based on a simple socialist tax system. As shown in Figure 4, revenue remitted from SOEs made up of 51% of total government revenue in 1978. Yet, the booming non-state enterprises eroded the previous dominance of SOEs in economy and forced them to become loss-making during market competition. In 1985, the subsidy to those loss-making SOEs held 25% of total government revenue, about 13 times more than the revenue from those profitable. SOEs turned out to be a heavy financial burden of the government.

[insert figure 4 about here]

On the other hand, the new tax system introduced western taxes like VAT in 1994, broadened tax base to non-state sector, shifted the focus of tax collection and administration to a large number of small-size enterprises and individuals and made taxes principal revenue source (nearly 100% or more since 1985), which extremely challenged government’s tax capability (e.g. Wong, 1997; World Bank, 2002). Moreover, the lack of traditional tax compliance of private sector and individuals exacerbated such problems. Consequently, The financial capability of government was severely constrained by the inadaptable tax system. The ratio of total fiscal revenue to GDP plummeted from 31% in 1978 to 11% in 1995 and 1996 and recently recovered to 18% in 2002. And the fiscal deficit peaked in 1979 at 3.4% of GDP and controlled around 1% for several years but was enlarging again since 1998. The fiscal deficit was 3% of GDP in 2002 (Figure 5).

[insert figure 5 about here]

2.3 The hidden figures

The existence of extensive extrabudgetary or even off-budgetary activities implies that the actual amount of government revenue and expenditure is much larger than those budgetary figures (e.g. Wong, 1998; Fan, 1998; Eckaus, 2003; Krug *et al*, 2005). Originated in 1950 to mitigate the scarcity of local financial resource, extrabudgetary revenue consists of administrative service charges, funds, and surcharges on taxes levied by the State Council, the provincial government or corresponding financial and

price regulation departments. It remained a minor part before 1980s but experienced a vicious spiral after that. In 1978, the extrabudgetary revenue possessed 10% of GDP and escalated to 17% during 1980s accounting for half of total actual government revenue (Figure 6). In addition, volumes of off-budgetary revenues and expenditures escaped from the public budget system and excluded from the budgetary figures. Thus, the actual government size of China is, to a large extent, underestimated.

[insert figure 6 about here]

3. Leviathan and decentralized China

3.1 Leviathan theory

In addition to preceding three explanations, we approach the shrinking Chinese government size by Leviathan theory. In Brennan and Buchanan's model (1980), the government consists of self-interest politicians and bureaucrats who maximize their discretionary resources and powers by all means so as to create the revenue-maximizing nature of a Leviathan government. Moreover, akin to a monopoly firm in the market, government monopolizes the provision of public goods and service, thereby exploits its citizenry-consumers to the extreme extent through maximized taxation. The democratic electoral process is, therefore, designed to hold back government's latent "grabbing hand" at the post-constitutional level. Indeed, underpinning the democracy, the commonly believed majority rule "embodies *no effective constraint on the exercise of government powers at all*" (1980:7, *italic in original*; see also Downs, 1957). Thus, as an alternative institutional arrangement, fiscal federalism may actually constrain government's insatiable appetite for fiscal expansion thanks to its two major merits: information revelation and competition (e.g. Musgrave, 1959; 1969; Oates, 1972). On the one hand, along the vertical government hierarchy, decentralized decision-making (Hayek, 1945) enables citizens more effectively check and balance on government coercive powers to tax in that the principal-agent problem might be better addressed by sufficient information revelation under closer distance between lower level government and its constituencies. Thus, the share of lower-level government in total government revenues and expenditures captures the degree of decentralized authority from upper-level. On the other hand, Tieboutian mobility (1956) of individuals and factors introduces horizontal interjurisdictional competition for fiscal resources and such "voting by feet" forces government to be a rational public goods provider economizing on relative tax cost. Any excessive tax burden would, obviously, induce massive migrations of tax bases to other regions with less tax levies. The number of rival jurisdictions, hence, determines the degree of intergovernmental competition. Consequently, two hypothesis are developed:

Decentralization hypothesis: The more decentralized fiscal authority to lower-level government, the smaller is the total government size.

Fragmentation hypothesis: The more rival jurisdictions, the smaller is the total government size.

Furthermore, due to the mobility of tax base, economies of scale and scope, fiscal equity ground and spillover effect, the vertical tax structure is known as the tax-assignment problem (e.g. McLure, 1983; Musgrave, 1997; Oates, 1999) in which central government levies most taxes and transfers to local government according to certain criteria or object. Yet, Brennan and Buchanan (1980) acknowledge that such intergovernmental collusion would moderate the interjurisdictional competitive pressures and lessen the effective constraint of fiscal decentralization on government size “because it subverts the primary purpose of federalism, which is to create competition between jurisdictions (p.183)”. Measured by intergovernmental grants, collusion hypothesis implies a larger government extraction.

Collusion hypothesis: The more intergovernmental grants, the larger is the total government size.

3.2 A survey of empirical literature

Although Leviathan theory has the sound theoretical roots, numerous empirical studies headed by Oates have shown inconsistent evidences at national, subnational and/or local level (Table 1)³. Based on a cross-section sample of 57 countries, Oates (1972) conducted a simple regression of government size (share of tax revenues in national income) on decentralization (central government tax revenue as a fraction of total tax revenues) and found a significant inverse relation that increased decentralization resulted in a larger government sector. After controlling variable of income level for Wagner’s Law, the coefficient remained negative but statistically insignificant, which lent no support to the decentralization hypothesis. In 1985, Oates used 43 IMF countries sample and again found no statistically significant association between fiscal decentralization and government size. Yet, the empirical result verified the collusion hypothesis that relatively heavy intergovernmental grants induce larger public sectors. To address the latent unreliability of IMF data, Heil (1991) used two comparison samples of 22 OECD and 39 IMF countries. In addition to Ordinary Least Squares technique, he also ran the Two-stage Least Squares regression by constructing federal structure, literacy rate and gross exports as percentage of GDP as instrumental variables. In all cases, no significant impact of fiscal decentralization on government size was obtained at the national level. Moreover, Stein (1999) observed relatively larger governments in fiscal decentralized Latin America, particularly, when subnational governments enjoyed extensive vertical imbalance, discretionary transfer and borrowing autonomy. Yet, in Moesen and van Cauwenberge (2000), decentralization variable was matched by local tax autonomy, thereby excluded intergovernmental grants and local borrowing, i.e., subnational government taxes as a percentage of total government expenditures. The estimation result of 19 OECD

³ The survey of previous empirical literatures is based on Shadbegian (1999) and Feld (2003).

countries supported Leviathan hypothesis that a decentralized tax authority tended to reduce overall government size. Rodden (2003) and Anderson and van Den Berg (1998) confirmed this point as well. Furthermore, Rodden provided empirical evidence that decentralization accompanied by intergovernmental transfers produced a larger government. Different from aggregate government size as dependent variable in customarily analyses, Jin and Zou (2002) explored how government size at different level was influenced by different fiscal decentralization measures. Using panel data of 17 industrial and 15 developing countries from 1980-1994, they found that: i) expenditure decentralization resulted in smaller national governments, larger subnational governments and larger overall government size; ii) revenue decentralization increased subnational government size but much more reduced national one, thereby cut down aggregate government size; and iii) intergovernmental grants enlarged government size at all levels. Marlow (1988) initially performed a time-series regression on 1946-1985 data of the United State and found strong supporting evidence for the decentralization hypothesis. Later, Grossman (1989a; 1989b), using the same data set, verified that decentralization (share of subnational expenditure in total government expenditure) curtailed government spending (total government expenditure relative to GNP) while federal-to-state grants encouraged government expansion. Similarly, Australia (1950-1984) and Canada (1958-1987) data were tested in Grossman (1992) and Grossman and West (1994), respectively. In the former case, the collusion hypothesis was demonstrated but not the decentralization one; while in the latter case, both hypotheses were supported. Kwon (2003) analyzed time-series data of Korea from 1979 to 2001 and obtained supporting findings as well.

Table 1 Empirical literature of Leviathan hypotheses

At the subnational level, Oates (1985) regressed cross-section data (1977) of 48 contiguous US states. In his estimated specification, the dependent variable was the state government size measured by aggregate state-local tax receipts as a fraction of personal income and his aimed explanatory variables included the state share of state-local revenues and expenditures (decentralization hypothesis) and number of local government units (fragmentation hypothesis) while intergovernmental grants as a percentage of state-local general revenues (collusion hypothesis), together with per capita personal income, population and urbanization ratio, was constructed as a control variable. Neither of the regression results showed statistically significant association between explanatory variable and dependent variable. Nonetheless, collusion hypothesis was partially supported by one of three equations in which a positive and statistically significant coefficient was resulted. While in the following empirical studies based on the same level, the decentralization hypothesis was supported by Wallis and Oates (1988), Joulfain and Marlow (1990; 1991), and Shadbegian (1999) and the collusion hypothesis was supported by Raimondo (1989), Grossman (1989) and Shadbegian (1999). With regard to fragmentation hypothesis, Nelson (1986; 1987) found general-purpose local government units increased

intergovernmental competition and then restricted the state-local government size. In addition to US states data, de Mello (2001) used 38 rayons (subnational) data in Moldova that provided supporting evidence for above three hypotheses. Feld et al (2003) also lent support to decentralization and collusion hypothesis except fragmentation one based evidence from 26 Swiss cantons (subnational).

Empirical studies at local level mainly concentrate on counties and municipalities in SMSAs of the United States. Forbes and Zampelli (1989) reject fragmentation hypothesis with a positive and significant effect of the number of counties on county government size, using sample of 345 counties in 157 SMSAs. Zax (1989) expanded sample to 3022 counties and Eberts and Gronberg (1988) used 2900 counties, both observing that increased general-purpose local government units were likely to reduce government size. Sjoquist (1982), Schneider (1986), and Eberts and Gronberg (1990) also found supporting evidence for fragmentation hypothesis at municipalities or SMSAs level. A more recent investigation undertaken by Campbell (2004) suggested different government levels matter how decentralization impact on government size: i) increased decentralization of expenditures tends to decrease municipal expenditures while have no influence on county expenditures; ii) increased fragmentation reduced county expenditures but has no effect on municipal expenditures.

3.3 Decentralized China

Considering the mixed empirical results, further study based on new data set is warranted to unravel the contradiction in the existing literature. China may be the right case. Firstly, a *de facto* fiscal decentralization has been resulted during last two decades. Local interests for development, together with the policy legacy of rural autarky in Mao era, accelerate the formation of a Chinese style of fiscal federalism (e.g. Montinola *et al*, 1995; Qian and Weingast, 1996,1997; Weingast, 1995). Since transition in 1978, China has undertaken decentralization through a series of tax and fiscal reforms: tax-for-profit reform (1983-84), fiscal contracting system (1985-93) and 1994 tax-sharing system, etc (see World Bank, 1990; 1995; 2002; Wong, 1995; 1997; 1998). Under the 1985 fiscal contracting system, central government assigned fixed revenue-remittance contract and made local government *de facto* residual claimant intensively pursuing revenue surplus. As shown in Figure 7, central share of budgetary revenue went on diminishing during 1985-93, which dropped 16 percent from 38% to 22%. The ratio of central to total budgetary expenditure fell from 40% to 28%. The continuous shrinkage of central revenue and expenditure provoked a tax reform in 1994, aimed to arrest the declining trend and recentralize the fiscal capacity. The result was dramatic that central share of budgetary revenue boosted into 56% of total in 1994 and kept average 51% recent years. Yet, on the extrabudgetary revenue and expenditure side, remarkable decentralization was undergoing, particularly after 1992, that local share of extrabudgetary revenue and expenditure rocketed from 56% in 1992 to highest 95% in 1998 and remained average 92% in 2001 (Figure 8).

[insert figure 7 and 8 about here]

Secondly, as Brennan and Buchanan point out, the fiscal decentralization may effectively constrain government's power to tax even when the democratic monitor fails. From this point of view, the absence of representative democracy in China offers a great opportunity for testing such hypothesis. Thirdly, China's sheer size allows a cross-section analysis on sub-national level. Its subnational government hierarchy consists of 31 provincial level government units, 333 prefectures, 2,074 counties, and 44,741 townships in 2000.⁴

4. Methodology and data

We intend to test the impact of decentralization, fragmentation, and collusion on government size and thereby address the problem of shrinking public sectors and inconsistency of Wagner's Law in China. Time series and cross-section regression will be performed using national and provincial data set, respectively.

4.1 Time series regression

Following Marlow (1988), a time series regression will firstly be conducted based on the data of aggregate central and subnational levels of Chinese government from 1953 to 2002, in which the subnational level includes province, prefecture, county and township. The dependent variable (*GOV*) is the government size measured by ratio of total government expenditure at all aggregate levels to Gross Domestic Production. The explanatory variable, decentralization (*DEC*), is the ratio of total subnational expenditure to total government expenditure. The control variables ($x\delta$) consist of population, per capita GDP and the degree of urbanization in accordance with previous empirical literatures⁵. One special control variable added to the estimation equation is the ratio of expenditure on economic construction to total government outlay in order to capture the transition nature of Chinese government after late 1970s. Such variable indicates to what extent government intervenes in economic activities.

The single estimation equation is as follows:

$$GOV_t = \beta_0 + \beta_1 DEC_t + x\delta + u_t \quad (1)$$

where the descriptions of variables are given in the table 2.

Table 2 Variable descriptions

4.2 Data

Data of PCGDP, GOV, DEC, and EXPECO are from China Statistical Yearbook 2001-2003, Table 3-1, 8-8 and 8-14; POP and URB 1978-2002 are from China Statistical Yearbook 2003 Table 4-1; POP 1953-1977 are calculated based on data of total GDP and per capita GDP from China Statistical Yearbook 2001 Table 3-1; URB

⁴ Provincial level government units refer to 22 provinces (*sheng*), 5 autonomous regions (*zizhiqu*), and 4 autonomous municipalities (*zhixiasi*, *Beijing*, *Shanghai*, *Tianjin*, and *Chongqing*). Taiwan province and two special administrative regions, Hong Kong and Macao are excluded.

⁵ We substitute per capita GDP for per capita income due to data unavailability of the latter.

1953-1977 are calculated based on data from China Statistical Yearbook 1982, p.89 and Population Census of Government 1953, 1964, 1982, 1990 and 2000.

Table 3 Summary statistics

Table 3 reports the basic summary statistics for the variables in time series regression. The government size (*GOV*) has a mean value of 24% and ranges from 12% in 1995 to 44% in 1960. The decentralization extent (*DEC*) fluctuates remarkably from 23% in 1955 to 73% in 1996 with a mean of 52%. Although population increases more than double of 580 million in 1953 to 1285 million in 2002, the per capita GDP rockets approximately sixtyfold of 142 RMB in 1953 to 8184 RMB in 2002. The maximum value of urbanization degree is 39% in 2002, 26 percent high than that in 1953. A considerable decrease of government expenditure on economic construction from 72% to 30% indicates the diminishing intervention of government in economy.

4.3 Cross-section regression

The cross-section samples are 31 China's provinces and the time point is 2000. The dependent variable (*GOV*) in the specification is ratio of total provincial and subprovincial government expenditure to provincial GDP⁶. As for the independent variable, we employ two different measures: the ratio of subprovincial government expenditure to total (*DECE*) and numbers of local government units of each province (*NUMLG*). In accordance with decentralization and fragmentation hypothesis, the *DECE* indicates the vertical decentralization while *NUMLG* reflects the degree of interjurisdictional competition at horizontal fragmentation dimension. Suggested by Grossman (1989) to test the influence of intergovernmental collusion on the dependent variable, the *GRANTS* is the share of total central grants to province in aggregate provincial government expenditure. Four control variables are added into the specification. Two variables control for the local preferences for public services: population and per capita income⁷. The variable *illiterate* represents the mobility of population that implies a relatively high percentage illiterate population with a low mobility. The variable *SOE* capture the variation of influence of State-owned enterprises (SOEs) on local economic development, which refers to the ratio of industrial output value of SOE's to total gross industrial output value of each province.

The single estimation equation is as follows:

$$GOV_k = \beta_0 + \beta_1 X_k + x\delta + u_k \quad (2)$$

where the X_k denotes independent variables and $x\delta$ denotes control variables. Descriptions of variables are given in the table 4.

⁶ Here the expenditure refers to actual budget in 2000.

⁷ Per capita income is calculated on the data of per capita income in urban area and rural area and percentage of population residing in urban area of each province.

Table 4 Variable descriptions

4.4 Data

Data of *GOV* and *GRANTS* are from various Provincial Actual Budget Sheets, China Financial Statistical Yearbook 2001; *DECE* are from various Provincial Financial Statistical Yearbooks 2001 and Provincial Budget Reports 2000; *NUMLG*, *POP*, *PCI*, *ILLITERATE* and *SOE* are from China Statistical Yearbook 2001 Table 1-1, 4-3, 4-9, 4-12, 10-12, 10-18, 13-3.

Table 5 Summary statistics

Table 5 reports the basic summary statistics for the variables in cross-section regression. An astonishing diversity exists among different localities. The government size (*GOV*) reaches high as 65% of total GDP in Tibet and low as 9% in Jiangsu. By contrast, the decentralization extent (*DEC*) ranges from 85% in Jiangsu and 33% in Tibet with a mean of 64%. Sichuan has the most local government units of 180 and the least province is Beijing and Tianjin of 18. Central grants obtain 83 percent of total government expenditure in Tibet, exceeding the average level by 44 percent and 69 percent high than the minimum ratio of 14% in Beijing. The maximum population is 92,560 thousand in Henan and the minimum 2,620 thousand in Tibet. Per capita annual income shows a large inequality among different regions by highest 11,002 RMB in Shanghai and lowest 2266 RMB in Gansu with an average of 4,004 RMB. The illiterate ratio ranges from 4% in Guangxi to 33% in Tibet. As one of the most underdevelopment provinces, Qinghai remains a high ratio of SOEs which dominate local economy by 89 percentage of gross industrial output value. In Guangdong province, SOEs only retain a quarter. The average level of SOEs' influence on local economy is still relatively high at 60% in 2000. The appendix provides the data sources.

5. Empirical results

5.1 Time series regression

The Ordinary Least Squares regression results of equation (1) are reported in Table 6. As in Oates (1985), a logistic transformation of *GOV* is used to allow the value of dependent variable to range over the entire real line. The Eq 1.1 is a simple regression of government size (*GOV*) on decentralization (*DEC*), which shows a strong statistically significant and negative relation. When control for other variables in Eq 1.2, the decentralization remain the same effect on government size.

Since Eq 1.2 suffers the problem of serial correlation, Eq 1.3 is adjusted for first-order serial correlation by using Hildreth-Lu technique and passes the *Q*-statistic test on the residual errors. The coefficient of decentralization stays statistically significant and negative against the dependent variable. Thus, other things equal, the more fiscally decentralized a government, the smaller is its size, which empirically supports the Leviathan hypothesis. The significant and negative sign of population

indicates that the growth of public goods and services drops far behind that of population. Consistent with Wagner's Law, the per capita GDP has a positive association with government size but is not significantly different from zero in both Eq 1.2 and Eq 1.3. At 10 percent significant level, urbanization exerts a positive influence on government size suggesting large-scale government expenditure for investment in public infrastructure, city maintenance, compensation for peasants, etc., in China. The expenditure on economic construction obviously retains positive correlation with government size for an economic-intervention-oriented government is thirsty for financial sources not only from supply side to sustain enormous subsidies but also from demand side to appease its nature to expand.

Table 6 OLS results of time series

5.2 Cross-section regression

The procedure is similar with that in earlier section where a logistic transformation is adopted on the dependent variable and Table 7 presents the regression results. The first three equations are simple regression of government size on *DECE*, *NUMLG* and *GRANTS*, respectively. All three independent variables hold a strong statistically significant coefficient consistent with Leviathan prediction: decentralization and fragmentation negatively against *GOV* and intergovernmental grants positively with *GOV*. Particularly, the explanatory power of *DECE* and *GRANTS* is relatively substantial which is able to explain 36 and 51 percent of the variation in the provincial government size.

The last three equations control for other variables and all use the White covariance estimator in place of the standard OLS formula correcting the heteroskedasticity problem. After such processing, the vertical decentralization remains negative effect on government size but statistically significant at 8% level, suggesting fiscal decentralization could rein in government's unbounded stretch and basically supporting the Leviathan hypothesis. The number of local government units become positive when control for other factors but statistically insignificant, which implies current division of administration area is, to a large extent, based on geographical principle and not for the sake of introducing interjurisdictional competition. Another implication is that increasing local government units alone cannot serve the purpose of competition effectively and, on the contrary, induces the expansion of government size. In Eq.2.6, *GRANTS* still retain a positive sign and at statistically significant 11% level. Other things equal, central grants to provinces enlarge their government size.

Population exhibits a negative and statistically significant association with government size in last three equations that further reveals that an insufficient local public good and service is provided relative to a huge population base in China. Coefficients of per capita income are predicted same as Wagner's Law although their value is near zero. Accordingly, an increase in per capita income would boost government size. Three strong statistically significant and positive signs of the

percentage of illiterate population indicate government prefers to tax most on its immobile population. The variable *SOE* keeps a significant and positive effect on government size in that most loss-making SOEs survive on government subsidies. Then, the more SOEs each province maintains in hand, the more financial resources they absorb, other things equal, the larger government size results.

Table 7 LS results of cross section

6. Conclusion

This paper offers a new data set and window to empirically test Leviathan theory in the sense of China's transition economy and also explain the superficial contradiction of China's empirical fact with Wagner's Law. Combining time series and cross-section regression analysis and various variables used by previous empirical studies, we test the Leviathan hypothesis for vertical decentralization, horizontal fragmentation and intergovernmental collusion at national and provincial level, respectively. The results demonstrate that fiscal decentralization in terms of vertical expenditure decentralization imposes constraints on government size at both national and provincial level. Without a traditional democratic monitoring process in China, fiscal decentralization assumes as a powerful institutional restriction to curtail the government size and foster the market development. Yet, we could not find an empirical support of the fragmentation dimension of fiscal decentralization curbing growth of provincial government size. Moreover, the intergovernmental collusion hypothesis is empirically verified that such institutional rearrangement of tax power would weaken interjurisdictional competition and, ultimately, the effect of fiscal decentralization. Furthermore, in addition to three plausible explanations for a shrinking public sector in China, we offer an alternative approach that fiscal decentralization contributes to restrict government size as well.

Additionally, some interesting findings present helpful policy implications. From increasing population perspective, the supply of public goods and services is insufficient either at national or provincial level in China. If Chinese government failed to address such problem, it would endanger sustainable development of future China. The positive relation between illiterate ratio and government size fully attests a theorem in public finance: immobile factor is more vulnerable to tax. The illiterate population with relatively less mobility induces government to aggravate their tax burden. The loss-making SOEs are draining government budget and blocking the allocation of financial resource into other imperative public services, like education, social security, etc.

Overall, we find empirical support for Leviathan theory although it is not conclusive. With regard to almost two decades searching for Leviathan, our contribution only provides an empirical result based on a new but particular case of transition China. Further empirical studies should be done to measure government size, fiscal decentralization and interjurisdictional competition more precisely. And new data set is also helpful to address such "fussy issue".

Appendix*Sample of provinces, China:*

East	Middle	West
Beijing	Jilin	Guangxi
Tianjin	Heilongjiang	Guizhou
Hebei	Shanxi	Yunnan
Liaoning	Inner Mongolia	Tibet
Shandong	Jiangxi	Shaanxi
Shanghai	Anhui	Gansu
Jiangsu	Henan	Qinghai
Zhejiang	Hubei	Ningxia
Fujian	Hunan	Xinjiang
Guangdong	Chongqing	
Hainan	Sichuan	

Reference

- Anderson, J.E. and van Den Berg, H. 1998. Fiscal Decentralization and Government Size: An International Test for Leviathan Accounting for Unmeasured Economic Activity. *International Tax and Public Finance* 5:171-186.
- Bird, R.M. 1970. *The Growth of Government Spending in Canada*. Toronto: Canadian Tax Foundation.
- Campbell, J. 1996. An Institutional Analysis of Fiscal Reform in Postcommunist Europe. *Theory and Society* 25:45-84.
- Campbell, R.J. 2004. Leviathan and Fiscal Illusion in Local Government Overlapping Jurisdictions. *Public Choice* 120:301-329.
- de Mello, L. 2001. Fiscal Federalism and Government Size in Transition Economies: the Case of Moldova. *Journal of International Development* 13:255-268.
- Downs, A. 1957. *An Economic Theory of Democracy*. New York: Harper and Brothers.
- Dudley, L. and Witt, U. 2004. Arms and the Man: World War I and the Rise of the Welfare State. *KYKLOS* 57: 475-504.
- Eberts, R.W. and Gronberg, T.J. 1990. Structure, Conduct, and Performance in the Local Public Sector. *National Tax Journal* 43:165-173.
- Eberts, R.W. and Gronberg, T.J.1988. Can Competition among Local Governments Constrain Government Spending? *Economic Review-Federal Reserve bank of Cleveland* 24:2-9.
- Eckaus, R.S. 2003. Some Consequences of Fiscal Reliance on Extrabudgetary Revenues in China. *China Economic Review* 14:72-88.
- Fan, G. 1998. Market-oriented economic reform and the growth of off-budget local public finance. In Brean, D.J.S. (eds). *Taxation in Modern China*. New York: Routledge Press.
- Feld, L.P., Kirchgässner, G. and Schaltegger, C.A. 2003. Decentralized Taxation and the Size of Government: Evidence from Swiss and Local Governments. CESifo Working Paper No.1087.
- Forbes, K. F., and Zampelli, E.M. 1989. Is Leviathan a Mythical Beast? *American Economic Review* 79:568-77.
- Grossman, P.J. 1989a. Fiscal Decentralization and Government Size: An Extension. *Public Choice* 62:63-69.
- Grossman, P.J. 1989b. Federalism and the Size of Government. *Southern Economic Journal* 55:580-592.
- Grossman, P.J. 1992. Fiscal Decentralization and Public Sector Size in Australia. *Economic Record*, 68:240-246.
- Grossman, P.J. and West, E.G. 1994. Federalism and the Growth of Government Revised. *Public Choice* 79:19-32.
- Hayek, F.A. 1945. The Use of Knowledge in Society. *American Economic Review* 35:519-530.
- Heady, C., Wong, C.P.W. and Woo, W.T. 1995. *Fiscal Management and Economic Reform in the People's Republic of China*. Hong Kong: Oxford University Press.
- Heil, J.B. 1991. The Search for Leviathan Revised. *Public Finance Quarterly*

-
- 19:334-346.
- Jin, J. and Zou, H.F. 2002. How Does Fiscal Decentralization Affect Aggregate, National, and Subnational Government Size? *Journal of Urban Economics* 52:270-293.
- Joulfaian, D. and Marlow, M.L. 1991, Centralization and Government Competition. *Applied Economics* 23:1603-1612.
- Joulfaian, D. and Marlow, M.L. 1990. Government Size and Decentralization Evidence from Disaggregated Data. *Southern Economic Journal* 56:1094-1102.
- Kown, O. 2003. The Effects of Fiscal Decentralization on Public Spending: the Korean Case. *Public Budget&Finance* 23:1-20.
- Krug, B., Zhu, Z. and Hendriscske, H. 2005. China's emerging tax regime: Devolution, fiscal federalism, or tax farming? Paper presented on annual conference of European Public Choice Society, March 31-April 3, Durham, UK.
- Krusell, P., and Rios-Rull, J.V. 1999. On the Size of U.S. Government: Political Economy in the Neoclassical Growth Model. *American Economic Review* 89: 1156-1181.
- Marlow, M.L.1988. Fiscal Decentralization and Government Size. *Public Choice* 56:259-69
- McLure, C.E. 1983. (eds.) *Tax Assignment in Federal Counties*. Canberra: Australian National University.
- Meltzer, A.H. and Richard, S.H. 1981. A Rational Theory of the Size of Government. *Journal of Political Economy* 89: 914-927.
- Moesen, W. and van Cauwenberge, P. 2000. The Status of the Budget Constraint, Federalism and the Relative Size of Government: A Bureaucracy Approach. *Public Choice* 104:207-224.
- Montinola, G., Qian, Y. and Weingast, B.R. 1995. Federalism, Chinese Style: The Political Basis for Economic Success in China. *World Politics* 48:50-81.
- Musgrave, R.A. 1959. *The Theory of Public Finance*. New York:McGraw-Hill.
- Musgrave, R.A. 1969. *Fiscal Systems*. New Haven and London: Yale University Press.
- Musgrave, R.A.1997. Reconsidering the Fiscal Role of Government. *American Economic Review* 87:156-159.
- Naughton, B., 1995. *Growing out of the Plan: Chinese Economic Reform, 1978-1993*. New York: Cambridge University Press.
- Nelson, M.A. 1986. An Empirical Analysis of State and Local Government Tax Structures in the Context of the Leviathan Model of Government. *Public Choice* 49:283-294.
- Nelson, M.A. 1987. Searching for Leviathan: Comment and Extension. *American Economic Review* 77:198-204.
- Oates, W.E. 1972. *Fiscal Federalism*. New York: Harcourt Brace Jovanovich.
- Oates, W.E. 1985. Searching for Leviathan: An Empirical Study. *American Economic Review* 75:748-57.
- Oates, W.E. 1989. Searching for Leviathan: A Reply and Some Further Reflections. *American Economic Review* 79:578-83.

-
- Oates, W.E. 1999. An Essay on Fiscal Federalism. *Journal of Economic Literature* 37:1120-1149.
- OECD. 2002. Economic Outlook 76 database. www.oecd.org
- Peacock, A.T. and Wiseman, J. 1961. *The Growth of Public Expenditure in the United Kingdom*. Princeton, NJ: Princeton University Press.
- Qian, Y., and Weingast, B.R. 1996. China's Transition to Markets: Market-Preserving Federalism, Chinese Style. *Journal of Policy Reform* 1:149-85.
- Qian, Y., and Weingast, B.R. 1997. Federalism As a Commitment to Market Incentives. *Journal of Economic Perspectives* 11:83-92.
- Raimondo, H.J. 1989. Leviathan and Federalism in the United States. *Public Finance Quarterly* 17:204-215.
- Rodden, J. 2003. Reviving Leviathan: Fiscal Federalism and the Growth of Government. *International Organization* 57:695-729.
- Schneider, M. 1986. Fragmentation and the Growth of Local Government. *Public Choice* 48:255-263.
- Schumpeter, J.A. 1918. The Crisis of Tax State. in Swedberg, R. (eds.), Joseph A. Schumpeter: *The Economics and Sociology of Capitalism*. Princeton: Princeton University Press 1991.
- Shadbegian, R.J. 1999. Fiscal Federalism, Collusion, and Government Size: Evidence from the States. *Public Finance Review* 27:262-281.
- Sjoquist, D.L. 1982. The Effect of the Number of Local Governments on Central City Expenditures. *National Tax Journal* 35:79-87.
- Stein, E. 1999. Fiscal Decentralization and Government Size in Latin America. *Journal of Applied Economics* 2:357-391.
- The Economist, 2003, China's Economy Steaming. 15 November p.71.
- Tiebout, C.M. 1956. A Pure Theory of Local Expenditures. *Journal of Political Economy* 64:416-424.
- Walder, A.G., 1996. (eds) *China's Transitional Economy*. New York: Oxford University Press.
- Wallis, J.J. and Oates, W.E. 1988. Does Economic Sclerosis Set in with Age? An Empirical Study of the Olson Hypothesis, *KYKLOS* 41:397-417.
- Weingast, B.R. 1995. The Economic Role of Political Institutions: Market-Preserving Federalism and Economic Development. *Journal of Law and Economic Organization* 11:1-31.
- Wong, C. P. (eds.). 1997. *Financing Local Government in the People's Republic of China*. Hong Kong: Oxford University Press.
- Wong, C.P. 1998. Fiscal dualism in China: Gradualist reform and the growth of off-budget finance. In Brean, D.J.S. (eds). *Taxation in Modern China*. New York: Routledge Press.
- Wong, C.P., Heady, C. and Woo, W.T. 1995. *Fiscal Management and Economic Reform in the People's Republic of China*. Manila: Asian Development Bank.
- World Bank. 1990. *Revenue Mobilization and Tax Policy*. Washington, DC: World Bank.
- World Bank. 1995. *Macroeconomic Stability in a Decentralized Economy*.

-
- Washington, DC: World Bank.
- World Bank. 2000. *Beyond Economic Growth*. Washington, DC: World Bank.
- World Bank. 2002. *China National Development and Sub-national Finance: A Review of Provincial Expenditures*. Washington, DC: World Bank.
- Zax, J.S.1989. Is There a Leviathan in Your Neighborhood? *American Economic Review* 79:560-67.

Table 2 Variable descriptions

Variable	Descriptions
GOV_t	Ratio of total government expenditure to GDP in time t
DEC_t	Ratio of total subnational expenditure to total government expenditure in time t
POP_t	Population in time t (in millions)
$PCGDP_t$	Per capita GDP in time t (in RMB)
URB_t	Percentage of population residing within urban area in time t
$EXPECO_t$	Ratio of total expenditure on economic construction to total government expenditure in time t

Table 3 Summary statistics

Variable	Mean	Maximum	Minimum	Std. Dev.
GOV	0.24	0.44	0.12	0.07
DEC	0.52	0.73	0.23	0.14
POP	939.05	1284.53	580.28	224.52
PCGDP	1601.12	8184.00	142.00	2335.64
URB	0.22	0.39	0.13	0.07
EXPECO	0.52	0.72	0.30	0.09
Observations		50		

Table 4 Variable descriptions

Variable	Descriptions
GOV_k	Ratio of total provincial and subprovincial government expenditure to GDP in province k
$DECE_k$	Ratio of subprovincial government expenditure to total provincial and subprovincial government expenditure in province k
$NUMLG_k$	Number of counties and city districts in province k
$GRANTS_k$	Ratio of central grants to total provincial and subprovincial government expenditure in province k
POP_k	Population in province k (in thousands)
PCI_k	Per capita income in province k (in RMB)
$Illiterate_k$	Percentage of illiterate population in province k
SOE_k	Ratio of industrial output value of SOE's to total gross industrial output value in province k

Table 5 Summary statistics

Variable	Mean	Maximum	Minimum	Std. Dev.
GOV	0.18	0.65	0.09	0.11
DECE	0.64	0.85	0.33	0.14
NUMLG	92.29	180.00	18.00	44.78
GRANTS	0.39	0.83	0.14	0.17
POP	40718.71	92560.00	2620.00	26455.90
PCI	4004.31	11002.39	2266.05	2062.05
ILLITERATE	0.08	0.33	0.04	0.06
SOE	0.60	0.89	0.25	0.16
Observations		31		

Table 6 OLS results of time series. Dependent variable: GOV

	Eq1.1	Eq1.2	Eq1.3
<u>Independent variable</u>			
DEC	-2.011*** (-6.775)	-1.339*** (-3.568)	-0.799** (-2.032)
<u>Control variable</u>			
POP		-0.001** (-2.620)	-0.001** (-2.127)
PCGDP		3.52E-05 (1.122)	4.66E-06 (0.093)
URB		2.946* (1.682)	4.410* (1.764)
EXPECO		3.690*** (7.758)	3.268*** (6.082)
Constant	-0.153 (-0.957)	-2.365 (-6.684)	-0.824 (-4.300)
Observations	50	50	49
adjusted R ²	0.478	0.834	0.595

Notes:

- a. t-statistics in parentheses.
- b. * statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

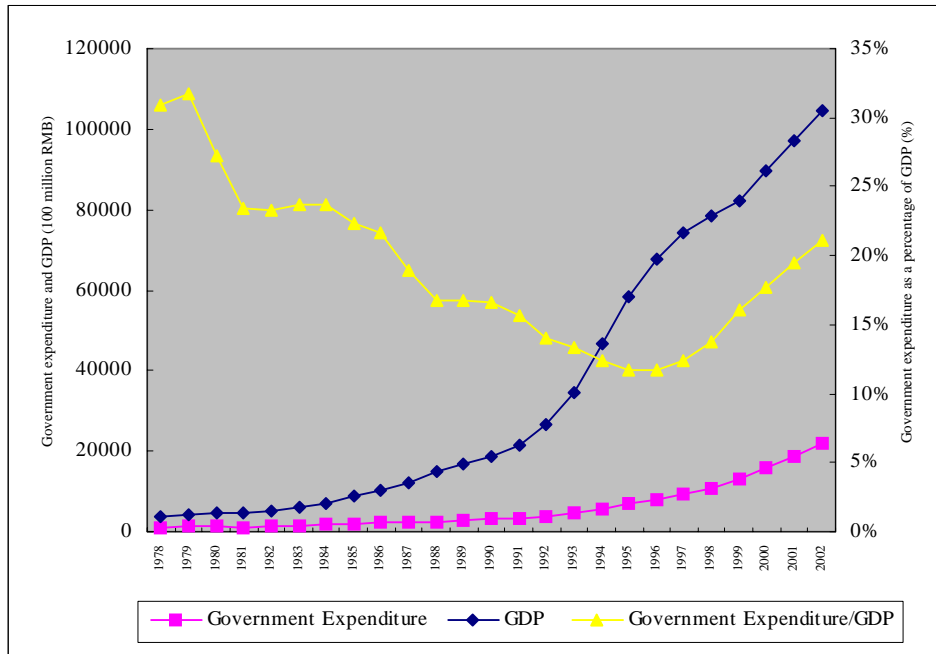
Table 7 LS results of cross section. Dependent variable: GOV

	Eq2.1	Eq2.2	Eq2.3	Eq2.4	Eq2.5	Eq2.6
<u>Independent variable</u>						
DECE	-2.591 ^{***} (-4.185)			-0.630 [*] (-1.810)		
NUMLG		-0.006 ^{***} (-3.335)			0.001 (0.841)	
GRANTS			2.505 ^{***} (5.585)			1.013 (1.638)
<u>Control variable</u>						
POP				-4.80E-06 ^{**} (-2.061)	-8.70E-06 ^{***} (-2.774)	-5.45E-06 ^{**} (-2.524)
PCI				6.16E-05 [*] (2.021)	7.43E-05 ^{**} (2.324)	9.91E-05 ^{**} (2.318)
ILLITERATE				6.387 ^{***} (6.448)	6.465 ^{***} (5.515)	5.370 ^{***} (4.652)
SOE				1.114 ^{***} (3.186)	1.179 ^{***} (2.906)	0.917 [*] (1.998)
Constant	0.039 (0.097)	-1.102 (-5.087)	-2.580 (-13.675)	-2.455 (-6.709)	-2.920 (-8.221)	-3.170 (-7.871)
Observations	31	31	31	31	31	31
adjusted R ²	0.355	0.151	0.502	0.851	0.841	0.852

Notes:

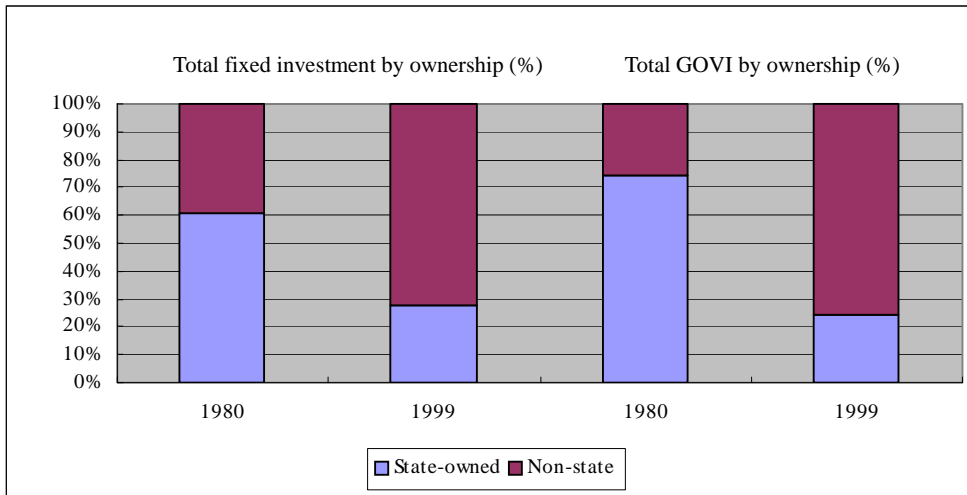
- t-statistics in parentheses.
- * statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.
- Eq 2.4, 2.5 and 2.6 use White Heteroskedasticity-Consistent Standard Errors & Covariance.

Figure 1 Government expenditure and as a percentage of GDP: 1978-2002



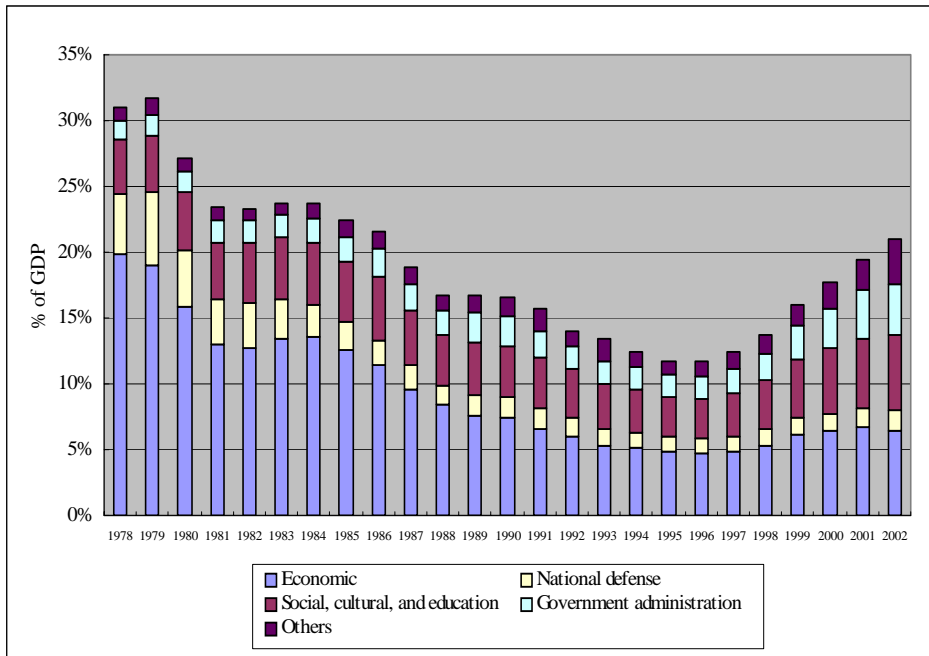
Source: China Statistic Yearbook, 1996-2003

Figure 2 Development of non-state sector



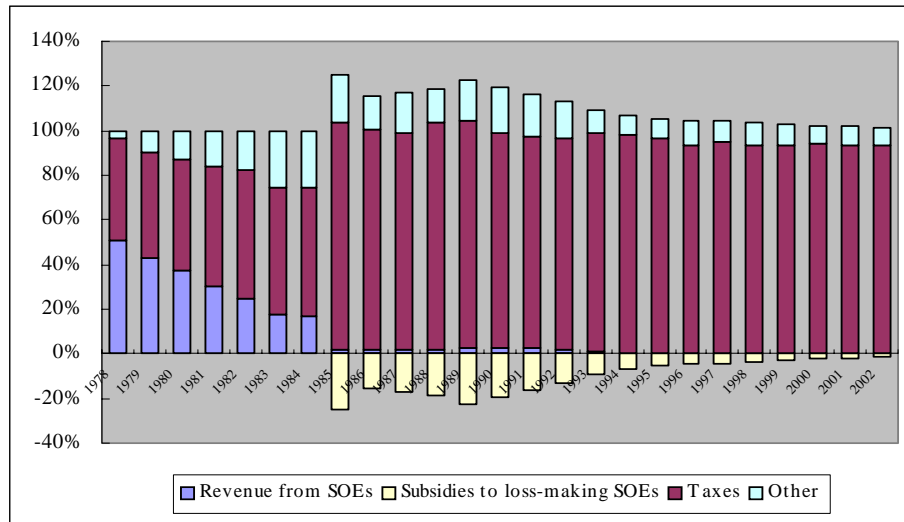
Source: China Statistic Yearbook, 1996-2000

Figure 3 Government expenditure by function (% of GDP)



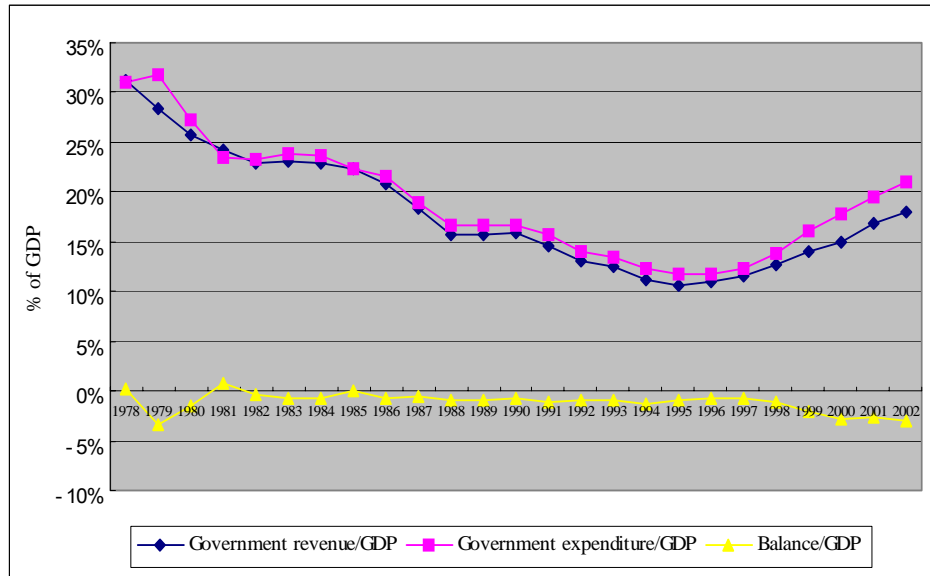
Source: China Statistic Yearbook, 1996-2003

Figure 4 Government revenue by source (%)



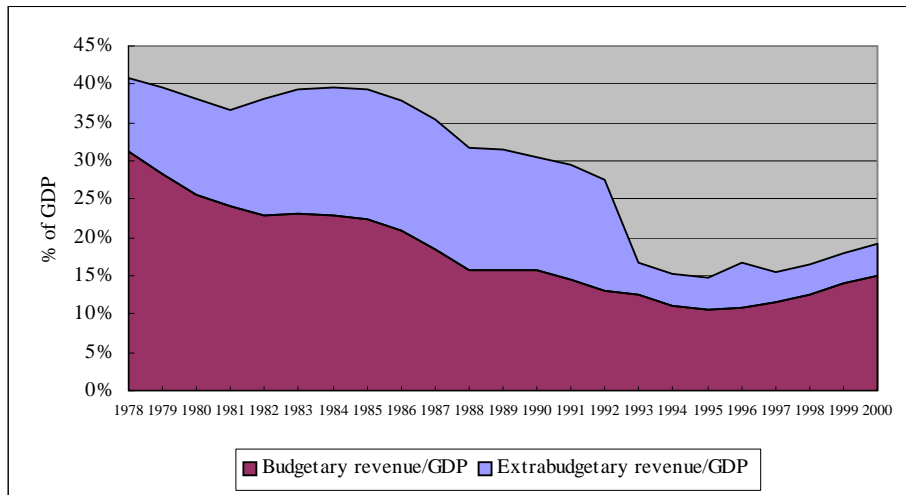
Source: China Statistic Yearbook, 1996-2003

Figure 5 Government revenue, expenditure and balance as a percentage of GDP



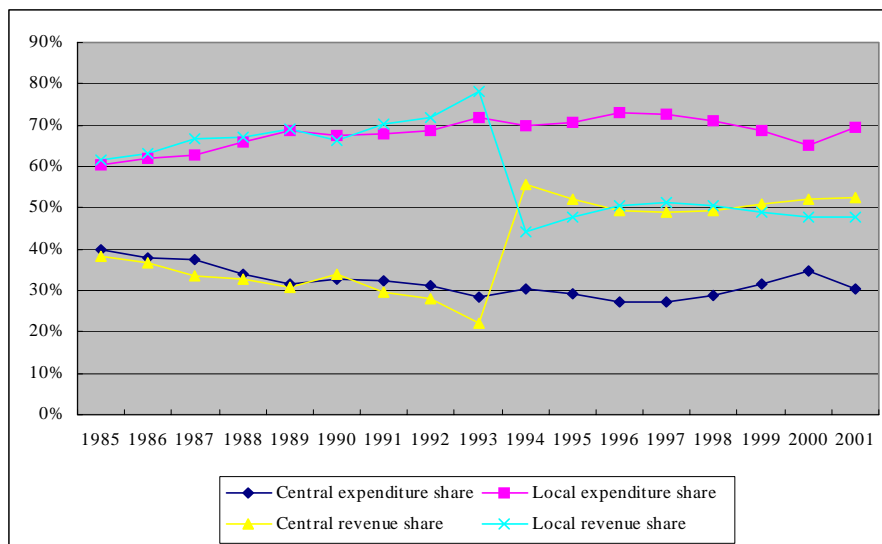
Source: China Statistic Yearbook, 1996-2003

Figure 6 Government budgetary and extrabudgetary revenue as a percentage of GDP



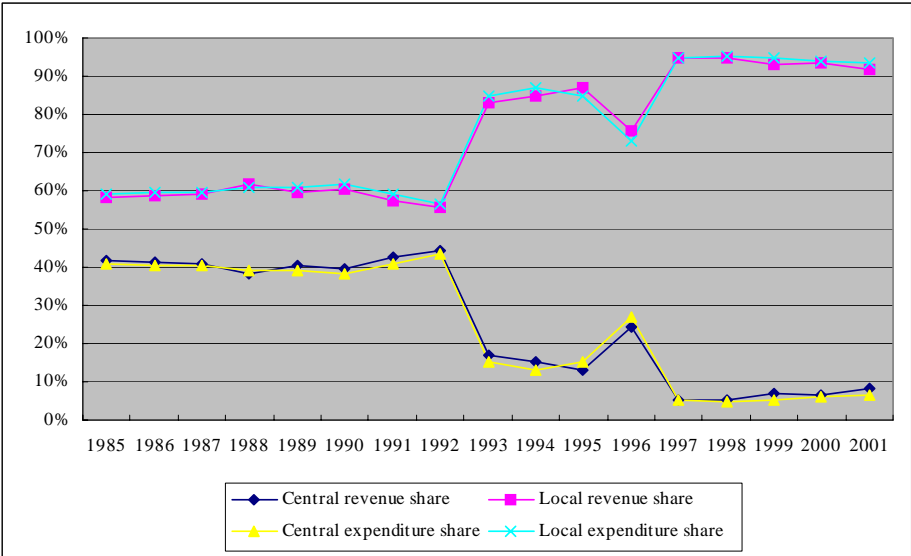
Source: China Statistic Yearbook, 1996-2003

Figure 7 Central and local share of budgetary government revenue and expenditure



Source: China Statistic Yearbook, 1996-2003

Figure 8 Central and local share of extrabudgetary government revenue and expenditure



Source: China Statistic Yearbook, 1996-2003

Table 1 Empirical literature of Leviathan hypotheses

Author(s)	Size of government	Leviathan hypotheses	Measurement	Level of observation units	Time	Result
Oates (1972)	Taxes/national income	Decentralization	Central taxes/total taxes	57 countries	1972	No
Sjoquist (1982)	GOVE per capita	Fragmentation	Number of jurisdiction in an SMSA	48 southern SMSAs, US	1972	Yes
Oates (1985)	Subnational taxes/personal income	Decentralization	State GOVR (GOVE)/subnational GOVR(GOVE)	48 states, US	1977	No
		Fragmentation	Number of local government units			No
	GOVR/GDP	Collusion	Intergovernmental grants/subnational GOVR	43 countries	1982	Yes
		Decentralization	Central GOVR (GOVE)/total GOVR (GOVE)			No
Schneider (1986)	GOVE per capita	Fragmentation	Number of suburban municipalities in an SMSA per 100,000 capita	757 suburban municipalities in	1972-77	Yes
				46 SMSAs, US		
Nelson (1986)	Subnational tax per capita Subnational tax/personal income	Decentralization	State taxes/total subnational taxes	49 states, US	1976	No
		Fragmentation	Population per county (special district)			Yes(No)
Nelson (1987)	Subnational taxes (GOVE)/personal income	Fragmentation	Number of general-purpose (single-) units per capita	50 states, US	1977	Yes (No)
Wallis&Oates (1988)	Subnational GOVR (GOVE)/per capita income	Decentralization	State GOVR (GOVE)/subnational GOVR (GOVE)	48 states, US	1902-1982	Yes (Yes)
Eberts&Gronberg (1988)	GOVE/personal income	Fragmentation	Number of general-purpose (single-) units, per capita, per square mile	2900 counties, US	1977	Yes (No)
				280 SMSAs, US		Yes (No)
Marlow (1988)	GOVE/GNP	Decentralization	Subnational GOVE/total GOVE	US	1946-1985	Yes

			County GOVR/total local GOVR			
Zax (1989)	County GOVR/personal income	Decentralization Fragmentation	Number of general-purpose (single-) governments per 1000 capita	3022 counties	1982	Yes Yes (No)
Forbes&Zampelli (1989)	County taxes/income, county taxes per capita, county GOVR/income, county GOVR per capita	Fragmentation	Number of counties in an SMSA	345 counties in 157 SMSAs, US	1977	No
Raimondo (1989)	GOVE/personal income (e.g. six forms)	Collusion	Federal-funded GOVE/state-local GOVE Local-funded GOVE/state-local GOVE	50 states, US	1960, 1970, 1980	Yes
Grossman (1989a)	GOVE/GNP	Decentralization Collusion	Subnational GOVE/total GOVE Federal grants/subnational GOVR	US	1946-1986	Yes Yes
Grossman (1989b)	Subnational GOVR/personal income GOVR/GNP	Collusion Fragmentation Collusion	Per capita state-to-local transfers Population per multiple function government Per capita federal grants	48 states, US US	1976-77 1948-1984	Yes No Yes
Joulfaian&Marlow (1990)	GOVE/GSP	Decentralization Fragmentation Collusion	Subnational GOVE/total GOVE Number of local governments Federal grants/subnational GOVE	50 states, US	1981, 1984	Yes Yes No
Eberts&Gronberg (1990)	Own-source GOVR (GOVE)/personal income	Fragmentation	Number of local jurisdictions	218 SMSAs, US	1977	Yes
Joulfaian&Marlow (1991)	GOVE/GSP Per capita GOVE	Decentralization Fragmentation Collusion	Subnational GOVE/total GOVE(Local GOVE/subnational GOVE) Number of local governments Federal grants/subnational GOVE	48 states, US	1983-1985	Yes Yes No
Heil (1991)	GOVE (GOVR)/GDP	Decentralization	Central GOVR (GOVE)/total GOVR (GOVE) Dummy variable for federal structure	22 OECD and 39 IMF countries	1985	No (No) No
Grossman (1992)	GOVE/GDP	Decentralization	Central (state/local) GOVE/total GOVE	Australia	1950-1984	No (No)

		Collusion	Grants/total state-local GOVR			Yes
Grossman&West (1994)	GOVE/GNP	Decentralization	Central (province/local) GOVE/total GOVE	Canada	1958-1987	Yes
		Collusion	Grants/total provincial-local GOVR			Yes
Anderson&van Den Berg (1998)	GOVR/GDP	Decentralization	Central GOVR (GOVE)/total GOVR (GOVE)	45 countries	1990	Yes (Yes)
		Decentralization	Subnational GOVE/total GOVE	19 Latin American	Average	No
Stein (1999)	GOVE/GDP	Collusion	Local program financed by central funds	and some OECD countries	1990-1995	Yes
		Decentralization	State and local own-purpose GOVE/total GOVE			Yes
Shadbegian (1999)	GOVE/GSP	Collusion	Central-state and state-local grants/total state-local GOVR	48 states, US	1979-1992	Yes
		Decentralization	Local taxes/total GOVE	19 OECD countries	1990-1992	Yes
Moesen&van Cauwenberge (2000)	GOVE/GDP	Decentralization	Rayon's GOVR (GOVE)/total GOVR (GOVE)	38 rayons, Moldova	1998	Yes (Yes)
de Mello (2001)	Per capita GOVE	Fragmentation	Number of cities and communes in rayon			Yes
		Collusion	Per capita grants			Yes
		Decentralization	Subnational GOVR (GOVE)/total GOVR (GOVE)	17 industrial and 15 developing countries	1980-1994	Yes (No)
Jin&Zou (2002)	GOVE/GDP	Collusion	Central grants/subnational GOVE			Yes
		Decentralization	Own-source subnational revenue/total revenue	44 countries	1978-1997	No
		Collusion	Grants/total GOVR			Yes
Rodden (2003)	GOVE/GDP	Decentralization	Own-source subnational revenue/total revenue	25 countries	1980-1993	No
		Collusion	Grants/total GOVR			Yes
		Decentralization	subnational revenue/total revenue	18 OECD	Average	Yes
		Collusion	Grants/total GOVR	countries	1985-95	Yes

Kwon (2003)	GOVE/GDP	Decentralization	Local GOVE/total GOVE	Korea	1979-2001	Yes
		Collusion	Central-to-local grants			Yes
Feld et al (2003)	Per capita GOVR	Decentralization	Communal GOVR/ subnational GOVR per capita	26 Swiss cantons	1980-1998	Yes
		Fragmentation	Number of communes per capita			No
		Collusion	Net central-to-canton grants per capita			Yes
Campbell (2004)	Per capita GOVE	Decentralization	Own GOVE/ municipalities and counties GOVE	205 counties, US	1982	Yes
		Fragmentation	Number of units per 100,000 capita	665		Yes
				municipalities, US		No

Note:

GOVE: Government expenditure, GOVR: Government revenue, GSP: Gross state product, GDP: Gross domestic product, GNP: Gross national product.

Publications in the ERIM Report Series Research* in Management

ERIM Research Program: "Organizing for Performance"

2005

Continuous versus Step-Level Public Good Games

Susanne Abele and Garold Stasser

ERS-2005-015-ORG

Collective Consuming: Consumers as Subcontractors on Electronic Markets

Wilfred Dolfsma

ERS-2005-020-ORG

Appropriability in Services

Wilfred Dolfsma

ERS-2005-021-ORG

* A complete overview of the ERIM Report Series Research in Management:
<https://ep.eur.nl/handle/1765/1>

ERIM Research Programs:

LIS Business Processes, Logistics and Information Systems

ORG Organizing for Performance

MKT Marketing

F&A Finance and Accounting

STR Strategy and Entrepreneurship