

# Interregional transfers and the smoothing of provincial expenditure in China

Kiril Tochkov \*

State University of New York at Binghamton

## Abstract

Fluctuations in regional government revenue cause spending on public services to vary, unless the central government stabilizes regional expenditure via the fiscal system. This paper estimates the amount of expenditure smoothing across provinces in China provided by interregional net transfers over the 1952-2001 period. The findings indicate that net transfers minimized the volatility of provincial expenditure by cushioning a very large fraction of province-specific revenue shocks. Rich provinces received a larger amount of expenditure smoothing than poor regions, especially during periods of fiscal decentralization. Extrabudgetary revenue weakened the stabilizing effect of net transfers.

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\*Department of Economics, State University of New York, P.O. Box 6000, Binghamton, NY 13902, tel.: 607-777-2572, fax: 607-777-2681, e-mail: ktochkov@binghamton.edu.

# 1. Introduction

The large regional income inequality has been a major issue in the process of economic development in China. The fiscal dimension of such inequality is a disparity in government revenue across provinces. Regions with relatively lower incomes per capita are able to generate less revenue which in turn limits the spending of the provincial government. The consequence is an inequitable distribution of public services across provinces. Moreover, provincial revenue fluctuates from year to year, and in the absence of a buffer this leads to variations in provincial expenditure. The central government could eliminate the disparities via taxes and transfers that equalize the fiscal capacity across regions and cushion shocks to provincial revenue.

In China, provincial governments that run budget deficits receive net transfers from the center and those with budget surpluses make net remittances to the center. In theory, this system of interregional transfers would ensure that fiscal resources are redistributed from richer to poorer provinces resulting in similar levels of expenditure per capita in each region. However, the efficacy of the tax-transfer system in performing this function has been controversial. The debate was initiated by Donnithorne (1973, 1976) who argued that fiscal decentralization in the late 1950s caused the disparity in per capita expenditure across provinces to widen. The reason was that as provinces gained more fiscal autonomy, remittances from rich provinces decreased leading to a fall in transfers to poor provinces. Lardy (1975) disputed this view and suggested that provinces that were more dependent on transfers from the center experienced larger increases in per capita spending on social services and investment than less dependent provinces.

The controversy was revived along similar lines in the late 1990s and focused on the impact of fiscal decentralization during the period of market reforms in the 1980s. Ma (1997) found that the redistributive role of net transfers declined between 1983 and 1991 due to the increasingly difficult fiscal position of the central government. On the other hand, Raiser (1996) showed that net transfers by the center were inefficient because they were allocated mostly to selected poor provinces based on their political, economic or military importance. Furthermore, Knight and Li (1999) argued that over the 1983-1991 period net transfers destabilized provincial expenditure since for the majority of provinces expenditure was more volatile over time than revenue.

The purpose of this paper is twofold. First, the paper estimates the extent of smoothing of provincial expenditure provided by interregional transfers in China. This is achieved by using a panel estimation technique adopted from the empirical literature on risk sharing that has considerable advantages over the methodologies of previous studies. In particular, it focuses on the region-specific variation in revenue across time as well as across provinces, and measures the fraction of shocks to revenue smoothed via net transfers. Second, the paper extends the scope of previous studies by relying on a comprehensive data set that covers the period 1952-2001. This makes it possible to compare and contrast different periods in terms of the effect of fiscal decentralization on expenditure smoothing.

The rest of the paper is organized as follows. The next section gives an overview of the horizontal imbalances in revenue and expenditure across Chinese provinces. Section 3 addresses data and measurement issues. The econometric model underlying the analysis is specified in Section 4. Section 5 reports and discusses the empirical findings and Section 6 concludes.

## 2. Horizontal fiscal imbalances in China

Since the founding of the People's Republic of China in 1949, provincial governments were given little formal control over their budgets. The central government assigns revenue sources and expenditure responsibilities to regions, has jurisdiction over tax rates, sets mandatory spending targets for certain major budgetary categories and determines the total size of provincial budgets. At its extreme, this tight fiscal control by the center results in a complete separation of revenue and expenditure at the provincial level. Budget surpluses are remitted to the center and budget deficits are eliminated by transfers from the center. The system thus provides the center with the power to redistribute fiscal resources from rich to poor provinces and to achieve equalization of fiscal capacity. From Table 1 which presents the coefficients of variation in provincial per capita revenue and expenditure it is clear that the center was relatively successful in harmonizing expenditure across provinces. Although the cross-sectional disparity in expenditure was as high as 67% over the 1952-2001 period, this was only a fraction of the variation in revenue.

One major problem of strict central control over the fiscal system is that it has a negative impact on the revenue mobilization efforts of regional governments and discourages fiscal responsibility. The central government in China undertook several attempts to combine regional budgetary control with more fiscal autonomy for the provinces with the goal of increasing revenue collection. The first period of fiscal decentralization was initiated in 1958 when the management of a majority of state enterprises along with their profits was turned over to provincial governments. Due to worsening economic conditions, the center recovered its control over some enterprises in the early 1960s. Nevertheless, it is evident from

Table 1 that the period 1958-60 was associated with an increase in the revenue disparity across regions which continued well into the 1970s. This can be explained by the fact that provinces with a greater number of enterprises were now in control of larger revenue sources as compared to provinces with smaller industrial bases. At the same time, the regional disparity in expenditure decreased after 1958 and remained relatively constant after that, suggesting that fiscal decentralization did not loosen the grip of the central government over the redistributive properties of the fiscal system.

In the 1970s, the center initiated another wave of decentralization measures providing provinces with more control over their budgets. But this resulted in a growing regional gap in per capita spending levels across provinces and the center reacted by separating revenue and expenditure again to guarantee expenditure equalization (Oksenberg and Tong, 1991). With the introduction of market reforms in the 1980s, a system of fiscal contracts was established requiring provinces to negotiate remittances and transfers with the central government. Depending on the type of contract, some provinces, the poor ones in particular, were allowed to keep all their revenues and received lump-sum transfers from the center. Others remitted a certain percentage of their revenue from categories assigned for sharing between the center and the regions. Interestingly, this major period of fiscal decentralization was characterized by a decline in the cross-sectional variation of revenue (see Table 1). This was, most likely, the result of two factors. The revenue of poor provinces rose faster due to the lucrative conditions of their contracts. By contrast, the revenue of rich provinces fell because of the high marginal tax rates set in their contracts. At the same time, rich provinces were able to channel larger amounts of their revenue in extrabudgetary accounts that were beyond the control of the center. Therefore, by focusing on the budgetary categories the

coefficient of variation for 1980-1993 in Table 1 may underestimate the actual regional gap in revenue. Expenditure in this period was still much smoother than revenue, even if the coefficient of variation may be downward biased as well due to additional spending from extrabudgetary accounts.

The fiscal decentralization in the 1980s eroded the fiscal position of the central government and in 1994 a comprehensive fiscal reform put an end to the contract system. A uniform sharing formula required all provinces to remit 75% of their revenue from the value-added tax to the center (Bahl, 1999). Moreover, income from provincially-owned state enterprises was assigned entirely as revenue of regional governments eliminating incentives for tax evasion via extrabudgetary accounts. This, however, was again more beneficial to provinces with a large number of enterprises, and therefore it is not surprising that coefficient of variation in revenue increased from 92% in 1993 to 110% in 1998. At the same time, the average disparity in expenditure for 1994-2001 was higher than in the preceding three decades which suggests that central control over provincial budgets weakened as the transition towards a market economy accelerated.

### **3. Data and measurement problems**

The sample includes 28 Chinese provinces and the time series cover the period 1952-2001. Tibet was excluded because of measurement problems detailed below. Hainan and Chongqing were treated as parts of Guangdong and Sichuan, respectively, due to the lack of data for the years before they became separate administrative regions. The data for the period 1952-1998 was collected from the *Comprehensive Statistical Data and Materials on 50 Years of New*

*China* (1999). In addition, various issues of the *Finance Yearbook of China* provided the data for the most recent years 1999-2001. In the case of Sichuan, missing observations were filled by consulting its provincial statistical yearbook.

Provincial revenue and expenditure are deflated by the general consumer price index with 1985 as a base year and expressed in per capita terms. They also include only items covered by the budget and do not take extrabudgetary revenue and expenditure into account. Moreover, the official Chinese statistics view subsidies to state enterprises as negative revenue rather than expenditure. In some extreme cases, such as Tibet, this practice results in negative provincial revenue in certain years. In order to minimize the effect of this measurement problem, Tibet was excluded from the sample. The lack of data on subsidies for the entire sample period prevents any attempts to adjust the data, and the variables are therefore used in accordance with the Chinese definition.

Furthermore, revenue as reported in the statistics includes only fiscal resources assigned to provincial governments and collected locally. Transfers from the center and remittances to the center are excluded. Provincial budgets in China are always balanced, but revenue rarely matches expenditure. If expenditure exceeds revenue, the province receives positive net transfers, defined as transfers minus remittances. In case the province runs a budget surplus, remittances to the center become larger than transfers leading again to a balanced budget. No detailed data is available on transfers and remittances by province for the 1952-2001 period, and for this reason net transfers are calculated as the difference between expenditure and revenue.

## 4. The empirical model

The literature on interregional risk sharing examines to what extent a central government can use fiscal policy to pool income risk across regions and contribute to the consumption smoothing of residents in these regions. Usually this is done by regressing per capita disposable regional income on per capita regional income (for an overview, see Mélitz and Zumer (2002)). The approach adopted here is similar, but the focus is on the smoothing of provincial expenditure rather than of income. The dependent variable is the amount of funds available to the provincial government for spending on public services after receiving net transfers from the center. The independent variable is provincial revenue which is a proxy for the amount of funds that would be potentially available for spending in absence of net transfers. The estimated panel regression takes the form:

$$\Delta \log EXP_{it} = \alpha_t + \beta \Delta \log REV_{it} + \varepsilon_{it} \quad (1)$$

$EXP_{it}$  denotes the expenditure of province  $i$  in year  $t$ .  $REV_{it}$  stands for the revenue of province  $i$  in year  $t$ . Both variables are expressed in log-differences allowing the coefficient  $\beta$  to be interpreted as the elasticity of expenditure with respect to revenue. In addition, aggregate shocks are controlled for by including time-fixed effects denoted by  $\alpha_t$ . This ensures that only shocks that affect the revenue of one province relative to all others are taken into account.

Since the amount of fiscal resources available for spending in a region is the sum of its own revenue and the net flow of funds from the center, provincial expenditure can be expressed as follows:

$$EXP_{it} = REV_{it} + NT_{it} \quad (2)$$



where  $NT_{it}$  represents net transfers to province  $i$  in year  $t$ . The substitution of Eq. (2) into Eq. (1) yields:

$$\Delta \log(REV_{it} + NT_{it}) = \alpha_t + \beta \Delta \log REV_{it} + \varepsilon_{it} \quad (3)$$

Although Eq. (1) and Eq. (3) are equivalent, the latter shows more clearly the role of net transfers in smoothing the amount of fiscal resources available to provincial governments. The coefficient  $\beta$  measures the amount of shocks to provincial expenditure that are *not* absorbed by net transfers. If  $\beta = 1$ , then net transfers are obviously zero and shocks to provincial revenue are fully reflected in provincial expenditure. If  $\beta$  is less than one, part of the shock is cushioned by the net transfers and the rest is transmitted to provincial expenditure. For instance, if  $\beta = 0.6$  and revenue decreases due to an adverse shock of 100%, net transfers absorb 40% and as a result expenditure decreases by only 60%. The extent of smoothing of provincial expenditure is therefore given by  $1-\beta$ . If  $\beta$  is bigger than 1, net transfers not only do not mitigate any shocks but even destabilize provincial expenditure and amplify regional disparities.

Due to the large regional income disparities in China, it is necessary to test for differences between rich and poor provinces with respect to the amount of expenditure smoothing. To achieve this, slope dummies are introduced in Eq. (3) as follows:

$$\Delta NT_{it} = \alpha_t + \beta_1 D_i \Delta GDP_{it} + \beta_2 (1 - D_i) \Delta GDP_{it} + \varepsilon_{it} \quad (4)$$

$D_i$  is a dummy variable which is 1 if province  $i$  is rich and 0 otherwise.

One key advantage of the empirical model specified in Eq. (3) over previous approaches is that it estimates the cross-sectional as well as the time-series dimension of expenditure

smoothing by using a panel data set. Knight and Li (1999), for instance, run a cross-sectional regression of provincial expenditure on revenue for the years 1983, 1987 and 1990 and compare the estimated coefficients. By contrast, the  $\beta$  coefficient in Eq. (3) is a weighted average of the year-by-year cross-sectional regressions over the sample period (Asdrubali et al., 1996). Higher weight is given to the years with larger variation in revenue across provinces since they are more relevant to the smoothing properties of net transfers.

Another major shortcoming of previous studies is that they fail to separate aggregate from province-specific shocks, and thus cannot provide a genuine measure for expenditure smoothing. The model in Eq. (3) focuses on province-specific shocks to revenue by controlling for nation-wide shocks via time-fixed effects. The consequence is that an increase in net transfers received by a province contributes towards smoothing only if it is financed by a reduction of net transfers received by all other provinces.

## 5. Estimation results

The results of the empirical investigation are displayed in Table 2. It is evident that over the 1952-2001 period 87.8% of province-specific shocks to revenue were cushioned by net transfers. The remaining 12.2% which correspond to the estimate of the coefficient  $\beta$  from Eq. (1) were passed onto provincial expenditure making it much smoother than revenue. For different subperiods, the fraction of absorbed shocks varies between 70% and 90%. Such large amounts of expenditure smoothing reflect the high degree of fiscal control over provincial budgets exercised by the central government in China. The center prevented expenditure to respond fully to fluctuation in revenue by collecting provincial budget surpluses and by

providing transfers to close budget gaps. Even during periods of fiscal decentralization such as the late 1950s and the 1980s, net transfers were very successful in offering protection against province-specific revenue shocks.<sup>1</sup> However, as the decentralization intensified in the late 1980s and early 1990s central control weakened, and the amount of smoothing dropped dramatically to a historic low of 54.3% . The ability of the central government to stabilize provincial expenditure recovered after the 1994 reform reestablished the fiscal power of the center, but the amount of smoothing was still lower than in previous periods. This may be the result of a transitory period of adjustment following the reform but may also reflect some constraints on reimposing total centralized budgetary control during the transition towards a market economy.

Although expenditure was much less volatile than revenue, it is surprising that the cross-sectional disparity of provincial expenditure was still relatively high, as reported in Table 1. Perhaps the fiscal system did not provide the same amount of expenditure smoothing to all provinces. To test this proposition, the sample is split evenly into rich and poor provinces based on their average per capita income over the sample period. The results from estimating Eq. (4) in Table 3 show that the percentage of province-specific revenue shocks absorbed by net transfers in 1952-2001 is exactly equal for both groups. However, the estimates for the 1950s and the 1980s signal that during periods of fiscal decentralization net transfers

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<sup>1</sup>The time dimension of the period of fiscal decentralization in 1958-60 is too short for the panel regression with time-fixed effects to provide reasonable results. For this reason, the 1950s were divided into a period predating the decentralization (1952-57) and a period that also includes the years of decentralization (1952-60). A comparison between the estimates for the two periods reveals that the amount of expenditure equalization was higher when the 1958-60 period was included.

were more beneficial to rich provinces. It should be pointed out that by defining provinces as rich or poor based on their average per-capita income over the 1952-2001 period, it is assumed that the income status remained constant across the subperiods. In fact, this was true for almost 90% of all provinces, but especially in the 1950s-1970s the income status of few regions changed frequently. Regressions using subsamples of the provinces that belonged consistently in every subperiod to either the rich or the poor group did not alter the results significantly except for confirming that the richest regions received even more and the poorest even less expenditure smoothing than suggested by the results in Table 3.

In the 1980s, the disparity in expenditure smoothing between rich and poor provinces increased to 12% , up from 2% in the preceding period. However, the estimates for 1980-1993 do not provide a full picture of what really happened in this period. The fiscal autonomy of provincial governments increased rapidly in the late 1980s which in turn allowed expenditure to follow more closely the fluctuations in revenue. As shown in the first row of Table 4, over the 1986-93 period net transfers smoothed only 41% of revenue shocks for poor provinces and 57% for rich provinces as opposed to 81% and 93% for the entire 1980-1993 period, respectively.

Moreover, as decentralization continued to undermine central control a growing amount of revenue was flowing into extrabudgetary accounts. To examine the effect of this issue, extrabudgetary revenue and expenditure were added to their respective budgetary components and the resulting total expenditure was regressed on total revenue using Eq. (1).<sup>2</sup> From the results displayed in the third row of Table 4, it is clear that by taking extrabudgetary components into account the discrepancy between rich and poor provinces with respect to

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<sup>2</sup>Data on extrabudgetary revenue and expenditure by province is available only for the period 1986-2000.

the amount of expenditure smoothing becomes even larger. In addition, net transfers were now more beneficial to poor provinces absorbing half of province-specific revenue shocks as compared to only a quarter for rich provinces. Rich provinces with broader tax bases were in a better position than poor provinces to gather large amounts of extrabudgetary fiscal resources. These funds increased the volatility of their total revenue and diminished the role of net transfers.

The results are largely consistent with the findings of previous studies focusing on the fiscal reforms in China in the 1980s. For instance, Knight and Li (1999) show that for deficit provinces (which correspond broadly to poor provinces) expenditure and revenue were negatively correlated in 1983, whereas by 1990 the response of expenditure to revenue shocks was not only positive but also bigger than 1. In other words, net transfers switched from smoothing provincial expenditure of poor provinces to having a destabilizing effect. This change was much less pronounced for surplus (rich) provinces. Furthermore, a study by the World Bank (1990) reports a negative relationship between the ratio of expenditure to revenue and per capita output for 1985. This suggests that rich provinces had lower expenditure levels relative to their revenue than poor provinces which is a further proof of the equalization properties of net transfers in the first half of the 1980s. Although the numerical value of the coefficients from these studies cannot be compared with the estimates of this paper due to key differences in methodology, all results point in the same direction, namely that net transfers to poor provinces achieved a certain degree of expenditure smoothing which declined in the late 1980s.

Two major factors contributed to the decrease in expenditure stabilization between rich and poor provinces over the 1980-1993 period. First, net transfers to poor provinces became

less efficient in smoothing province-specific revenue shocks. As mentioned in Section 2, the majority of poor provinces in the 1980s signed fiscal contracts with the central government allowing them to keep all the revenue collected and providing them with lump-sum transfers. This type of transfers, however, was inadequate for buffering shocks since it does not react to changes in provincial revenue, although frequent adjustments in the amount of lump-sum transfers could mitigate this inefficiency. Many rich provinces, on the other hand, were required by contract to remit a certain percentage of their revenue to the center causing their net transfers to be more sensitive to movements in revenue and thus more equalizing. Second, larger amounts of net transfers were allocated to rich provinces than to poor ones. Lump-sum transfers to poor provinces were fixed in nominal terms and their real value declined over time. By contrast, rich provinces were in a better position to attract earmarked grants because of their ability to negotiate transfers from the center. Since 1985, the amount of earmarked grants increased relative to lumps-sum transfers and was provided in large parts to the richest provinces in the form of price subsidies and subsidies to loss-making state enterprises (Ma, 1997).

The results in Table 3 indicate further that after 1994 net transfers buffered a smaller fraction of shocks relative to the 1980-1993 period, but this was still an increase in expenditure equalization when compared only to the 1986-93 period, as shown in Table 4. Moreover, the amount of expenditure smoothing for poor provinces dropped even further causing the gap between rich and poor regions to widen to 30% . This disparity was smaller for total revenue, but the associated amount of smoothing was extremely low indicating that the role of extrabudgetary funds did not diminish seriously after 1994 (see Table 4).

The 1994 fiscal reform replaced the system of fiscal contracts with a uniform revenue

sharing formula for all provinces that was proportional to the revenue from the value-added tax and was thus highly sensitive to revenue shocks. This is probably the major factor that caused expenditure stabilization to recover from its low in the late 1980s. However, the central government slowed down the immediate implementation of the new rules by introducing transitional arrangements. For instance, provinces continued receiving transfers based on their old contracts and were guaranteed that their revenue will not fall below its nominal level of 1993. To achieve this, the central government returned large amounts of its share of the collected value-added tax to the provinces, but this was done on a derivation basis (Bahl, 1999). In other words, this type of transfers from the center to a province consisted only of tax revenue that had been collected in that province. This, in turn, prevented the revenue from the value-added tax to be redistributed across regions and ensured larger transfers to rich provinces. Moreover, by assigning the enterprise income tax as revenue to provincial governments, the center favored rich provinces with larger tax bases. This combined with the dismantling of central control over mandatory spending levels in the regions contributed to the growing gap in expenditure smoothing between rich and poor provinces.

If net transfers are efficient in providing a certain level of expenditure stabilization, then it is expected that larger amounts of net transfers will also buffer more revenue shocks. To explore whether provinces which tend to receive larger amounts of net transfers have smoothing patterns different from those of other regions, the sample is split in two. One group includes only the 10 provinces which were the recipients of the largest per capita net transfers over the sample period as well as in every one of the subperiods, and the other consists of the rest. The panel regression given by Eq. (4) is estimated with dummy variable

$D_i$  taking the value of 1 if province  $i$  received large net transfers and 0 otherwise. The results reported in Table 5 indicate that small amounts of net transfers were, in fact, associated with lower levels of expenditure smoothing.

Lastly, to verify that the central results of the empirical analysis are qualitatively robust, the response of net transfers to province-specific revenue shocks is estimated by running the following panel regression:

$$\Delta NT_{it} = \alpha_t + \beta \Delta REV_{it} + \varepsilon_{it} \quad (5)$$

Both variables are expressed in first differences since their levels are non-stationary. The logarithmic form is not appropriate here due to the fact that net transfers can take negative values. Furthermore, time-fixed effects are included again to control for nation-wide shocks to revenue.

The results, displayed in Table 6, show that an increase in provincial revenue by 100 yuan led to a decrease in net transfers to that province of 75 yuan over the 1952-2001 period. This indicates that net transfers indeed provide smoothing of revenue which is very much in line with the analysis of the estimates reported in Table 2. The results further confirm that the response of net transfers to province-specific revenue shocks became weaker since the 1970s and reached its lowest level in the 1990s.

## 6. Conclusions

This paper provided evidence that net transfers in China smoothed almost 90% of province-specific shocks to provincial budgetary revenue over the 1952-2001 period. The fiscal system therefore achieved a high degree of expenditure equalization across provinces. The highly



centralized control over provincial budgets provided the central government with the necessary tools to minimize the cross-sectional volatility of provincial revenue. As the intervention ability of the center declined in the course of fiscal decentralization and market reforms, net transfers lost part of their smoothing power which gave rise to regional discrepancies in expenditure. After 1994, the fraction of shocks to revenue cushioned by net transfers increased again compared to the late 1980s, but the gap between rich and poor provinces with respect to expenditure equalization widened.

As the transition towards a market economy accelerates, the central government in China is likely to face again the dilemma of strict fiscal control versus more provincial autonomy. The decentralization of the late 1980s has shown that weak central management of net transfers along with a discretionary policy of providing earmarked grants favor rich provinces and adversely affect equalization of public spending across regions. At the same time, attempts to limit the fiscal autonomy of provinces as in earlier decades are likely to prove unsuccessful. Instead, the direct administrative control over provincial budgets needs to be replaced with new mechanisms designed to reduce horizontal imbalances. One option is to introduce equalization grants that are inversely linked with the taxable capacity of a province and vary positively with the needs of regional governments to ensure a standard range of public services.

*Table 1:* Coefficients of variation in provincial per capita revenue and expenditure (in per cent)

	Revenue	Expenditure
1952-2001	152.4	67.4
1952-1957	105.8	81.7
1958-60	141.8	67.3
1961-69	178.4	57.6
1970-79	197.3	66.8
1980-93	152.4	63.8
1994-2001	105.6	74.6

**Note:** The coefficient of variation is calculated as the ratio of the standard deviation of provincial per capita GDP to the unweighted average thereof. The reported coefficients of variation are averages over the given periods.

Table 2: Amounts of expenditure smoothing via net transfers in China

	$1-\beta$
1952-2001	0.878 (7.58)
1952-57	0.701 (4.28)
1952-60	0.863 (2.71)
1961-69	0.818 (5.50)
1970-79	0.920 (3.85)
1980-93	0.895 (4.10)
1986-93	0.543 (10.70)
1994-2001	0.733 (6.56)

**Note:** The reported coefficients represent the fraction of shocks to revenue cushioned by net transfers as given by  $1-\beta$  where  $\beta$  is the estimate from panel regression (3). Values of t-statistics appear in parenthesis.

Table 3: Amounts of expenditure smoothing for rich and poor provinces

	Rich Provinces	Poor Provinces
	$1-\beta_1$	$1-\beta_2$
1952-2001	0.877 (5.12)	0.877 (5.60)
1952-57	0.424 (4.39)	0.817 (2.45)
1952-60	0.880 (1.78)	0.849 (2.08)
1961-69	0.790 (4.06)	0.830 (3.90)
1970-79	0.904 (2.82)	0.927 (2.75)
1980-93	0.930 (2.31)	0.811 (4.35)
1994-2001	0.856 (2.50)	0.556 (7.42)

**Note:** The reported coefficients represent the fraction of shocks to revenue cushioned by net transfers as given by  $1-\beta_1$  and  $1-\beta_2$  where  $\beta_1$  and  $\beta_2$  are the estimates from panel regression (4). Values of t-statistics appear in parenthesis.

Table 4: Amounts of expenditure smoothing for budgetary and total revenue, 1986-2000

Province	All	Rich	Poor
<i>Budgetary Revenue:</i>			
1986-1993	0.543	0.574	0.511
	(10.70)	(7.87)	(7.28)
1994-2000	0.733	0.875	0.609
	(6.45)	(2.16)	(6.71)
<i>Total Revenue:</i>			
1986-1993	0.360	0.250	0.520
	(17.01)	(16.47)	(7.80)
1994-2000	0.287	0.270	0.300
	(18.32)	(13.73)	(12.31)

**Note:** The reported coefficients represent the fraction of shocks to revenue cushioned by net transfers as given by  $1-\beta$  where  $\beta$  is the estimate from panel regression (3). Total revenue is the sum of budgetary and extrabudgetary revenue. Values of t-statistics appear in parenthesis.

Table 5: Amounts of expenditure smoothing by the size of net transfers

	Large Transfers	Small Transfers
	$1-\beta_1$	$1-\beta_2$
1952-2001	0.942 (2.26)	0.836 (8.03)
1952-57	0.737 (2.33)	0.671 (3.20)
1952-60	0.881 (1.82)	0.804 (2.54)
1961-69	0.868 (2.42)	0.788 (5.03)
1970-79	0.978 (2.56)	0.896 (4.30)
1980-93	0.983 (0.59)	0.691 (8.65)
1994-2001	0.814 (2.06)	0.719 (6.19)

**Note:** The reported coefficients represent the fraction of shocks to revenue cushioned by net transfers as given by  $1-\beta_1$  and  $1-\beta_2$  where  $\beta_1$  and  $\beta_2$  are the estimates from panel regression (4). Values of t-statistics appear in parenthesis.

Table 6: The response of net transfers to changes in provincial revenue

	$\beta$
1952-2001	-0.751 (-29.12)
1952-57	-0.724 (-12.71)
1952-60	-0.947 (-22.49)
1961-69	-0.779 (-27.10)
1970-79	-0.845 (-39.02)
1980-93	-0.745 (-23.18)
1994-2001	-0.545 (-11.94)

**Note:** The reported coefficients represent the estimates from the panel regression given by Eq. (5). Values of t-statistics appear in parenthesis.

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