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FOSTERING OR STRIPPING RURAL CHINA: MODERNIZING AGRICULTURE AND RURAL TO URBAN CAPITAL FLOWS

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The present study focuses on the flow of fiscal and financial resources in China's rural economy during the first two decades of reform. Specifically, we seek to quantify the nature and direction of the capital flows between agriculture and the non-agricultural sectors and between the rural and non-rural sectors. We track identify the flows of three main sources of capital: fiscal flows, financial shifts through the formal banking system, and the implicit taxes that are moving through the grain system as a result of payment of in-kind (e.g., delivery quotas by farmers). Through this analysis, we provide policy makers with a set of measures showing that although in recent years the agriculture-to-industry and rural-to-urban flows have appeared to reverse themselves, as late as 2000 it does not appear as if the government is not directing enough resources into the rural economy. Greater flows, however, are needed if rural China is to modernize.

Keywords: China; Fiscal flows; Financial flows; Agriculture-to-industry; Rural-to-urban
JEL classification: H20, O18, R51

I. INTRODUCTION

Two decades of economic reform have changed the economic landscape of China. During the 1980s and 1990s, per capita grain output reached a level similar to that in developed countries (FAO 2002). Agricultural productivity has risen steadily for two decades (Jin *et al*. 2002). Many farmers have shifted into higher valued agricultural enterprises, making decisions increasingly on market-oriented principles (Huang, Li, and Rozelle 2003). Off the farm, more than 40 per cent of rural residents have employment; approximately 100 million of them, most of them young and headed for new lives in the city, have left home and moved to urban

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areas for employment (de Brauw *et al*. 2002). Rural incomes have risen significantly and hundreds of million of people have escaped poverty during this time (World Bank 2001). Indeed, economists looking at China from a comparative perspective praise China's reforms as the "biggest antipoverty program the world has ever seen" (McMillan 1997, p. 94) and have claimed that the reform policies have led to "the greatest increase in economic well-being within a 15-year period in all of history" (Fischer 1994, p. 131).

Although past success is indisputable, there are still great challenges ahead. More than 100 million farmers and their families still live below the poverty line (World Bank 2001). Inequality within the rural economy rose during the early reforms and has remained high since the mid-1990s (Rozelle 1996). Despite nearly continuous growth, the gap between urban and rural incomes has not narrowed (Fleisher and Yang 2003). Visitors to most parts of rural China find that, although life has improved immeasurably in recent years, the landscape is still of a poor, developing country. Understanding the importance of keeping the rural economy strong and reducing the glaring differences between the rural and urban economies, national leaders during the recent 16th National Congress of the Communist Party of China (CPC) reiterated several times that one of the main goals of the coming decade was to integrate the rural and urban economies, ensure a more balanced growth between city and countryside, shift massive amounts of labor out of agriculture and to generally seek a modern, urban-based society.

To achieve such lofty goals, not only do leaders need to continue to push reform policies, the experience of other nations demonstrates that massive investments, from both fiscal and financial sources, are needed to facilitate the modernization of China's rural sector. In countries that have gone through this development transition in the past, Timmer (1998) has described a process by which many modern nations at a certain point in their development path make a fundamental shift in priorities and begin to increase investment into the rural sector. For example, the Republic of Korea, which at one time heavily taxed its agricultural sector, changed directions in the later stages of development, and at a later stage began to invest large volumes of capital to allow those in the countryside to share the benefits of modernization. Although China's leaders clearly have their sights set on becoming a modern nation in the not-so-distant future, it is unclear if the government's investment and taxation behavior is becoming consistent with this phase of development. Surprisingly, given the importance that is now being attached to accelerating rural development, published reports do not provide an account of the extent to which China's government is taxing or supporting the rural economy. Policy makers, at the very least, should be made aware of how the nation has treated the rural and agricultural sectors in the past and the trends of investment and taxation in recent years.

The current study focuses on the flow of fiscal and financial resources in China's rural economy during the first two decades of reform. Specifically, we seek to

quantify the nature of the capital flows between agriculture and the non-agricultural sectors (henceforth, agriculture-to-industry) and between the rural and non-rural sectors (henceforth, rural-to-urban). Importantly, we are not only interested in the level of the net direction of the flows, but are also interested in the trend of the flows. Through this analysis, we want to provide policy makers with a set of measures that will show if they are making the size of the investments that are necessary to help modernize rural China. We also identify the flows of four separate sources of capital: fiscal flows; financial shifts through the formal banking system; the implicit taxes that are moving through the grain system as a result of payment of in-kind and delivery quotas by farmers; and the remittance of wages by rural migrants.

Such an ambitious study unavoidably must be subject to certain limitations. First, although the findings in the present study might help track the contours of capital flows in China, identifying the determinants of the flows is beyond the scope of the current analysis. As such, we realize that even if we find net flows from rural-to-urban, it does not mean that such flows are irrational. If rates of returns of investments differ in sectors, such flows can be reflecting the response of rational investors moving funds from low return to high return sectors. The flows, however, might also in part result from distortions in the financial and/or fiscal system that might be biasing the flows, and encouraging the high rate of outflows of capital. For example, if policies preclude banks from using collectively held farm land and housing investments for collateral, funds might not be able to be invested into agriculture, even if there are fairly competitive rates of return. Other banking regulations or budgetary decisions could even more directly be influencing the flows based on the urban/industrial biases inherent to China's current political/economic system. Therefore, if we find that capital is flowing from agriculture-to-industry and from rural-to-urban at the very most we can say that the direction of flows is not consistent with the capital flows experienced by many developed countries during the times in which they were modernizing. Such knowledge might also help policy officials calibrate their goals or make decisions to adjust the direction or volume of flows.

We also have necessarily limited the scope of our inquiry to more direct fiscal and financial flows. In addition, there are a number of other policies that affect the net resource transfer from agriculture-to-rural to industry-to-urban. For example, trade and exchange rate policies might favor urban areas and hurt rural areas through their effect on prices (e.g., China's closed borders historically had depressed grain and cotton prices, in effecting taxing agricultural producers and subsidizing urban consumers). We also ignore issues such as FDI flows and industrial/agricultural pricing and marketing policies (e.g., those policies that allow or encourage monopoly market power in certain sectors). As seen below, we also do not take the broad approach of some in published reports (e.g., Nakagane 1989) that attempt to capture the flow of all physical resources as well.

A number of our assumption makes our work somewhat different (and as such difficult to compare) to the previous research that has been interested in measuring the flows of resources in China between the agricultural and non-agricultural sector. Most fundamentally, earlier work (e.g., Ishikawa 1967; Nakagane 1989; Sheng 1993) motivated their work as trying to understand the source of capital that helped fund China's industrialization drive between the 1950s and mid-1980s. In many ways the interest of previous published works is one capturing the totality of the flows between the fundamental sectors of the economy. In contrast, our study wants to try to add up physical flows of capital, which are more under the direct or indirect control of policy makers to allow them to see the consequences of past actions or help policy makers adjust future flows if they are trying to move a greater net volume of resources flow to the agricultural and rural sectors.

Although the goal of previous work on this topic is different from the current interests of policy makers there are still valuable lessons. Above all, perhaps the most important message is that close attention needs to be paid to defining the scope of the flows and sectors between which flows are being measured. Differences in the approaches taken by the different authors, as well as by the authors themselves, shows that there is no clear consensus in published reports on the net direction of the flow. For example, Ishikawa (1967) uses the idea of capital funds, which he refers to as claims on commodity flows, to show that except for in 1952 and 1953, there was a net flow from the non-agricultural to the agricultural sector during the 1950s. Nakagane (1989) uses a different set of approaches, trade surplus and savings surplus methodologies, to conclude that during most of the period between the 1950s and mid-1980s resources flows from agriculture were at most modest and most of China's industrialization was in fact funded from low wages and other pro-industrialization policies. Finally, Sheng (1993) uses two approaches, a price-based and a non-price-based approach, and comes to a different conclusion, the former method finding that agricultural provided a net quantity of resources to the agricultural sector before the 1980s and the latter method finding a net inflow into agriculture from the non-agricultural sector. In their reviews of the previous literature, both Nakagane (1989) and Sheng (1993) summarize the difficulties of doing research on measuring resource flows as depending highly on the approach, definition of the sectors being studied and the sources of data.

II. METHODS OF MEASURING FLOWS

We divide capital flows into four broad categories: fiscal flows; financial shifts through the formal banking system; the implicit taxes that are moving through the grain system as a result of payment of in-kind, delivery quotas by farmers; and the remittance of wages by rural migrants. We also further subdivide capital flows into movements between two sets of sectors: between agricultural and industry and

between the rural sector (which we assume is agriculture plus the rural industrial sector) and the urban sector.[1] Estimates of the flows are generated for the fiscal, financial, and implicit grain tax from 1978 to 2000 and are based on published statistics. Because wage remittances can only be estimated based on micro-studies of labor markets, estimates are not included in the tables that provide complete time-series for each of the variables.

A. *Measuring Fiscal Flows*

Budgets provide leaders with the most explicit channel for directing capital flows. In our analysis, fiscal flows across sectoral boundaries consist primarily of direct budgetary expenditures to agricultural activities and tax receipts from agriculture and rural industries. Fiscal expenditures in agriculture include all allocated funds targeted for investments in activities such as irrigation, land improvement projects, and other integrated agricultural development projects. We use China's consolidated fiscal accounts (NBSC various years) so that we capture expenditures from national and subnational budgetary sources. Because of shortcomings in China's statistical sources on investment, we do not include expenditures on activities that can be classified as "rural" in the broader sense of the word that would capture central government investments in the broader rural economy, e.g., rural roads and rural schools. Wong (1997) would argue, however, that the distortions from doing so would not be very great given the degree of decentralization that characterizes rural economy fiscal issues. Luo *et al*. (2005) shows that more than half of public goods are financed by the village itself. At least through the 1990s, most rural public goods are paid for by those in the rural economy, and as such do not contribute to net inflow

[1] As stated in Nakagane (1989) and Sheng (1993), care needs to be taken in defining sectors. In particular, we rely on official data that break rural by formal jurisdictional categories which often are historic in nature. In other words, regions in some parts of China which were at one time rural and dominated by traditional rural activities (e.g., cropping and livestock activities) have now been virtually urbanized. Yet, in many cases, the residents are still officially designated as rural and their output is still included in rural domestic product. Such a tendency would affect our analysis. For example, some of our rural-to-industry numbers are in fact industry-to-industry and so some of the rural-to-industry flows might be overstated. To offset this tendency, however, in some cases regions are redrawn as urban and urban residency permits are given to the population, even though many still live in villages. The main point here, however, is that China's statistical system is not perfect and results have to be interpreted with care.

In order to analyze flows carefully, in the present study we break the rural sector into the agricultural and non-agricultural rural sectors. The non-agricultural rural sectors include rural enterprises or township and village enterprises (TVE) that are engaged in non-agricultural activities (henceforth, non-agricultural TVE). The agricultural sector includes the farming sector (cropping, livestock, forestry, and fisheries) and TVE that are engaged in agricultural activities (or agricultural enterprises). The total TVE sector includes non-agricultural TVE plus agricultural enterprises.

or outflow of resources. We do include investments in rural areas from other major programs, such as the nation's poverty alleviation program (e.g., funds that come from subsidized loan programs and targeted grants).

Farmers and other rural residents also pay taxes, an important source of capital outflow. Fiscal contributions from the agricultural and rural sectors primarily come from official agricultural taxes, which include the long-standing national grain tax and a more recently assessed agricultural special commodity tax (which is typically assessed on livestock and certain cash crops, such as fruits and vegetables). The *China Statistical Yearbook*s also include estimates of other agricultural fees, which include special assessments approved by the central government (e.g., the *nongye fujia shui* (additional tax on agriculture)). In view of the high degree of attention given to the various fees and unofficial taxes that have caused rural dissention in some regions during various times during the reform era (Oi 1999), there might be a larger outflow of rural funds through these unofficial channels that are not captured. Most of the informal fees, however, are supposed to be used within the rural economy (which would be the case if such fees also leaked into the personal bank accounts of officials or were used for other less productive activities, such as banquets and entertainment). We do account for formal taxes paid by rural industries. Taxes on rural industries include funds remitted through the tax system by township-run, village-run, and private enterprises. As in the case of informal fees from farming households, the unavailability of data means that we did not account for the fees and profit remittances provided to township governments, some of which certainly are being invested in the industrial and urban sector. According to Wong (1997), however, most of these fees enter the extra-budgetary and self-raised funds systems, over which leaders have almost complete control (which would mean that most of the funds stay inside the rural sector).

B. *Measuring Financial Flows*

As important if not more important than fiscal flows, the banking system is able to move a large volume of capital among sectors. Among all of the sources, our coverage of financial flows might be the least comprehensive. Financial flows include only those savings and loan transactions in the three major rural financial intermediaries, the Agricultural Bank of China (ABC), Rural Credit Cooperatives (RCC), and China Post-Office (saving only). After the appearance of the ABC's policy arm, the Agricultural Development Bank of China (ADBC) in 1994, loaning activities in both institutions are shown. Savings with and loans by the other commercial banks and informal institutions are ignored (although they certainly might become more important).[2] Informal financial intermediation also is not accounted for, however, because most informal loans are between individuals that know each other and are engaged in the same business (Park, Brandt, and Giles forthcoming), the probability is higher that the capital flows out of the region are less

frequent. Shen (2005) shows empirically that most informal funds are borrowed and lent among actors within the same locality and sector.

The nature of the data in China's financial statistics means that we need to put the data into a more usable form before it can be used for our analysis. Above all, adjustments are made to statistics reported in the national financial yearbooks to account for the stock nature of the data. Yearbook report accumulated savings and aggregate loan figures for each year. Because we are interested in the incremental flows of financial resources, in our capital flow calculations we report only the net differences in year-end increases in savings minus increases in total outstanding loans. Savings accounts and lending activities are divided between enterprises and rural households. Enterprise financial transactions can be further subdivided between agriculturally-oriented enterprises (agricultural enterprises) and those engaged in industrial activities and the provision of services (non-agricultural township and village enterprises [TVE]). Rural household savings and loans to rural households are counted as transactions in agriculture, even though we recognize that in many cases the source of rural savings are earnings from off-farm employment and the uses of borrowed funds are non-agricultural in nature.[3]

C. *Measuring Mandatory Delivery Quotas: Implicit Taxation of Agriculture*

In addition to the formal tax obligations of farmers, during the first 20 years of reform officials in most areas required farming households to complete mandatory delivery quotas (Sicular 1995). In our analysis the grain quota tax measures only the impact on incomes of the obligation given to farm households to deliver to the state a stipulated quantity of grain for which the household earns a state-set price that is usually below (although in recent years is above) the price that is set by the market. In our analysis the "tax burden" of the quota is measured as the product of the annual

[2] We know our coverage of financial institutions is incomplete. Most importantly, we do not include information from the "other" major state banks, e.g., the Construction Bank of China or the Industrial Bank of China. In recent years, these banks have moved into certain rural areas. We know from field work that farmers and local enterprises are customers of these banks. Hence, our flows are incomplete by not including them. Unfortunately, deposits and loans from these institutions are not available by source or target. We did, however, interview a senior banking official about this issue and he unequivocally stated that the net flow out of agriculture and out of rural areas (that is, especially the TVE sector) from the other state banks are in the same direction as the agricultural and rural banks, but even more pronounced. This means that if we had been able to included information from the other commercial banks, the analysis would have reinforced our findings.

[3] In fact, rural households make deposits from their non-agricultural savings and take loans for non-agricultural activities. Although we do not have data that separate deposit and loan statistics in this way, if we use the proportion of income from agricultural and non-agricultural income to proxy the proportion of financial transactions (both deposits and loans) as an estimate of the proportion of deposits from agricultural sources and loans for agricultural purposes, we find the flows from agriculture to non-agriculture are attenuated but they are still large and growing over time. Hence, our assumptions do not affect the fundamental nature of the finding of our research.

grain quota (e.g., in recent years approximately 50 million metric tons, MODT, various years; National Domestic Trade Bureau, various years) and the difference between the domestic market and quota price. Over time, the tax varies either as the volume of the quota changes (in general it increased from 1978 to 1988 and has decreased since) or as either the market price or quota price shifts.[4] Because in most of the study period the market price exceeded the quota price, the quota will mostly contribute to capital outflow. It is possible, however, for the quota to be part of the inflow of capital as it was in the late 1990s when the market price fell below the quota price and farmers were paid the above-market state-set price by procurement officials for their deliveries. Local subsidies to grain procurement, which make up only a small fraction of such subsidies, are not included. Fertilizer subsidies are picked up by their direct budgetary allocations and are included in fiscal expenditures to agriculture.

III. RESULTS

In the first part of this section we examine the net flows of capital for each source. In the final section we look at the aggregate flow in each time period. The flow of capital is examined for both between agriculture and industry and between rural and urban.

A. *Fiscal Flows*

Low agricultural tax rates and self-sufficiency policies have kept fiscal flows between the agricultural and industrial sectors low (Table I, columns 1, 2, 4, and 5). The grain tax, which has remained almost constant during the reform era in nominal terms, has sharply fallen in real terms. Only the rise in special agricultural taxes associated with the boom of the fruit and vegetable sector in the late 1980s reversed the trend and led to the recent rise in tax receipts (columns 2 minus 3).[5] Hence, the structural change in the cropping sector, not changes in tax rates, was almost unilaterally responsible for the resurgence of capital outflow from taxes. In the 1980s,

[4] Our measure of the value of the tax depends importantly on the assumption that the market price is a measure of the price that the farmer would have received had they not had to deliver the quota to the state. If the basic model of Sicular (1988) is true and the quota is in fact a non-distorting tax, then we are correct in our assumption. However, Sicular (1988) also suggest that there could be an income effect of the quota tax which would alter the overall demand (and perhaps production) structure of China's economy. The complexity of the effect, unfortunately, means that we can not predict the direction of the shift in market price. Hence, our estimates of the quota tax might be overstated or understated. Fortunately, whichever the direction of the effect, it likely is small. Although several empirical studies have studied the distortions of the quota system (e.g., Wang *et al*. 2001), in most studies, the magnitude of the net effect is small.

[5] It should be noted that the agricultural special tax was eliminated in 2003.

TABLE I

TOTAL AND AGRICULTURAL FISCAL REVENUE IN CHINA, 1978–2000

(Billion yuan in 2000 price)

Year	Official Reports on Fiscal Revenue from Agriculture				Actual Fiscal Revenue from Agriculture (5) = (1) − (3)	Total Fiscal Revenue (6)	Share of Fiscal Revenue from Agriculture (%) (5)/(6) × 100
	Sub-total (Official Figure) (1)	Taxes (2)	Among: Tax on Land Occupation (3)	Other Fees Collected from Agriculture (4) = (1) − (2)			
1978	11.2	10.1	0.0	1.2	11.2	401.3	2.8
1979	11.1	10.2	0.0	0.9	11.1	398.3	2.8
1980	10.9	9.1	0.0	1.8	10.9	380.3	2.9
1981	12.4	9.1	0.0	3.3	12.4	376.4	3.3
1982	15.5	9.2	0.0	6.3	15.5	380.9	4.1
1983	20.9	10.2	0.0	10.7	20.9	423.1	4.9
1984	18.4	10.5	0.0	7.9	18.4	494.7	3.7
1985	24.2	11.6	0.0	12.5	24.2	554.6	4.4
1986	21.0	11.6	0.0	9.4	21.0	553.8	3.8
1987	21.9	12.4	0.3	9.5	21.6	535.0	4.0
1988	24.9	15.1	4.4	9.8	20.6	483.7	4.3
1989	24.7	14.8	2.9	9.9	21.7	464.3	4.7
1990	21.6	15.0	2.5	6.6	19.1	501.2	3.8
1991	22.2	15.0	3.0	7.1	19.2	522.3	3.7
1992	23.5	18.8	4.6	4.8	18.9	548.2	3.5
1993	32.8	17.5	4.1	15.3	28.7	604.7	4.8
1994	34.6	26.4	4.2	8.1	30.4	596.2	5.1
1995	36.0	27.7	3.4	8.4	32.6	621.2	5.2
1996	43.7	34.7	2.9	9.0	40.7	694.9	5.9
1997	49.9	37.0	3.0	12.9	46.9	805.1	5.8
1998	51.4	38.1	3.2	13.3	48.3	943.7	5.1
1999	56.3	41.7	3.3	14.6	53.1	1,127.2	4.7
2000	62.8	46.5	3.5	16.3	59.3	1,338.0	4.4
1978–2000:							
Total	651.9	452.4	45.3	199.6	606.6	13,749.1	4.4
Annual	28.3	19.7	2.0	8.7	26.4	597.8	4.4

Notes: All values in nominal terms are deflated by the general retail price index. Data for (1) in 1978–96 are from MOA (1997). The official data after 1996 are not available because of changes in the statistical categories that do not separately the fiscal revenue from agriculture. The data for (1) in 1997–2000 are estimated by the authors based on the ratio of "fiscal revenue from agriculture" to "agricultural tax revenue" in the previous five years. Data for (2) are from NBSC (2001). Tax on land occupation (3) is reported under agricultural tax. However, this tax is paid by industry for use of agricultural land.

the agricultural tax was nearly constant at 10–12 billion yuan (in 2000 price), rose to 24.3 billion in 1995 and then increased to 43 billion in 2000 (Table I, columns 2 minus 3). Although after the onset household responsibility system and the establishment of China's new township and village system of governance agricultural fees jumped somewhat (from approximately 1 billion yuan per year in the late 1970s to approximately 10 billion yuan per year in the mid-1980s and more than 15 billion yuan in 2000, column 4).

The low agricultural tax rates are also clearly shown by the low shares of fiscal revenue from agriculture. On average, the share of government fiscal revenue from agricultural sector accounted for 4.4 per cent only in entire reform period. However, the share did rise from 2.8 per cent in 1978 to approximately 5 per cent recently (Table I, last column).

Although it might be thought that the low taxation rates that have not risen much during the reform can mean that fiscal policy have been pro-agriculture, the low rates of investments temper the conclusion. In short, the nation has not invested heavily in agriculture during most years and the level of investment has risen only gradually over time (column 2, Table II). During the earlier reforms (1978 to 1985), budgetary allocations to agriculture fell from approximately 50 billion yuan in the late 1970s to approximately 39 billion yuan in 1984/85. In the late 1980s and early 1990s investments rose somewhat; but by 1995/96 total annual investment in agriculture is still just marginally above the level in the late 1970s in real terms. It is not until after the mid-1990s that China's investments accelerate, perhaps in response to the grain shortages and high grain prices in the mid-1990s.

When considering taxes and budgetary allocations together, according to our analysis, the total net fiscal investment into agriculture has been positive throughout the entire reform era (the negative sign means that extractions are less than investments, Table III, column 4). During the two decades of reform, government tax and budget authorities have invested 612.9 billion yuan in agriculture in net terms (bottom row: 1,219.5−606.6). Throughout the period, however, the level of net investment has fluctuated. With tax rates about constant, the level of net investment fell with the declining investments through the early reform period before recovering in the late 1980s. Although the rise of taxes in the early 1990s put pressure to increase the outflow of capital, during this same period the modest increases in budgetary allocations was high enough to increase the net inflow. Throughout the rest of 1990s, net inflow at first fell in 1997 to its lowest level since 1985, before rising the following year to its highest level. Despite the fluctuations, the main finding of our analysis is that China's fiscal system for the entire reform era has continuously supported agriculture.

The story changes, however, when examining the net flows from rural-to-urban. Calculating the flow of fiscal funds from rural-to-urban (Table III, column 5) mainly involves deducting tax receipts collected from rural industries (column 2) from the

TABLE II

TOTAL AND AGRICULTURAL FISCAL EXPENDITURE IN CHINA, 1978–2000

(Billion yuan in 2000 price)

Year	Official Report on Fiscal Expenditure in Agriculture (1)	Actual Fiscal Expenditure on Agriculture (2)	Share of Agricultural Fiscal Expenditure in Total Fiscal Expenditure (%) (3)	Water Control Capital Investment (4)	Water Control Administrative Budget (Shiyefee) (5)	Non-agricultural Share in Water Control (%) (6)	Non-agricultural Expenditure in Water Control (7)	Natural Forest Protection and Land Conversion Programs (8)
1978	53.4	47.6	12.0	11.8	2.7	40.0	5.8	
1979	60.6	54.5	12.2	11.8	3.2	40.0	6.0	
1980	49.2	44.5	11.0	8.0	3.6	40.0	4.7	
1981	35.3	32.3	8.9	3.9	3.4	40.0	2.9	
1982	37.9	34.2	8.9	5.2	3.9	40.0	3.6	
1983	41.1	37.0	8.5	6.0	4.3	40.0	4.1	
1984	42.5	38.8	7.6	5.1	4.1	40.0	3.7	
1985	42.5	39.1	7.1	4.5	3.9	40.0	3.4	
1986	48.1	43.9	7.6	6.0	4.4	40.0	4.1	
1987	47.6	44.1	8.0	4.6	4.2	40.0	3.6	
1988	43.9	40.7	8.0	4.2	3.9	40.0	3.3	
1989	46.3	43.4	8.8	4.0	3.3	40.0	2.9	
1990	52.5	48.7	9.2	4.8	3.6	46.0	3.9	
1991	57.6	52.6	9.4	5.6	4.0	52.0	5.0	
1992	59.2	53.8	9.1	5.8	4.1	54.0	5.4	
1993	61.2	55.5	8.6	5.4	4.6	57.0	5.7	
1994	60.9	55.3	8.4	4.8	4.0	64.0	5.6	
1995	57.2	51.0	7.5	5.3	4.5	63.0	6.2	
1996	65.7	59.5	8.0	5.0	4.8	63.0	6.2	
1997	71.3	62.4	7.3	8.0	6.3	62.0	8.9	
1998	110.3	96.1	9.3	8.1	12.7	59.0	12.3	2.0
1999	107.0	79.2	6.1	31.8	12.0	56.0	24.7	3.5
2000	134.7	106.4	6.7	31.9	8.5	54.0	21.6	7.3
1978–2000:								
Total	1,386.1	1,220.7	7.9	191.6	113.8	48.3	153.8	12.7
Annual	60.3	53.1		8.3	4.9	48.3	6.7	4.2

Sources: Data for (1) and total fiscal revenue used to compute (3) are from NBSC (various years). Data for (4) and (5) are from MWR (various years). Data for (6) are derived from Appendix Table I. Data for (8) are from State Forest Bureau (2001).

Note: (2) = (1) − (7) − (8); (7) = [(4) + (5)] × (6).

TABLE III

FISCAL CASH FLOW FROM AGRICULTURE/RURAL TO INDUSTRY/URBAN, 1978–2000

(Billion yuan in 2000 price)

Year	Fiscal Revenue from		Fiscal Expenditure in Agriculture	Cash Flow from	
	Agriculture	TVE Tax		Agriculture to Industry	Rural to Urban
1978	11.2	7.3	47.6	–36.3	–29.0
1979	11.1	7.4	54.5	–43.4	–36.0
1980	10.9	7.9	44.5	–33.6	–25.8
1981	12.4	10.3	32.3	–19.9	–9.6
1982	15.5	13.2	34.2	–18.7	–5.5
1983	20.9	17.1	37.0	–16.1	1.0
1984	18.4	22.3	38.8	–20.5	1.9
1985	24.2	28.2	39.1	–14.9	13.2
1986	21.0	33.7	43.9	–22.9	10.8
1987	21.6	38.4	44.1	–22.5	15.8
1988	20.6	45.6	40.7	–20.1	25.5
1989	21.7	44.5	43.4	–21.7	22.9
1990	19.1	44.1	48.7	–29.6	14.5
1991	19.2	51.9	52.6	–33.4	18.5
1992	18.9	69.4	53.8	–34.9	34.5
1993	28.7	123.6	55.5	–26.8	96.8
1994	30.4	122.9	55.3	–24.9	98.1
1995	32.6	134.3	51.0	–18.4	115.8
1996	40.7	126.4	59.5	–18.8	107.6
1997	46.9	142.1	62.4	–15.5	126.5
1998	48.3	151.3	96.1	–47.8	103.5
1999	53.1	176.3	79.2	–25.7	150.6
2000	59.3	199.7	106.4	–46.5	153.2
1978–2000:					
Total	606.6	1,617.6	1,220.6	–612.9	1,004.7
Annual	26.4	70.3	53.1	–26.7	43.7

Sources: Township and village enterprises (TVE) taxes are from MOA-TVEYEC (various years). Other estimates see Tables I–II. TVE include enterprises that engage in both agricultural and non-agricultural activities (but which are located in rural areas—see footnote 1).

net agriculture-to-industrial flows (column 4) because few budgetary transfers are used for directly investing in rural industries. In the early reform years before the explosion of rural industrial growth, and before the implementation of the fiscal responsibility system (when tax codes were more formally instituted), rural industrial managers (including the local officials that were in charge of TVE) remitted few taxes. Through 1984, tax remittances were not high enough to offset the net investment into agriculture; hence, in the early reform era there was still a net flow of capital into the rural economy through the fiscal system. After the liberalization of investment in the rural industrial sector (which were enhanced by the incentives

given to local officials to increase industrial activities) in the mid-1980s, tax collections by the upper level governments raised steadily every year. Since 1993, annual tax remittances from rural industries have surpassed 100 billion yuan per year and have been more than twice as much as on-budget allocations to agriculture in almost every year since. In total, since the reforms, more than 1 trillion yuan have moved from the rural-to-urban sector through fiscal channels, a sharp contrast to the case of agricultural-to-industrial fiscal movements.

B. *Financial Flows*

Whereas net financial flows display many of the same general contours as those of net fiscal disbursements, the movement of funds out of agriculture through the financial system began earlier and the volume of capital flows out of agriculture has dominated other categories of funds movements. The biggest movement of funds out of the agricultural sector occurs when rural households deposit their savings in rural financial institutions (Table IV, column 3). With China's rising wealth, rural savers—non-agricultural TVE, agricultural enterprises, and households—have accumulated ever increasing levels of deposits during the reforms.

During the same period, capital flows to the agricultural and rural sectors through lending by the financial system also increased steadily, but throughout the period the banking system only returned a fraction of the deposits back into their original sector (Table IV, columns 4 to 6). From an average of approximately 62 billion yuan per year in the early 1980s, loans to agriculture and farmers rose through the late 1990s to a point in which on average bankers lent 400 to 480 billion yuan per year. Loans to rural industry (both non-agricultural TVE and agricultural enterprises) rose even faster. In the early 1980s, the volume of loans to rural industries was only around half that of those to households; by the late 1990s the volume to rural industries was nearly double that of agricultural households.

When simultaneously accounting for both deposits and loans, net financial flows out of agriculture are shown to be larger and growing faster than the fiscal flows (Table IV, column 7). According to our analysis, except for 1984, in all years deposits by agricultural enterprises and households (using data from columns 2 and 3) exceeded lending to the sector (using data from columns 5 and 6). Net extraction from agriculture also has accelerated over time. By 2000, bankers had moved more than 1.4 trillion yuan moved from agriculture to industry (Table IV, sum of column 7). At this rate of extraction, the outflow of capital from the financial system was nearly three times that of the inflow through the fiscal system. Interestingly, according to our disaggregated numbers (not shown) the extractions out of agriculture by the RCC exceed those of the ABC.

The net flow of capital from the rural-to-urban sector also was large and has been growing over time (Table IV, column 8). The rural-to-urban flow, which is measured as the flow from agriculture-to-industry plus lending to rural industrial firms minus

TABLE IV

FINANCIAL OUTFLOW FROM AGRICULTURE TO INDUSTRY AND FROM RURAL TO URBAN IN CHINA, 1978–2000

(Billion yuan in 2000 price)

	Savings by			Loan to			Cash Flow from	
		Agriculture			Agriculture			
Year	TVE* (1)	Enterprise (2)	Farmers (3)	TVE (4)	Enterprise (5)	Farmers (6)	Agriculture-to-Industry (7)	Rural-to-Urban (8)
1978	8.8	44.6	22.5	11.3	37.3	4.0		
1979	10.4	47.4	32.4	15.3	41.0	3.8	9.2	6.8
1980	13.1	54.9	45.6	26.4	46.4	5.2	13.9	5.5
1981	13.9	53.9	63.6	31.2	48.2	8.1	12.2	8.2
1982	15.7	57.2	83.0	36.3	50.5	13.9	14.7	11.4
1983	24.6	47.2	112.7	43.4	51.6	23.3	9.1	11.1
1984	35.1	48.6	151.6	88.1	65.3	54.5	−4.6	−38.9
1985	28.5	39.3	183.8	97.5	66.0	53.7	22.9	7.0
1986	35.9	46.3	242.3	144.5	76.5	67.4	41.4	1.8
1987	38.7	47.9	308.9	172.6	88.7	84.6	38.8	13.6
1988	39.1	42.2	308.7	174.0	87.9	76.5	3.1	2.1
1989	31.8	35.4	338.4	173.5	93.8	72.4	21.0	14.2
1990	36.9	41.1	446.4	209.4	133.2	88.4	58.2	27.4
1991	46.1	49.2	550.7	250.7	164.1	104.7	65.4	33.3
1992	68.3	63.9	649.3	296.4	201.9	119.5	60.7	37.2
1993	88.2	58.6	723.5	338.9	207.8	122.4	60.1	37.4
1994	85.1	54.2	806.2	260.4	223.9	123.5	61.2	136.7
1995	81.3	53.2	914.9	276.6	254.0	135.4	65.6	45.6
1996	88.3	56.4	1,073.5	306.3	215.2	146.4	189.6	167.0
1997	85.6	57.1	1,268.2	468.7	225.1	83.3	248.5	83.4
1998	100.2	66.8	1,495.3	533.2	310.0	114.7	120.6	70.7
1999	125.7	83.8	1,666.3	606.9	344.6	127.5	140.6	92.3
2000	158.5	105.7	1,887.4	606.1	356.8	132.0	226.3	259.9
Average	54.8	54.6	581.5	224.7	147.4	76.7	67.2	47.0

Sources: Data on saving before 1997 are from MOA (1997, pp. 277–78) and Agricultural Bank of China (ABC) (various years). Data on savings after 1997 are from PBC-RD (1997–2001). However, these saving data are not reported separately for township and village enterprises (TVE) and agricultural enterprise, which are estimated by the authors based on personal communications with the officials from the People's Bank of China. Loan data for agricultural enterprises and farmers before 1997 are from MOA (1997, pp. 277–78) and ABC (various years), data after 1997 are from PBC-RD (1997–2001), which report total agricultural and farmers' loans. The separate figures after 1997 are estimated by the authors given the total numbers reported in PBC-RD (1997–2001). Loan to TVE in all years are from PBC-RD (various years).

$(7)_t = [(2)_t - (2)_{t-1}] + [(3)_t - (3)_{t-1}] - [(5)_t - (5)_{t-1}] - [(6)_t - (6)_{t-1}]$.

$(8)_t = [(1)_t - (1)_{t-1}] + [(2)_t - (2)_{t-1}] + [(3)_t - (3)_{t-1}] - [(4)_t - (4)_{t-1}] - [(5)_t - (5)_{t-1}] - [(6)_t - (6)_{t-1}]$.

Note: Savings include those in Rural Credit Cooperatives, ABC, and rural post-office, which is expected to underestimate the total savings as farmers and rural enterprises also deposit in other banks in rural China. However, other banks also provide some loans to agriculture, rural enterprises, and farmers, this might offset the underestimation of deposit so that the impacts on net cash flow could be minimal. TVE* in this table are those not engaged in agricultural activities. TVE in total are TVE* plus agricultural enterprises. See footnote 1.

the deposits of the firms, grow steadily although the variance over time is great, perhaps as a result of the on-again/off-again lending restriction of state-owned banks to rural firms. Because banks lend more to rural firms than they take in from deposits, the volume of the rural-to-urban capital outflow is lower than the agricultural-to-industry flow (bottom row). When the financial flows are added to fiscal flows (Table III plus Table IV), however, the volume of rural-to-urban capital flow is nearly double the agricultural-to-industry flow.

C. *Quotas, Remittances, and Capital Flows*

Additional capital flows also have moved out of agriculture through the mandatory delivery quota system during the reform era (Table V). Although there is some fluctuation, especially in the major commodities—rice, wheat, and maize—from 1980 to 1985, the total movement of capital out of agriculture is remarkably consistent, ranging from 30 to 60 billion per year. According to our analysis, however, there is a sharp structural shift that occurs in China's in-kind tax policy in the late 1990s. In part, the fall in the quota tax is because of the sharp reduction in quota volume that gradually occurred in the 1990s (Rozelle *et al*. 2000). However, a shift in pricing strategy also is responsible. Starting in 1998 for rice, 1999 for wheat, and 2000 for maize, producers in some regions of the country began to receive subsidies. Despite the turnaround of the policy in the late 1990s, when examining the nature of the flows during the entire reform era, quotas were responsible for 688 billion yuan of capital flow out of agriculture. This amount is actually slightly more than total net inflow from the fiscal system (612 billion yuan).

In contrast to all other channels of capital flow, wage remittances move capital from the urban-to-rural sector. Although there are no national sources of data before 2000, the rise in migration certainly means that remittances have grown steadily during the reform era. In our analysis we assume that each migrant, on average, earns approximately 4,000 yuan per year (in 2,000 real prices) and remits approximately 50 per cent of their earnings (Rural Development Institute 1994). With this assumption, we can use estimates of the migrant workforce from de Brauw *et al*. (2002) devised estimates of total annual remittances. For example, in 1995, we estimate that the 50 million migrants lived and worked outside of their villages in urban areas earned 200 billion yuan and remitted 100 billion. From de Brauw *et al*. (2002) the estimates of the migration explosion in the late 1990s mean that this has become a major source of capital inflow to rural areas, rising to as much as 200 billion yuan in 2000.

D. *Total Flows*

When examined in the aggregate (summing the capital flows from the fiscal, financial, and quota system, but not wages because we lack systematic data), we see that at least during the first 20+ years of reforms (between 1978 and 2000), China

TABLE V

IMPLICIT TAX THROUGH GRAIN PROCUREMENT IN CHINA, 1978–2000

(Billion yuan in 2000 price)

	Rice	Wheat	Maize	Soybean	Other Grain	Total
1978	15.82	6.40	7.33	1.01	0.61	31.2
1979	18.95	11.67	10.41	1.90	0.86	43.8
1980	17.86	9.58	9.21	1.86	0.77	39.3
1981	20.10	8.86	8.08	0.87	0.76	38.7
1982	19.12	10.51	9.43	1.45	0.81	41.3
1983	29.79	15.93	15.62	2.39	1.27	65.0
1984	30.92	15.24	10.43	3.46	1.20	61.3
1985	4.23	2.63	2.69	1.48	0.22	11.3
1986	7.83	6.51	6.92	2.29	0.47	24.0
1987	9.34	9.62	9.36	3.57	0.64	32.5
1988	16.60	13.29	8.80	4.32	0.86	43.9
1989	24.58	19.92	11.11	5.89	1.23	62.7
1990	7.24	11.72	8.80	4.86	0.65	33.3
1991	2.81	7.03	5.61	3.34	0.47	19.3
1992	11.42	6.15	5.04	2.96	0.64	26.2
1993	12.83	4.98	6.01	3.52	0.68	28.0
1994	18.30	3.80	4.87	2.65	0.74	30.4
1995	17.96	9.06	3.83	1.86	0.82	33.5
1996	11.77	6.91	0.18	2.48	0.53	21.9
1997	1.49	1.30	1.23	2.14	0.15	6.3
1998	–2.08	–1.05	4.52	0.16	0.04	1.6
1999	–6.05	0.22	3.19	–0.19	–0.07	–2.9
2000	–2.15	–0.12	–1.63	–0.01	–0.10	–4.0
1978–2000:						
Total	288.7	180.2	151.0	54.2	14.3	688.4
Annual	12.6	7.8	6.6	2.4	0.6	29.9

Note: See Appendix Tables II–V.

was in a stage of development in which it was still extracting heavily from agriculture. During this time period, large volumes of capital funds moved from agriculture to industry (1.55 trillion yuan) and from rural to urban (2.73 trillion—Table VI). Moreover, for both the case of agriculture and the case of the rural sector, the flows were rising at an increasing rate. The capital outflow from agriculture primarily occurs through the financial and marketing sectors and is abated by investment through budgetary channels. The additional component which makes the capital outflow from the broader rural sector even higher (during most all years, but particularly so after the late 1980s) is primarily caused by taxes that were assessed on rural industries.

Notwithstanding the sharp rise in outflow from the rural sector in 2000, our data do show that in the late 1990s, the rate of extraction might be beginning to fall. One of the main components of the fall in capital outflows is the elimination of the

TABLE VI

CAPITAL FLOW FROM AGRICULTURE/RURAL TO INDUSTRY/URBAN THROUGH FISCAL, FINANCIAL, AND GRAIN PROCUREMENT SYSTEMS

(Billion yuan in 2000 price)

	Fiscal System		Financial System			Cash Flow from	
	Agriculture-to-Industry	Rural-to-Urban	Agriculture-to-Industry	Rural-to-Urban	Grain Marketing (Implicit Tax)	Agriculture-to-Industry	Rural-to-Urban
1978	–36.3	–29.0			31.2	–5.1	2.2
1979	–43.4	–36.0	9.2	6.8	43.8	9.6	14.6
1980	–33.6	–25.8	13.9	5.5	39.3	19.6	19.0
1981	–19.9	–9.6	12.2	8.2	38.7	31.0	37.3
1982	–18.7	–5.5	14.7	11.4	41.3	37.3	47.2
1983	–16.1	1.0	9.1	11.1	65.0	58.0	77.1
1984	–20.5	1.9	–4.6	–38.9	61.3	36.2	24.3
1985	–14.9	13.2	22.9	7.0	11.3	19.3	31.5
1986	–22.9	10.8	41.4	1.8	24.0	42.5	36.6
1987	–22.5	15.8	38.8	13.6	32.5	48.8	61.9
1988	–20.1	25.5	3.1	2.1	43.9	26.9	71.5
1989	–21.7	22.9	21.0	14.2	62.7	62.0	99.8
1990	–29.6	14.5	58.2	27.4	33.3	61.9	75.2
1991	–33.4	18.5	65.4	33.3	19.3	51.3	71.1
1992	–34.9	34.5	60.7	37.2	26.2	52.0	97.9
1993	–26.8	96.8	60.1	37.4	28.0	61.3	162.2
1994	–24.9	98.1	61.2	136.7	30.4	66.7	265.2
1995	–18.4	115.8	65.6	45.6	33.5	80.7	194.9
1996	–18.8	107.6	189.6	167.0	21.9	192.7	296.5
1997	–15.5	126.5	248.5	83.4	6.3	239.3	216.2
1998	–47.8	103.5	120.6	70.7	1.6	74.4	175.8
1999	–25.7	150.6	140.6	92.3	–2.9	112.0	240.0
2000	–46.5	153.2	226.3	259.9	–4.0	175.8	409.1
1978–2000	–612.9	1,004.7	1,478.5	1,033.4	688.4	1,554.2	2,726.8
Annual	–26.7	43.7	67.2	47.0	29.9	67.6	118.6

Sources: Tables I–V.

in-kind quota tax. Investments from budgetary sources also rise in the late 1990s as China's development priorities slowly began to shift to include the rural sector.

E. *Since 2000*

Unfortunately, it is impossible from our data to determine if and when China will begin to enter a new phase of rural development. Reliance on short time-series certainly can be misleading. Specifically, it is unclear if the downward fall in the late 1990s is a harbinger of things to come. If China continues to move in this direction, it could soon be in a position that characterized the historic path of other developing nations, one in which there is a net inflow into the rural economy. Alternatively, the continuing high levels of outflows, even in the late 1990s, and the rise in 2000—especially in the rural-to-urban outflows—might mean that China's priorities (or constraints that it is facing) are such that it will continue to extract resources out of the sector, a move that will undoubtedly slow the development of the rural sector.

In fact, since the last year of our data (in 2000), the trends identified at the end of the 1990s have continued and have strengthened mainly because of a number of initiatives of the central government. In 2000, policy makers began to experiment with Tax for Fee and agricultural tax reform (Sonntag *et al*. 2005). In 2002, a number of programs began to be extended nationwide. As a result, fees paid by farmers to the local governments were eliminated. The agricultural tax was reduced and is being scheduled to be completely eliminated by 2007. The special agricultural tax was abolished in 2003. In 2004, a series of subsidies and fee reduction programs were begun as part of a program to transfer more resources to the rural sector, in general, and the agricultural sector in particular. Although there have been questions raised by some about the implementation of these new programs, should they be carried through and implemented as designed, surely the flows from the rural-to-urban sector and the flows from agriculture-to-industry are becoming more consistent with those identified by Timmer (1998).

IV. CONCLUSIONS

Growth in agriculture, non-farm employment and rural industry and the transformation of domestic and international markets have changed the face of rural China and are playing key roles in the nation's modernization. However, great challenges face the nation. If the experience of other countries is relevant for China, the nation will need to experience a phase of development when national leaders pour large volumes of resources into the rural sector.

In the current study we have documented that China still has not reached this stage. At least in terms of the broad (although incomplete) set of fiscal and financial flows that we account for in our analysis, we find that in almost the entire reform era China has been extracting large volumes of capital from agriculture, in particular,

and the rural sector, more generally. The largest outflows from the rural economy occur through the financial system, although taxation of rural industries also has contributed to the outflow. Driven mostly by these forces, the rate of extraction rose between 1980 and 1995. Although still large and positive, investments and the elimination of quotas, especially in recent years, have attenuated the outflows.

What are the implications? Are there policies and/or structural considerations biasing these flows? It is beyond the scope of this present study to answer this question, although, most likely the lack of an effective rural lobby makes it so leaders do not have a lot of pressure to invest in the rural sector. It could also be that the lack of a strong intervention into the sector in recent years is allowing funds, both fiscal and financial, to move capital from low-return sectors to high-return sectors. To answer the question about which is the most important determining factor would rely on an integrated analysis of the rural economy. Although such an analysis might be difficult, it is certainly true, given the income levels of the two sectors and the relative earning capabilities, that the large movement of funds out of agriculture and out of the rural economy highlights the important role the sector has played in contributing to the rise of the nation's economy as a whole. It also is true that if China is to move into a new phase of development, in which the modernization of the rural economy is given higher priority, a large shift in fiscal and/or financial policy is needed.

REFERENCES

Agricultural Bank of China (ABC). Various years. *Zhongguo nongcun jinrong tongji nianjian*. [China's rural financial statistical yearbook]. Beijing: China Statistics Press.

de Brauw, Alan; Jikun Huang; Scott Rozelle; Linxiu Zhang; and Yigang Zhang. 2002. "China's Rural Labor Markets." *China Business Review*, March–April: 2–8.

Center for Chinese Agricultural Policy (CCAP). *CAPSiM Database*. Beijing: CCAP, Chinese Academy of Sciences.

Fischer, Standy. 1994. "Structural Factors in the Economic Reforms of China, Eastern Europe, and the Former Soviet Union, Discussion." *Economic Policy* 9, no. 18: 131–35.

Fleisher, Belton M, and Dennis Tao Yang. 2003. "China's Labor Market." Paper presented at the Conference on China's Market Reforms, organized by Stanford Center for International Development, Stanford University, Stanford, 19–20 Sept 2003, Stanford, USA.

Food and Agricultural Organization of the United Nations (FAO). 2002. *The State of Food Insecurity in the World 2001*. Rome: FAO.

Huang, Jikun; Ninghui Li; and Scott Rozelle. 2003. "Trade Reform, Household Effect, and Poverty in Rural China." *American Journal of Agricultural Economics* 85, no. 5: 1292–98.

Ishikawa, Shigeru. 1967. "Resource Flow between Agriculture and Industry: The Chinese Experience." *Developing Economies* 5, no. 1: 3–49.

Jin, Songqing; Jikun Huang; Ruifa Hu; and Scott Rozelle. 2002. "The Creation and Spread of Technology and Total Factor Productivity in China's Agriculture." *American Journal of Agricultural Economics* 84, no. 4: 916–30.

Luo, Renfu; Linxiu Zhang; Chengfang Liu; and Scott Rozelle. 2005. "Investing in Rural China: Tracking China's Commitment to Modernization Chinese Economy." *Chinese Economy* (forthcoming).

McMillan, J., 1997. "Markets in Transition." In *Advances in Economics and Econometrics: Theory and Applications*, Vol. 2, ed. David M. Kreps and Kenneth F. Wallis. Cambridge: Cambridge University Press, pp. 210–39.

Ministry of Agriculture (MOA), Marketing Information Department. 1997. *Zhongguo nongcun tongji ziliao* [Statistical materials of China's rural economy]. Beijing: China's Agricultural Press.

Ministry of Agriculture, Township and Village Enterprises Yearbook Editorial Committee (MOA-TVEYEC). Various years from 1985 to 2001. *Zhongguo xiangzhen qiye nianjian* [China's township and village enterprises yearbook]. Beijing: China's Agricultural Press.

Ministry of Domestic Trade (MODT, recently renamed as the National Domestic Trade Bureau). Various years from 1988 to 1993. *Zhongguo shangye nianjian* [China commercial yearbook]. Beijing: China's Domestic Trade Yearbook Society, MODT.

Ministry of Water Resource (MWR). Various years from 1989 to 2001. *Zhongguo shuili nianjian* [China water resource yearbook]. Beijing: China Water Conservancy and Electricity Press.

Nakagane, Katsuji. 1989. "Intersectoral Resource Flows in China Revisited: Who Provided Industrialization Funds?" *Developing Economies* 27, no. 2: 146–73.

National Bureau of Statistics of China (NBSC). Various years from 1982 to 2001. *China Statistical Yearbook*. Beijing: China Statistics Press.

National Domestic Trade Bureau. Various years from 1994 to 2000. *Zhongguo guonei maoyi nianjian* [Almanac of China's domestic trade]. Beijing: China's Domestic Trade Yearbook Society, National Domestic Trade Bureau.

Oi, Jean C. 1999. *Rural China Takes off: Institutional Foundations of Economic Reform*. Berkeley, Calif.: University of California Press.

Park, Albert; Loren Brandt; and John Giles. Forthcoming. "Competition under Credit Rationing: Theory and Evidence from Rural China." *Journal of Development Economics*.

People's Bank of China, Research Department (PBC-RD). Various years. *Zhongguo jinrong nianjian* [China financial yearbook]. Beijing: China Financial Press.

Rozelle, Scott. 1996. "Stagnation without Equity: Patterns of Growth and Inequality in China's Rural Economy." *China Journal*, January, no. 35: 63–96.

Rozelle, Scott; Albert Park; Jikun Huang; and Hehui Jin. 2000. "Bureaucrat to Entrepreneur: The Changing Role of the State in China's Grain Economy." *Economic Development and Cultural Change* 48, no. 2: 227–52.

Rural Development Institute. 1994. *Green Book on Rural Economy Development: 1993*. Beijing: Rural Development Institute, Chinese Academy of Sciences.

Shen, Minggao. 2005. "Informal Finance and China's Development: A Case Study of Wenzhou." Working Paper. Beijing: China Center for Economic Research, Peking University.

Sheng, Yuming. 1993. *Intersectoral Resource Flows and China's Economic Development*. Basingstoke: Macmillan Press; New York: St. Martin's Press.

Sicular, Terry. 1988. "Plan and Market in China's Agricultural Commerce." *Journal of Political Economy* 96, no. 2: 283–307.

————. 1995. "Redefining State, Plan and Market: China's Reforms in Agricultural Commerce." *China Quarterly*, no. 144: 1020–46.

Sonntag, Bernard H.; Jikun Huang; Scott Rozelle; and John H Skerritt. 2005. *China's Agricultural and Rural Development in the Early 21st Century*. Canberra: ACIAR Press.

State Forest Bureau. 2001. *Zhongguo linye nianjian* [China forestry yearbook]. Beijing: China Forestry Press.

Timmer, C. Peter. 1998. "The Agricultural Transformation." In *International Agricultural Development*, 3rd ed., ed. Carl K. Eicher and John M. Staatz. Baltimore, Md.: Johns Hopkins University Press.

Wang Dewen; Jikun Huang; Daniel Sumner; and Scott Rozelle. 2001. "Quotas, Production and Farmer Response in Agriculture." Working Paper, Department of Agricultural and Resource Economics, University of California, Davis, California.

Wong, Christine P. W., ed. 1997. *Financing Local Government in the People's Republic of China*. Oxford: Oxford University Press.

World Bank. 2001. "The Alleviation of Poverty in China." World Bank Report. Washington, D.C.: World Bank.

APPENDIX

APPENDIX TABLE I

ESTIMATES ON WATER CONTROL INVESTMENT USED FOR NON-AGRICULTURAL PURPOSE IN THE SELECTED YEARS IN CHINA

	Investment in Water Control (Billion Yuan at Current Price)									Estimated Non-agricultural Investment	Share of Non-agricultural Investment (%)
	Total	Reservoir Project	Irrigation Project	Water-logging	Flood Control	Non-agricultural Water Supply	Hydro-electric	Water Conservation	Others		
1989	3.56	1.05	0.73	0.21	0.73	0.04	0.00	0.00	0.80	1.43	40
1991	6.48	1.39	1.24	0.29	1.38	0.55	0.98	0.00	0.65	3.39	52
1992	9.72	1.99	1.62	0.51	2.22	0.95	1.54	0.00	0.89	5.30	54
1993	12.50	3.09	1.77	0.39	2.37	1.20	2.43	0.00	1.25	7.18	57
1994	16.87	4.36	1.63	0.57	2.43	2.37	3.93	0.00	1.58	10.77	64
1996	20.64	5.89	1.83	0.69	3.19	1.39	5.82	0.00	1.83	13.01	63
1997	31.54	10.00	3.07	0.65	5.10	2.85	7.92	0.00	1.94	19.62	62
2000	61.29	9.60	5.37	1.10	30.5	4.11	5.63	1.83	3.15	32.83	54

Sources: MOA-TVEYEC (various years).

Note: Investment figures reported in this table include both fiscal and non-fiscal budgets. The non-fiscal investments are normally a matching funding. Here we assume non-fiscal budget has a similar structure as the fiscal budget. Based on our interviews with the officials from the Ministry of Finance, it is not unreasonable assumption. Further, we assume that the shares of non-agricultural investment in each project are: reservoir (50%), irrigation project (0%), waterlogging (50%), flood control (50%), non-agricultural water supply (100%), hydroelectric project (100%), water conservation (50%), and others (50%).

APPENDIX TABLE II

IMPLICIT TAX ON RICE PRODUCERS IN CHINA, 1978–2000

	Procurement (Million Metric Tons)			Prices (Yuan/Ton)			Implicit Tax in Current Price	Implicit Tax in 2000 Price
Year	Total	Quota	Negotiate	Quota	Negotiate	Market	(Billion Yuan)	(Billion Yuan)
1978	29.0	27.4	1.6	220	293	378	4.46	15.82
1979	31.9	28.8	3.0	263	409	448	5.45	18.95
1980	32.0	27.2	4.8	265	417	458	5.45	17.86
1981	35.1	29.7	5.4	263	426	467	6.28	20.10
1982	42.0	31.0	11.0	263	443	455	6.09	19.12
1983	48.6	45.5	3.0	251	444	461	9.62	29.79
1984	55.9	52.8	3.2	256	429	449	10.27	30.92
1985	43.8	43.5	0.3	350	360	385	1.53	4.23
1986	47.2	33.6	13.6	360	440	447	3.00	7.83
1987	45.7	28.7	17.0	380	510	512	3.84	9.34
1988	45.9	25.5	20.4	400	610	669	8.09	16.60
1989	52.5	28.3	24.2	480	870	929	14.11	24.58
1990	45.7	29.3	16.4	510	820	714	4.25	7.24
1991	45.2	27.1	18.1	510	730	636	1.70	2.81
1992	44.8	24.9	19.9	550	650	756	7.26	11.42
1993	36.1	27.2	8.8	620	740	905	9.23	12.83
1994	37.8	24.2	13.6	890	1,140	1,404	16.02	18.30
1995	41.6	26.7	14.9	1,090	1,720	1,750	18.05	17.96
1996	39.6	27.4	12.2	1,330	1,710	1,764	12.55	11.77
1997	50.9	27.3	23.6	1,480	1,450	1,498	1.60	1.49
1998	37.1	20.6	16.5	1,460	1,340	1,348	–2.18	–2.08
1999	46.2	19.5	26.7	1,330	1,230	1,139	–6.14	–6.05
2000	47.7	14.9	32.8	1,130	1,130	1,085	–2.15	–2.15

Sources: Procurement data before 1996 are from MODT (various years) and National Domestic Trade Bureau (various years) and data after 1995 are from personal interview with the officials from the State Grain Bureau. Prices are from Center for Chinese Agricultural Policy's database.

Note: Implicit taxes are the difference between market price and procurement price. Rice is measured in paddy (milled rate is 0.7).

APPENDIX TABLE III

IMPLICIT TAX ON WHEAT PRODUCERS IN CHINA, 1978–2000

Year	Procurement (Million Metric Tons)			Prices (Yuan/Ton)			Implicit Tax in Current Price (Billion Yuan)	Implicit Tax in 2000 Price (Billion Yuan)
	Total	Quota	Negotiate	Quota	Negotiate	Market		
1978	11.8	11.0	0.8	271	374	431	1.81	6.40
1979	15.6	14.9	0.7	328	523	552	3.36	11.67
1980	13.9	12.6	1.3	328	528	557	2.92	9.58
1981	14.2	12.2	2.0	326	519	548	2.77	8.86
1982	19.3	14.6	4.7	324	516	544	3.34	10.51
1983	27.6	26.2	1.4	325	493	520	5.15	15.93
1984	34.3	32.1	2.2	326	457	482	5.06	15.24
1985	26.6	23.1	3.5	426	428	462	0.95	2.63
1986	28.5	22.6	5.9	436	501	537	2.50	6.51
1987	28.2	17.7	10.5	442	546	621	3.96	9.62
1988	27.3	17.4	9.9	467	629	763	6.48	13.29
1989	28.6	16.9	11.7	506	893	1,064	11.43	19.92
1990	25.5	17.0	8.5	508	846	890	6.87	11.72
1991	28.3	15.1	13.2	512	772	783	4.24	7.03
1992	34.5	17.8	16.7	594	734	775	3.91	6.15
1993	32.3	18.6	13.7	659	749	808	3.58	4.98
1994	32.3	17.0	15.3	894	1,050	1,071	3.33	3.80
1995	31.2	17.1	14.1	1,080	1,530	1,575	9.10	9.06
1996	33.1	17.1	16.0	1,312	1,650	1,698	7.37	6.91
1997	46.0	17.8	28.3	1,460	1,430	1,472	1.40	1.30
1998	28.0	15.5	12.5	1,440	1,300	1,338	−1.10	−1.05
1999	38.6	12.5	26.1	1,310	1,220	1,255	0.23	0.22
2000	39.1	11.0	28.1	1,140	1,140	1,137	−0.12	−0.12

Sources: Same as Appendix Table II.

Note: Implicit taxes are the difference between market price and procurement price.

APPENDIX TABLE IV

IMPLICIT TAX ON MAIZE PRODUCERS IN CHINA, 1978–2000

Year	Procurement (Million Metric Tons)			Prices (Yuan/Ton)			Implicit Tax in Current Price (Billion Yuan)	Implicit Tax in 2000 Price (Billion Yuan)
	Total	Quota	Negotiate	Quota	Negotiate	Market		
1978	16.5	15.5	1.0	214	290	344	2.07	7.33
1979	17.9	16.1	1.8	214	339	394	3.00	10.41
1980	18.7	15.8	2.9	214	329	382	2.81	9.21
1981	19.7	16.2	3.5	217	312	362	2.52	8.08
1982	20.7	17.0	3.7	219	331	384	3.00	9.43
1983	31.5	28.6	2.9	216	333	387	5.05	15.62
1984	32.0	28.4	3.6	217	330	338	3.47	10.43
1985	17.7	10.5	7.2	312	327	373	0.97	2.69
1986	26.1	13.8	12.3	317	392	454	2.65	6.92
1987	32.0	17.2	14.8	332	444	504	3.85	9.36
1988	27.6	12.1	15.5	347	471	572	4.29	8.80
1989	25.9	10.2	15.7	371	643	782	6.37	11.11
1990	31.3	12.5	18.8	376	626	691	5.16	8.80
1991	30.2	11.0	19.2	376	546	596	3.38	5.61
1992	24.7	9.3	15.4	416	548	628	3.20	5.04
1993	26.4	11.1	15.3	459	644	730	4.32	6.01
1994	21.2	8.6	12.6	690	910	1,022	4.27	4.87
1995	24.3	9.3	15.0	856	1,390	1,344	3.85	3.83
1996	29.1	11.3	17.8	1,058	1,389	1,267	0.19	0.18
1997	26.9	7.7	19.3	1,230	1,100	1,186	1.32	1.23
1998	38.7	9.4	29.3	1,230	1,170	1,307	4.74	4.52
1999	54.3	8.2	46.1	1,165	1,050	1,127	3.24	3.19
2000	39.8	4.6	35.3	960	960	919	−1.63	−1.63

Sources: Same as Appendix Table II.

Note: Same as Appendix Table III.

APPENDIX TABLE V

IMPLICIT TAX ON SOYBEAN PRODUCERS IN CHINA, 1978–2000

Year	Procurement (Million Metric Tons)			Prices (Yuan/Ton)			Implicit Tax in Current Price (Billion Yuan)	Implicit Tax in 2000 Price (Billion Yuan)
	Total	Quota	Negotiate	Quota	Negotiate	Market		
1978	2.5	2.1	0.4	401	455	524	0.29	1.01
1979	2.9	2.4	0.5	461	582	670	0.55	1.90
1980	3.1	2.3	0.8	461	588	677	0.57	1.86
1981	3.3	2.4	0.9	692	666	767	0.27	0.87
1982	3.5	2.5	1.0	692	723	833	0.46	1.45
1983	5.0	4.2	0.8	691	740	853	0.77	2.39
1984	5.2	4.2	1.0	625	756	871	1.15	3.46
1985	3.4	1.5	1.9	668	760	877	0.54	1.48
1986	5.3	2.0	3.3	700	880	978	0.88	2.29
1987	6.1	2.2	3.9	740	930	1,102	1.47	3.57
1988	5.8	2.0	3.8	750	1,030	1,296	2.10	4.32
1989	6.2	1.6	4.6	780	1,400	1,785	3.38	5.89
1990	6.7	2.2	4.5	830	1,330	1,591	2.85	4.86
1991	5.7	1.8	3.9	880	1,260	1,493	2.01	3.34
1992	4.0	0.7	3.3	910	1,480	1,851	1.88	2.96
1993	5.7	1.8	3.9	1,040	1,840	2,031	2.53	3.52
1994	7.3	1.3	6.0	1,540	2,130	2,343	2.32	2.65
1995	5.2	1.0	4.2	1,810	2,420	2,662	1.87	1.86
1996	4.4	1.4	3.0	1,950	2,920	3,213	2.65	2.48
1997	5.2	0.8	4.3	2,280	3,090	3,405	2.29	2.14
1998	3.5	1.1	2.4	2,230	2,820	2,684	0.17	0.16
1999	2.5	0.3	2.2	2,100	2,170	2,082	–0.20	–0.19
2000	1.2	0.1	1.1	2,030	2,030	2,020	–0.01	–0.01

Sources: Same as Appendix Table II.
Note: Same as Appendix Table III.