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Does Fiscal Decentralization Increase the Investment Rate? Evidence from Chinese Panel Data

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China has one of the highest investment rates in the world, and in 1994, China introduced a new fiscal system. The current study utilizes provincial panel data from the period of 1995-2010 to provide a consistent underlying fiscal regime. The estimation results show that expenditure decentralization has a significant, positive effect on the physical capital investment rate in both least squares dummy variables (LSDV) and system GMM (Generalized method of moments) estimations. In contrast, revenue decentralization has a negative effect on the investment rate. One possible explanation is that China's political centralization has been maintained during its economic decentralization. Since the provincial officials are not elected by local constituents but are rather appointed by the central government, it is rational for provincial officials to raise investment rates to meet the cadre promotion criteria of the central government, be it growth performance, as argued by Blanchard and Shleifer (2001) or revenue collection, identified by Shih et al. (2012).

Key Words: Fiscal decentralization; Investment rate; Panel data.
JEL Classification Numbers: H77, O16, C23.

1. INTRODUCTION

The essence of China's economic reform and opening-up strategy is to introduce market mechanisms to replace planning and command, eliciting people's initiatives and creativity. Economic decision-making has been given to micro-level agents such as individuals, firms, and local governments. One important reform in China is fiscal decentralization, which has

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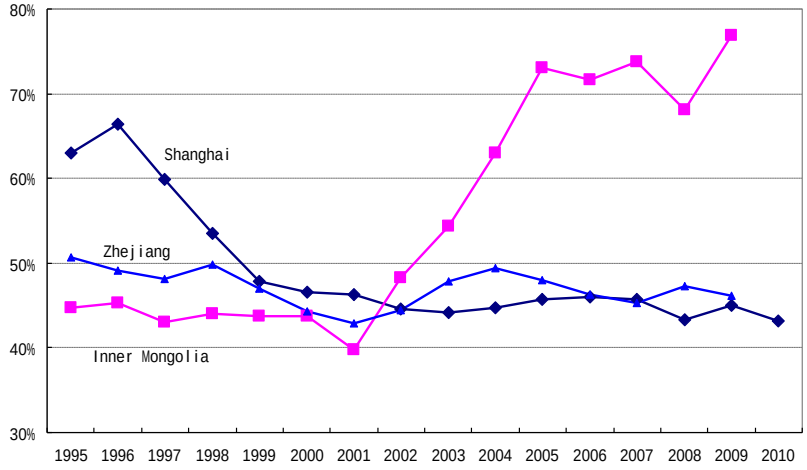
been widely studied (see Montinola et al., 1995; Qian and Roland, 1998; Lin and Liu, 2000; Zhang and Zou, 2001; Blanchard and Shleifer, 2001; Gong and Zou, 2002; Jin and Zou, 2005; Shen et al., 2012; Jia et al., 2014; He and Sun, 2014; Martinez-Vazquez et al., 2014; Shen et al., 2014; Han and Kung, 2015; Sun and He, 2018). In this paper we focus on whether fiscal decentralization promotes the physical capital investment rate (hereafter "investment rate") in China, which is important as elaborated on below.

It is widely documented that China's investment rate has been one of the highest in the world (see Bai, Hsieh and Qian, 2006; Chow and Li, 2002). Figure 1 illustrates its high investment rate, measured as the ratio of nominal physical capital investment to nominal gross domestic product (GDP), denoted by I/GDP, for three representative provinces in China: Shanghai, representing developed municipalities, Zhejiang, representing coastal developed provinces, and Inner Mongolia, representing interior undeveloped provinces. In 1995, the investment rates were as high as 63%, 51%, and 45% for Shanghai, Zhejiang, and Inner Mongolia, respectively, illustrating the substantial variations across provinces. It is of interest why investment rates are so high in China, and why there are substantial variations in investment rates across provinces. Empirically, we find that fiscal decentralization and its provincial variations are the underlying driving forces.

FIG. 1. Physical Capital Investment Rate (I/GDP) for Three Representative Chinese Provinces: 1995-2010.



One possible rationale for our empirical findings is as follows. Under fiscal decentralization, local economic decision-making has been deregulated to China's local governments, while its central government has maintained political centralization. The local officials are not elected by the local con-

stituents, but rather appointed by the central government. Blanchard and Shleifer (2001) highlight how political centralization is the key in explaining why federalism in China promotes economic development: under the tight control of the Chinese Communist Party (CCP), the central government has been in a strong position to both reward and punish local administrations. Qian and Xu (1993) and Maskin et al. (2000) further show that the reward mechanism is made possible by the multidivisional-form (M-form) structure of the Chinese economic system. Blanchard and Shleifer (2001), and Li and Zhou (2005) argue that the central government primarily uses growth performance to evaluate and promote local officials. On the other hand, Shih et al. (2012) find that instead of growth performance, revenue collection and social stability determine cadre promotion for the CCP. Nevertheless, rising investment rates would be a 'one-size-fits-all' strategy to collect revenue, provide employment, and push up GDP growth for provincial officials. Doing so would maximize the chance of promotion or punishment avoidance for local officials.

Our contributions are as follows. First, our study complements Bai, Hsieh and Qian (2006). Bai, Hsieh and Qian find that aggregate return to capital in China does not appear to be significantly lower than return in the rest of the world, which provides a rationale for the high investment rates in China. We take a different approach, instead of determining whether high investment rates are efficient, we try to identify the causes for the high investment rates in China. In this paper we find that fiscal decentralization is an important causal factor for China's high investment rate. Even if local administrations are driven to push up the investment rate in the Chinese institutional context (our finding), the return to investment does not appear to be significantly lower than the return to capital in the rest of the world (the finding of Bai, Hsieh and Qian). This implies that there may not be a large efficiency loss when local administrations are motivated to push up investment rates. Considering the importance of capital accumulation in China's growth (illustrated below), our analysis helps to explain China's past economic success.

Second, our study has strong implications for China's future growth. Chow and Li (2002) find that China's capital accumulations account for 54% of its growth and productivity increases account for 32%, attributing only 13% to labor from the period of 1978-1998. They predicted that "in the next decade [2000-2010] the Chinese economy would still manage to grow at a substantial rate of at least 7% because of the expected high rate of capital formation of over 30% of GDP and the high capital elasticity of about 0.6." Given the slow-changing institutional framework and the on-going fiscal decentralization, China's investment rate should continue to be high in the future. Our analysis is certainly important in predicting China's future investment rates and thereby its future growth rates.

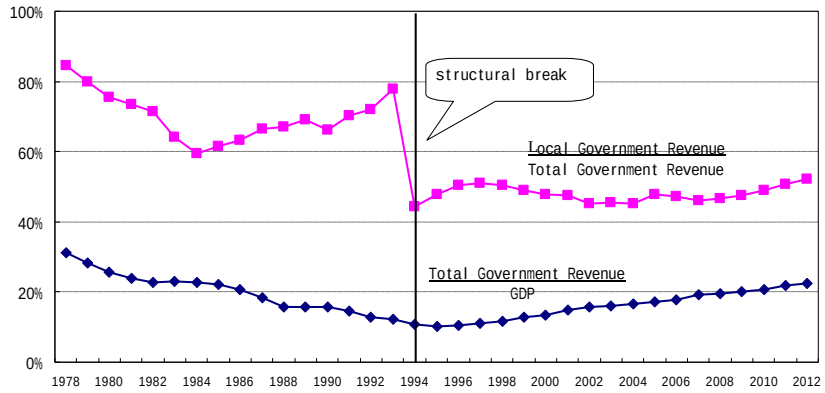
Third, our analysis also contributes to understanding the role of federalism in the process of economic development (see Davoodi and Zou, 1998, for an early contribution; Oates, 2005, and Xu, 2011, for a review). We identify investment as an important mean for Chinese-style federalism to impact the economy. Our mechanism also complements previous means such as tax competition (Wilson, 1999), public goods (Zodrow and Mieszkowski, 1986), foreign direct investment (He and Sun, 2014), the discipline imposed by federalism on local governments (Blanchard and Shleifer, 2001, Qian and Roland, 1998), and the interregional negative externalities (Cai and Treisman, 2005). Since investment is an important determinant of growth, our mechanism helps to solve the empirical debate on the fiscal decentralization-growth nexus in China (see Zhang and Zou, 1998; Lin and Liu, 2000; Qiao et al., 2008).

Specifically, concerning fiscal decentralization, in 1994, the Chinese government introduced the tax assignment system to replace the fiscal contracting system (see subsection 1.1). Considering the structural break (elaborated on below), we examine how this new fiscal decentralization impacted the investment rate for 27 Chinese provinces during the 16 year period following 1994. The panel data from 1995-2010 has many appealing features, as presented below.

First, using data solely from China's new fiscal system period provides a consistent underlying fiscal regime. While China's old fiscal system before 1994 was discretion-based, its new fiscal system after 1994 is rule-based, with revenue-sharing between the central and local governments. This new fiscal system established fixed formulas by the central government to share tax revenues with the provincial governments. By contrast, in the old system, the central government and the local government negotiated a percentage or amount of locally collected revenues (which could change from year to year) to be remitted to the central government. Given the substantial difference between the two fiscal systems, it is more appealing to use data from the new system because it is rule-based and not subject to negotiations.

Figure 2 further illustrates the existence of structural changes in underlying fiscal regimes. One goal of the 1994 fiscal reform was to increase the revenue of the central government. As Figure 2 shows, the share of total government revenue in GDP decreased continuously from 1978, whereas the share of local governments' revenues in total government revenue surged to almost 80% in 1993. The 1994 fiscal reform reversed this trend and the total government revenue-to-GDP ratio has been rising ever since. There was a big drop in the share of local governments' revenue in total government revenue in 1994, but this share has remained around 50% ever since. Given that 1994 marked an obvious structural break in underlying fiscal systems, we utilize data after 1994 to avoid the underlying structural change.

FIG. 2. Structural Break in China's Fiscal System.

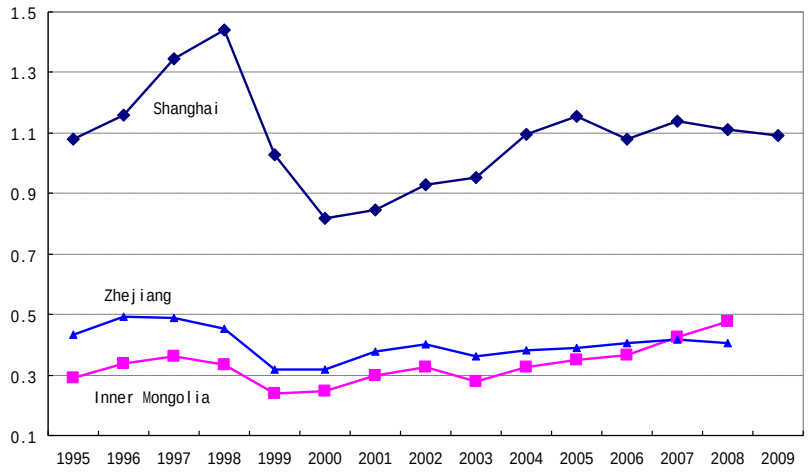


Additionally, the degree of rule-based fiscal decentralization still varies substantially across provinces and time, due to the gradual approach to reform in China. Based on previous literature (e.g., Zhang and Zou, 1998; Montinola et al., 1995), we measure expenditure fiscal decentralization as the ratio of provincial budgetary and extra-budgetary expenditures to the budgetary expenditure of the central government, weighted by provincial population (i.e., expressed in per capita terms to remove scale effects), denoted by FDCEXP (see section 2.4). Figure 3 illustrates the substantial variations in FDCEXP across the three representative provinces in China mentioned above, and substantial time variations can be observed. The degree of fiscal decentralization steadily increases from 1995 to 1998, slightly dips in 1999, and then gradually increases after 1999. Our analysis exploits these variations.

Finally, the unobserved fundamental differences between provinces are much smaller compared to those across countries. Our panel data allows us to control for unobserved province characteristics and avoid biases caused by omitting such characteristics. Furthermore, the indicators on fiscal decentralization within a single country are relatively more uniform than those across different countries.

Using the panel for 27 Chinese provinces during 1995-2010 (a balanced panel with 432 observations), we find the following. Expenditure fiscal decentralization has a significant (at the 1% level), positive effect on the physical capital investment rate (i.e., I/GDP), while revenue decentralization has a significant, negative effect on the physical capital investment rate in China in the least squares dummy variables (LSDV) estimation. The results are robust in controlling for other variables, as well as province and time fixed effects. Our results remain sturdy when we use system GMM

FIG. 3. Degree of Expenditure Decentralization (FDCEXP) for Three Representative Chinese Provinces: 1995-2010.



(Generalized method of moments) estimation to deal with the potential endogeneity of the fiscal decentralization. Our results suggest that China's fiscal decentralization is a significant causal factor for its high investment rate.

The rest of this paper is organized as follows. After a brief introduction of the institutional background, Section 2 describes the data and the estimation strategy. Section 3 presents the regression results and Section 4 concludes our findings.

1.1. Institutional background

A comprehensive description of China's fiscal decentralization is beyond the scope of this paper, see Montinola et al. (1995) and Wang (1995) for more in-depth reviews. Here, we give a brief summary.

In 1978, China initiated market-oriented reform and opening-up strategies. One important aspect of the market-oriented reform is the initiation of fiscal decentralization in 1980. China then adopted a fiscal contracting system between the central and provincial governments and between any two adjacent levels of government. The provincial government negotiated with the central government on the total amount (or share) of tax and profit revenues (with negative values meaning subsidies) to be remitted to the central government over the following several years. In 1994, a new fiscal system, the tax assignment system, was introduced to replace the old discretion-based system of revenue-sharing, or the fiscal contracting sys-

tem. We follow Wang (1995) to summarize the main characteristics of the new rule-based system of revenue-sharing below.

First and foremost, taxes are now divided into three distinct categories: central, local, and shared. Central taxes concern those with national interests and macroeconomic management, and include tariffs, corporate income taxes, and remitted profits of state-owned enterprises. Local taxes include corporate income taxes and remitted profits of local enterprises, personal income tax, and others related to local economic activities. Shared taxes include the value added tax (VAT), resource tax, and securities exchange tax. This new system puts central and local taxes into the central and local budgets, respectively. As for shared taxes, they are to be split between the central and provincial governments according to established formulas. The established formulas are fixed (i.e., not subject to negotiation) and apply to all of the provinces. For instance, 75% of the revenue from the VAT goes to the central government and the remaining 25% goes to the provincial governments; 50% of the revenue from securities exchange tax belongs to the central government and the other half belongs to the provincial governments.

Next, tax administration is centralized. Before 1994, local tax offices were responsible for collecting virtually all taxes but after 1994, the central government established its own revenue collection agency, called the national tax service. Under the two parallel systems of tax administration, the national system collects central taxes and the local system collects local taxes. Shared taxes are collected by the national system first, but the proceeds from these taxes are divided between the central and subnational governments, according to the formulas mentioned above.

Lastly, tax rates have been standardized and the tax structure has been simplified. A universal tax rate of 33% has been imposed on all enterprises and some taxes, such as product taxes, have been abolished completely. In addition, local governments are no longer allowed to grant tax breaks.

One aspect of fiscal decentralization is the expansion of China's extra-budgetary funds. In China, some of the revenues collected by the local administration are not covered by the categories listed in its budgetary income. According to the Finance Yearbook of China (FYC), extra-budgetary revenues include administrative charges, forfeit charges, operating profits of state-owned assets, earmarked revenue, land and sea area usage charges, and other various revenues. The budgetary income also includes some categories of the extra-budgetary revenues such as administrative charges, forfeit charges, and earmarked revenue. Montinola et al. (1995) describe:

> The extra-budgetary revenue is wholly retained by the local government. Moreover, the local government has complete authority over the determination of taxes or fees that fall into the categories of extra budget. The decentral-

ized nature of extra-budgetary revenues also increases local government security from predation by the central government, as such revenues are easier to hide from the higher governments.

Some researchers use Figure 2 to argue that the Chinese fiscal system became more centralized directly after the 1994 fiscal reform. However, from our discussion of the institutional backgrounds above, it may not be simply true that China's fiscal system became more centralized. Instead, rules were introduced in the 1994 fiscal reform to replace negotiations. Regardless, we can safely say that China entered a new phase of fiscal decentralization after 1994. Our analysis does not rely on the assumption that the fiscal system before 1994 is relatively more de-centralized than the post 1994 fiscal system. Our analysis exploits the provincial variations in the degree of fiscal decentralization in the consistent underlying fiscal regime after 1994.

2. THE DATA

2.1. The empirical specification

Before we construct the data, we will present the empirical specifications and identify the suitable independent variables. Our empirical formulation is

$$\begin{aligned}\ln(I/GDP)_{i,t} \;=\; & \alpha_1 \ln(I/GDP)_{i,t-1} + \alpha_2(FDCEXP)_{i,t} + \alpha_3(FDCREV)_{i,t} \\ & + \alpha_4(\text{Control Variables})_{i,t} + u_i + T_t + \varepsilon_{i,t}, \qquad (1)\end{aligned}$$

where in equation (1), $(I/GDP)_{i,t}$ is the ratio of total investment to GDP for the i^{th} province in year t. $FDCEXP$ and $FDCREV$ are the degrees of expenditure fiscal decentralization and revenue fiscal decentralization, respectively. Here we follow Jia et al. (2014, p. 111) to include both expenditure and revenue decentralization indicators in the regressions because these two dimensions of fiscal decentralization may have different effects on the investment rate. u_i and T_t stand for fixed province and time effects, respectively. Control for other independent variables is also necessary for a number of reasons.

First, the growth rate of the economy is an important explanatory variable. According to economic theory (e.g., Mankiw et al., 1992), physical capital investment is an important component of GDP. As discussed, in the Chinese institutional context, one priority of local governments may be to maximize the growth rate of the economy. Therefore, we control for the rate of economic growth, denoted by Growth. Second, according to the production function, human and physical capital are two important inputs. They may complement each other, in that human capital investment would raise the marginal product of physical capital investment. Therefore, we

control for human capital investment (referred to as HC). Third, China has an open economy, and its degree of openness may affect the investment behavior of local governments. Therefore, we control for the openness to international trade (denoted by EXP/GDP). These variables are the main macroeconomic variables that may impact investment in the literature. There may also be omitted variables captured by the fixed province and time effects.

We first estimate the effect of fiscal decentralization on investment rates using LSDV regressions. While are aware that fiscal decentralization may be endogenous to the investment process for many possible reasons, we will use system GMM to deal with the potential endogeneity of fiscal decentralization.

2.2. The data sample

We use Chinese provincial data from the 1995-2010 period. Our data sample begins at 1995 because China's new fiscal system was implemented in 1994 (see section 1.1). Given the structural break (elaborated in the introduction), we only consider the consistent regime after 1994. We choose 2010 as the ending year because 2010 is the most recent year that we can collect data from all of the appropriate variables.

Before 1998, among the 31 provincial governments in China, four were municipalities and four were autonomous regions. For the sake of this paper, we use the 'province' for all the regions. Before 1997, Chongqing was a city of Sichuan province, hence why both of them are excluded from the sample. Hainan was part of Guangdong before it became an independent province so Hainan is dropped from the data sample, but since Guangdong has a complete set of data, it is included. Tibet is excluded because there is much missing data. In summary, the data sample comprises panel data of 27 provinces over 16 years (1995-2010). This produces a balanced panel with 432 observations.

2.3. Measuring investment rates

Provincial investment data and GDP data are available from the CSY (China Statistical Yearbooks). China's physical capital investment has generated some controversy in previous literature (see Young, 2003, section VI). According to Young (2003), the deflator of physical capital investment (the gross capital formation in CSY) has been downwardly reported by the Chinese provincial statistical bureaus. Therefore, using the gross capital formation and its indexes to calculate real investment may cause some provinces to appear to have unbelievably high real investment rates. In this paper we use the nominal investment rate, which is the ratio of nominal physical capital investment to nominal GDP.

2.4. Measuring fiscal decentralization

The FYC contains the complete data on the budgetary incomes and expenditures of all provincial governments, the budgetary income and expenditures of the central government (for the whole country, i.e., all the provinces), the inter-governmental transfers (i.e., bilateral transfers between the central government and the provincial governments), and the extra budgetary incomes and expenditures of all provincial governments. Table 1 presents the data for the three representative provinces mentioned above: Shanghai, Zhejiang and Inner Mongolia.

TABLE 1.

Data on China's fiscal system

	Shanghai		Zhejiang		Inner Mongolia		China	
	1995	2002	1995	2002	1995	2002	1995	2002
Budgetary Expenditure	240.0	851.8	226.0	896.6	110.8	461.8	2045	6412
Extra-Budgetary Expenditure	72.8	116.3	157.7	303.1	25.4	38.3		
Budgetary Income	212.4	606	108.3	463.6	40.2	100.6	3219	7973
Extra-Budgetary Income	78.6	149.3	171.5	353.6	27.3	40.9		
Subsidies from the Central Government	180.2	280.3	116.5	246.5	63.1	287.7		
Remittance to the Central Government	128.3	123.1	48.4	50.2	0.8	1.85		
Population (million)	14.15	16.25	43.19	46.47	22.84	23.79		

Note: the income, expenditure and transfers data are in 100 million Yuan.
Data Source: Finance Yearbook of China, Beijing: China Finance Press 1996-2003 (annual).

We rely on FYC for data on the measurement of fiscal decentralization. Following the previous literature on China's fiscal decentralization (Jin, Qian and Weingast, 2005; Montinola et al., 1995; Zhang and Gong, 2005; He, 2015), we consider the budgetary amount of provincial governments and extra-budgetary funds. We construct the following two measures of fiscal decentralization:

1. $FDCEXP$ is the ratio of the sum of budgetary and extra-budgetary expenditures of a provincial government to the budgetary expenditure of the central government (for the whole country), divided by the total population of the province. In our data sample, the ratios of extra-budgetary expenditure to budgetary expenditure are 36% and 21% in 1995 and 2002 respectively. Therefore, extra-budgetary funds are important.

2. $FDCREV$ is the ratio of the sum of budgetary and extra-budgetary incomes of a provincial government to the budgetary income of the central government (for the whole country), divided by the total population of the province.

To give an example, we use Shanghai to calculate $FDCEXP$ as follows. In the year 1995, the $FDCEXP$ and $FDCREV$ would be

$FDCEXP$ = (budgetary expenditure (240.0)+extra-budgetary expenditure (72.8))/(budgetary expenditure of the central government(20.45)×Population of Shanghai(14))=1.08,

$FDCREV$ = (budgetary income (212.4)+extra-budgetary income (78.6))/(budgetary income of the central government (32.19)×Population of Shanghai (14))=0.64,

where the data can be found in Table 1.

A deep look into the data is essential to see whether our measures of fiscal decentralization make sense. First, is our measure expenditure decentralization ($FDCEXP$) closely related to the share of locally collected tax revenues kept by local provinces? Second, since the rules for revenue-sharing are fixed and apply to all provinces in the new fiscal system, why are there substantial variations in our measures of fiscal decentralization ($FDCEXP$ and $FDCREV$)? The answers to these questions determine whether our measures of fiscal decentralization make sense.

The substantial provincial and time variations in $FDCEXP$, as illustrated in Figure 3, drive our results. To identify the source of these substantial variations we rely on the data presented in Table 1. We observe the following patterns within the data.

First, funding for budgetary expenditures of a province come mainly from three sources: budgetary income, extra-budgetary income, and a net transfer from the central government. Thus, the budgetary expenditure of a province roughly equals the sum of its budgetary income, extra-budgetary income, and its net transfer from the central government. The net transfer from the central government equals subsidies from the central government less the remittance to the central government. The central government subsidies transferred to provincial governments are financed by its tax-revenues from central taxes, shared taxes, and remittance from the provincial governments. For instance, in 1995 and 2002 respectively, the central government had a budgetary income of 321.9 and 797.3 billion Yuan (the Chinese currency).

Second, transfer payment data for the three representative provinces show remittances to the central government changed little from 1995 to 2002, while subsidies from the central government increased substantially. Poorer provinces like Inner Mongolia experienced much larger increases in subsidies than other provinces. For example, in 2002 Inner Mongolia received a 28.77 billion Yuan subsidy when in 1995 it had received 6.31 billion – an increase of 22.5 billion Yuan. In comparison, the corresponding numbers for Shanghai are 28.03 billion and 18.02 billion in 2002 and 1995 respectively, an increase of 10 billion. In summary, although the central government rebates some of its tax revenues to provincial governments, on average it rebates more to poorer provinces.

Third, given the second pattern it may appear that more affluent provinces are subsidizing poorer provinces. However, as one can see by observing Table 1, the expansion of extra-budgetary income within wealthier provinces — such as Shanghai and Zhejiang, nearly doubled from 1995 to 2002, while that of the poor province Inner Mongolia increased less than 50% from 1995 to 2002. Data shows that wealthier provinces expand the extra-budgetary income further, and in so doing actually avoid subsidizing poorer provinces. In addition, Montinola et al. (1995) show that the decentralized nature of China's provincial governments, and the expansion of its central government's extra-budgetary revenues, actually increases its local government's security from predation by the central government. Because extra-budgetary revenue is wholly retained by local governments, and they also retain control of their central government subsidies, local governments now have the final say as to where and how their budget is spent.

Fourth, provinces spend almost the entirety of their extra-budgetary income on extra-budgetary expenditures. For instance, in 2002 the extra-budgetary income of Zhejiang province was 35.36 billion, and its extra-budgetary expenditure was 30.31 billion. The corresponding numbers for Inner Mongolia are 4.09 billion and 3.83 billion. That is, local provinces use their extra-budgetary income to finance the extra-budgetary expenditures. Moreover, the extra-budgetary income/expenditure becomes more and more important as time goes on. For example, in 2002 Zhejiang's extra-budgetary expenditure was about 34% of its budgetary expenditure (89.66 billion). For Inner Mongolia, which relies on the subsidies from the central government to finance its budgetary expenditure, the ratio is only 8%. The extra-budgetary income of Zhejiang province is 35.36 billion, and its budgetary income is 46.36 billion, showing that its extra-budgetary income is almost as important as its budgetary income. Data supports a correlation between the expansion of extra-budgetary income/expenditure and an increase in the fiscal autonomy and independence of the local provinces.

We can now identify the substantial variations in our measures of fiscal decentralization ($FDCEXP$ and $FDCREV$). For the expenditure measure of fiscal decentralization, $FDCEXP$, the provincial variations mainly come from two sources. First is the extra-budgetary expenditure. As shown above, in 2002 the extra-budgetary expenditure of Zhejiang province was about 34% of its budgetary expenditure, while the corresponding number for Inner Mongolia was only 8%. Second is the net transfer from the central government. For instance, in 2002 Zhejiang received a net transfer of 19.63 billion from the central government, which contributed to 22% of its budgetary expenditure. In comparison, Inner Mongolia received a net transfer of 28.59 billion from the central government, which contributed to 62% of its budgetary expenditure. For the income measurement of fiscal

decentralization $FDCREV$, the provincial variations come mainly from the extra-budgetary income.

Moreover, the fiscal decentralization data patterns show that the extra-budgetary income/expenditure is closely related to the share of locally collected tax revenues kept by the local province under the rule-based fiscal system. Therefore, $FDCEXP$ and $FDCREV$ are suitable measures of fiscal autonomy at the provincial level. Nonetheless, they may not be perfect. Although $FDCEXP$ takes into account the fiscal autonomy of affluent provinces, it tends to over-estimate that of poorer provinces since they receive more subsidies from the central government, and thereby have higher budgetary expenditure. However, a measure that uses only the extra-budgetary expenditures is not accurate. Although the extra-budgetary expenditures are important, it is the budgetary expenditures that are of most significance within each of the provinces. Therefore, we must consider the budgetary expenditures when measuring the fiscal independence of the provinces, and we believe $FDCEXP$ is the best way to accomplish this task.

In summary, even if the new fiscal system is rule-based, there are still substantial variations in the degree of fiscal autonomy across provinces and our indicators of fiscal autonomy can suitably measure the different degree of fiscal autonomy across provinces.

2.5. Measuring other variables

The CSY provides nominal GDP and GDP indexes for each province. Using a nominal GDP, the GDP indexes, and 1978 as our base year, we multiply the nominal GDP in 1978 by the GDP index within that year, then divide the result by 100.

To calculate the growth of real GDP per worker, we need data on the labor force. However, there is a large statistical adjustment in 1990 on labor force. This has been analyzed in Young (2003, 1233-1234). The provincial statistical bureau of Jiangsu reported its labor force by using a new measurement detailed in Young. Its labor force jumps from 35.19 million in 1989 to 42.25 million in 1990, while the CSY lists its labor force at 35.69 million in 1990. The provincial statistical bureau reports 6.56 million more workers. Around half of Chinese provinces made the changes in 1990. One can infer that the provincial statistical bureau did not simply make up numbers. Instead, it is the change in statistical caliber as detailed in Young which caused the anomaly. Fortunately, CSY has maintained the original statistical caliber and provided the data on the provincial labor force.[1] Therefore, the relatively more consistent series provided by CSY

[1]For the majority of years and provinces, the labor force data provided by CSY seems reasonable. However, we also found a rare anomaly in it. For instance, the labor force datum for Beijing jumps to 7.99 million in 2002 from 6.29 million in 2001 (which yields a

allow us to cover the periods before and after 1990 to avoid "spurious labor force growth" (Young, p. 1234).

With the labor force data and the real GDP data, we can calculate two needed variables: the growth rate of real GDP per worker (Growth), and the human capital investment rate (HC). The CSY provides complete data on the student enrollments for all levels of education in China, including primary, secondary and higher education levels. We follow Mankiw et al. (1992) to measure the human capital investment rate as the ratio of secondary school enrollment (grades 7 to 12) to labor force. EXP/GDP are nominal values of export to nominal GDP respectively. The export data is reported in US dollars. We multiply the amount by the fixed yearly exchange rate of the Chinese currency against the US dollar to get the export data in Chinese currency. The data are all from CSY. Table 2 presents the summary statistics of the final data.

TABLE 2.

Descriptive statistics

	Observations	Mean	Standard deviation	Minimum	Maximum
I/GDP (%)	432	49.58	11.46	30.54	96.71
PubI/GDP (%)	432	18.73	6.92	8.68	55.78
$FDCEXP$	432	0.36	0.22	0.12	1.44
$FDCREV$	432	0.13	0.12	0.03	0.71
Growth (%)	432	9.99	4.43	−19.87	53.13
$\ln(HC)$	432	2.42	0.26	1.35	3.01
$\ln(EXP/GDP)$	432	2.32	0.97	0.22	4.53

Note: The panel data comprise 27 provinces and 16 years (1995-2010).

3. EMPIRICAL RESULTS

3.1. LSDV estimation results

We first use a LSDV estimation (i.e., ordinary least squares (OLS) estimations, which include 27 province dummies and 16 time dummies), and present the results in Table 3. In Table 3, regression 3.1 presents the results with the logarithm of the total investment rate (i.e., ln(I/GDP)) as the dependent variable, while regression 3.2 presents the results with the level of total investment rate (i.e., I/GDP) as the dependent variable to check the robustness of our results.

According to regression 3.1 in Table 3, the estimated coefficient on our expenditure measure of fiscal decentralization ($\ln(FDCEXP)$) is positive

negative growth rate in real GDP per worker), while the provincial statistical yearbook lists the numbers in 2002 and 2001 as 6.79 and 6.29 million respectively.

and significant at the 10% level. After controlling for other factors that may affect investment rate and fixed time and province effects, one can see that expenditure fiscal decentralization is significantly and positively correlated with the total investment rate in China. The estimated coefficient on revenue decentralization ($\ln(FDCREV)$) is negative and significant at the 10% level. After controlling for other factors that may affect investment rate and fixed time and province effects, one can see that expenditure fiscal decentralization is significantly and positively correlated with the total investment rate in China, while revenue decentralization is significantly and negatively correlated with the total investment rate in China. The estimated coefficient on the lagged dependent variable ($\ln(I/GDP)_{t-1}$) is positive and significant at the 1% level. The estimated coefficients on Growth and $\ln(HC)$ are positive and insignificant. The estimated coefficient on $\ln(EXP/GDP)$ is negative and significant at the 5% level, indicating that openness is negatively correlated with the total investment rate in China.

Regression 3.2 in Table 3 indicates that our results remain similar when we use the level of total investment rate (i.e., I/GDP) as the dependent variable. The estimation results on other control variables remain similar to those in regression 3.1.

To summarize, expenditure fiscal decentralization is significantly and positively correlated with total physical capital investment rates in China, while revenue decentralization is significantly and negatively correlated with total physical capital investment rates in China.

3.2. System GMM estimation results

Fiscal decentralization is very likely to be exogenous to the investment process. Nonetheless, there may exist reverse causality between fiscal decentralization and investment rate, which may bias our estimation. The dynamic panel data specification allows us to use system GMM estimation to deal with the potential endogeneity problem of the explanatory variables. Arellano and Bover (1995) and Blundell and Bond (1998) show that system GMM estimator can dramatically improve efficiency and avoid the weak instruments problem in the first-difference GMM estimator. Moreover, the advantage of system GMM estimation is that it only needs "internal" instruments. That is, the system GMM estimator estimates a system of two simultaneous equations, one in levels (with lagged first differences as instruments) and the other in first differences (with lagged levels as instruments). Therefore, we estimate our model with system GMM estimator.

The identification in system GMM estimator is not commonly known to those who have not studied or used it. We follow Roodman (2006) to give

TABLE 3.

LSDV regressions between investment rate and fiscal decentralization (Annual provincial data: 1995-2010)

	Regression number	
	3.1	3.2
	Dependent variable as	
Indep. Vari.	$\ln(I/GDP)$	(I/GDP)
$\ln(FDCEXP)$	0.10^{**}	6.09^{***}
	(0.05)	(2.75)
$\ln(FDCREV)$	-0.11^{***}	-4.83^{**}
	(0.04)	(2.38)
$\ln(I/GDP)_{t-1}$	0.81^{***}	
	(0.03)	
$(I/GDP)_{t-1}$	0.80^{***}	
	(0.03)	
Growth	0.001	0.03
	(0.001)	(0.05)
$\ln(HC)$	0.004	0.22
	(0.03)	(1.75)
$\ln(EXP/GDP)$	-0.032^{**}	-2.12^{**}
	(0.015)	(0.83)
Time FE	Yes	
Province FE	Yes	
R^2	0.90	0.90
Observations:	405	405

*** Significant at the 0.01 level, ** at the 0.05 level, * at the 0.10 level (Standard error in parentheses)

a simple illustration. The general model of the data-generating process is

$$\begin{aligned} y_{i,t} &= \alpha y_{i,t-1} + x'_{i,t}\beta + \varepsilon_{i,t}, \\ \varepsilon_{i,t} &= u_i + v_{i,t}, \\ E(u_i) &= E(v_{i,t}) = E(u_i v_{i,t}) = 0, \end{aligned} \tag{2}$$

where β is a column of coefficients. The disturbance term has two orthogonal components: the fixed effects, u_i, and the idiosyncratic shocks, v_{it}. The lagged dependent variable may not be strictly exogenous. Some regressors may be endogenous.

The first-difference transformation of equation (2) is

$$\Delta y_{i,t} = \alpha \Delta y_{i,t-1} + \Delta x'_{i,t}\beta + \Delta v_{i,t}, \tag{3}$$

One can see that the fixed effects are gone. The lagged dependent variable ($\Delta y_{i,t-1}$) is still endogenous because it is correlated with Δv_{it}. This is because the $y_{i,t-1}$ component in $\Delta y_{i,t-1} = y_{i,t} - 1 - y_{i,t-2}$ is correlated with $v_{i,t-1}$ in $\Delta v_{it} = v_{i,t-1} - v_{i,t-2}$. However, deeper lags of the regressors (e.g., $x_{i,t-4}, x_{i,t-5}$, etc.) are orthogonal to the error, and they are available as instruments for the first difference equation in (3).

As Blundell and Bond (1998) demonstrate, if y_{it} is close to a random walk, then difference GMM performs poorly because untransformed lags are weak instruments. Developing an approach outlined in Arellano and Bover (1995), Blundell and Bond pursue a more efficient strategy. Rather than transforming the regressors, it transforms the instruments to make them exogenous to the fixed effects. That is, it uses differences of regressors as instruments for the level equation (2). This is valid assuming that the differences of regressors are uncorrelated with the fixed effects. In general, if x_{it} is endogenous in (2), $\Delta x_{i,t-1}$ is available as an instrument if $\Delta x_{i,t-1} = x_{i,t-1} - x_{i,t-2}$ is not correlate with vit. Earlier realizations of Δx can be valid instruments as well.

To use all moment conditions, the system GMM estimator proposed by Blundell and Bond estimates a system of two simultaneous equations: one in levels as in equation (2) (with lagged first differences as instruments) and the other in first differences as in (3) (with lagged levels as instruments). The instruments are valid as illustrated above. This is the essence of identification in system GMM estimation.

Therefore, we use the most efficient system GMM estimator to establish a causal relationship between investment rate and fiscal decentralization. Since we use the macro-level data, it is possible that the other explanatory variables may also be endogenous due to reverse causality. Since we use yearly data, we have enough observations to deal with the potential endogeneity problem of all the important explanatory variables. In using the system GMM estimation, we treat lagged variables as predetermined and the other variables as endogenous. Moreover, following Roodman (2006), the fixed province dummies are excluded, while the time dummies are used as exogenous instruments in xtabond2 in Stata (the proprietor program written by Roodman, 2006, and used in our analysis), as Roodman (p. 31) highlights:

> In system GMM, one can include time-invariant regressors ... Asymptotically, this does not affect the coefficients estimates for other regressors. This is because all instruments for the levels equation are assumed to be orthogonal to fixed effects, thus to all time-invariant variables ... However, it is still a mistake to introduce explicit fixed effects dummies, for they would still effectively cause the With Groups transformation to be applied as described in subsection 3.1. In fact any dummy that is 0 for almost all individuals, or 1 for almost all, might cause bias in the same way, especially if T is very small.

Moreover, because the two-step GMM is asymptotically more efficient than the corresponding one-step GMM, we use the two-step system GMM estimation. However, the two-step GMM presents estimates of the standard errors that tend to be severely downward biased. To solve this problem, Windmeijer (2005) proposes a small-sample correction for the two-step standard errors that would facilitate two-step robust estimations to be more efficient than corresponding one-step estimations, especially for system GMM. We take the Windmeijer correction into account in using two-step system GMM estimations. We are aware of the instrument proliferation problem in system GMM estimation highlighted in Roodman (2009). To reduce the number of instruments, we have collapsed the instruments. The two-step system GMM estimation results are presented in Table 4.

According to regression 4.1, both the Hansen and the Sargan tests for over-identifying restrictions confirm that the instrument set can be considered valid. The F-test shows that the overall regression is significant. The Arellano-Bond AR(1) test rejects the hypothesis of no autocorrelation of the first order. The Arellano-Bond AR(2) test accepts the hypothesis of no autocorrelation of the second order. After collapsing the instruments, the number of instruments is reduced to 41. These support system GMM estimation.

According to regression 4.1 in Table 4, the estimated coefficient on expenditure decentralization (i.e., $\ln(FDCEXP)$) remains positive and significant at the 5% level in system GMM estimation. The magnitude of the estimated coefficient on $\ln(FDCEXP)$ becomes larger than that in LSDV regression in Table 3. The estimated coefficient on revenue decentralization (i.e., $\ln(FDCREV)$) remains negative and significant at the 10% level in system GMM estimation. Regression 4.2 in Table 4 indicates that our results remain similar when we use the level of total investment rate (i.e., I/GDP) as the dependent variable.

It is worth discussing the source of identification in system GMM estimations. According to the quotation of Roodman, we have to exclude the fixed province effects from the system GMM regressions. However, the instruments in system GMM regressions are not capturing the fixed province effects. From the illustration, the source of identification in system GMM is using "internal" instruments: differences and lagged differences of regressors as instruments for the level equation. According to Blundell and Bond, the validity of the instruments relies on the assumption that the differences and the lagged differences of regressors are uncorrelated with the fixed province effects. Does this assumption hold? Although the over-identifying tests are known to be weak, both the Hansen test and the Sargan test for over-identifying restrictions confirm that the instrument set can be considered valid (see Table 4). Therefore, the system GMM estimation

TABLE 4.

System GMM regressions between investment rate and fiscal decentralization
Dynamic panel-data estimation, two-step system GMM (Annual provincial data: 1995-2010)

	Regression number	
	4.1	4.2
	Dependent variable as	
Independent Variable	$\ln(I/GDP)$	(I/GDP)
$\ln(FDCEXP)$	0.28^{**}	50.63^{*}
	(0.13)	(27.17)
$\ln(FDCREV)$	-0.28^{*}	-42.94^{**}
	(0.14)	(18.51)
$\ln(I/GDP)_{t-1}$	0.84^{***}	
	(0.14)	
$(I/GDP)_{t-1}$		1.00^{***}
		(0.17)
Growth	0.003	0.46^{**}
	(0.004)	(0.21)
$\ln(HC)$	-0.17	-46.03
	(0.13)	(28.96)
$\ln(EXP/GDP)$	0.06	7.09^{**}
	(0.05)	(1.18)
Time FE	Yes	Yes
Hansen OverID test (p-value)	0.99	1.00
Sargan OverID test (p-value)	0.35	0.51
Difference-in-Hansena (p-val)	0.84	0.71
Number of Instruments	41	41
Arellano-Bond test for AR(1)	$P_{r>z} = 0.003$	$P_{r>z} = 0.024$
Arellano-Bond test for AR(2)	$P_{r>z} = 0.699$	$P_{r>z} = 0.758$
F-test	14039^{***}	3.47^{***}
Observations	405	405

Note: lagged dependent variables are treated as predetermined. All other variables except the time dummies are treated as endogenous. Time dummies are used as instruments.
[a]: Difference-in-Hansen tests of exogeneity of instrument subsets for levels.
*** Significant at the 0.01 level, ** at the 0.05 level, * at the 0.10 level (corrected standard error in parentheses)

provides a valid identification of the effect of the fiscal decentralization on investment rate. Therefore, the significant effect of fiscal decentralization on the investment rate is causal.

Although there are limitations for system GMM estimation (see Roodman, 2009, p. 156), our results hold up in both LSDV and system GMM

estimations. Therefore, the significant effect of fiscal decentralization on the investment rate is robust.

3.3. Robustness checks

We have shown that our results remain similar when we use the level of total investment rate (i.e., I/GDP) rather than the logarithm of total investment rate (i.e., $\ln(I/GDP)$) as the dependent variable. In the following we split the sample into two subsamples to check the robustness of our results. The reason is double-fold. First, we can check whether our results suffer from the sample selection bias. Second, as highlighted in Roodman (2006), the system GMM estimation fits better with "large N and small T". This is because the increase in T (the number of years in the sample) would cause the instrument proliferation problem. Using smaller samples would help to reduce the number of instruments.

3.3.1. Results for 1995-2002

We first report the results for subsample 1995-2002. We first use the LSDV estimation that includes 27 province dummies and 8 time dummies and present the results in Table 5. According to regression 5.1 in Table 5, the estimated coefficient on expenditure decentralization (ln(FDCEXP)) remains positive and significant at the 1% level, while that on revenue decentralization (ln(FDCREV)) remains negative and significant at the 10% level. Regression 5.3 in Table 5 indicates that our results remain similar when we use the level of total investment rate (i.e., I/GDP) as the dependent variable.

The corresponding two-step system GMM estimation results are presented in Table 6. According to regression 6.1, both the Hansen and the Sargan tests for over-identifying restrictions confirm that the instrument set can be considered valid. The F-test shows that the overall regression is significant. The Arellano-Bond AR(2) test accepts the hypothesis of no autocorrelation of the second order. Following Roodman (2006), we have collapsed the instruments. Now the number of instruments decreases to 27. These support system GMM estimation.

According to regression 6.1 in Table 6, the estimated coefficient on expenditure decentralization ($\ln(FDCEXP)$) remains positive and significant at the 10% level, while that on revenue decentralization ($\ln(FDCREV)$) remains negative and insignificant. The results in system GMM estimation are weaker in subsample 1995-2002.

3.3.2. Results for 2003-2010

TABLE 5.

LSDV regressions between investment Rate and fiscal decentralization

	Regression number			
	5.1	5.2	5.3	5.4
	Dependent variable as			
	$\ln(I/GDP)$		(I/GDP)	
	sample period			
Indep. Vari.	1995-2002	2003-2010	1995-2002	2003-2010
$\ln(FDCEXP)$	0.30^{***}	0.29^{***}	17.00^{***}	15.87^{**}
	(0.07)	(0.11)	(3.53)	(6.30)
$\ln(FDCREV)$	-0.13^{*}	-0.30^{***}	$-6.55^{?}$	-15.28^{**}
	(0.07)	(0.11)	(3.62)	(6.81)
$\ln(I/GDP)_{t-1}$	0.48^{***}		0.48^{***}	
	(0.06)		(0.06)	
$(I/GDP)_{t-1}$		0.63^{***}		0.64^{***}
		(0.06)		(0.06)
Growth	0.0001	0.002	0.02	0.09
	(0.001)	(0.003)	(0.04)	(0.015)
$\ln(HC)$	0.01	0.04	-1.55	3.05
	(0.08)	(0.09)	(4.08)	(5.19)
$\ln(EXP/GDP)$	-0.04	-0.06^{**}	-1.58	-4.17^{**}
	(0.03)	(0.03)	(1.62)	(1.83)
Time FE	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes
R^2	0.93	0.91	0.92	0.90
Observations:	189	189	189	189

*** Significant at the 0.01 level, ** at the 0.05 level, * at the 0.10 level (Standard error in parentheses)

For subsample 2003-2010, we present the LSDV estimation results in Table 5. According to regression 5.2 in Table 5, the estimated coefficient on expenditure decentralization ($\ln(FDCEXP)$) remains positive and significant at the 1% level, while that on revenue decentralization ($\ln(FDCREV)$) remains negative and significant at the 1% level. Regression 5.4 in Table 5 indicates that our results remain similar when we use the level of total investment rate (i.e., I/GDP) as the dependent variable.

The corresponding two-step system GMM estimation results are presented in Table 6. According to regression 6.2, both the Hansen and the Sargan tests for over-identifying restrictions confirm that the instrument set can be considered valid. The F-test shows that the overall regression is significant. The Arellano-Bond AR(2) test accepts the hypothesis of no

TABLE 6.

System GMM regressions between investment rate and fiscal decentralization
Dynamic panel-data estimation, two-step system GMM

	Regression number			
	6.1	6.2	6.3	6.4
	Dependent variable as			
	$\ln(I/GDP)$		(I/GDP)	
	Sample Period			
Independent Variable	1995-2002	2003-2010	1995-2002	2003-2010
$\ln(FDCEXP)$	0.08^{*}	0.24^{***}	3.38	11.51^{*}
	(0.04)	(0.08)	(2.22)	(5.73)
$\ln(FDCREV)$	-0.06	-0.122^{*}	-4.17	-3.55
	(0.05)	(0.064)	(2.50)	(4.25)
$\ln(I/GDP)_{t-1}$	1.02^{***}		1.05^{***}	
	(0.07)		(0.09)	
$(I/GDP)_{t-1}$		0.75^{***}		0.75^{***}
		(0.12)		(0.11)
Growth	-0.001	0.03	-0.04	1.69^{*}
	(0.003)	(0.02)	(0.12)	(0.83)
$\ln(HC)$	-0.004	0.03	-1.88	4.09
	(0.10)	(0.10)	(3.97)	(5.15)
$\ln(EXP/GDP)$	-0.002	0.03	0.29	0.51
	(0.03)	(0.02)	(1.15)	(1.29)
Time FE	Yes	Yes	Yes	Yes
Hansen OverID test (p-value)	0.58	0.56	0.39	0.62
Sargan OverID test (p-value)	0.40	0.96	0.26	0.92
Difference-in-Hansena (p-val)	0.48	0.35	0.59	0.45
Number of Instruments	27	27	27	27
Arellano-Bond test for AR(1)	$P_{r>z} = 0.002$	$P_{r>z} = 0.03$	$P_{r>z} = 0.002$	$P_{r>z} = 0.03$
Arellano-Bond test for AR(2)	$P_{r>z} = 0.404$	$P_{r>z} = 0.56$	$P_{r>z} = 0.403$	$P_{r>z} = 0.42$
F-test	244472^{***}	34434^{***}	10582^{***}	3395^{***}
Observations	189	189	189	189

Note: lagged dependent variables are treated as predetermined. All other variables except the time dummies are treated as endogenous. Time dummies are used as instruments.
[a]: Difference-in-Hansen tests of exogeneity of instrument subsets for levels.
*** Significant at the 0.01 level, ** at the 0.05 level, * at the 0.10 level (corrected standard error in parentheses)

autocorrelation of the second order. Following Roodman (2006), we have collapsed the instruments. Now the number of instruments decreases to 27. These support system GMM estimation.

According to regression 6.2 in Table 6, the estimated coefficient on expenditure decentralization ($\ln(FDCEXP)$) remains positive and significant at

the 1% level, while that on revenue decentralization ($\ln(FDCREV)$) remains negative and significant at the 10% level. According to regression 6.4 in Table 6, the results in system GMM estimation becomes slightly weaker in subsample 1995-2002 when we use the level of total investment rate (i.e., I/GDP) as the dependent variable.

3.4. Discussion of the findings

The above findings suggest that expenditure decentralization raises the investment rate while revenue decentralization tends to decrease the investment rate. Our results are consistent with the findings of Jia et al. (2014). Using the county-level data, Jia et al. (2014) find the following: expenditure decentralization raises the amount of county governments' total expenditures and the ratio of capital construction spending but reduces the proportions of education and administrative expenditures, while revenue decentralization has little influence on the size or the composition of county governments' expenditures. Therefore, we follow Jia et al. (2014) to resort to the institutional background of China to rationalize our findings.

Jia et al. (2014, p. 108) state: "In China, the1994 tax-sharing reform initiated a series of fiscal reforms that recentralize the tax revenues while devolving expenditure responsibilities to the lower levels of governments." As discussed in the introduction, one goal of the 1994 fiscal reform was to increase the revenue of the central government. The reason is that, in the old negotiation-based fiscal system before 1994, the local governments have incentives to shift tax revenues to extra-budgetary revenues as much as possible to avoid the common-pool problem. As discussed in Section 2.4, although the central government in China rebates some of its tax revenues to provincial governments, on average it rebates more to poorer provinces (the rich provinces have subsidized the poor provinces), yielding the common-pool problem.

To avoid the common-pool problem (the predation from the central government), the provincial government expands their extra-budgetary income more (see Section 2.4) because extra-budgetary revenue is wholly retained by local governments. The 1994 fiscal reform tries to recentralize the tax revenues while devolving expenditure responsibilities to the lower levels of governments. As local governments have higher degrees of expenditure responsibilities, they are motivated to increase the investment rate. The political structure of the Chinese economy (often implicitly) lays out the reward and punishment mechanisms for local officials. It does not matter whether the central government evaluates its provincial officials based on growth performance (Blanchard and Shleifer, 2001) or revenue collection

(Shih et al., 2012), the bottom line is that pushing up the investment rate is a one-size-fits-all solution for local officials.

4. CONCLUSIONS

By using the provincial panel data from 1995-2010, we are provided with a consistent underlying fiscal regime through which we find that the following. Expenditure decentralization has a significant, positive effect on the physical capital investment rate. In contrast, revenue decentralization has a negative effect on the investment rate. As discussed, our findings are consistent with the two opposing views of fiscal federalism in China. The cadre promotion criteria for the ruling CCP can only be indirectly inferred, even for local officials. However, as long as the provincial officials are not elected by the local constituents but rather promoted by the ruling CCP, pushing up the investment rate is a one-size-fits-all instrument for the local officials to satisfy the preference of the central government – be it growth performance or revenue collection. For China, capital accumulation is particularly important for its growth, as observed in Chow and Li (2002). Our analysis is important in explaining the past impressive growth rates of China. Moreover, given the on-going fiscal decentralization, our analysis is also important in predicting future investment rates in China. In future studies, for example, it would be useful to look at the effect of fiscal decentralization on the composition of public investment (i.e., on productive infrastructure or non-productive public goods).

Our analysis has strong policy implications for other transitional economies. During the Mao-era (the period 1949-76), China had both political centralization and economic centralization (the essence of a central-planning regime). After the market-oriented reform initiated in 1978, China decentralized economically, while maintaining political centralization as observed by Blanchard and Shleifer, among others. China outperformed Russia, which decentralized both economically and politically in the 1990s, as highlighted by Blanchard and Shleifer. A question to be asked is, "can a country with both economic and political decentralization achieve economic success?" The economic success of developed countries including the U.S. shows that the answer is "yes". However, for a country in transition, the answer is not so clear. Nonetheless, the success of the Chinese economic structure shows a way to achieve economic prosperity. As Milton Friedman writes in his seminal book "Capitalism and Freedom" (Ch. I, pp. 7-10): "It is therefore clearly possible to have economic arrangements that are fundamentally capitalist and political arrangements that are not free."

Historical evidence indicates that it is not easy for transitional countries to achieve the ultimate goal of political freedom. Friedman praised the Chinese economic reform in his above-mentioned book. We share the belief with Friedman that economic freedom is not only a part of freedom, it is the foundation for political freedom. Although China maintained political centralization, this political centralization helped to make the economic decentralization successful, at least in getting local officials motivated to push up investment rates. If it is too risky to simultaneously decentralize both economically and politically, it makes sense to decentralize economically first, and postpone decentralizing politically until a safer time in the future. This is because economic prosperity makes a democratic regime more sustainable, and decentralizing economically and politically in two separate phases may stand a much better chance of success. We believe that the Chinese success contains some economic and philosophical wisdom, and this message is what we hope we have conveyed with our empirical analysis.

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