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Investing in Rural China

Tracking China's Commitment to Modernization

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, Rozelle, and Wang 2003). Off the farm, more than 40 percent of rural residents have employment; about 100 million of them—most of them young and eager to make new lives in the city—have left home and moved to urban areas for employment

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(deBrauw et al. 2002). Rural incomes have risen significantly and hundreds of millions 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) and have claimed that the reform policies have led to "the greatest increase in economic well-being within a fifteen-year period in all of history" (Fischer 1994).

While past success of China's poverty-alleviation efforts 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; Zhang and Kanbur 2001). 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, while life has improved immeasurably in recent years, the landscape is still one 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 Sixteenth National Congress of the Chinese Communist Party (CCP) 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 generally seek a modern, urban-based society (NCCCP 2002).

To achieve such lofty goals, not only do leaders need to continue to push reform policies, but 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. For 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 make a fundamental shift in priorities and begin to increase investment into the rural sector. While recent work has quantified the nature of the capital flows between agriculture and the nonagricultural sectors and between the rural and nonrural sectors (Huang and Rozelle 2005), there is almost no understanding of the channels through which the investments flow, how the decisions are made at the microlevel to invest or not, how much support is provided by upper-level government and how much by the village itself, and finally how to explain the great deal of heterogeneity that we observe in rural China.

In this article, we seek to better understand how investments—both those from above and those made by villagers themselves—have contributed to the process of rural development and poverty alleviation in China. In particular, we use a new, nationally representative data set from nearly 2,500 villages to describe the contours of investment in rural China. We also present profiles of investments in rich and poor areas and examine the nature of the heterogeneity in investment. Finally, we attempt to explain why some villages have received and made a lot of investments and others have not.

Data

At the heart of our analysis is our data set. We use a unique set of data on the institutions and development investments in rural China collected by the authors in 2003. The authors and several collaborators from inside and outside of China designed the sampling procedure and final survey instrument with the village as the unit of analysis. The fieldwork team, made up of the three authors and thirty graduate students and research fellows, chose the sample and implemented the survey in six provinces and thirty-six counties in a nearly nationally representative sample. The sample provinces were each randomly selected from each of China's major agro-ecological zones.[1]

The sample villages were selected by a process that the survey teams implemented uniformly in each of the sample provinces. Six counties were selected from each province, two from each tercile of a list of counties arranged in descending order of per capita gross value of industrial output (GVIO). GVIO was used on the basis of the conclusions of Rozelle (1996) that GVIO is one of the best predictors of standard of living and development potential and is often more reliable than net rural per capita income. Within each county, we also chose six townships, following the same procedure as the county selection. When our enumerator teams visited each of the 216 townships (6 provinces × 6 counties × 6 townships) officials asked each village to send two representatives (typically the village head and accountant) to a meeting in the township. On average, enumerators surveyed around eleven villages in each township. The number of villages per township ranged from two to twenty-nine.[2] Because there were different numbers of villages in each sample township, there were differences among the provinces in the number of sample villages. For example, Jiangsu (19 percent) and Hebei (23 percent) provinces had relatively more sample villages than the other sample provinces (with sample proportions ranging between 13 and 15 percent).

After answering questions about the economic, political, and demographic conditions of their villages in 1997 and 2003—that is, initial and current conditions within the study period—the respondents answered a set of questions about all of the investment activities in or around their villages between the years 1998 and 2003.[3] The questionnaire was designed to elicit information about the size of each investment, its primary objective, sources of funding, and the level of participation in terms of investment and labor contribution of the village. The questionnaire collected information on both the *number of investment projects* in the village between 1998 and 2003 and the total *level of investment*. The information was collected for seventeen different types of *public goods projects* and ten different types of *development projects* (where development projects were defined as projects with the major objective of promoting an economic enterprise that is normally run by the household as a primary income-generating activity, such as the development of orchards, cash-crop enterprises, or livestock-raising activities). In this article we focus mostly on public goods projects. By public goods projects, we refer

to projects that are implemented by the village committee (the quasi government body that in part governs most rural communities in China) and/or upper-level governments or their agencies that provide a public or environmental service from which it is difficult to exclude people in the village as consumers.

Tracking Investment in Rural China

Despite the suggestion by some that China's rural areas are being neglected, our survey shows a surprisingly high level of investment activity in rural China. During the six years of our study, enumerators recorded that there were 9,138 investment projects, either public or development, in the 2,459 sample villages.[4] On average this means that during the six-year sample period, each village had 3.72 projects, nearly one per year. More than 85 percent of villages in the sample had more than one investment project between 1998 and 2003. While it is hard to say if this level of investment is high enough to facilitate China's modernization, compared to other developing countries, it appears that China in recent years is generating a relatively high degree of investment. For example, in a study by Khwaja (2002), after canvassing several hundred villages in Northern Pakistan, enumerators found only ninety-nine villages that had at least one development project during the previous decade or more. Only thirty-three villages had more than one project. A recent national representative sample of villages in Mexico found that investment levels were relatively lower, as the study found on average approximately one investment project had been implemented in the typical village during the past ten years.

In addition, China's investment targets are increasingly focusing on investment in public goods. In the 1980s local leaders put a lot of effort into managing village-run development projects (Rozelle 1990). For example, during the 1980s and 1990s leaders often took an active role in starting and running local enterprises instead of taking on a more traditional regulatory, public goods–providing role. In some parts of China the vast tracts of fast-growing forests, citrus and apple orchards, and large-scale livestock projects testify to the efforts of entrepreneurial village and township leaders who were trying to diversify the economic bases of their communities. After 1998, however, our data show that leaders centered a majority of their effort on public goods–oriented investment projects (87 percent).[5] In value terms, nearly 80 percent of rural investment was spent on public goods.

Although most new investment projects since 1997 were public goods in nature, leaders invested in different types of infrastructure projects. Specifically, of the 5,975 public goods projects, there were at least twenty sample villages that invested in fifteen different types of public goods investment projects (Table 1, column 1).[6] The average size of each type of project was fairly small (RMB108,000), although these vary from project to project—from a high for watershed management projects (RMB298,000) to projects such as clinics and village beautification that were only around RMB25,000 (column 2).

Some types of investment projects, however, were much more popular than others and, in fact, a large majority of all types of public goods investment projects were made in one of five categories of projects (columns 1 and 3). For example, over half of the villages (1,266) invested in roads or bridges. Roads and bridges accounted for 21.2 percent of all of public goods projects. Between 800 and 900 villages invested in Grain for Green, school construction, or irrigation and drainage projects.[7] More than 600 villages invested in drinking-water projects. In total, 75 percent of all projects were accounted for by investment into these five investment activities.

The top five projects—roads and bridges, Grain for Green, irrigation, school construction, and drinking water—also commanded a large share of total investment. Of all investment in value terms, leaders invested 81 percent of their funds in the top five projects. In fact, of all of the investments made in China's villages, according to our data, 22 percent of investments are into roads and bridges.

Sources of Funding

While investment activity in China's villages has been fairly robust and varied, the extent of decentralization and the sources of investment need to be tracked before one can assess the commitment of the central leadership to the rural economy. Many government functions in China are decentralized (Wong 2002). In many cases, the degree of decentralization is more than in any other country of the world. For example, while in most countries the national government takes responsibility for most agricultural research and development and rural educational programs, in China provincial and subprovincial governments bear most responsibility for investment into agricultural technology, agricultural extension, and the hiring of primary teachers.

In the area of public goods investment, according to our data, China's villages also contribute a large share of the funding to the development of their villages (Table 2, columns 1–4). For example, after dividing projects into three types—those fully invested from above, those fully invested by the village, and those that are jointly funded, our data show that villages fund 18 percent of all public goods projects by themselves (row 9). And while 36 percent of projects are fully funded from above, nearly half (46 percent) are funded with matching funds from the village and upper-level government. In rural areas in other countries such as Indonesia and Malaysia local governments contribute little, if any, to public goods investment.

Examining the total contribution from villagers in value terms, in fact, the role of the village is even higher (Table 2, columns 5 and 6). While 53 percent does come from above, villagers in China are funding 47 percent of their public goods investment (row 9). Moreover, China's villages also help by investing in in-kind labor. In 56 percent of projects, villagers contributed labor. On average, for each project in which villagers invested their labor, villagers contributed 1,121 days of

Table 1

Number and Size of Public Goods Projects (regional population weighted), Between 1998 and 2003

Project	Number of projects	Average size (RMB1,000)	Accumulated distribution of projects
Roads and bridges	1,266	112	21.2
Grain for Green	892	67	36.1
School construction	850	99	50.3
Irrigation & drainage	819	65	64.1
Drinking water	636	75	74.7
Loudspeaker for village committee	379	60	81.0
Recreation center	262	50	85.4
Build clinic	163	25	88.2
Beautify environment	157	24	90.8
Watershed management	151	298	93.3
Forest closure	140	34	95.6
Land leveling	124	136	97.7
Eco-forest	55	34	98.6
Land improvement	52	110	99.5
Build pasture	19	134	99.8
Other public project	10	244	100.0
N / mean	5,975	108	—

Source: Authors' survey.

labor (on average about five days per household). Hence, if the time that villagers work is monetized and counted toward the overall contribution, the local share of public goods investment is far greater than 50 percent.

Counting investment in public goods from both sources, both from above and from villagers, the nature of our sample allows us to estimate the total volume of investment funds that are channeled into China's villages each year for public goods investments and demonstrate that a substantial amount of investment is now going into China's villages. For example, according to our data, during the six-year study period, China is investing RMB11 billion per year into the construction of roads (Table 3, column 1). This is part of a national effort that was announced in 2000 which set a goal of improving China's rural road network (Ministry of Communications 2001). During the same period, upper-level officials and local leaders also invested RMB7.2 billion annually into the construction of schools, RMB4.7 billion into irrigation at the village level, and RMB4.7 billion into Grain for Green. The simultaneous appearance of investment at the local levels and nationwide in-

Table 2

Funding Source of Public Goods Projects by Province, 1998–2003

Province	Total no. of projects	No. funded from above	No. funded by village	No. funded jointly	Investment from above (%)	Investment by village (%)
Jiangsu	1,646	436	392	818	26.0	74.0
Gansu	1,085	481	67	537	76.9	23.1
Sichuan	1,037	567	92	378	64.3	35.7
Shaanxi	1,352	525	142	685	72.2	27.8
Jilin	1,130	420	135	575	44.7	55.3
Hebei	1,473	318	557	598	50.4	49.6
Total no. of projects	7,723	2,747	1,385	3591	—	—
Percent of total	100.0	36.0	18.0	46.0	53.0	47.0

Source: Authors' survey.

frastructure-improvement programs demonstrate that at least to some extent the central government's investments do make their way down to rural communities.

While such large levels of investments are impressive, it is important to note that because of the nature of our data, we still only count the part of total investment that is spent at the village level. Our figures do not count the part of the amount of investment funds budgeted by upper-level officials (henceforth, budgeted investment funds) that is spent on projects or project components outside of China's villages (for example, investments into a reservoir that will supply irrigation water to a village's canal network). Likewise, budgeted investment data from yearbooks and other information sources do not typically include spending by villages on public goods. Village spending is off budget and therefore is almost never counted. Hence, in the same way that our data do not include all of budgeted investment figures, budgeted investment figures do not capture all of the investment going into China's villages. Hence, when we added budgeted investment to the investments from villagers, total investments rose further (Table 3, columns 3, 4, and 6).

Our data also let us examine in part how rural public goods investment funds are managed and what fraction of budgeted investments is spent in China's villages. When we compare the part of village-level investments coming from above with budgeted investments, we find that only a relatively small share of total budgeted investment is ultimately spent in China's villages. For example, according to

Table 3

Total Annual Investment into Rural China's Infrastructure at Village Level, 2003 (RMB billion) 2003

Project type	Our sample data[a]			Budgeted investment[b] (4)	Percent of budgeted investment spent at villages level[c] (5) = [(2)/(4)] *100%	Total investment (6) = (3) + (4)
	Total investment at village level (1)	From above (2)	By village (3)			
Roads and bridges	11.01	5.19	5.83	12	43	17.83
Irrigation	4.67	1.77	2.90	26	7	28.90
Grain for Green	4.66	3.85	0.81	5.3	72	6.11
Schools	7.19	3.51	3.68	82	4	85.68
Drinking water	3.70	1.90	1.80	n/a	n/a	n/a
Others	7.60	4.25	3.35	n/a	n/a	n/a

Notes: [a]Data from columns 1, 2, and 3 are from authors' survey. and [b] data from column 4 are from secondary sources and are tabulating budgeted investment from above (Huang and Rozelle 2005; Huang, Rozelle, and Wang 2003; Fan, Zhang, and Zhang 2002; Xu and Cao 2002).

national data sources, about RMB12 billion per year has been expended by upper-level governments on roads (Table 3, column 4). According to our data, however, only RMB5.2 billion of the RMB12 billion, or 43 percent of total budgeted investment funds spent in the villages is from above (row 1, columns 2, 4, and 5). In fact, the proportion of budgeted investment that is spent at the village level varies greatly. In the case of Grain for Green, 72 percent of the funds allocated from above make it to the village level. In the case of irrigation projects, only 7 percent is spent at the village level. While it is beyond the scope of our article to analyze the reason for these differences, certainly, it is a combination of technology (for example, a large fraction of irrigation money goes to maintain the large irrigation infrastructure that is needed to deliver water from its source to the village), the nature of the data (in the case of roads, we are comparing the funds spent at the village to the total budgeted amount for rural roads; the amount of funds invested in interprovincial roads and urban roads are not included), and any diversion of investment funds that occurs for administration and/or other less transparent reasons.

Changing Investment Strategy and Pace of Investment

In addition to becoming more focused on public goods and shifting away from direct involvement in private development projects, our data suggest that China's commitment to rural public goods provision is evolving. During our survey, in response to our inquiries about the objective of investments in the past (that is, before the study period in the 1980s and early 1990s), village leaders told us that most projects would only be implemented if they had a close connection to village incomes or would increase employment opportunities for villagers. For the study period, we asked a series of more formal questions about the motivation for investments. Specifically, enumerators asked village leader respondents about the *primary* goal of each investment that their village made. They were asked to choose among several precoded answers: increase income of villagers; improve the standard of living (apart from any direct rise in rural incomes); raise village fiscal revenue; generate employment; improve the environment; and some other unspecified reasons. While a large share of respondents (34 percent) still said that the primary reason for a project was to increase farmer income, many did not. In fact, the most frequent response about the motivation of public goods investment (41 percent) was to improve the standard of living in the village. Moreover, a significant proportion (16 percent) stated that projects were primarily being implemented in order to improve the environment. Only an insignificant share stated the projects were to generate employment or increase village revenues. If our data are accurate, there has truly been a shift in the quality of the projects being implemented.

Even more dramatic than the change in the *quality* of China's investment projects, our data show the rapid increase in the *quantity* of investment funds flowing into China's villages. According to our data, during the first part of our study period (before 2001), on average, China implemented 0.46 projects per year per village

(regional population weighted). In other words, during this time, there was less than one project implemented in each two villages during each year. There was no province in which upper-level officials and village leaders reached an investment rate that exceeded one project per year. In fact, most provinces in our sample did not achieve a project-implementation rate greater than one project every two years.

The rate of project implementation, however, began to rise during the second part of our study period after 2001. According to our data, on average, each village in China was implementing near 0.6 projects per year (regional population weighted). Officials and leaders in Shaanxi and Jilin implemented almost one project per year. Although not shown, if we include improvements to the electrical web and telephone network, the number of investment projects per year almost reached an average of one per year for the entire sample. Finally, the amount of investment from villages, as with the number of projects, followed similar contours.

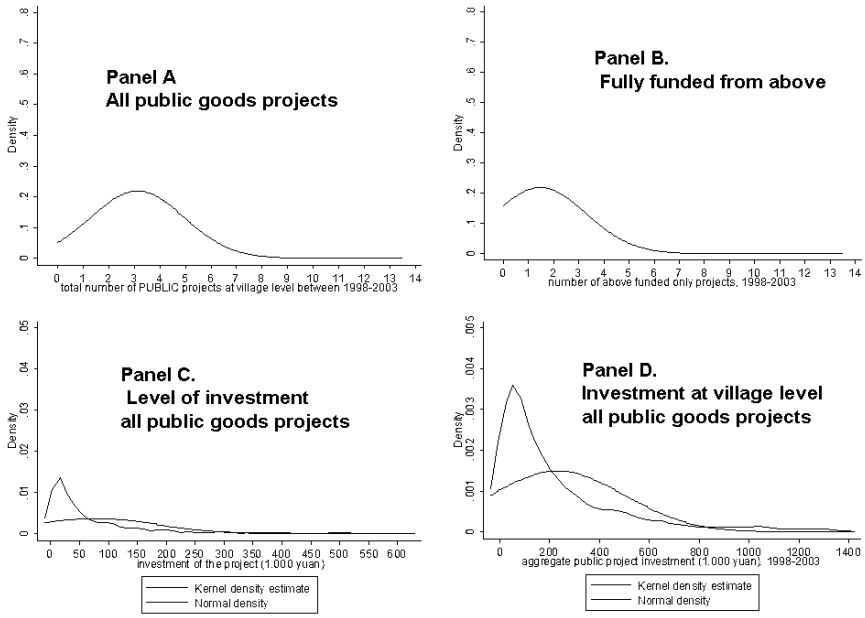
Hence, when examining descriptive statistics, we see a profile of a rural economy that is in the midst of an emergence of investment activities. As is needed for the fundamental transformation of its villages, according to our data, it appears as if China's rural areas are getting significantly greater amounts of investment than before. While it is unclear whether or not the level of investment is sufficient to push the nation toward modernization, at the very least, the nation is moving in the right direction: investment in public goods is growing; it is focused on roads, irrigation, schools, forests, and drinking water—projects that will improve the standard of living of those in rural areas and/or improve the environment. Although China's commitment to public goods investment is improving, it is still not enough when compared with other economies in Eastern Asia. For example, the government of Japan spent more than US$400 per person per year during the 1950s and the government of South Korea spent around US$200 per capita per year during the 1980s.

Explaining Intervillage Differences in Public Goods Investments

While the profile of investment for rural China, in general, is mostly positive, there are still a number of unanswered questions, many of which include questions about the distribution of investments. Are the poor benefiting? How have minorities fared? In such a decentralized fiscal system, which villages are financing their own investments, and are the investments being put into the areas that demand investments? Who is receiving support from above, and what are the factors that determine the allocations of public goods investment funding?

In this section, the primary purpose is to answer some of these questions and to identify the determinants of investments in public goods. To do so, we first need to examine the degree of heterogeneity of public goods investments. Second, we need to identify the factors that lead to high investment in some villages and low ones in others. The determinant analysis uses both descriptive statistics and multivariate analyses.

Figure 1 Distribution of public goods projects and levels of investment in rural China, 1998–2003



Source: Authors' survey.

The importance of determinant analysis is underscored when examining the distribution of China's investments. While our data show that the number of investment projects in China is fairly substantial and rising over time, the number of investments varies significantly among our sample villages (Figure 1). For example, although the mean of the distribution is 3.7, there are some villages that have implemented many more projects between 1998 and 2003. Nearly 20 percent of villages have run five or more projects during the six-year study period; several have had up to ten (Panel A). At the same time, however, a significant share of villages has only one project (12 percent of villages) or none at all (5 percent of villages).

In addition, there also is substantial heterogeneity of the size of projects and the amount of investment in each village. On average, each public goods project is about RMB50,000 (Figure 1, panel C). However, there are some projects that are very large (up to RMB500,000 or more). In contrast, a substantial share of projects also are under RMB20,000. When we examined the correlation coefficient between the number of projects and the size of projects, it is found to be insignificant from zero. This means that the intervillage distribution of aggregated level of in-

vestments in public goods projects (Panel D) is nearly as skewed as the distribution associated with the number of projects (Panel A).

Finally, our data also show that when examining projects by funding source the distribution of investment is even more unevenly distributed. In the case of projects that are fully funded from above, while about 20 percent of villages have three or more such projects, 48 percent have none (Figure 1, panel B). The distribution of projects that are fully funded by the village is also highly skewed. For example, around 25 percent of villages have implemented at least two projects without any assistance from above. However, nearly two-thirds of our sample villages have never done so.

Determinants of Public Goods Investments

In a system in which there are two main sources of funding—those from above and those from the village itself—there are two major types of factors—targeting factors and demand-side factors—that could affect the intensity of public goods investment. Targeting factors are those characteristics of villages that are used by upper-level officials as criteria for channeling investment into a village. For example, a pro-poor investment project concentrates relatively more investment into poor villages and less into rich ones. Officials could also use criteria such as the fragility of the environment and the ethnic community's ethnic status. Demand-side factors can be thought of as characteristics of the village that would make villagers more or less inclined to invest in their village's public goods or to take the time and put out the effort to lobby upper-level officials for public goods investment.

One of the most surprising targeting factors that are correlated with the intensity of public goods investment in our descriptive statistics is the level of income, although the relationship differs when using different definitions of income and examining different dimensions of the relationship.[8] In fact, when examining the relationship between per capita income and the number of public goods projects during the entire sample period (1998–2003), there is little pattern to the data (Figure 2, panel A). As villages move from lowest quintile when ranked in terms of per capita income to the highest quintile, the number of projects ranges between 3.0 and 3.2; there is little apparent relationship during 1998–2003.

In contrast, when comparing the number of public goods investments over time between rich and poor villages, we see a positive shift in the government's commitment toward poor areas (Figure 2, panel B). In the first part of our study period, not only was the average investment low, as noted in the discussion above; there was slightly more investment in richer areas (about 0.47 projects per year) than in poor areas (0.44 projects per year). In the second part of our study period, however, China's investment patterns became more progressive. In that period, officials and leaders in poor areas were implementing 0.65 projects per year. Although public goods investment also rose in richer areas, the rate of rise was low enough that the average number of projects per year was lower (only 0.59).

Our data also identify the emergence of China's progressive investment strategy when looking at the level of investment from above for different per capita income quintiles throughout China and in selected provinces. On average, investment from above to villages in China's poorest income quintile is almost two times more than the richest villages. The same pattern appears in Jiangsu, the richest province in our sample, and Shaanxi, the poor western province (Figure 2, panel C). Indeed, our descriptive data show a number of dimensions in which China's investment behavior is favoring the poor, especially the investment from above.

A number of other descriptive correlates (and noncorrelates) between public goods investment and targeting and demand-side factors can be identified in a table of cross tabulations that we created with our data (Table 4). Unlike the case of per capita income, our descriptive data show that there is little overt effort by the government to target minority areas (Number 1). There is no evident trend, either in the number or level of investments, as the data range from villages with no or negligible shares of minorities to those with substantial shares. While this result is disappointing for those who were hoping that more investment would be channeled to minority communities, it should be remembered that the cross tabulations are using all investments, both those from above and those generated by the villages. It could be that upper-level officials are allocating more to minorities, but this is being obscured in the descriptive statistics by the fact that minority villages are poorer and have fewer of their own resources to invest.

The descriptive data do show, however, that officials appear to be targeting investments according to several criteria, some of which appear to be positive in nature. Others could be interpreted to have a negative connotation. For example, somewhat more projects and significantly more investment are being put into areas that are more mountainous (Table 4, number 2). Most likely driven by recent efforts to increase investment in poor mountainous areas with projects such as Grain for Green, it appears as if the government is beginning to be concerned about environmental problems. However, our data show that officials are not targeting smaller villages in more remote areas (numbers 3 and 4). Instead, relatively more investment is going to larger villages and to villages that are near roads. Investing in villages near roads may be done for the convenience of project-implementing teams or by officials wishing to showcase their results. By doing so, officials may be sacrificing greater needs in more remote villages for the benefits that come from being able to show off their investment efforts.

In addition to a number of targeting factors, our descriptive data show clearly that several demand-side factors could also be associated with the demand by villagers for higher or lower rates of investments. In particular, villages with more collective enterprises and those with more self-employed private entrepreneurs have more projects and higher levels of public goods investments than those without (Table 4, number 5 and 6). In contrast, villages with a large share of the population in the migrant labor force have less investment (number 7). While there are a number of reasons why such patterns may emerge, they also are consistent with a

Figure 2 Relationship between number of public goods projects and per capita income, richer areas (Jiangsu and Hebei) and poorer areas (Gansu, Sichuan, Shaanxi, and Jilin), between 1998 and 2003

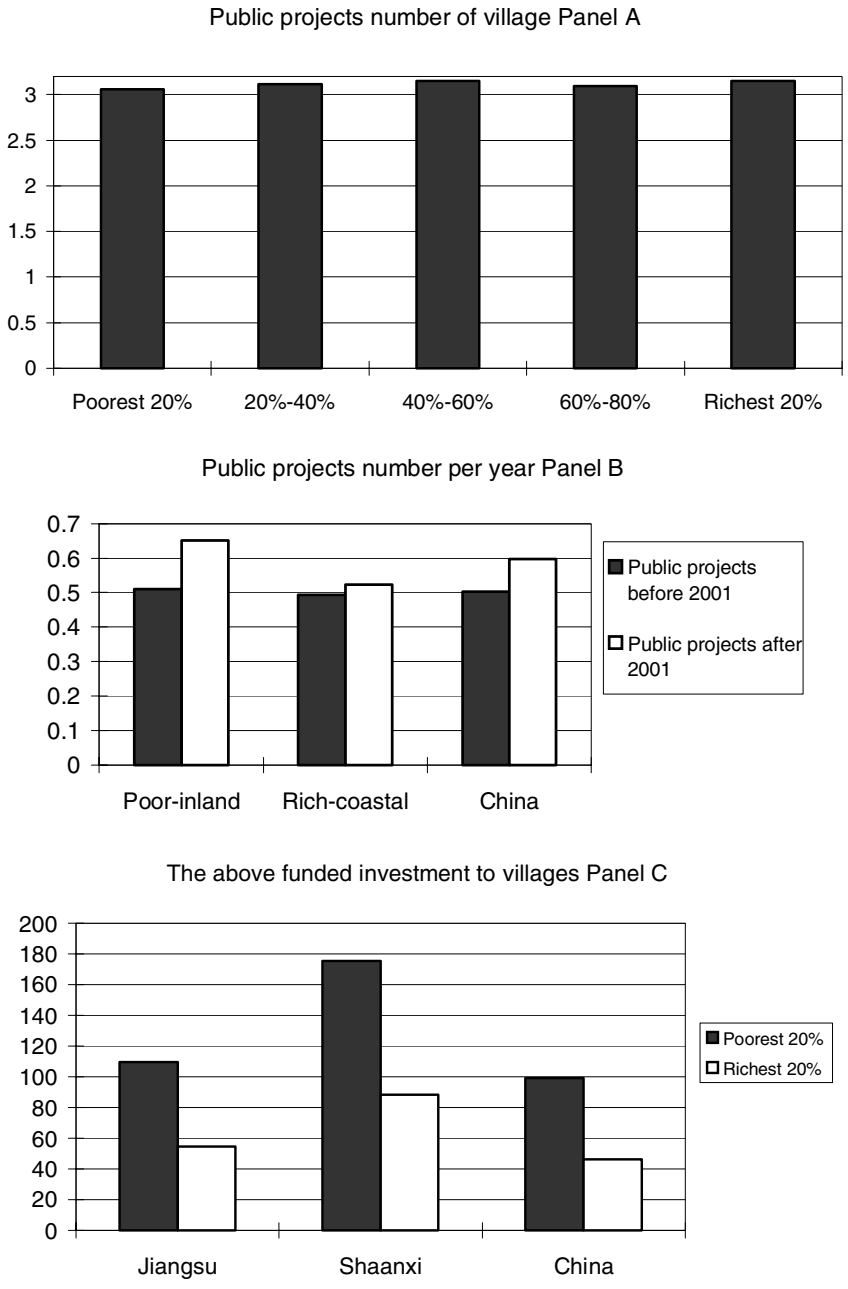


Table 4
Relationship Between Number and Level of Investments on Public Goods Projects and Some Village Factors, 2003

	Category–Proportion of minority population quintiles				
1. Proportion of ethnic minority population	Bottom 20%	2d 20%	Mid 20%	4th 20%	Top 20%
Number of projects	2.9	3.1	3.4	3.6	3.3
Investment (RMB1,000)	209	254	228	266	236
	Category–Proportion of hilly land quintiles				
2. Proportion of hilly land with slope over 25 degrees	0	0–25%	25–50%	50–75%	>75%
Number of projects	2.6	3.1	3.4	3.4	3.2
Investment (RMB1,000)	191	200	308	247	269
	Category–Distance to nearest road quintiles				
3. Distance from village committee to the nearest road	Bottom 20%	2d 20%	Mid 20%	4th 20%	Top 20%
Number of projects	3.0	3.0	2.9	2.9	2.9
Investment (RMB1,000)	291	223	184	194	202
	Category–Population quintiles				
4. Total population	Bottom 20%	2d 20%	Mid 20%	4th 20%	Top 20%
Number of projects	2.8	2.8	2.9	3.2	3.2
Investment (RMB1,000)	186	195	223	252	401
	Category–Number of enterprises				
5. Village collective enterprises	0	1	1–5	5–10	>10
Number of projects	2.9	3.6	3.7	3.9	5.7
Investment (RMB1,000)	200	442	364	421	1125

(*continued*)

Table 4 (*Continued*)

	Category–Proportion of self-employed hhds quintiles				
6. Proportion of self-employed households as total village households	Bottom 20%	2d 20%	Mid 20%	4th 20%	Top 20%
Number of projects	2.8	2.9	3.2	3.2	3.8
Investment (RMB1,000)	161	220	241	339	346
	Category–Percent of migrant labor quintiles				
7. Percentage of migrant as total village labor	Bottom 20%	2d 20%	Mid 20%	4th 20%	Top 20%
Number of projects	2.9	3.0	3.1	2.8	2.8
Investment (RMB1,000)	276	206	241	188	173
	Category–Per capita land quintile				
8. Per capita land (*mu*)	Bottom 20%	2d 20%	Mid 20%	4th 20%	Top 20%
Number of projects	3.4	3.0	2.8	2.8	2.8
Investment (RMB1,000)	369	230	183	172	182
	Category–Number of villagers				
9. Number of villages working at township or upper-level government	0	1–3	3–10	10–20	> 20
Number of projects	2.7	2.9	3.1	3.5	3.9
Investment (RMB1,000)	141	249	234	303	464
	Category–Number of turnovers				
10. Number of village head turnovers between 1998–2003	None	At least one			
Number of projects	2.7	3.0			
Investment (RMB1,000)	190	229			

Source: Authors' survey.

story in which those with economic interests in the village (for example, those running or working in collective enterprises and those running self-employed businesses) welcome and/or are willing to contribute to public goods investments. When a large number of the villagers live and work outside the village in the city, however, those outside and those left in the village may be less inclined to support public goods projects. Somewhat surprisingly, given the government's commitment to national food security, those villages with more land, or those that may be more reliant on agriculture, have relatively less investment in public goods (number 8).[9]

Finally, when looking at other factors, we find in some cases that there are other factors that might affect the number or level of investment projects. Above all, we find a strong correlation between the number of villagers who hold positions as officials in the township or upper-level governments (Table 4, number 9). According to our data, connections (*guangxi*) in the places in which investment decisions are at least partially made matter. We use the number of villagers who are employed in either township or upper-level governments as indicators to measure connections. Such a finding most likely is not surprising in a society that has thrived over the years on informal networks. In contrast, there is little support for a hypothesis that would predict an association between village governance and investment. In the descriptive data, few, if any, of village governance variables are associated—either positively or negatively—with investment (number 10).

Multivariate Analysis

To further examine the determinants of investment intensity, we use a series of regressions to examine the factors that induce high investment in some villages and low investment in others. In order to implement the multivariate analysis, we examine the effect of a number of factors on the number and level of public goods investment. Because we want to run a regression that is weighted by regional population in order to produce results that are nationally representative we use a weighted ordinary least squares (OLS) estimator. Also, because of the nature of the limited dependent variable, we use a Tobit estimator. The explanatory variables include three types: targeting factors (including per capita income level, both a linear and squared term; the share of the population that is minority; the share of the village's land that is sloped more than 25 degrees; and two location variables, the distance of the village in kilometers from the nearest all-weather road, and the distance of the village to the township seat, that is, the location of the township government; and two measures of the size of the village—the village's population and the physical size of the village measured as the distance in kilometers between the furthest two *xiaozu*); demand-side factors (including the number of collective enterprises; the share of households that are self-employed; the share of the labor force that is working as a migrant; per capita land holdings to proxy for the importance of farming; and the share of cultivated land that is irrigated); and other factors (in-

cluding the number of villagers who are in official positions in either the township or upper-level government; six governance variables—a dummy variable that equals one if the village head turned over during the study period; the occupations of the village head and party secretary prior to taking office; and the level of education of the village head and party secretary; and per capita debt). All of the explanatory variables, when available, are for 1997. The mean, standard error, and range of the main variables used in the regression analysis are in Table 5. We run the model for both the number of projects and the level of investment and report the results of the number of projects in Table 6 and the level of investment results in Table 7. Because the results are mostly the same, we discuss the results of the number of projects only.

Although there are a number of exceptions, the results of the multivariate analysis of the determinants of public goods investment are consistent with the descriptive statistics. For example, in the multivariate analysis, we find supporting evidence for the demand-side hypotheses. In villages with more industrial and other commercial activity—that is those with collective enterprises and self-employed households—there is relatively more investment. However, in communities with more migrants, there is less investment. Hence, in the multivariate analysis, we find that in communities in which a larger part of the population has more local economic interests there is more investment activity. It is possible that since attracting or making its own investment is costly in terms of time and capital, a village without close ties to the local economy will not take steps to invest in public goods.

In addition to the demand-side hypotheses, a number of other results are consistent with the cross-tabulation analysis. Connections are important. In fact, in almost every one of the descriptive and multivariate exercises, villages with more people working in the township or upper-level governments had high public goods investments. Although it is unclear why, as in the descriptive findings, we did not find many of the governance variables to be statistically significant. Two explanations are plausible. One is that since most of the village's investment comes from above or is initiated from above, the quality of the village's leadership does not matter. Alternatively, it could be that village leaders do not matter and that the power rests in the party secretary, and even in today's more market-oriented environment, that traditional ties to upper-level party officials (that are difficult to measure) matter more than traditional human capital–type variables.

A number of interesting results also appeared when using multivariate analysis, a fact that might mean that the more complicated relations were masked when using simple descriptive statistics. For example, we find that larger villages—those with larger populations—attract a greater number of public goods projects. We also find that villages with more land per capita and those with a larger share of cultivated land that is irrigated have fewer investment projects. Apparently, China's industry-oriented fiscal and financial system (Wong 1997) also affects the intensity of investment. Villages without an industrial base have difficulty raising revenues and are less able to make investment into their communi-

Table 5

Summary Statistics of Variables Used in the Regression

Variable	Obs.	Mean	S. D.	Min.	Max.
Project information					
Total number of projects	2,420	3.7	2.2	0	14
No. of public projects	2,420	3.2	1.8	0	13
No. of projects funded by above only	2,344	1.47	1.84	0	13
No. of projects funded by village only	2,344	0.78	1.40	0	11
Targeting factors					
Net per capita income (RMB)	2,420	1,436	965	80	8,000
Percent of minority population	2,420	7.8	24.4	0	100
Percent of hilly land with slope over 25 degrees	2,420	24.7	29.4	0	100
Distance between village to town (km)	2,419	5.3	4.9	0	75
Distance from village to nearest road(km)	2,420	6.1	11.0	0	110
Total population	2,420	1,435	1,073	76	8,700
Distance between two furthest small groups (km)	2,420	2.4	2.6	0	30
Demand side factors					
No. of village enterprises	2,420	0.3	1.4	0	45
Percent of self-employed households	2,420	4.0	6.9	0	85.2
Percent of migrant labor	2,420	12.2	13.2	0	89.4
Per capita land area (*mu*)	2,420	2.1	2.1	0.01	45.0
Percent of effectively irrigated land (*mu*)	2,420	42.8	38.9	0	100
Other factors					
No. of villagers working at township	2,420	2.3	4.1	0	86
No. of villagers working at county	2,420	2.7	4.8	0	45
Village head's education	2,389	9.4	2.4	0	15
Party secretary's education	2,381	9.7	2.5	0	15
Per capita debt (RMB)	2,420	108	358	0	9,474

ties. Finally, we also find that, as in the descriptive results, there is evidence of showcasing; we find either the number of projects or the level of investment negatively correlated with the distance of the village from the nearest all-weather road.

Determinants of Funding from Above and by the Village

While the results in the previous section were interesting, one of the main conceptual problems with the determinant analysis is that the dependent variables are actually the additive summation of two processes, funding from above and fund-

Table 6

Determinants of Number of Public Goods Projects at the Village Level Between 1998 and 2003

	Number of public goods projects			
Dependent variable:	Population weighted		Tobit	
Targeting factors				
Net per capita income, 1997 (RMB)	4.10e–08	0	–0.00014	–1.22
Net per capita income square, 1997 (RMB)	1.66e–08	0.7	0	(1.88)*
Percent of minority population	0.002374	0.79	–0.00291	(1.86)*
Percent of hilly land with slope over 25 degrees	0.007085	(3.64)***	0.002949	(1.91)*
Distance from village committee to township seat (km)	0.011216	0.97	–0.01641	(2.06)**
Distance from village committee to the nearest road (km)	–0.01607	(3.81)***	–0.00658	(1.96)*
Total population, 1997 (person)	0.00021	(3.57)***	0.000271	(6.34)***
Distance between two most distant small groups within this village (km)	0.002905	0.2	0.039351	(2.93)***
Demand-side factors				
Number of collective enterprises	0.107772	(2.75)***	0.074373	(2.67)***
Percent of self-employed households	0.026779	(3.28)***	0.019392	(3.65)***
Percent of migrant laborers	–0.00576	–1.48	–0.00572	(1.96)*
Per capita land (*mu*)	–0.04014	–1.39	–0.02637	–1.33
Percent of effectively irrigated land	–0.00685	(3.95)***	–0.00866	(6.66)***
Other factors				
No. of fellow villagers with township or upper-level governments (person)	0.030891	(4.12)***	0.020646	(3.94)***

Village head turnover, 1998–2003; 1 = yes, 0 = no	0.22298	(1.71)*	0.102749	0.97
Village head occupation prior to office: 1 = full-time farmer, 0 = not 1	–0.21257	(1.88)*	–0.16451	(1.75)*
Schooling of village head (year)	0.003529	0.14	–0.01813	–1.07
Party secretary occupation prior to office: 1 = full-time farmer, 0 = not 1	–0.10934	–0.93	–0.06384	–0.66
Schooling of party secretary (year)	–0.01847	–0.77	–0.01173	–0.72
Per capita debt, 1997 (RMB)	0.000162	(2.43)**	0.00019	(1.80)*
Constant	2.857202	(7.22)***	3.307571	(12.61)***
Observations	2,324		2,389	
R^2	0.12			

Notes: Absolute value of *t* statistics in parentheses; *significant at 10 percent; **significant at 5 percent; and *** significant at 1 percent.

Table 7

Determinants of Level of Investment in Public Goods Projects at Village Level Between 1998 and 2003

	Model (1)		Model (2)	
	Provincial population weighted		Regional population weighted	
Targeting factors				
Net per capita income, 1997 (RMB)	–0.31774	(2.30)**	–0.33079	(2.24)**
Net per capita income square, 1997 (RMB)	0.000094	(2.37)**	0.000098	(2.34)**
Percent of minority population	0.448921	1.11	0.499676	1.17
Percent of hilly land with slope over 25 degrees	1.169004	(2.60)***	1.180395	(2.48)**
Distance from village committee to township seat	0.677331	0.46	0.479552	0.32
Distance from village committee to the nearest road (km)	–3.5045	(3.14)***	–3.05278	(2.74)***
Total population, 1997 (person)	0.112885	(6.31)***	0.113741	(6.22)***
Distance between two most distant small groups within this village (km)	–3.27419	–0.76	–1.36398	–0.26
Demand side factors				
Number of collective enterprises	120.2922	(1.78)*	128.8306	(1.76)*
Percent of self-employed households	0.190839	0.1	–0.93933	–0.43
Percent of migrant laborers	–0.36961	–0.35	–0.48361	–0.36
Per capita land (*mu*)	8.863307	1.54	0.92482	0.13
Percent of effectively irrigated land	–0.05513	–0.12	–0.28039	–0.59
Other factors				
No. of fellow villagers with township or upper-level				

governments (person)	3.062545	1.47	1.09036	0.45
Village head turnover, 1998–2003: 1 = yes, 0 = no	21.83309	0.66	16.53165	0.48
Village head occupation prior to office: 1 = full-time farmer, 0 = not 1	8.214378	0.29	0.296215	0.01
Schooling of village head (year)	–2.42564	–0.42	2.545216	0.44
Party secretary occupation prior to office: 1 = full-time farmer, 0 = not 1	–28.8258	–0.95	–12.6718	–0.42
Schooling of party secretary (year)	2.324312	0.49	2.585234	0.6
Per capita debt, 1997 (RMB)	0.050688	1.22	0.063311	1.24
Constant	264.2339	(2.64)***	238.6537	(2.40)**
Observations	2,273		2,273	
R^2	0.14		0.16	

Notes: Absolute value of *t* statistics in parentheses; *significant at 10 percent; **significant at 5 percent; ***significant at 1 percent.

ing by the village, each of which may be expected to have its own set of determinants. In fact, for a number of explanatory variables, it is possible that the expected sign in an equation explaining funding from above could be precisely the opposite of the expected sign in an equation explaining funding by villages. As a consequence, it could be that these confounding effects are masking some important relationships in our data. Therefore, in this section, we divide the dependent variables into two parts—the proportion of investment from above and the proportion of investment by the village itself—and run two independent sets of regression analyses, because the coefficients of the two equations are the same except the sign, so we only report one of them (Table 8).

In fact, when examining the determinants of the different sources of funding, fit of the equation rises and the relationships between the proportion of investment and a number of the explanatory variables are sharper (Table 8). Moreover, the results actually can be interpreted in a way that provides a clear and positive picture about the approach China's government is taking in its investment decisions. Specifically, we find that in the case of the proportion of funding from the above equation, public goods investments are being targets to poor and minority villages. The results also show that officials are channeling funds to smaller, more remote, and mountainous villages with little irrigated area. If truly representative of rural China in the late 1990s and the post-2000 period, then one interpretation of the findings is that officials have adopted a progressive or pro-poor, ethnically sensitive, and environmentally oriented investment strategy.

Hence, according to these results, we can see that China's richer villages with a Han majority have been left in a relative sense to fund public works themselves. Villages that are closer to the road network, closer to the township seat, and located on relatively favorable land (that is less sloped and more irrigated) also have invested relatively larger shares of their own funds into public goods (Table 8).

Summary and Conclusions

In this article we have used a new, nationally representative data set to create a profile of China's investment at the village level. In doing so, we have discovered that in recent years upper-level officials have begun to invest increasingly more into rural China. Moreover, unlike in earlier years, they are investing in public goods, frequently in projects that have both environmental and/or other spillovers. From this effort, there has been a rise in the number of investment projects, especially in roads and bridges, irrigation, drinking water, schools, and environmental protection forests.

When assessing this effort, we have also found that at least in the case of funding directed from above, there is an effort to meet some of rural China's more pressing problems. While we do not know how investments were targeted in the past, according to our results we know that between 1998 and 2003, upper-level officials are focusing their efforts on poverty alleviation and are doing so in both

Table 8

Determinants of Public Goods Project from Above and by Village, Between 1998 and 2003

Dependent variables: proportion of investment from above	Coefficient	*T*-value
Targeting factors		
Net per capita income, 1997 (RMB)	0.00159	(0.45)
Net per capita income square, 1997 (RMB)	–0.00000	(2.01)**
Percent of minority population	0.17030	(3.82)***
Percent of hilly land with slope over 25 degrees	0.14374	(3.33)***
Distance from village committee to township seat (km)	–0.02133	(0.07)
Distance from village committee to the nearest road (km)	0.20689	(1.93)*
Total population, 1997 (persons)	–0.00336	(2.35)**
Distance between two most distant small groups within this village (km)	0.46893	(1.10)
Demand-side factors		
Number of collective enterprises	–1.09701	(1.46)
Percent of self-employed households	–0.06310	(0.44)
Percent of migrant laborers	–0.07726	(0.84)
Per capita land (*mu*)	–0.02811	(0.05)
Percent of effectively irrigated land	–0.17261	(4.13)***
Other factors		
Number of fellow villagers with township or upper-level governments (person)	0.53281	(3.16)***
Village head turnover, 1998–2003: 1 = yes, 0 = no	6.31325	(1.72)*
Village head occupation prior to office: 1 = full-time, farmer 0 = not 1	–2.62722	(0.83)
Schooling of village head (year)	–0.30288	(0.56)
Party secretary occupation prior to office: 1 = full-time farmer, 0 = not 1	2.36733	(0.72)
Schooling of party secretary (year)	–0.19654	(0.38)
Per capita debt, 1997 (RMB)	–0.00157	(1.03)
Constant	60.79314	(6.88)***
Observations		2083
R^2		0.16

Notes: Absolute value of *t* statistics in parentheses; *significant at 10 percent; **significant at 5 percent; ***significant at 1 percent.

minority and environmentally less favorable areas. In fact, over all, China's investment into villages in poor, inland regions is now occurring at a higher rate and is growing faster than in richer areas. In contrast, our results show that communities in better-off areas are making public goods investment themselves.

If this is true, then China's leaders should be praised for their efforts and encouraged to continue along the same path and expand future investment plans, though some problems such as showcasing still exist and should be taken into account by officials in their works later. During the 1980s and 1990s, it was shown that China actually was still taxing agriculture and the rural sector, although there were signs in the macrodata that a turnaround was occurring. Our study suggests that indeed either the turnaround has actually occurred or that at least there is a shift from net taxation to net investment in rural China underway. Undoubtedly, given China's size in population and land and the depth of poverty and backwardness in some areas, more is needed. However, at the very least, for perhaps the first time, it appears as if the transformation to a more modern nation is happening. Moreover, it also appears as if China has made a commitment to focusing its resources on the development priorities that other nations have found to be the key to successful development.

Notes

1. The sample villages come from six representative provinces. Jiangsu represents the eastern coastal areas (Jiangsu, Shandong, Shanghai, Zhejiang, Fujian, Guangdong, and Hainan); Sichuan represents the southwestern provinces (Sichuan, Chongqing, Guizhou, and Yunnan) plus Guangxi; Shaanxi represents the provinces on the Loess Plateau (Shaanxi and Shanxi) and neighboring Inner Mongolia; Gansu represents the rest of the provinces in the northwest (Gansu, Ningxia, Qinghai, Tibet, and Xinjiang); Hebei represents the north and central provinces (Hebei, Beijing, Tianjin, Henan, Anhui, Hubei, Jiangxi, and Hunan); and Jilin represents the northeastern provinces (Jilin, Liaoning, and Heilongjiang). While we recognize that we have deviated from the standard definition of China's agro-ecological zones, the realities of survey work justified our compromises. Pretests in Guangdong demonstrated that data collection was extraordinarily expensive and the attrition rate high. One of our funding agencies demanded that we choose at least two provinces in the northwest. Our budget did not allow us to add another central province (for example, Hunan or Hubei) to the sample.

2. On average, the attrition rate was only 6 percent. In no case did we leave a township until at least 80 percent of the villages had been enumerated. In order to examine if the villages that were not enumerated (due to attrition) were systematically different from those that participated, we collected a set of variables about no-show villages from the township and ran a probit regression with the dependent variable represented as an indicator variable where the variable equaled one if the village did not come and zero otherwise. There were no variables that were significant. If a township had more than twenty-five villages, we randomly selected twenty-five of them. This only affected fewer than five townships.

3. The year 1997 was chosen as the year to ask village leaders about the village characteristics and other control variables to ensure that these potential explanatory factors were measured at a time prior to the investment activity in order to help us examine causality.

4. In calculating *all* public goods projects, we do not include investments made in

electrical grid and telephone line upgrades. There were about 3,000 of these projects in our sample village between 1998 and 2003. In some sense, however, these projects are not run like the rest of the projects, either public goods investments or development projects. For example, in a vast majority of the electrical grid–upgrading projects, the electrical company made all of the investment and did not include the village in any of the decision-making process. The cost of the project, according to our interviewees would be captured by higher electricity fees or increased electricity use. Given the different nature of these types of projects, in the rest of the article we do not include them in the analysis of public goods projects.

5. The numbers of public and development projects were 7,723 and 1,453, respectively.

6. After being weighted by regional populations, the number of public goods projects reduced from 7,723 to 5,975.

7. Grain for Green is large national forestry program begun in 1999 that was designed to pay farmers to set aside cultivated land for forests or grasslands. In total between 1999 and 2003, more than 5 million hectares nationally were converted from cultivated land to forests and grasslands (Xu and Cao 2002).

8. Income could also be a demand-side factor. It is possible that as people get richer, they demand a better environment or an improved living standard that can be provided by public goods investments. When examining all public goods investments, we do not see evidence of this. However, when focusing on the propensity of villages to fund their own public goods (see discussion below), income is a positive correlate and it could be that there is a demand-side explanation.

9. Although we do not know precisely why, it could be that in fact the pattern of investment is consistent with the pro-food security policy. Having more land per capita does not necessarily mean that production (or market surplus) is higher. In China the productivity (and market surplus) of regions in the Yangtzi River Delta, the Northern China Plain, and Liaoning (higher mechanization) is often higher because land is irrigated and the multicropping is higher.

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