Is China a Leviathan?

Ze Zhu And Barbara Krug

ERIM REPORT SERIES *RESEARCH IN MANAGEMENT*	
ERIM Report Series reference number	ERS-2004-103-ORG
Publication	November 2004
Number of pages	26
Email address corresponding author	zzhu@fbk.eur.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

ERASMUS RESEARCH INSTITUTE OF MANAGEMENT

REPORT SERIES
RESEARCH IN MANAGEMENT

BIBLIOGRAPHIC DATA AND CLASSIFICATIONS		
Abstract	This paper offers a new data set and window to empirically test Leviathan theory in the sense of China's transition economy. By 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. Our empirical results lend support to Leviathan hypothesis, especially, under the condition of absence of traditional democratic electoral constraint.	
Library of Congress Classification (LCC) LCC Webpage	Mission: HF 5001-6182	
	Programme: HD 2741+, HD 2755.5, HF 5387,	
	Paper:	DS 930 Democratic People's Republic
Journal of Economic Literature (JEL) JEL Webpage	Mission: M	
	Programme : F 23, M 14	
	Paper:	H1 Structure and Scope of Government P24 National Income, Product and Expenditure P35 Public Finance
Gemeenschappelijke Onderwerpsontsluiting (GOO)		
Classification GOO	Mission: 85.00	
	Programme: 83.83, 85.00, 85.02	
	Paper:	88.50 Overheid en burger
Keywords GOO	Mission: Bedrijfskunde / Bedrijfseconomie	
	Programme: Corporate Governance, Multinationals, Bedrijfsethiek	
	Paper: overheid en burger, Leviathan …, Volksrepubliek China, economische hervormingen.	
Free keywords	Public Choice, Leviathan, China, Transition Economy	

Is China a Leviathan?

ZE ZHU

Rotterdam School of Management, Erasmus University Rotterdam

zzhu@fbk.eur.nl

BARBARA KRUG

Rotterdam School of Management, Erasmus University Rotterdam

bkrug@fbk.eur.nl

Abstract. This paper offers a new data set and window to empirically test Leviathan theory in the sense of China's transition economy. By 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. Our empirical results lend support to Leviathan hypothesis, especially, under the condition of absence of traditional democratic electoral constraint.

Keywords: Public Choice, Leviathan, China, Transition Economy

JEL Classifications: H1, P24, P35

1. Introduction

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 complementary to nominally democratic electoral process. 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).

Numerous empirical tests have been conducted but with conflicting results, which show either no significant relation between fiscal decentralization and government size (e.g. Oates, 1985), contradictory empirical evidence (e.g. Forbes and Zampelli, 1989; Stein, 1999), or supportive findings (e.g. Nelson, 1987; Marlow, 1988; Zax, 1989; Rodden, 2003; Campbell, 2004). Considering the American case overused by major previous empirical researches, we intend to offer a new window to examine the Leviathan hypothesis by analyzing time series and cross section data of China for such reasons: 1) a *de facto* fiscal decentralization in China is accredited by numerous scholars and researchers (e.g. Montinola *et al,* 1995); 2) the absence of representative democracy lends a great opportunity for testing whether fiscal decentralization is another effective institutional constraint curbing government size; and 3) China's sheer size permits a cross-section analysis on subnational level.

The paper will proceed as follows. Next section presents the theory, followed by the section of methodology and data. Section 4 and 5 provide the empirical results of time series and cross section analysis, respectively. The final section draws the conclusion.

2. Leviathan and China

In Brennan and Buchanan's theory, the commonly believed democracy "embodies *no effective constraint on the exercise of government powers at all* " (1980:7, *italic in original*). Thus, fiscal decentralization may actually substitute for electoral constraints imposed on government's insatiable appetite for bulgy growth. By introducing "intergovernmental competition for fiscal resources and interjurisdictional mobility of persons in pursuit of 'fiscal gains' ''(1980:184), the larger degree of fiscal decentralization should result in the less government size. Although Leviathan provides an attractive theory to public finance discipline, empirical studies headed by Oates since 1985 have embarrassed its advocators by inconsistent evidences. Either various variables adopted to measure government size and fiscal decentralization, or different analysis levels (i.e. national, state or county) and dimensions (i.e. vertical centralism and horizontal fragmentation) of fiscal decentralization emphasized by different authors contribute to such puzzle (Table 1). Here the centralism refers to the share of superior government level in total tax revenue or expenditure and the fragmentation means the number of lower level government units as a proxy for the degree of intergovernmental competition (Oates, 1989).

Table 1 Selected previous empirical studies

In Oates (1985), two cross-section regressions on 48 contiguous states in the United States and 43 countries find no empirical evidence support for Leviathan hypothesis. A further study on county level by Forbes and Zampelli (1989) also reject Leviathan with a positive and significant effect of the number of county governments (measuring the fiscal decentralization) on their size. Later, Stein (1999) presents a relative lager government in fiscal decentralized Latin America.

On the other hand, Nelson (1987) finds a statistically significant negative association between the size of state-local public sector and per capita general-purpose government unit. Zax's regression result (1989) on the sample of 3,022 counties suggests strong evidence for Leviathan. Rodden (2003) proclaims the effectiveness of prediction of Leviathan hypothesis depends on the nature of fiscal decentralization. Only if the decentralization is funded by local fiscal autonomy, such institutional arrangement could exert pressure on government size. A more recent investigation undertaken by Campbell (2004) also shows a conditioned effect of fiscal decentralization on government size, in which the two decentralization dimensions and different government levels matter. In addition to above cross-section analysis, Marlow (1988) alternatively conduct time-series analysis on data of the United State from 1946 to 1985 and provide supporting result.

Besides, Brennan and Buchanan (1980) also acknowledge that an intergovernmental collusion would moderate the interjurisdictional competitive pressures and thus the effective constraint of fiscal decentralization on government size. “Revenue sharing is undesirable, because it subverts the primary purpose of federalism, which is to create competition between jurisdictions. (p.183)” To this point, Grossman (1989) finds a relative weak but positive relation between intergovernmental collusion measured by share of federal grants-in-aid to state and local governments in total state and local revenue and national government size so as to support Leviathan theory.

According to Oates’s (1989) suggestions, a fresh study based on new data set besides that of the United States is warranted in order to unravel some of the inconsistence 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 (Montinola *et al,* 1995). Secondly, as Brennan and Buchanan point out, the fiscal decentralization may effectively constrain government’s power to tax even when the democracy monitor fails. In this 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.[1]

Thus, we intend to test the effect of fiscal decentralization via two dimensions and also the intergovernmental collusion on government size. Time series and cross-section regression will be performed using Chinese data set, respectively.

3. Methodology and data

3.1 Time series regression

Following Marlow (1988), a time series regression will firstly be conducted based on the data of total 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 literatures[2]. 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 its reform. Such variable indicates to what extent government intervenes in economic activities.

The single estimation equation is as follows:

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

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

Table 2 Variable descriptions

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. The data sources are listed in the appendix.

3.2 Cross-section regression

Instead of 48 states in Oates (1985) or Nelson (1987), our 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 GDP[3]. As for the independent variable, decentralization, we employ two different measures: the ratio of subprovincial government expenditure to total one (*DECE*) and numbers of local government units of each province (*NUMLG*). In accordance with two dimensions of the fiscal decentralization, the *DECE* indicates the vertical centralism while *NUMLG* reflects the degree of interjurisdictional competition at horizontal fragmentation dimension. Suggested by Grossman (1989), another important independent variable is to test the influence of intergovernmental collusion on the dependent variable. The *GRANTS* is the share of total central grants to province in 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 income[4]. The variable *illiterate* represents the mobility of population that implies a relative 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:

$$GOV_k = \beta_0 + \beta_1 X_k + x\delta + u_k \tag{2}$$

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

Table 4 Variable descriptions

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 .09 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 .04 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 relative high at .60 in 2000. The appendix provides the data sources.

4. Empirical results: the 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 explanatory 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 verifies 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. Empirical results: the 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 on two dimensions negative against *GOV* and intergovernmental grants positive 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 explanatory 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 .08 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. 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 interjurisdicational competition and, ultimately, the effect of fiscal decentralization.

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 relative 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	

Sources of data for time series regression:

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: 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 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.

Sources of data for cross-section regression:

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

Reference

Brennan, Geoffrey and James Buchanan, 1980, The Power to Tax: Analytical Foundations of a Fiscal Constitution, New York: Cambridge University Press

Forbes, Kevin F., and Ernest M. Zampelli, 1989, Is Leviathan a Mythical Beast?, American Economic Review, Vol.79, No.3:568-77

Campbell, Rebecca J., 2004, Leviathan and Fiscal Illusion in Local Government Overlapping Jurisdictions, Public Choice, 120: 301-29

Grossman, Philip J., 1989, Fiscal Decentralization and Government Size: An Extension, Public Choice, No.62:63-69

Marlow, Michael L., 1988, Fiscal Decentralization and Government Size, Public Choice, No.56:259-69

Montinola, G., Qian Y.Y. and Weingast B.R. (1995). Federalism, Chinese Style: The Political Basis for Economic Success in China. *World Politics*. 48: 50-81.

Nelson, Michael A., 1987, Searching for Leviathan: Comment and Extension, American Economic Review, Vol.77, No.1:198-204

Oates, Wallace E., 1989, Searching for Leviathan: A Reply and Some Further Reflections, American Economic Review, Vol.79, No.3:578-83

Oates, Wallace E., 1985, Searching for Leviathan: An Empirical Study, American Economic Review, Vol.75, No.4:748-57

Rodden, Jonathan, 2003, Reviving Leviathan: Fiscal Federalism and the Growth of Government, International Organization, No.57:695-729

Stein, Ernesto, 1999, Fiscal Decentralization and Government Size in Latin America, Journal of Applied Economics, Vol.11. No.2:357-91

Zax, Jeffrey S., 1989, Is There a Leviathan in Your Neighborhood?, American Economic Review, Vol.79, No.3:560-67

Table 1 Selected previous empirical studies [a]

Analysis level	Decentralization dimension	
	Centralism	Fragmentation
National	Oates, 1985; Stein, 1999; Rodden, 2003; Marlow, 1988; Grossman, 1989	
State	Oates, 1985	Oates, 1985; Nelson, 1987
County	Zax, 1989; Campbell, 2004	Forbes and Zampelli, 1989; Zax, 1989; Campbell, 2004

[a] Due to enormous volumes of such empirical studies, here presents some of them.

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
Independent variable			
DEC	-2.011***	-1.339***	-0.799**
	(-6.775)	(-3.568)	(-2.032)
Control variable			
POP		-0.001**	-0.001**
		(-2.620)	(-2.127)
PCGDP		3.52E-05	4.66E-06
		(1.122)	(0.093)
URB		2.946*	4.410*
		(1.682)	(1.764)
EXPECO		3.690***	3.268***
		(7.758)	(6.082)
Constant	-0.153	-2.365	-0.824
	(-0.957)	(-6.684)	(-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***			-0.630*		
	(-4.185)			(-1.810)		
NUMLG		-0.006***			0.001	
		(-3.335)			(0.841)	
GRANTS			2.505***			1.013
			(5.585)			(1.638)
<u>Control variable</u>						
POP				-4.80E-06**	-8.70E-06***	-5.45E-06**
				(-2.061)	(-2.774)	(-2.524)
PCI				6.16E-05*	7.43E-05**	9.91E-05**
				(2.021)	(2.324)	(2.318)
ILLITERATE				6.387***	6.465***	5.370***
				(6.448)	(5.515)	(4.652)
SOE				1.114***	1.179***	0.917*
				(3.186)	(2.906)	(1.998)
Constant	0.039	-1.102	-2.580	-2.455	-2.920	-3.170
	(0.097)	(-5.087)	(-13.675)	(-6.709)	(-8.221)	(-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:

a. t-statistics in parentheses.

b. * statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

c. Eq 2.4, 2.5 and 2.6 use White Heteroskedasticity-Consistent Standard Errors & Covariance.

Notes:

[1] 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.

[2] We substitute per capita GDP for per capita income due to data unavailability of the latter.

[3] Here the expenditure refers to actual budget in 2000.

[4] 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.

Publications in the ERIM Report Series Research* in Management

ERIM Research Program: "Organizing for Performance"

2004

Learning And Governance In Inter-Firm Relations
Bart Nooteboom
ERS-2004-003-ORG
http://hdl.handle.net/1765/1122

Organisational Learning And Multinational Strategy
Bart Nooteboom
ERS-2004-004-ORG
http://hdl.handle.net/1765/1123

Density And Strength Of Ties In Innovation Networks: A Competence And Governance View
Bart Nooteboom and Victor A. Gilsing
ERS-2004-005-ORG
http://hdl.handle.net/1765/1124

Innovation, learning and cluster dynamics
Bart Nooteboom
ERS-2004-006-ORG
http://hdl.handle.net/1765/1125

Empirical Tests Of Optimal Cognitive Distance
Stefan Wuyts, Massimo G. Colombo, Shantanu Dutta, and Bart Nooteboom
ERS-2004-007-ORG
http://hdl.handle.net/1765/1126

Entrepreneurship in Transition: Searching for governance in China's new private sector
Barbara Krug and Hans Hendrischke
ERS-2004-008-ORG
http://hdl.handle.net/1765/1128

Exploring Emotional Competence: Its effects on coping, social capital, and performance of salespeople
Willem Verbeke, Frank Belschak and Richard P. Bagozzi
ERS-2004-014-ORG
http://hdl.handle.net/1765/1174

The Impact of Business Ownership Change on Employee Relations: Buy-outs in the UK and the Netherlands
Hans Bruining, Paul Boselie, Mike Wright and Nicolas Bacon
ERS-2004-021-ORG
http://hdl.handle.net/1765/1263

∗ 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

Towards a Dynamic (Schumpeterian) Welfare Economics
Wilfred Dolfsma
ERS-2004-026-ORG
http://hdl.handle.net/1765/1264

The Three-Step Test-Interview (TSTI): An observational instrument for pretesting self-completion questionnaires
Tony Hak, Kees van der Veer and Harrie Jansen
ERS-2004-029-ORG
http://hdl.handle.net/1765/1265

Measuring the Knowledge Base of an Economy in terms of Triple-Helix Relations among 'Technology, Organization, and Territory'
Loet Leydesdorff, Wilfred Dolfsma & Gerben van der Panne
ERS-2004-034-ORG
http://hdl.handle.net/1765/1300

Paradoxes of Modernist Consumption – Reading Fashions
Wilfred Dolfsma
ERS-2004-035-ORG
http://hdl.handle.net/1765/1330

Some Economics of Digital Content
Wilfred Dolfsma
ERS-2004-036-ORG
http://hdl.handle.net/1765/1331

Learning Opportunities And Learning Behaviours Of Small Business Starters: Relations With Goal Achievement, Skill Development, And Satisfaction
Marco van Gelderen, Lidewey van der Sluis & Paul Jansen
ERS-2004-037-ORG
http://hdl.handle.net/1765/1429

The Process Of New Service Development – Issues Of Formalization And Appropriability
Wilfred Dolfsma
ERS-2004-051-ORG
http://hdl.handle.net/1765/1445

On And Off The Beaten Path: How Individuals Broker Knowledge Through Formal And Informal Networks
Rick Aalbers, Wilfred Dolfsma & Otto Koppius
ERS-2004-066-LIS/ORG
http://hdl.handle.net/1765/1549

Governance Modes For Systemic Innovation. Service Development In Mobile Telecommunications
J. van den Ende and F. Jaspers
ERS-2004-067-ORG
http://hdl.handle.net/1765/1539

Performance Management: A model and research agenda
Deanne N. den Hartog, Paul Boselie & Jaap Paauwe
ERS-2004-068-ORG
http://hdl.handle.net/1765/1779

Human Resource Function Competencies In European Companies
Paul Boselie and Jaap Paauwe
ERS-2004-069-ORG
http://hdl.handle.net/1765/1451

"Best Practices…in spite of Performance" Just a matter of Imitation?
Jaap Paauwe and Paul Boselie
ERS-2004-070-ORG

Web-Based Organizing In Traditional Brick-And-Mortar Companies: The Impact On HR
Jaap Paauwe, Elaine Farndale and Roger Williams
ERS-2004-071-ORG
http://hdl.handle.net/1765/1609

Longevity in services: the case of the Dutch warehousing companies 1600-2000
Hugo van Driel, Henk Volberda and Sjoerd Eikelboom
ERS-2004-072-STR/ORG
http://hdl.handle.net/1765/1571

Honing and Framing Ourselves (Extreme Subjectivity and Organizing)
Sławomir Magala
ERS-2004-076-ORG
http://hdl.handle.net/1765/1583

Cross-cultural compromises, multiculturalism and the actuality of unzipped Hofstede
Sławomir Magala
ERS-2004-078-ORG
http://hdl.handle.net/1765/1584

Perceptions about the ISO 9000 (2000) quality system standard revision and its value: The Dutch experience
T. van der Wiele, J. Iwaarden, R. Williams and B. Dale
ERS-2004-081-ORG
http://hdl.handle.net/1765/1736

Mystery shopping: A tool to develop insight into customer service provision
M. Hesselink, J. van Iwaarden and T. van der Wiele
ERS-2004-082-ORG
http://hdl.handle.net/1765/1737

A transparent role of information systems within business processes: A case study
Menno Verboom, Jos van Iwaarden and Ton van der Wiele
ERS-2004-083-ORG
http://hdl.handle.net/1765/1738

Understanding the development of temporary agency work in Europe
Bas Koene, Jaap Paauwe and John Groenewegen
ERS-2004-086-ORG
http://hdl.handle.net/1765/1803

Central Unification versus Local Diversity: China's Tax Regime, 1980s-2000s
Ze Zhu and Barbara Krug
ERS-2004-089-ORG
https://ep.eur.nl/handle/1765/1787

The evolution of high-technology in China after 1978: Towards technological entrepreneurship
M.J. Greeven
ERS-2004-092-ORG
http://hdl.handle.net/1765/1785

Effects of multiple network ties Knowledge transfer and sharing in a network: The effects of multiple ties
Irma Bogenrieder
ERS-2004-093-ORG
http://hdl.handle.net/1765/1781

Multiple Inclusion and Community Networks
Irma Bogenrieder and Peter van Baalen
ERS-2004-094-ORG
http://hdl.handle.net/1765/1782

The Performance Of Team Start-Ups In The First Phases Of The Life Course
Erik Stam And Veronique Schutjens
ERS-2004-097-ORG
http://hdl.handle.net/1765/1784

How To Be Better Prepared For A Paradigm Shift In Economic Theory, And Write Better Articles In The Meantime
Pat Welch and Wilfred Dolfsma
ERS-2004-101-ORG
http://hdl.handle.net/1765/1811

Is China a Leviathan?
Ze Zhu And Barbara Krug
ERS-2004-103-ORG

Market and Society: How do they relate, and contribute to welfare?
Wilfred Dolfsma, John Finch and Robert McMaster
ERS-2004-105-ORG

Determinants Of Entrepreneurship In Europe
Isabel Grilo And Roy Thurik
ERS-2004-106-ORG