

Interregional transfers and the smoothing of provincial expenditure in China[☆]

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Abstract

Interregional transfers can smooth shocks to regional revenue and prevent spending from varying across time. This paper estimates the amounts of expenditure smoothing provided by interregional net transfers to China's provinces over the 1952–2001 period. The findings indicate that net transfers minimized the volatility of provincial expenditure by cushioning a relatively large fraction of province-specific revenue shocks. However, aggregate shocks to revenue diminished the amount of smoothing, and extrabudgetary funds increased expenditure volatility. Rich provinces were better insured against province-specific revenue shocks than poor provinces. The cross-sectional disparity in expenditure smoothing widened dramatically after 1994.

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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 regional disparity in government revenue. Regions with relatively lower incomes per capita generate less revenue, which in turn limits the spending of provincial governments. The consequence is an inequitable distribution of public

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services across provinces. Interregional transfers could eliminate the disparities by equalizing the fiscal capacity across regions. However, the efficacy of the tax-transfer system in redistributing fiscal resources from richer to poorer provinces in China 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 the provinces that were more dependent on transfers from the central government experienced larger increases in per capita spending on social services and investment than less dependent ones.

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 redistribution role of the fiscal system weakened between 1983 and 1991 due to tax evasion by provincial governments, which caused the amount of interregional transfers to decline. On the other hand, [Raiser \(1998\)](#) showed that fiscal transfers exacerbated regional disparities, because they were allocated by the central government to selected provinces based on political rather than equity considerations.

By focusing on cross-sectional disparities, previous studies have ignored that provincial revenue fluctuates from year to year. In the absence of a buffer that could be provided by fiscal transfers, this results in variation of provincial expenditure. Accordingly, the purpose of this paper is to examine the smoothing of regional expenditure via the fiscal system by estimating the fraction of revenue shocks absorbed by interregional transfers. This issue has been addressed so far by [Knight and Li \(1999\)](#) who investigated provincial budgets over the 1983–1991 period and concluded that net transfers destabilize provincial expenditure. Moreover, [Bahl \(1999\)](#) observed that expenditure equalization across provinces declined between 1990 and 1995.

This paper applies a panel estimation technique that has a major advantage over the methodologies of previous studies. The empirical model allows for province-specific variation in revenue to be examined separately from fluctuations caused by aggregate shocks. If aggregate shocks are controlled for, it is possible to estimate how much risk of a revenue shock is shared among provinces via interregional transfers. If, on the other hand, aggregate shocks are allowed to affect provincial revenue, the empirical analysis can provide clues about the smoothing properties of net transfers during nationwide revenue fluctuations as well as about the impact of central government policies on regional expenditure volatility. In addition, the paper tests for differences in expenditure smoothing between rich and poor provinces, and estimates the percentage of shocks cushioned by remittances and transfers separately.

Furthermore, 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 the extent of expenditure smoothing in different periods and to assess the impact of fiscal decentralization and market reforms on regional stabilization provided by the fiscal system in China.

The rest of the paper is organized as follows. The next section gives an overview of the Chinese fiscal system and its transition. 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. Overview of the fiscal system in China

Since the founding of the People's Republic of China in 1949, provincial governments have been 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. This institutional framework thus allows the central government to redistribute fiscal resources so as to equalize fiscal capacity across provinces and smooth provincial spending across time.

The scope for interregional expenditure smoothing in China is illustrated in Table 1. The reported coefficients of variation across time show the relative volatility of real per capita expenditure at the provincial as well as at the national levels. It is evident that provincial expenditure per capita is more variable than national expenditure per capita indicating that shocks to regional revenue were successfully absorbed. The volatility of provincial expenditure appears to be slightly less than that of national expenditure only in the 1980s, a period of intense fiscal decentralization.

The goal of fiscal decentralization is to increase revenue mobilization efforts of regional governments and encourage fiscal responsibility. The central government in China undertook several attempts to combine regional budgetary control with more fiscal autonomy for the provinces. 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. However, due to worsening economic conditions, the center recovered its control few years later.

The political turmoils of the 1960s called for stricter fiscal controls, but in the early 1970s the central government initiated a new wave of decentralization measures providing provinces with more discretion over their budgets. This resulted soon in a growing disparity in per capita spending levels across provinces, and the center reacted by separating revenue and expenditure once again (Oksenberg & Tong, 1991). With the introduction of market reforms in the 1980s, a system of fiscal contracts was established requiring provinces to negotiate the amounts of remittances, transfers and revenue sharing with the central government. Depending on the type of contract, some provinces were allowed to keep all their revenue, others received lump-sum transfers or were required to remit a certain percentage of their revenue from taxes assigned for sharing with the center (Knight & Li, 1999).

As the fiscal decentralization intensified in the second half of the 1980s, provincial governments started offering unauthorized tax concessions and exemptions to local enterprises in an attempt to keep revenue in their localities (Ma, 1997). Moreover, provinces channeled revenue

Table 1
Coefficients of variation in per capita expenditure (in percent)

	Provincial expenditure	National expenditure
1952–2001	72.1	35.6
1952–1960	78.8	41.2
1961–70	25.6	19.5
1971–80	19.3	18.2
1981–90	23.0	24.7
1991–2001	34.9	14.5

Note: The coefficient of variation is calculated for each region over the given period as the ratio of the standard deviation of real per capita expenditure to the unweighted average thereof. The reported coefficients for provincial expenditure are averages across regions.

from local fees, surcharges and other sources not sanctioned by the center into extrabudgetary funds that were not subject to central control. All these factors undermined the authority of the central government and eroded its fiscal powers.

In 1994, a comprehensive fiscal reform put an end to the contract system and introduced a uniform sharing formula requiring 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, thus largely eliminating incentives for tax evasion via extrabudgetary accounts. Over a transitional period, provinces continued receiving transfers based on their old fiscal contracts and were guaranteed that their revenue will not fall below its nominal level of 1993. The 1994 reform helped the central government regain its fiscal power, but the impact of the reform on regional disparities and interregional smoothing has not yet been assessed empirically.

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* (National Bureau of Statistics, 1999). In addition, various issues of the *Finance Yearbook of China* (Ministry of Finance, 1992–2002) provided the data for the years 1995–2001.

All variables used in the empirical analysis are measured in per capita terms and are expressed in 1985 constant prices by deflating them with the general consumer price index. Provincial revenue and expenditure include only items covered by the budget and do not take extrabudgetary funds 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.

Data on the amounts of transfers and remittances between the central government and each province are reported solely in the *Finance Yearbook of China* (Ministry of Finance, 1992–2002) and only for the period after 1994. Unfortunately, neither national nor provincial statistical sources provide such data for earlier years. To be able to analyze the smoothing properties of interregional fiscal flows over the entire sample period 1952–2001, it was necessary to use a broader measure such as net transfers which could be constructed without data on transfers and remittances. Net transfers defined as transfers less remittances were actually calculated as the difference between revenue and expenditure. Similar measures of net fiscal flows have been used in previous research on China (Knight & Li, 1999; Raiser, 1998).

This method for calculating net transfers can be justified by the role of transfers and remittances in balancing provincial budgets. Revenue as reported in the official statistics includes only fiscal resources assigned to provincial governments and collected locally, whereas expenditure is defined as the total amount spent by provinces. From the provincial balance sheets it is evident that once transfers are added to and remittances are subtracted from revenue the resulting amount corresponds very closely to expenditure. Thus if expenditure exceeds revenue, the province must have received positive net transfers from the central government. In the case of

a provincial budget surplus, remittances to the center become larger than transfers (negative net transfers). The smoothing effect of net transfers is estimated for the entire sample period, whereas due to the aforementioned data limitations the separate contributions of transfers and remittances are estimated for the 1995–2001 period only.

4. The empirical model

To capture the fraction of shocks to revenue smoothed by net transfers empirically, it is necessary to examine the response of budgetary funds after receiving net transfers to changes in the funds available before net transfers. The estimated panel regression takes the form:

$$\Delta \log \text{EXP}_{it} = \alpha_t + \gamma_i + \beta \Delta \log \text{REV}_{it} + \varepsilon_{it} \quad (1)$$

EXP_{it} denotes the expenditure of province i in year t and represents the amount of funds available to the provincial government for spending on public services after receiving net transfers. REV_{it} stands for the revenue of province i in year t and is a proxy for the amount of funds that would be potentially available for spending in absence of net transfers. Both variables are expressed in log-differences allowing the coefficient β to be interpreted as the elasticity of expenditure with respect to revenue. To correct for heteroscedasticity, a two-step procedure is used which allows for different error variances across provinces.

One key advantage of the panel regression specified in Eq. (1) over cross-sectional models used in previous studies is that the β coefficient is a weighted average of the year-by-year cross-sectional regressions over the sample period (Asdrubali, Sørensen, & Yosha, 1996). Higher weight is given to the years with larger variation in revenue across provinces, since these years contain more relevant information about the smoothing properties of net transfers.

Another major shortcoming of previous studies is that they fail to distinguish between aggregate and province-specific shocks to revenue, and thus cannot provide a genuine measure for interregional smoothing. An increase in net transfers received by a province in response to a negative revenue shock achieves interregional smoothing only if it is financed by a reduction of net transfers received by all other provinces. If the increase is financed instead by an increase in the budget deficit of the central government, then it is the central government, not the other regions, that provides smoothing by implicitly undertaking the borrowing on behalf of the province. The time-fixed effects, α_t , are dummy variables for each year of the sample period that control for any aggregate time-series variation including the fiscal policy of the central government, and thus ensure that only province-specific shocks to revenue are taken into account. Eq. (1) is estimated with and without time-fixed effects.

The region-fixed effects denoted by γ_i represent dummy variables for each province and control for any cross-sectional variation in provincial expenditure caused by unobserved regional characteristics that are constant over the sample period.

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

$$\text{EXP}_{it} = \text{REV}_{it} + \text{NT}_{it} \quad (2)$$

where NT_{it} represents net transfers to province i in year t .

The substitution of Eq. (2) into Eq. (1) yields:

$$\Delta \log(\text{REV}_{it} + \text{NT}_{it}) = \alpha_t + \gamma_i + \beta \Delta \log \text{REV}_{it} + \varepsilon_{it} \quad (3)$$

Eqs. (1) and (3) are equivalent, but the latter shows more clearly the role of net transfers in smoothing the amount of fiscal resources available to provincial governments. The coefficient β measures the amount of shocks to provincial revenue 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 β is less than one, part of the shock is cushioned by 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 expenditure smoothing is therefore given by $1-\beta$. If β is bigger than 1, net transfers not only do not mitigate any shocks but even destabilize provincial expenditure.

The large regional income disparities in China make it important 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:

$$\Delta \log(\text{REV}_{it} + \text{NT}_{it}) = \alpha_t + \gamma_i + \beta_1 D_i \Delta \log \text{REV}_{it} + \beta_2 (1 - D_i) \Delta \log \text{REV}_{it} + \varepsilon_{it} \quad (4)$$

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

Net transfers were calculated so far as the difference between expenditure and revenue. Alternatively, they can be defined as:

$$\text{NT}_{it} = \text{TR}_{it} - \text{RM}_{it} \quad (5)$$

TR_{it} and RM_{it} denote real per capita transfers and remittances of province i in year t , respectively. Accordingly, Eq. (3) can be broken down into two regressions that estimate the smoothing effect of each determinant of net transfers separately:

$$\Delta \log(\text{REV}_{it} + \text{TR}_{it}) = \alpha_t + \gamma_i + \beta_T \Delta \log \text{REV}_{it} + \varepsilon_{iT} \quad (6)$$

and

$$\Delta \log(\text{REV}_{it} - \text{RM}_{it}) = \alpha_t + \gamma_i + \beta_R \Delta \log \text{REV}_{it} + \varepsilon_{iR} \quad (7)$$

The coefficients β_T and β_R measure the fraction of shocks to provincial revenue cushioned by transfers and remittances, respectively.

5. Estimation results

The estimated fractions of shocks to provincial revenue smoothed by net transfers are displayed in Table 2. The four columns show the estimates of $1-\beta$ for different combinations of time-fixed and region-fixed effects. A comparison of the first with the third column, and of the second with the fourth column suggest that the inclusion of region-fixed effects barely changes the coefficients. This means that the relationship between revenue and expenditure cannot be accounted for by some unobserved characteristics of provinces. However, when time-fixed effects are included in the regression, the estimates of $1-\beta$ in columns (ii) and (iv) generally increase in magnitude indicating that net transfers react differently to aggregate and province-specific shocks to revenue.

From the fourth column of Table 2, it is evident that over the 1952–2001 period 87.8% of province-specific revenue shocks were cushioned by net transfers. The remaining 12.2% which correspond to the estimate of the coefficient β from Eq. (3) were passed onto provincial expenditure making it much smoother than revenue. When time-fixed effects are not included, the

Table 2
Amounts of expenditure smoothing via interregional net transfers for different periods

Effect	(i)	(ii)	(iii)	(iv)
Period				
1952–2001	0.334 (32.69)	0.878 (7.58)	0.333 (32.71)	0.878 (7.56)
1952–60	0.096 (13.07)	0.863 (2.69)	0.069 (13.49)	0.865 (2.82)
1961–70	0.089 (26.01)	0.818 (5.50)	0.082 (26.35)	0.825 (5.31)
1971–80	0.800 (7.77)	0.937 (3.14)	0.799 (7.84)	0.939 (3.12)
1981–90	0.597 (7.91)	0.946 (1.69)	0.547 (8.58)	0.949 (1.63)
1991–2001	0.703 (16.46)	0.619 (10.29)	0.701 (16.75)	0.607 (10.17)
1986–94	0.814 (10.39)	0.688 (7.55)	0.814 (11.47)	0.725 (7.14)
1995–2001	0.326 (12.24)	0.539 (9.28)	0.218 (15.62)	0.530 (9.63)
<i>Variables included:</i>				
Time-fixed effects	No	Yes	No	Yes
Region-fixed effects	No	No	Yes	Yes

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

fraction of shocks absorbed by net transfers drops to 33.3%, suggesting that there is less expenditure smoothing via the fiscal system in response to aggregate revenue shocks. A possible interpretation is that when the revenue of a province declines relative to all other regions, interregional net transfers are extremely generous and provide large amounts of insurance against the province-specific revenue shock. However, during a nationwide decline in revenue, net transfers increase by a much smaller amount, and expenditure is thus much more volatile than during a province-specific downturn.

Table 2 also reports the amounts of expenditure smoothing by decade. When time-fixed effects are included, the fraction of shocks cushioned by net transfers varies between 82% and 95% with the exception of the 1990s. The large amounts of interregional expenditure smoothing reflect the high degree of fiscal control over provincial budgets by the central government which prevented expenditure from responding fully to fluctuations in revenue. Provincial budget surpluses were collected by the center and transfers were provided to close regional budget gaps, so that idiosyncratic revenue shocks had a relatively small impact on expenditure.

During the 1980s, interregional net transfers were overall still very successful in offering protection from province-specific revenue shocks. However, as the fiscal decentralization intensified followed by the weakening of central control over the 1986–1994 period, the extent of expenditure smoothing dropped to 72.5%. The system of fiscal contracts gave provincial governments more discretion over their fiscal resources and prevented net transfers from responding as effectively to idiosyncratic changes in provincial budgets as before. In addition, as more funds remained in the locality where they were collected, the amount of net transfers available for interregional redistribution declined.

In the second half of the 1990s, the cushioning effect of net transfers fell even further and reached a historic low of 53%. This suggests that the reform of 1994, which put an end to the system of fiscal contracts and strengthened the fiscal power of the central government, did not reverse the decline in expenditure smoothing. As the transition towards a market economy accelerated in the mid 1990s, the central government was reluctant to reimpose the tight controls over provincial budgets as in previous decades. In this sense, fiscal decentralization was not overturned by the reform of 1994. Another reason could be that the fiscal contracts were phased

out only gradually, and in the short run this may have offset the effect of the new revenue sharing formula that made remittances more sensitive to revenue shocks by linking them proportionally to the value-added tax.

When time-fixed effects are not included, less than 10% of revenue shocks were buffered via the fiscal system in the 1950s and 1960s. In the 1970s, this fraction increased dramatically, and over the 1986–1994 period, the estimate without time-fixed effects was even larger than the one with time-fixed effects. This means that net remittances (i.e., negative net transfers) increased by more in response to a nationwide rather than a province-specific increase in revenue. This was probably triggered by a common reaction of all provincial governments to a change in the fiscal policy of the central government. As its fiscal situation became increasingly difficult in the late 1980s, the central government relied on a number of ad hoc measures to increase revenue remittances by the regions. This involved among others ‘borrowing’ revenues from the provinces without returning them, or forcing provincial governments to buy centrally issued bonds and repeatedly extending the bond’s maturity (Ma, 1997; Wong, Heady, & Woo, 1995). As the center regained its fiscal power after 1994 and these measures were no longer necessary, expenditure smoothing dropped to 21.8% from a level of 80%.

Given the large disparities in income across provinces, it is possible that the fiscal system did not provide the same amount of expenditure smoothing to all regions. 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.¹ The results from estimating Eq. (4) are presented in Table 3 and show that the percentage of province-specific revenue shocks absorbed by net transfers in 1952–2001 was exactly equal for both groups. However, the estimates differ when examined by decade. From the second and fourth columns of Table 3 it is evident that when time-fixed effects are included, poor provinces received larger amounts of expenditure smoothing in the 1950s and 1960s, but net transfers were more beneficial to rich provinces in the 1980s and 1990s. When time-fixed effects are not included, interregional net transfers absorbed larger fractions of revenue shocks for rich provinces in all periods except for the 1960s.²

Table 3 illustrates that the expenditure of poor provinces was more volatile than for rich ones during fiscal decentralization. In 1986–1994, an idiosyncratic increase in revenue of 100% caused the provincial expenditure to increase by 22% for rich provinces and by 32% for poor provinces. For the period 1995–2001, these magnitudes were 20% and 66%, respectively, suggesting that the fiscal reform of 1994 exacerbated the cross-sectional disparity in smoothing at the disadvantage of poor provinces. When aggregate shocks are not controlled for, the amounts of expenditure smoothing were almost identical for both groups of provinces in 1986–1994, but diverged after 1994 with the expenditure volatility being again much higher for poor provinces.

These results are largely consistent with the findings of Knight and Li (1999), although the magnitudes of the coefficients are not directly comparable due to differences in the methodology.

¹ Using the average per capita income over a 50-year period conceals the possibility that the same province may belong to the group of poor and rich regions depending on the decade. To test the robustness of the results, the regressions involving rich and poor provinces were estimated for each decade using the median of decade averages of per capita income as cut-off point for the sample. The results barely changed, probably because very few provinces traversed the median across decades and these were mostly tiny economies (e.g., Gansu, Ningxia).

² The negative coefficient for the period 1961–70 indicates that rather than smoothing them net transfers actually amplified (albeit slightly) the revenue shocks for rich provinces. Aggregate revenue shocks were difficult to smooth due to the nationwide fiscal crisis in the aftermath of the Great Leap Forward. However, the budgetary impact of the crisis differed across provinces and allowed interregional net transfers to smooth large amounts of province-specific revenue shocks as seen in the second column of Table 3.

Table 3
Amounts of expenditure smoothing for rich and poor provinces

	Rich provinces		Poor provinces	
	$1 - \beta_1$	$1 - \beta_1$	$1 - \beta_2$	$1 - \beta_2$
1952–2001	0.331 (22.04)	0.877 (5.11)	0.335 (24.12)	0.877 (5.58)
1952–60	0.125 (8.33)	0.838 (2.44)	0.033 (10.88)	0.905 (1.29)
1961–70	-0.010 (-20.53)	0.779 (4.37)	0.143 (16.61)	0.856 (3.32)
1971–80	0.828 (4.05)	0.941 (1.70)	0.781 (6.60)	0.928 (2.86)
1981–90	0.624 (5.57)	0.981 (0.48)	0.513 (6.21)	0.895 (2.03)
1991–2001	0.707 (11.84)	0.712 (5.39)	0.698 (11.63)	0.506 (9.25)
1986–1994	0.809 (7.82)	0.781 (4.11)	0.818 (9.26)	0.678 (6.67)
1995–2001	0.245 (13.11)	0.704 (4.95)	0.163 (6.87)	0.341 (10.75)

Variables included:

	No	Yes	No	Yes
Time-fixed effects	No	Yes	No	Yes
Region-fixed effects	Yes	Yes	Yes	Yes

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 β_1 and β_2 are the estimates from panel regression (4). Values of *t*-statistics appear in parentheses.

Their study used cross-sectional regressions and showed that for deficit provinces (which correspond broadly to poor provinces) expenditure and revenue were negatively correlated in 1983. By 1990, the response of expenditure to revenue had switched to positive and was bigger than 1, suggesting that net transfers amplified expenditure volatility rather than minimizing it. This shift from a smoothing to a dis-smoothing effect of net transfers was much less pronounced for surplus (rich) provinces. Furthermore, Bahl (1999) estimated that a 10% difference in per capita income was associated with a 5.6% difference in per capita expenditure in 1990, and 7.2% difference in 1995, signaling a trend away from equalization of expenditure across regions.

To examine the 1995–2001 period in more detail, the contribution of transfers and remittances to expenditure smoothing is estimated separately and the results are shown in Table 4. It is apparent that transfers were responsible for larger amounts of smoothing than remittances for the

Table 4
Amounts of expenditure smoothing via remittances and transfers, 1995–2001

	(i)	(ii)
<i>Remittances:</i>		
All provinces	0.029 (7.03)	0.125 (3.23)
Rich provinces	-0.137 (-5.29)	0.672 (2.93)
Poor provinces	0.111 (3.53)	-0.116 (-3.18)
<i>Transfers:</i>		
All provinces	0.187 (6.25)	0.412 (4.51)
Rich provinces	0.382 (3.08)	0.039 (5.38)
Poor provinces	0.054 (3.21)	0.458 (3.14)

Variables included:

	No	Yes
Time-fixed effects	No	Yes
Region-fixed effects	Yes	Yes

Note: The reported coefficients represent the fraction of shocks to revenue cushioned by remittances and transfers as given by $1 - \beta_R$ and $1 - \beta_T$ where β_R and β_T are the estimates from panel regressions (6) and (7). Values of *t*-statistics appear in parentheses.

entire sample of provinces, regardless of whether time-fixed effects are included in the regression. For rich provinces, 67.2% of province-specific revenue shocks were evened out by remittances and only 3.9% by transfers. In contrast, transfers were the only source of insurance against province-specific revenue shocks for poor provinces, since remittances amplified expenditure volatility as indicated by the negative sign of the corresponding estimate. When aggregate shocks are not controlled for, the roles switch so that larger amounts of smoothing were provided by transfers for rich provinces and by remittances for poor provinces.

These findings suggest that when the revenue of a rich province decreases relative to all others, the corresponding provincial government gets a huge break on remittances but receives only a very small amount of transfers. When revenue declines nationwide, rich provinces remit more but receive even larger amounts of transfers, so that the net effect is still beneficial to them in terms of expenditure smoothing. Poor provinces, on the other hand, receive more transfers and remit less during an aggregate fall in revenue, but both amounts are relatively modest. A province-specific decline in revenue ensures that poor provinces receive large amounts of transfers, whereas remittances increase as well but by less.

Since the early 1980s, provincial governments have channeled a growing amount of revenue into extrabudgetary accounts that were outside the budgetary planning framework of the central government. To examine the effect of this issue on expenditure smoothing, extrabudgetary revenue and expenditure were added to their respective budgetary components over the 1986–2000 period, and the resulting total expenditure was regressed on total revenue using Eq. (1). The results for both budgetary and total revenue are displayed in Table 5. When aggregate shocks are controlled for, net transfers for all provinces smoothed 65.2% of province-specific shocks to budgetary revenue, but only 33.2% of shocks to total revenue. The disparity is similar in magnitude when time-fixed effects are not included. It is evident that extrabudgetary components amplified the volatility of provincial expenditure since the cushioning effect of net transfers diminished. The explanation is that during province-specific increases in revenue, regional governments diverted larger amounts of funds into extrabudgetary accounts. A comparison

Table 5
Amounts of expenditure smoothing for budgetary and total revenue, 1986–2000

Province	All		Rich		Poor	
	(i)	(ii)	(i)	(ii)	(i)	(ii)
<i>Budgetary revenue:</i>						
1986–2000	0.716 (15.47)	0.652 (10.00)	0.713 (11.18)	0.718 (5.83)	0.719 (10.61)	0.589 (8.36)
1986–1994	0.814 (12.33)	0.725 (7.68)	0.809 (7.82)	0.781 (4.11)	0.818 (9.26)	0.678 (6.67)
1995–2000	0.313 (11.94)	0.481 (8.99)	0.317 (9.85)	0.702 (4.62)	0.336 (5.83)	0.342 (9.71)
<i>Total revenue:</i>						
1986–2000	0.493 (21.63)	0.332 (24.02)	0.439 (16.51)	0.304 (15.88)	0.548 (14.22)	0.368 (17.24)
1986–1994	0.657 (12.91)	0.446 (15.06)	0.597 (9.12)	0.365 (9.56)	0.692 (10.86)	0.519 (12.24)
1995–2000	0.303 (26.44)	0.236 (21.78)	0.276 (26.49)	0.211 (13.85)	0.387 (10.90)	0.247 (16.63)
<i>Variables included:</i>						
Time-fixed effects	No	Yes	No	Yes	No	Yes
Region-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes

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

between the estimates for budgetary and total revenue over the period 1995–2000 shows that the amount of smoothing was almost identical when time-fixed effects were included. This is most likely due to the fiscal reform of 1994 that closed off many of the options for provincial governments to transfer revenues in extrabudgetary accounts, and consequently their destabilizing impact on total expenditure vanished.

Table 5 also reports the extent of smoothing budgetary and total revenue for rich and poor provinces. Again, net transfers absorbed smaller amounts of shocks to total revenue than to budgetary revenue for both groups, but the difference between the estimates for rich provinces was about 40% as compared to only 20% for poor regions, regardless of the time-fixed effects. Total expenditure was much more volatile for rich provinces, since they have broader tax bases and was in a better position than poor ones to gather larger amounts of extrabudgetary resources.

6. Conclusions

This paper provides evidence that net transfers in China cushioned almost 90% of province-specific revenue shocks over the 1952–2001 period. The tight controls imposed over provincial budgets were responsible for the large amount of interregional expenditure smoothing. As fiscal decentralization and market reforms weakened these controls in the 1980s and 1990s, the fraction of shocks absorbed by net transfers declined. When aggregate shocks to revenue were not controlled for, the amounts of expenditure smoothing were ostensibly lower. In addition, the percentage of province-specific revenue shocks buffered by net transfers was shown to be larger for rich provinces than for poor ones in every period of the sample, and this regional discrepancy increased dramatically after 1994.

In general, the extent of expenditure smoothing can be increased either by increasing the amount of interregional transfers or by making transfers more efficient. The first measure requires that the central government increases the proportion of revenue remitted by and transferred to provinces, which can be achieved, for instance, by increasing the rate of revenue sharing or by adjusting the way how grants and other types of transfers are distributed. For the second measure, it is necessary to make interregional transfers more sensitive to changes in provincial revenue by eliminating lump-sum transfers and remittances, and including taxes into the revenue sharing process that are more sensitive to changes in provincial income, such as personal and corporate income taxes. With respect to the cross-sectional disparity in expenditure smoothing, the central government could 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 across China.

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