

The Role of Fiscal Decentralization in Regional Economic Growth in China⁺

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⁺ The previous version of this study was presented at the 2005 Taipei Conference on Taxation: Theory, Policy, and Administration at the Institute of Economics, Academia Sinica, Taipei, 115 Taiwan, December 29-30, 2005. The authors are grateful to all participants at the Conference, particularly James Alm, Chairperson of Department of Economics at Georgia State University, and Ronald A. Edwards, Assistant Professor of Economics at Tamkang University, Taipei, for their helpful comments.

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ABSTRACT

The purpose of this study is to investigate the role of fiscal decentralization in China's regional economic growth ever since fiscal reform was embarked upon in 1994. This study uses provincial-level panel data from 1996-2004 to examine the role of fiscal decentralization in China's regional economic growth. Two empirical models with the square term of fiscal decentralization as an independent variable are established. The primary finding of this study is that the relationship between fiscal decentralization and regional economic growth is a U-shaped curve. This conclusion might explain why past papers have inconstant conclusions to this problem and further provide some policy implications in this regard.

Keywords: China; Economic Growth; Fiscal Decentralization

JEL Classifications: C33; E62; H77

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1. Introduction

China's high economic growth has attracted attention all around the world ever since its economic reforms started at the end of the 1970s. How has a huge economy grown so fast? This is a very interesting issue that all economists want to know as well as to find those key factors that contribute to China's amazing economic growth. Ma (1997) thought that fiscal decentralization has been one of China's most important areas of reform and contributed to economic growth since 1978. Knight and Shi (1999) pointed out that important issues of governmental decentralization have to be well solved, involving serious principle-agent problems, as discussing China's economic growth.¹ Lin and Liu (2000) also considered that an important reform - fiscal decentralization - is a key factor contributing to such rapid economic development.² Qiao et al. (2002) indicated that fiscal decentralization has been one of the most important policy thrusts undertaken by the Chinese government during the last two decades of economic reform from planned socialism.

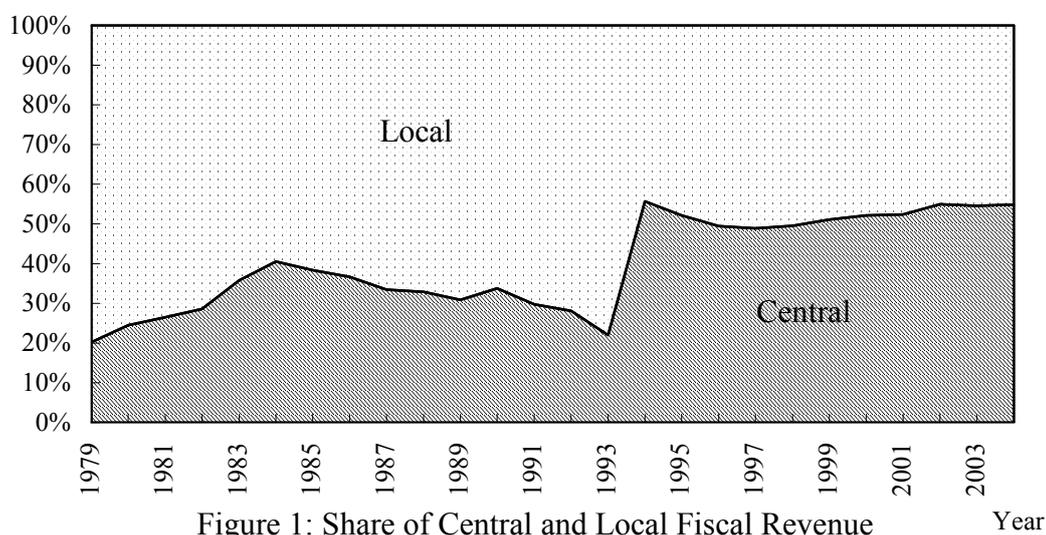
China's fiscal decentralization has been shaped by the two major fiscal reform thrusts that took place during reform period. The first fiscal reform started in 1985 and became known as the "Fiscal Responsibility System (FRS)", and the second reform started in 1994 and was termed as the "Tax Sharing System (TSS)". The major goals of the TSS were to increase both the share of government revenues in GDP and

¹ This is because China's provinces average 40 million people, making each province equivalent to a country in other parts of the world.

² Many other factors have also played important roles in the growth process. The main driving powers include rural reforms, enterprise reforms, various prices reforms, the importation of technology, the opening up of the market to international trade and foreign investment, and a flourishing non-state sector.

the share of central government revenue in the total budgetary revenue.³

The change of the central-local fiscal relation is shown in Figure 1. It presents that the fiscal structure has changed violently since 1994. The share of central government's revenue was substantially raised, but the share of regional governments' fiscal revenue suffered a reduction. It seems that fiscal power has been centralized and might cause a deficit within regional public finance.⁴ However, it does not mean that the degree of fiscal decentralization has declined. In order to explore the issue regarding fiscal decentralization, this study adopts revenue-autonomy to measure the degree of fiscal decentralization. In fact, the regional governments have to submit a part of their revenues to the central government in China's fiscal system. If a regional government is able to retain more revenue to use, then it is assumed to have a higher revenue-autonomy and a higher degree of fiscal decentralization.



Source: *China Statistical Yearbook* (State Statistical Bureau, SSB).

Note: The central and local revenue in this table represent the income from the central and local level governments themselves.

³ As pointed out by Qiao (2002), the key measures in the TSS included the introduction of a value added tax (VAT) as the major revenue source and the setting up of uniform tax-sharing rates for major taxes including VAT. The uniform tax-sharing rates replaced the previous fixed-amount remittance scheme adopted in the FRS.

⁴ Zhang (2004) also discussed this problem.

Since the TSS thus provided better incentives for local governments through separate tax administrations and through the removal of the ceiling imposed de facto by the FRS on the increase of local revenues, Figure 2 shows that the amount the regional governments should submit to the central government has almost not fluctuated. Owing to the continuous growth of the regional revenues, the regions can retain more revenue year by year, and thus there is growth in regional governmental freedom to exercise the revenues which they collect. As a result, it is shown that the degree of fiscal decentralization has become higher since the reforms in 1994.

Even though rapid economic growth has come with a higher revenue-autonomy of local governments, among the related empirical literature there is no consistent conclusion about the relationship between fiscal decentralization and regional economic growth. Zhang and Zou (1998) found a negative association between fiscal decentralization and provincial economic growth,⁵ but Lin and Liu (2000) saw

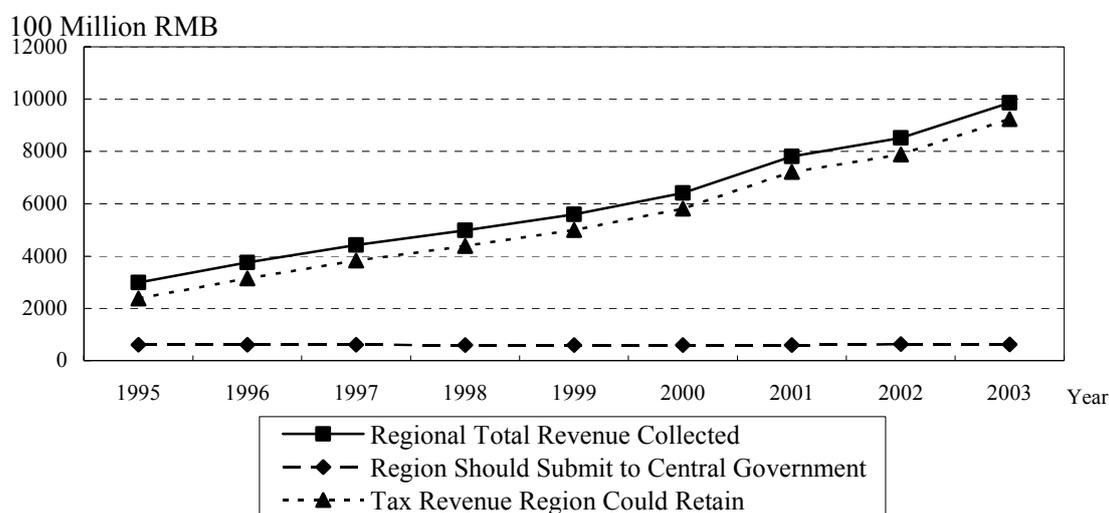


Figure 2: The Distribution of China's Regional Revenue

Source: *Finance Yearbook of China* (State Statistical Bureau, SSB).

Note: The central and local revenue in this table represent the income from the central and local level governments themselves.

⁵ Zhang and Zou (1998) explained that some key infrastructure projects may have a far more significant impact on growth across provinces than in each province, such as highways, railways, and energy.

a contrary result. Some studies in the theoretical literature also found unanimous approval for a positive contribution from fiscal decentralization to regional economic growth, because fiscal decentralization could improve the efficiency of resource allocation.

The above inconsistent conclusions might imply that both absolute fiscal centralization and decentralization might be the two most efficient extremes that benefit regional economic growth. This study thus conjectures that the effect of fiscal decentralization on regional economic growth might be non-linear.⁶ That is to say, the relationship between these two variables could be a U-shaped curve. Therefore, the primary purpose of this study is to examine the possible non-linear relationship between fiscal decentralization to regional economic growth in China.

The rest of the article proceeds as follows. Section 2 reviews the related theoretical and empirical literature followed by a description of the fiscal decentralization and regional economic growth in China in Section 3. In Section 4, empirical models and data adopted in this study are introduced. Section 5 analyzes empirical results and Section 6 provides conclusions and some policy implications.

2. Literature Review

As reviewing the theoretical literature, it is found that almost all articles approve that fiscal decentralization may have a positive effect on economic growth. Hayek (1945) discussed the use of knowledge in society, suggesting that local governments have better access to local information than central ones do. This allows them to

⁶ Martinez-Vazquez and McNab (2005) ever examined whether a non-monotonic relationship exists between decentralization and growth by including the square of decentralization as an additional variable. However, the estimated coefficients for the decentralization and its squared terms were both insignificant and failed to detect a statistically significant direct relationship between decentralization and economic growth.

provide public goods and services that better match local preferences than the national government. Oates (1972, 1993) suggested that local governments are better positioned than the national government to deliver public services and match local preferences and needs. Therefore, fiscal decentralization increases economic efficiency.⁷ Bahl and Linn (1992) and Bird and Wallich (1993) also considered that fiscal decentralization or the devolution of fiscal power is seen as a way to improve efficiency of the public sector, cut the budget deficit, and stimulate economic growth.

Davoodi and Zou (1998) provided two essential and complementary assumptions for this conclusion. The first assumption is that local governments are better positioned than a central government to provide public services, because local governments have information advantages. The second assumption is that population mobility and competition among local governments ensure the matching of local public services' provision and local communities' needs. The former is based on "Oates' Decentralization Theorem" proposed by Oates (1972) and the latter is in the spirit of "Voting with feet theorem" constructed by Tiebout (1956).⁸ Qian and Weingast (1997) also indicated that fiscal decentralization raises the degree of jurisdictional competition, a disciplinary device to punish inappropriate market intervention by lower government officials,⁹ and further improves the local economic

⁷ As mentioned in Oates (1993), "The basic economic case for fiscal decentralization is the enhancement of economic efficiency: the provision of local outputs that are differentiated according to local tastes and circumstances result in higher levels of social welfare than centrally determined and more uniform levels of outputs across all jurisdictions. There surely are strong reasons, in principle, to believe that policies formulated for the provision of infrastructure and even human capital that are sensitive to regional or local conditions are likely to be more effective in encouraging economic development than centrally determined policies that ignore these geographical differences."

⁸ There is a close relationship between these two assumptions, because the "Oates' Decentralization Theorem" essentially is based on the belief that local residents could freely move and choose jurisdictions that provide different packages of public services and local taxes, and this is what Tiebout thought

⁹ In a federal system, however, the mobility of resources across regions raises the opportunity costs to local governments of bailing out inefficient firms or wasteful public expenditures will find it harder to attract mobile resources. Therefore, competition endogenously hardens the budget constraints of local government and changes the incentives of local politicians.

efficiency and provides positive effect on local economic growth.

While most theoretical papers suggest that fiscal decentralization is beneficial to stimulate economic growth, empirical papers do not show unanimous evidence. Some empirical papers have contrary conclusions and some do not find any relationship between fiscal decentralization and economic growth. However, this mixed picture of existing evidence of decentralization on economic growth is primarily due to the different number of countries (single country or cross-countries) in the research.

For research dealing with cross-countries data, Davoodi and Zou (1998) used a panel dataset of 46 countries over the period of 1970-1989 to find that the negative contribution of fiscal decentralization to economic growth exists in developing countries, but there is an insignificant contribution in developed countries.¹⁰ Martinez-Vazquez and McNab (2003) pointed out that there are multiplicities of potentially indirect effects of decentralization on growth.¹¹ Later Martinez- Vazquez and McNab (2005) used an unbalanced base panel data set of 982 observations for 52 developed and developing countries with observations ranging from 1972 to 1997 and failed to observe evidence of a direct relationship between decentralization and growth, but found that fiscal decentralization appears to have a positive indirect effect on economic growth through its beneficial impact on price stability.¹² In addition,

¹⁰ Davoodi and Zou (1998) provided several explanations. First, capital and infrastructure spending make a positive contribution to growth, but welfare and current spending do not. Excessive spending on the wrong expenditure items may lead to lower growth. Second, lower growth can result from the wrong revenue assignment among various levels of government. Third, revenue collection and expenditure decisions by local governments may still be constrained by the central government in developing countries. Fourth, local governments may not be responsive to local needs. This can occur when local officials are not elected by local residents and local residents are too poor to “vote with their feet.”

¹¹ These indirect factors include consumer efficiency, producer efficiency, the geographical distribution of resources, macroeconomic stability, corruption, and capture by elites

¹² Martinez-Vazquez and McNab (2005) examined both potential direct and indirect impacts of decentralization in the full sample of countries using a two-way fixed effects model. They also indicated that poorly designed or implemented fiscal decentralization policies may create incentives for sub-national governments to over-borrow relative to their debt-servicing capacity and potentially lead to macroeconomic instability. It appears that, by allowing governments at different levels to mobilize

Iimi (2005) used the latest cross-country data for the period from 1997 to 2001 to find that there is a significantly positive relationship between the per capita GDP growth rate and fiscal decentralization,¹³ which is measured by the local share of the expenditure to total government expenditure.

There is also a mixed picture of existing evidence of fiscal decentralization on economic growth in a single country. Taking the U.S. as an example, Xie et al. (1999) found that the existing spending shares for local and state governments are consistent with growth maximization, and that fiscal decentralization may be detrimental to growth.¹⁴ Moreover, Agundez-Garcia (2000) measured fiscal decentralization as the fraction that represents tax revenue directly collected by a regional government over this sub-national government's total revenues and found a negative relation between fiscal decentralization and regional economic growth in Spain.¹⁵ However, Akai and Sakata (2002) and Stansel (2005) both achieved consistent empirical results with the theoretical viewpoint which is that decentralization enhances economic growth. The former used the ordinary least squares (OLS) technique and new state-level data for the U.S. from 1988 to 1996,¹⁶ and the latter used a new panel dataset of 314 U.S. metropolitan areas.

With respect to China, the relationship of fiscal decentralization on economic growth is also unclear. Zhang and Zou (1998) measured fiscal decentralization by the ratio of provincial spending to total central spending and found that a higher degree of

their own revenues, decentralization ultimately leads to more stable prices.

¹³ Iimi (2005) dealt with two important econometric issues, endogeneity and cross-country heterogeneity, by using the instrument variables (IV) technique and incorporated income-group and region-specific fixed effects in the empirical model.

¹⁴ Xie et al. (1999) used annual time series data for the U.S. economy from 1948 to 1994 and estimated the growth regression equation by using the ordinary least squares (OLS).

¹⁵ Agundez-Garcia (2000) implemented a panel dataset of 15 regions in Spain from 1991 to 1996 and the ordinary least squares (OLS) technique.

¹⁶ Akai and Sakata (2002) believed that the new data are more objective than previous data, because the dataset does not cover a period of high economic growth and there are no substantial historical or cultural differences across observations in a single country.

fiscal decentralization of government spending is associated with lower provincial economic growth in China, because the central government may be better positioned to undertake public investments with nation-wide externalities in the early stage of economic development.¹⁷ In addition, Ma (2000) measured the degree of fiscal decentralization by the average share of government budgetary revenue retained by a province and found a consistent conclusion with the theoretical literature.¹⁸ An argument made by Lin and Liu (2000) is that Zhang and Zou (1998) and Ma (2000) both used a problematic measure for decentralization and failed to take into account other concurrent reforms.¹⁹ Lin and Liu (2000) measured the degree of fiscal decentralization by the marginal retention rate of locally-collected budgetary revenues by the provincial government and found that fiscal decentralization raises the growth rate in China mainly by improving the efficiency of resource allocation rather than inducing more investment.²⁰

Recently Jin and Zou (2005) adopted a panel dataset for 30 provinces in China to examine the relationship between fiscal decentralization and economic growth over two phases of fiscal decentralization in China: the fiscal contract system (1979-1993) and the tax assignment system (1994-1999). They used two measures of expenditure decentralization and two measures of revenue decentralization in empirical models and found that further revenue decentralization and expenditure centralization

¹⁷ Zhang and Zou (1998) used a panel dataset from 1980 to 1992 for 28 provinces and thought that the current stage of economic growth in China should be taken into account, and their empirical results do provide some policy implications. Some key infrastructure projects may have a far more significant effect on growth across provinces than their counterparts in each province.

¹⁸ Ma (2000) used data from 1980 to 1991 in China and. He used the ordinary least squares (OLS) technique to examine the relationship between fiscal decentralization and economic growth.

¹⁹ Lin and Liu (2000) claimed that the province with the highest local spending would also be the one that enjoys the highest degree of fiscal latitude, which is unreasonable and that Ma (2000) failed to capture the dramatic change in the central-provincial relationship.

²⁰ Lin and Liu (2000) considered that fiscal decentralization started in 1985 and used province-level panel data of 28 provinces (Hainan and Xizang are excluded) in China for the period 1970-93 and included separate proxies for major reforms in the empirical investigation. They also suggested that rural reform and the development of the non-state sector were other important driving forces of China's impressive growth.

promote growth under the fiscal contract system.²¹ However, under the tax assignment system provincial economic growth rate is shown to have no statistically significant association with expenditure decentralization, and is negatively (rather than positively) associated with revenue decentralization.

3. Fiscal Decentralization and Regional Economic Growth in China

According to the literature reviewed above, it is found that fiscal decentralization might be an important factor to affect economic growth, particularly in China. This study adopts the degree of revenue-autonomy to measure the degree of fiscal decentralization based upon the existing literature. Therefore, two variables - *FDA* and *FDB* - are utilized to measure the degree of fiscal decentralization and are added into the empirical models to confirm the consistency of empirical results. These two variables are specified as follows.

$$FDA_{i,t} = (RR_{i,t} - SUBMIT_{i,t}) / RE_{i,t} \quad (1)$$

$$FDB_{i,t} = (RR_{i,t} - SUBMIT_{i,t}) / (RR_{i,t} - SUBMIT_{i,t} + TRANS_{i,t}) \quad (2)$$

In equations (1) and (2), *FDA*_{*i,t*} denotes region *i*'s share of retained revenue in total expenditure in period *t*, *FDB*_{*i,t*} represents region *i*'s share of retained revenue in total revenue in period *t*. In addition, *RR*_{*i,t*} represents region *i*'s revenue in period *t*, *SUBMIT*_{*i,t*} is the amount region *i* should submit to the central government in period *t*, *RE*_{*i,t*} is region *i*'s total expenditure in period *t*, and *TRANS*_{*i,t*} is the transfer from the central government to region *i* in period *t*, where *i*=1, 2, . . ., 31; *t*=1995, 1996, . . .,

²¹ Two measures of expenditure decentralization are the provincial budgetary expenditure (a share in total budgetary expenditure) and the provincial extra-budgetary expenditure (a share in total extra-budgetary expenditure). The two measures of revenue decentralization are the provincial budgetary revenue (a share in total budgetary revenue) and the provincial extra-budgetary revenue (a share in total extra-budgetary revenue).

2003. The higher the value is of *FDA* or *FDB*, the higher the degree will be of fiscal decentralization.

The figures of *FDA* and *FDB* for China's 31 provinces from 1995 to 2003 have been calculated in this study and selected years of *FDA* and *FDB* values as well as the regional real GDP growth rates in 1995, 2001, and 2003 for all 31 regions in China are presented in Table 1. According to Table 1, it is shown that the disparity of fiscal decentralization among regions has been enlarged. The difference between the maximum and minimum value of *FDA* in 2001 is higher than its counterpart in 1995. The former is 64.41%, but the latter is 50.2%. This conclusion is also true while using *FDB* as proxy for fiscal decentralization. The differences between the maximum and minimum value of *FDB* in 2001 and 1995 are 76.09% and 63.43%, respectively.

Regarding *FDA* in these 3 years, the top 5 regions with higher *FDA* in 1995 were Hainan, Guangdong, Fujian, Guangxi, and Sichuan, accordingly. In 2001, Shandong, Beijing, and Zhejiang replaced Hainan, Guangxi, and Sichuan as one of the top five regions. However, in 2003, Shanghai replaced Fujian as one of the top five regions. The region with the lowest *FDA* in these 3 years was Tibet. The degree of revenue-autonomy has increased during this period in 17 regions, but decreased in 14 regions. The 5 regions with the highest increase in *FDA* during this period were Shanghai, Beijing, Jiangsu, Zhejiang, and Tianjin, accordingly. However, the 5 regions with the highest decrease in *FDA* during this period were Hainan, Gansu, Qinghai, Jilin, and Jiangxi, accordingly.

Using *FDB* as the indicator to represent fiscal decentralization instead, the top 5 regions with higher *FDB* in 1995 were Hainan, Guangdong, Fujian, Sichuan, and Jiangxi, accordingly. In 2001, the top 5 regions with higher *FDB* were the same as those with higher *FDA*. However, in 2003, Jiangsu and Shanghai replaced Shandong

Table 1: FDA, FDB, and Regional Real GDP Growth Rate in Selected Years (%)

Region	FDA			FDB			Real GDP Growth Rate		
	1995	2001	2003	1995	2001	2003	1995	2001	2003
Beijing	27.84	61.69	65.09	44.19	72.14	74.88	9.2	11.20	10.70
Tianjin	20.09	44.59	45.64	33.90	57.26	56.64	14.3	12.00	14.80
Hebei	36.25	43.31	40.68	51.04	51.87	47.44	13.5	8.70	11.60
Shanxi	35.84	35.86	37.36	54.79	43.38	44.11	11.0	8.40	13.90
Inner Mongolia	33.06	24.87	27.42	40.47	28.97	33.28	12.7	9.60	16.80
Liaoning	28.51	37.07	37.45	45.39	48.07	48.35	8.6	9.00	11.50
Jilin	37.71	29.78	28.85	49.26	36.46	33.75	13.7	9.30	10.20
Heilongjiang	33.02	34.58	35.67	48.33	42.63	42.32	10.5	9.30	10.30
Shanghai	19.22	55.54	60.86	33.62	68.15	70.07	13.0	10.20	11.80
Jiangsu	19.91	52.09	54.84	34.98	67.38	67.80	12.2	10.20	13.60
Zhejiang	21.89	56.01	56.56	37.00	72.81	70.39	12.7	10.50	14.40
Anhui	37.39	36.34	35.33	53.83	44.35	41.58	14.4	8.30	9.20
Fujian	46.60	58.26	53.98	61.90	72.12	65.87	15.4	9.00	11.60
Jiangxi	40.73	32.52	32.25	55.54	43.77	42.59	13.4	8.80	13.00
Shandong	38.79	60.19	57.14	53.74	72.34	67.29	12.2	10.10	13.70
Henan	39.44	40.00	38.43	50.95	48.47	43.83	13.9	9.10	10.80
Hubei	27.10	35.07	35.13	43.34	42.10	41.97	13.2	9.10	9.40
Hunan	38.98	36.45	37.88	51.43	42.98	43.33	12.2	9.00	9.60
Guangdong	48.75	69.17	61.29	64.42	81.65	74.70	10.7	9.60	14.30
Guangxi	44.79	40.50	40.11	54.14	48.69	45.64	8.3	8.20	10.20
Hainan	53.52	41.26	37.66	67.45	52.83	44.51	4.8	8.90	10.50
Chongqing	19.56	28.88	35.05	38.72	35.65	42.47	11.2	9.00	11.50
Sichuan	44.35	39.99	40.53	56.00	44.39	44.98	10.1	9.20	11.80
Guizhou	35.56	31.01	33.05	43.71	35.59	36.14	8.9	8.80	10.10
Yunnan	32.39	33.30	34.66	39.91	38.71	39.08	10.4	6.50	8.60
Tibet	3.32	4.76	5.00	4.02	5.56	5.57	13.2	12.80	12.10
Shaanxi	37.86	32.43	35.95	49.25	38.44	40.84	10.2	9.10	10.90
Gansu	36.59	25.93	27.23	41.54	28.68	29.01	11.5	9.40	10.10
Qinghai	25.87	15.07	16.56	30.39	17.26	19.85	8.6	12.00	12.10
Ningxia	25.74	20.26	21.68	35.15	26.88	28.63	18.1	10.10	12.20
Xinjiang	33.85	31.78	34.03	41.60	33.18	34.63	6.4	8.10	10.80

Source: Various issues of the *Finance Yearbook of China* and of the *China Statistical Yearbook*.

and Fujian as the top five regions. In addition, the 5 regions with the highest increase in *FDB* during this period were the same as those with the highest increase in *FDA*, but in different order. However, the 5 regions with the highest decrease in *FDA* during this period were Hainan, Jilin, Jiangxi, Gansu, and Anhui, accordingly.

Based upon Table 1, the top 5 regions with the highest real GDP growth rates in 1995 were Ningxia, Fujian, Anhui, Tianjin, and Henan, accordingly. In 2001, Tibet,

Tianjin, Qinghai, Beijing, Zhejiang became the top 5 regions with the highest real GDP growth rates. In 2003, Inner Mongolia, Guangdong, and Shanxi replaced Tibet, Qinghai, and Beijing in this group. Moreover, Hainan, Xinjiang, Inner Mongolia, Guangdong, and Qinghai were the 5 regions with the biggest increase in their real GDP growth rate during this period. However, Jilin, Hubei, Fujian, Anhui, and Ningxia were the 5 regions with the lowest increase in their real GDP growth rate.

According to Table 1, it is found that several regions with a highest or lowest degree of fiscal decentralization displayed a remarkable economic growth rate. Some regions categorized in the eastern region had a higher degree of fiscal decentralization and revealed a better economic growth performance. However, some in the western area with a very low degree of fiscal decentralization still showed a higher economic growth.

To sum up, this finding could propose that there is a relationship between fiscal decentralization and economic growth. However, this relation might not be linear, and could be non-linear. Therefore, this study has tried to use an empirical model to accurately examine the relationship between fiscal decentralization and regional economic growth to further investigate the hypothesis of a non-linear relation.

4. Empirical Model

As mentioned above, the purpose of this study is to investigate the role of fiscal decentralization in China's regional economic growth. In this study other factors which may affect regional economic growth suggested by other studies are also considered including the annual growth rate of regional fixed asset investment, the total value of imports and exports, the population growth rate, and the retail price index by region. In order to examine whether or not the non-linear relationship

between fiscal decentralization and regional economic growth exists, aside from the core variable (the measure of the fiscal decentralization), this study adds the square term of fiscal decentralization as an independent variable in the regression model.

This study uses panel data of 31 provinces in China from 1996 to 2004. However, different policies and the unbalanced distribution in resource allocation across regions could cause a disparity of economic development among regions. If these regional characteristics are ignored, it might lead to a biased estimation result.²² The best way to cope with this issue is the fixed effect model. However, due to relatively more individuals and shorter time period, the empirical model could encounter a multicollinearity problem and make most estimated parameters insignificant. This problem also occurs in Hyclak (1996), Liu and Huang (2003), and Huang et al. (2005).²³ Therefore, this study employs the ordinary least square (OLS) method to estimate two model specifications: one uses *FDA* and the other substitutes *FDA* with *FDB* as a measurement of fiscal decentralization. The empirical model is represented as follows:

$$GGDP_{i,t} = \beta_0 + \beta_1 FD_{i,t-1} + \beta_2 FDSQ_{i,t-1} + \beta_3 GFA_{i,t-1} + \beta_4 \log(OPEN)_{i,t-1} + \beta_5 GPOP_{i,t-1} + \beta_6 RPI_{i,t-1} + \sum_{k=1}^2 \gamma_k AREA_{i,k} + \beta_7 T_{i,t} + \varepsilon_{i,t} \quad (3)$$

In equation (3), $GGDP_{i,t}$ represents the region i 's real GDP growth rate in year t , and $T_{i,t}$ represents the time trend, where $i = 1, 2, \dots, 31$; $t = 1996, 1997, \dots, 2004$.

²² The regional characteristics also include geographical features and different cultural customs across regions.

²³ Hyclak (1996) used panel data from 200 U.S. metropolitan cities during the 1976 to 1984 period, and Hyclak studied the structure changes in labor demand and unemployment in this period. Liu and Huang (2003) studied the determinants of the differences in the unemployment rate between regions in Taiwan and further showed those factors which affect women's unemployment rate. Huang et al. (2005) analyzed the relationship between the efficiency of local governments and foreign direct investments. These three papers have the same problem as our analysis does.

Since this study uses FDA or FDB as the proxy for fiscal decentralization, $FD_{i,t-1}$ could be either $FDA_{i,t-1}$ or $FDB_{i,t-1}$. In addition, $FDSQ_{i,t-1}$ is the square term of $FD_{i,t-1}$, while $GFA_{i,t-1}$, $GPOP_{i,t-1}$, and $RPI_{i,t-1}$ represent region i 's annual growth rate of regional fixed asset investment, the population growth rate, and the retail price index in year $t-1$, respectively. Moreover, $OPEN_{i,t-1}$ represents region i 's total value of imports and exports which is in logarithmic form. Owing to the potential differentials among areas, this study adds two area dummies representing the eastern and central areas. Finally, in order to avoid the problems of causality or endogeneity between dependent and any independent variables, all explanatory variables, except for time variable and area dummies, are lagged by one year. Therefore, there are 279 observations (31 regions from 1996-2004) in our empirical models.

With regard to data sources, all explanatory variables are obtained from various issues of the *China Statistical Yearbook* and the fiscal decentralization variable is from various issues of the *Finance Yearbook of China*.²⁴ Since Chongqing has been promoted to a municipality separated from Sichuan since 1997, its administrative divisions have been changed.²⁵ Therefore, Chongqing's related data before 1997 are obtained from various issues of the *Chongqing Statistical Yearbook*, *Sichuan Statistical Yearbook*.²⁶ The following illustrates the expected influence of all explanatory variables on the regional economic growth and the summary is provided in Table 2.

The primary independent variable in this study is fiscal decentralization. According to Zhang and Zou (1998), there is a negative relationship between fiscal

²⁴ Some regions lack the amount that a region should submit to the central government, and so we use the former and latter data to estimate it.

²⁵ The new administrative divisions include Chongqing, Wanxian, Fuling, and Qianjiang.

²⁶ Some new administrative divisions' data could be obtained from the *Chongqing Statistical Yearbook* and *Sichuan Statistical Yearbook* after the 1997 issues. If it could not be gotten from the later issues, then we use the new administrative divisions.

Table 2: Variable Descriptions and Statistics

Variables	Descriptions	Mean	Expected effect
$GGDP_t$	Annual growth rate of regional real GDP in year t . (%)	10.38 (2.11)	
FDA_{t-1}	The ratio of the amount of revenue collected and retained by every region divided by every region's total expenditure in year $t-1$. (%)	38.54 (12.02)	—
FDB_{t-1}	The ratio of the amount of revenue collected and retained by every region divided by the summation of the amount of revenue collected by each region and the net transfer from central government to every region in year $t-1$. (%)	48.71 (14.64)	—
$FDASQ_{t-1}$	The square term of FDA in year $t-1$.	1629.56 (929.09)	+
$FDBSQ_{t-1}$	The square term of FDB in year $t-1$.	2585.55 (1358.69)	+
GFA_{t-1}	Annual growth rate of regional fixed asset investment in year $t-1$. (%)	16.35 (11.68)	+
$OPEN_{t-1}$	Total value of imports and exports by region in year $t-1$. (100 million RMB)	1198.78 (2772.24)	+
$GPOP_{t-1}$	Population growth rate by region in year $t-1$. (%)	1.06 (2.20)	—
RPI_{t-1}	Retail price index by region in year $t-1$, preceding year = 100 (%)	101.57 (5.65)	+
$EAST_t$	=1 if regions are categorized in the eastern area; =0 otherwise.	0.39 (0.49)	+
$CENTRAL_t$	=1 if regions are categorized in the central area; =0 otherwise.	0.29 (0.45)	+
T_t	Time trend=1 in 1996 and increases by 1 each year	5.00 (2.59)	+
Observations		279	

Source: Various issues of the *China Statistical Yearbook*, *Finance Yearbook of China*, *Chongqing Statistical Yearbook*, and *Sichuan Statistical Yearbook*.

Notes: 1. In addition to $GGDP_t$, T_t , $EAST_t$, and $CENTRAL_t$, other explanatory variables are lagged by one year.

2. $GGDP_t$ is in real terms (in 1994 prices), and other variables are counted by a nominal amount.

decentralization and regional economic growth. However, Oates (1972), Oates (1993), and Bahl and Linn (1992) suggested that fiscal decentralization could improve the

efficiency of resource allocation so as to stimulate regional economic growth. As discussed earlier, perfectly fiscal centralization and decentralization may be the two most efficient extremes beneficial to regional economic growth. Therefore, this study proposes a non-linear (U-shaped) relationship between fiscal centralization and regional economic growth and expects that the sign of *FDA*'s and *FDB*'s coefficients might be negative, but coefficients of their square-term are expected to have a positive sign.

In the economic growth literature, investment is always an important factor which positively contributes to an economy. Zhang and Zou (1998) and Lin and Liu (2000) both regard investment as an important variable. It is thus expected that the coefficient of the annual growth rate of regional fixed asset investment should have a positive sign. Regarding openness measured by the sum of exports and imports, it is assumed that the higher the degree of openness is, the more the economy is free. As proposed by Feder (1983), exports could induce a more efficient allocation of resources in the domestic market, because home products should compete with other developed countries or transnational corporations. Moreover, imports could introduce advanced technologies from developed countries or transnational corporations. Therefore, if trade is not limited to too many constraints, then it is beneficial to promote economic growth. Both Zhang and Zou (1998) and Xie et al. (1999) used openness as an explanatory variable and found a positive effect on economic growth. It is thus suggested that openness should have a positive contribution to regional economic growth.

Zhang and Zou (1998) and Xie et al. (1999) both added the annual growth rate of the labor force as an explanatory variable to their models. The former achieved a positive result in China, but the latter could not obtain a consistent result. Although

labor force is a very important input in the production function, China's big population could result in an unnecessary labor force, as growth in the labor force could not raise the value of economic output, and instead might damage economic growth. Due to lack of labor force data, this study replaces the annual labor force growth rate with the annual population growth rate. This study thus expects a negative effect of the annual growth rate of population growth rate on economic growth.²⁷

This study also considers a price factor in the empirical model by following Zhang and Zou (1998). The retail price index is employed to substitute for inflation and to examine whether or not the price factor affects regional economic growth.²⁸ Since the influence of the retail price index on regional economic growth is positive in Zhang and Zou (1998), this finding is expected to exist in this study. Finally, two area dummies representing the east and central areas are included in the regression models in order to control different area characteristics. Owing to regions in the eastern and central areas having more rapid economic growth, it is thus expected that the coefficient of these two dummy variables should be positive.

5. Empirical Results

As mentioned above, the purpose of this study is to examine the influence of fiscal decentralization on regional economic growth. Using provincial-level panel data of 31 regions in China during 1996 to 2004 and ordinary least square technique, the estimation results of equation (3) are presented in Table 3. Since all specifications are found to have a heteroskedasticity problem (the χ^2 statistics of Breusch-Pagan both reject the critical value in $\alpha=0.01$), the corrected covariance matrix proposed by

²⁷ China does not calculate the size of its labor force, and it is very difficult to be estimated, because of some special labor systems in China, such as the registered unemployment rate and laid-off workers.

²⁸ Zhang and Zou (1998) also used the retail price index to substitute for inflation.

White (1980) is used.²⁹ After taking account of heteroskedasticity, the estimations of two models with different variables of fiscal decentralization are reported in Table 3. The *F*-statistics in the two models both reject the null hypothesis which assumes the coefficients are all zero in $\alpha=0.01$. Based upon some tests for econometric issues, such as model misspecification, autocorrelation, and multicollinearity, it is suggested that conclusions provided by this study are very reliable.³⁰

With regard to the influence of fiscal decentralization, it is found that the coefficients of *FDA* and *FDB* are both significantly negative at the 1% significance level in models 1 and 2, respectively. It reveals a negative relationship between fiscal decentralization and regional economic growth, whereby if the degree of fiscal decentralization of a region increases, then this region's economic growth will slow down. This negative finding is consistent with the conclusion in Zhang and Zou (1998) and in some studies,³¹ but contrary to the point of view in theory and in Lin and Liu (2000) possibly due to different research periods.³² In addition, *FDASQ* and *FDBSQ* are both positive and significant at the 1% significance level, meaning that if the degree of fiscal decentralization is higher, then the negative influence of fiscal decentralization on regional economic growth will be mitigated. That is to say, there is a U-shaped relationship between fiscal decentralization and regional economic growth. This conclusion also answers the question for why their relation is not consistent in the literature.

²⁹ In fact, the usual set of OLS results is given, but with a revised robust covariance matrix.

³⁰ According to the LM test, these two models both reject the existence of autocorrelation. In addition, in order to testify the hypothesis of model misspecification, the RESET (Regression Specification Error Test) test is adopted and shows models in this study do not have this problem. Finally, none of the pair-wise correlation coefficients are greater than 0.8 and thus conclude no multicollinearity in the empirical models.

³¹ Other studies on a single country or on cross-countries also have negative findings.

³² This study focuses on fiscal reform since 1994 in China, but Lin and Liu (2000) examined this effect from 1978 to 1993 and got a positive result.

Table 3: Estimation Results

Variables	Model 1		Model 2	
	coefficient	t-value	coefficient	t-value
Constant	-12.14	-3.96	-12.25 ***	-3.83
FDA _{t-1}	-0.13 ***	-4.66		
FDASQ _{t-1}	1.20×10 ⁻³ ***	3.63		
FDB _{t-1}			-0.11 ***	-4.29
FDBSQ _{t-1}			8.84×10 ⁻⁴ ***	3.49
GFA _{t-1}	5.75×10 ⁻² ***	5.39	5.96×10 ⁻² ***	5.53
log(OPEN _{t-1})	0.42 ***	4.45	0.44 ***	4.09
GPOP _{t-1}	-5.80×10 ⁻²	-1.50	-6.28×10 ⁻² *	-1.61
RPI _{t-1}	0.19 ***	6.52	0.19 ***	6.39
EAST _t	0.96 ***	3.46	1.04 ***	3.58
CENTRAL _t	0.74 ***	3.20	0.80 ***	3.36
T _t	0.41 ***	9.69	0.38 ***	7.98
Sample size	279		279	
Adjusted R ²	0.56		0.56	
F statistic	40.80 ***		40.80 ***	
Breusch-Pagan statistic	83.25 ***		83.25 ***	
LM test	0.23		0.15	
RESET test	0.85		0.71	

Notes: 1. The dependent variable is the annual growth rate of regional real GDP.

2. The estimations are corrected for heteroskedasticity according to White (1980).

3. Asterisks indicate variables whose coefficients are significant at the 10% (*), 5% (**), and 1% (***) levels.

The explanations of this finding are as follow. As discussed earlier, according to Hayek (1945), Zhang and Zou (1998), Oates (1972, 1993), Lin and Liu (2000), both absolute fiscal centralization and decentralization might be the two most efficient extremes that benefit regional economic growth. In the situation of perfectly fiscal centralization, it implies that the central government takes full responsibility of undertaking public investment and economic planning, however, perfectly fiscal decentralization implies that the local government takes full responsibility. However, partial fiscal centralization/decentralization does not well define who will take full

responsibility of public investment and economic planning, and this might further cause possible conflicts between central and local governments and possible overinvestment or inefficient investment which might damage a regional economy.

This U-shaped relation has been drawn in Figure 3. According to Figure 3, it is revealed that at the beginning, fiscal decentralization might be disadvantageous to regional economic growth due to possible conflicts between central and local governments which might further cause inefficient investment or overinvestment. However, along with the enhancement of the degree of fiscal decentralization, the negative marginal effect will be reduced. Based upon empirical results, the critical levels of fiscal decentralization in both models which have the lowest regional economic growth are 52.56% and 61.67%. Passing these levels will improve economic efficiency and further positively contribute to regional economic growth.

In addition to fiscal decentralization, other factors also play important roles in regional economic growth in China. It is found that each explanatory variable has the same sign of coefficient in two models and all explanatory variables are significant in $\alpha=0.1$ in both models, except for GPOP in model 1. The annual growth of regional fixed asset investment contributes positively to regional economic growth, and it is consistent with the expectation of theoretical and empirical literature. This study uses the total value of imports and exports by region to measure openness, suggesting a positive influence of openness on regional economic growth, because openness is always expected to improve economic efficiency. The price factor in this study reveals a positive relation to regional economic growth - i.e., inflation may positively relate with regional economic growth. This positive relation also meets our expectation.

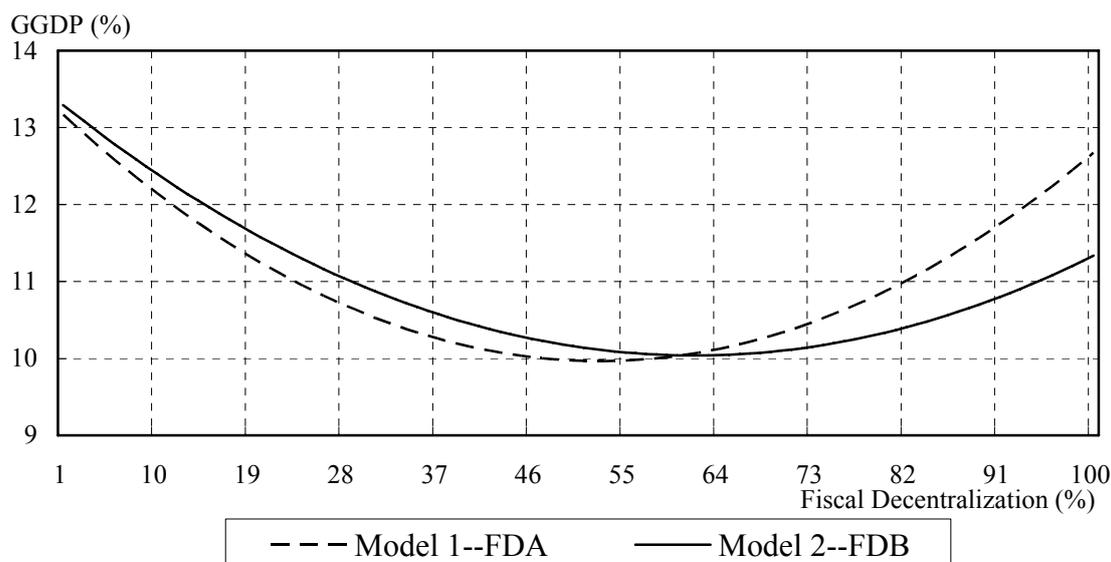


Figure 3: The Relationship between Fiscal Decentralization and Regional Economic Growth

It is consistent with our expectation that the population growth rate is negatively related to regional economic growth in model 2. That is to say, if a region has more rapid population growth, then it will lead to lower economic growth. This further implies that there is already an excess of labor force in China, and any growth in the labor force cannot benefit economic growth. These findings show that there is a very serious population problem in China, and significant population growth will cause an economic recession. The regional differential, coefficients of the eastern and central areas are both significant and positive, meaning that regions in both areas have relatively high economic growth rates rather than their counterparts in the west region. Furthermore, the coefficient of the eastern area is higher than that of the central area. Finally, the time variable is also positive, implying an upward regional economic growth trend.

6. Concluding Remarks

The purpose of this study is to investigate the role of fiscal decentralization in China's regional economic growth. This study uses China's provincial-level data of 31

regions from 1996 to 2004 and the ordinary least square technique to explore this issue. After controlling the problem of heteroskedasticity, the primary finding of this study is that fiscal decentralization has a U-shaped relation with regional economic growth, which means it contributes negatively to regional economic growth at the initial stage of fiscal decentralization. However, the negative effect is reduced along with the enhancement of the degree of fiscal decentralization. After passing the critical level, fiscal decentralization will benefit regional economic growth. Other factors, such as the annual growth of regional fixed asset investment, the total value of imports and exports, inflation, the population growth rate, areas, and a time trend, are all important to regional economic growth.

According to the primary finding of this study, perfectly fiscal decentralization might not be the only system to stimulate regional economic growth, as instead perfectly fiscal centralization might be able to fulfill this goal as well. However, if fiscal decentralization is the mainstream fiscal system and it is very hard to return to the initial situation of perfectly fiscal centralization, then this study suggests that China's government has to take a bigger step of fiscal reform in the future. As a matter of fact, the values of *FDA* and *FDB* in all of China were merely 45.35% and 52.77% in 2003, both below its respective critical levels of 52.56% and 61.67%. This reveals that the degree of fiscal decentralization is under the critical level, and still has the disadvantageous effect to regional economic growth and that the fiscal reform has produced some costs of institutional transition.

Using *FDB* as an example, in 2003 there were 7 regions (including Beijing, Guangdong, Zhejiang, Shanghai, Jiangsu, Shandong, and Fujian) with *FDB* greater than the critical value, implying these regions' economic growth will benefit in the future from fiscal reform as the regions have more fiscal autonomy. However, the

other regions with *FDB* below the critical value still have to suffer from the fiscal decentralization. This might further partly explain the situation for why China has suffered from a serious regional disparity of economic development as indicated by Huang et al. (2003).

According to conclusions proposed by Martinez-Vazquez and Bahl (2003), China's road to fiscal federalism reform has been and continues to be strongly conditioned not only by tax policy and tax administration reform but also by a wide range of economic policies which reduce the efficiency of fiscal system. Moreover, Martinez-Vazquez and Rider (2005) indicated that China has not been fully using the potential of fiscal decentralization for improving the allocation of resources and thereby achieving their respective growth potentials. If the primary objective of China's government is to have sustainable economic development and to mitigate the severe disparity of regional development, this study suggests that the government should adopt more aggressive fiscal reform policies in the future. As long as China's government could let those regions with low economic growth, particularly regions in the western area, have more fiscal autonomy, doing so might make it possible to stimulate their poor economies and further mitigate the severe development problem of regional inequality in China.

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