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Elections, Fiscal Reform and Public Goods Provision in Rural China

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Abstract

Public services provision in the developing world, including China, is crucial for rural development and poverty reduction. Although there has been much effort focused on public goods investment in China in recent years, there are still great differences among villages in the level of public goods investment. This study seeks to explain these differences by focusing on the effect of community governance on public goods provision at the village level, including investment into roads, water control and schools. During the recent past several years, village governance in rural China has undergone a series of fundamental reforms. Arguably, the advent of direct elections for village leaders and the rural Tax for Fee Reforms are two of the most important shifts in the ways that communities manage themselves. Using a nearly nationally representative sample of communities from survey data that includes information from more than 2400 villages in rural China, we find that the direct election of a village's leader leads to increased public goods investment in the village. The paper also demonstrates that the rural Tax for Fee Reforms, *ceteris paribus*, has a negative effect on public goods, especially on investment by the village itself.

JEL classification: H41, H54, H71

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The World Development Report (2004) reports that in developing countries key services in education, water, sanitation, health and electricity fail poor people—in access, in quantity and in quality. Vulnerable populations often are unable to access services provided by the higher levels of government or the private sector. Rural residents often rely on public services provided by local communities for their survival and development (World Bank, 2000; Darja et al., 2004). No matter how they are provided (from higher level governments or their own collective efforts), according to Khan (2000), in almost all developing countries the public goods infrastructure in rural communities—including access to education, transport, drinking water and sanitation, health care and communications—are far worse than those of urban residents. Without improvements in public services, poor people will have little chance to escape poverty. Clearly, there is a critical need to improve the provision of public goods in rural areas.

Although some progress was made in the development of China's rural infrastructure in the 1980s and 1990s, living conditions in rural areas are still poor after two decades of reform. According to the World Bank (2001), there are more than 100 million poor people in China; most live in rural communities. In many of these communities, public services are severely under funded (Unger, 2003; West, 1997). For example, by the end of the 1990s more than 30 million children of school age were not going to school (World Bank, 1999). As late as the 1990s, more than 13 percent of villages were still not connected by any road to the outside world; almost half of rural

areas lacked telephones; nearly 83 percent of villages in rural China were unable to access to clean drinking water (Gao, 2003; Yu, 2003).

In recent years the investment into the community in terms of roads, irrigation, schools and drinking water has improved. According to a national representative survey of China's villages undertaken by the China National Statistical Bureau, during the past several years there has been more than one investment project per village per year (World Bank, 2005). The pace of investment accelerated in recent years (Liu et al., 2005). Fan et al. (2004) has shown that when public goods are improved, they help promote rural development and reduce rural poverty.

Although investment into public goods in rural China has improved in recent years, several factors demonstrate there are still many reasons to remain concerned. First, the level of investment on a per capital annual basis in rural China in recent years is far less than that of Korea and Japan in their rapid developing era (CCICED, 2004). Moreover, there is concern over whether or not upper level government officials and local leaders are delivering the types of services that are in demand by villagers (Sonntag et al., 2005). Public goods investments in rural China are uneven across regions. An Asian Development Bank study demonstrates that since 2000 some villages had more than 10 public projects while during the same period some villages did not have any projects (ADB, 2005). Finally, many policy changes, for example, the Tax for Fee Reforms and local governance shifts, almost certainly have affected the ability and incentives of local leaders to provide their villages with public goods (Jia and Zhao, 2002; CCICED, 2004).

Despite the importance of the provision of public goods in rural areas, only a limited number of studies in developing countries have quantitatively examined the effect of important policy efforts, such as governance and fiscal reforms, on rural infrastructure. According to one scholar, the lack of an empirical basis in the literature arises largely because of the absence of detailed information (Dethier, 1999). In the few empirical studies that do exist, economists have tended to investigate the links between governance and types of public goods provision. For example, Besley and Burgess (2001) use data from India to show that the election of local leaders has a positive effect on public food distribution and calamity relief. Chattopadhyay and Duflo (2004) find that the gender of the Pradhan (mayor) affects the provision of certain types of public goods more than others. Rosenzweig and Foster (2003) demonstrate that local democratization is positively correlated with the provision of local public goods in general. In sum, the literature that does exist suggests that good governance will enhance local public goods provision. Sound fiscal policy in developing and transition countries also has been shown to have an important effect on rural infrastructure development, in particular, and development, in general (Zhuravskaya, 2000; Parker et al., 1997; Rosenzweig and Foster, 2003).

There is a good reason to believe that changes in local governance in China in recent years also may have affected the provision of rural public goods. “The Organic Law of Village Committees” changed the way village leaders ascend to office. Originally local leaders were appointed. In recent years, most of them are supposed to be elected. While there are still leaders that are appointed, when leaders are elected,

there is almost assuredly a change in the accountability of leaders in some villages, which may affect rural infrastructure investment in general. Indeed, the study of Zhang et al. (2004) has found such an effect.

China's new rural Tax for Fee Reforms, a policy that seeks to introduce greater fiscal discipline at the local level, also may impose constraints on public goods provision in the same way that fiscal reform in the past affected the local economy. For example, the literature shows that changes in the way budgets are managed have sharp effects on rural China's investment and development (Oi, 1992; 1994). Qian and Weingast (1996; 1997) and Jin et al. (2005) argue that the fiscal reforms of the 1980s and early 1990s are among the most influential factors that triggered China's remarkable economic performance. Zhuravakaya (2000) argues that stronger fiscal incentives in China led to higher efficiency in the provision of public goods because a smaller portion of the resource was being wasted. In this paper we are interested in the effect of China's newest effort to reform fiscal matters—the so-called the Tax for Fee Reforms. Although these policies ultimately will affect all villages in China, the magnitude of the effects in recent years on local community may differ due to the fact that these policies were implemented at different time in different areas.

Given this context, the overall goal of this paper is to discover whether or not local governance changes and fiscal policy reforms have influenced the provision of public goods in rural China. To meet this goal, we have three objectives. First, we provide a description of rural infrastructure projects that have been built in China's villages in recent years, the evolution of local governance and the fiscal reforms in

rural China. Second, we build a profile of the observed facts about the linkages among public goods provisions, governance reform and fiscal policy shifts. Finally, we examine whether or not these factors, especially the rise of the direct election of village leaders and the implementation of the Tax for Fee Reforms, have a causal impact on the provision of public goods in rural China.

The broad nature of our questions necessitates narrowing the focus of the paper. In particular, our analysis examines only the village level. Although the empirical analysis of the determinants of village infrastructure is almost unique in the literature, we admit that we are not able to address the fiscal reforms and investment efforts at the town and county levels. In recent years there also have been many specific components of the Tax for Fee Reforms that have been implemented (for example, the reduction of the agricultural tax); we are only able to aggregate all of these individual factors into a single measure: the time period in which the original Tax for Fee Reforms were formally implemented. Likewise, our measure of governance reforms is fairly rudimentary—focusing on whether or not the village leader was directly elected. In using such a measure, we almost certainly will miss the richness that characterizes some of the rest of the governance reforms. What we give up in richness, however, we gain in coverage, since our data cover more than 2000 villages and 6 years.

Governance and Fiscal Reforms in Rural China

Although the roots of governance reforms emerged early in China's general economic reforms, local elections actually only began to be implemented on a

widespread basis in the late 1980s and 1990s. In the years immediately following the initiative of the rural reforms, village leaders were appointed summarily by upper level government. In the early years of transition, however, in part as a result of the institutional shifts, there was considerable confusion in the responsibilities over the provision of rural public goods and management of village affairs which in some cases the confusion resulted in significant strife within villages (Zhang, 2004). When the conflicts between local leaders and villagers became increasingly serious, the central government gradually began to embrace the idea of village elections (O'Brien and Li, 2000). Logically, the idea was that if villages elected their own leaders, the parties would be jointly responsible for managing their own affairs and would be more likely to create a collaborative solution rather than be angry at the state. The nation-wide extension of direct elections for the members of village committees did not actually begin until the passing of the "Organic Law of Village Committees" in 1987.

With the implementation of the Organic Law, new electoral procedures began to emerge gradually. One of the most distinguishing characteristics of governance at the village level is that there are sharp differences among communities in implementing the election protocols. In fact, criteria for the selection of village leaders have never been specified clearly and vary from place to place and from time to time (Morduch and Sicular, 2000; Shi, 2004). When examining a number of papers on China's local elections, it can be seen that there are a great number of different ways that communities have used to produce the slate of candidates (Oi, 1989; Oi and Rozelle, 2000; Chan et al., 1992; Potter and Potter, 1990; Ho, 1994; Kelliher,

1997;Paster and Tan, 2000; Tan, 2004; Tsai, 2002; Kennedy, 2002). While there are still disputes on why this heterogeneity exists, the fact that there are differences among villages actually is fortunate for the empirical social scientist since it gives us an opportunity to test whether or not village governance affects village outcomes.

Rural Fiscal Reforms

At the same time that village governance policies were first being developed, leaders also were launching a series of reforms in order to try to establish a more solid basis for the rural economy's fiscal system. Although policies have gone through a number of shifts, in the early 1980s officials promoted the fiscal contracting system, which can be counted as first round of fiscal reforms (or *the decentralization reforms*). The core idea of the decentralization reforms was to improve incentives for revenue generation. However, as the decentralization reforms unfolded, through the late 1980s and early 1990s the share of the revenues accruing to the central government fell; at the same time the revenues of local governments increased (Wong, 1991; 1997).

In response to these problems, in 1994 the second round of fiscal reforms (the *recentralization reforms*) was introduced with the main idea focused on building a system of tax sharing. While it is clear that the tax sharing system achieved some success (for example, the share of revenue collected by the central government rose dramatically), there were still a number of problems. Above all, because tax revenues that accrued to the local governments fell as a result of the tax-sharing system, new problems arose in the way that public goods were financed. Perhaps, most seriously, the reforms did not address the issue of fees that were being levied by local

governments (Cai et al., 1999). Expenditure mandates continued to emerge which gave implicit support to the efforts of local officials to seek supplementary/informal fiscal resources in the form of fee levies on local residents. In many places fees were taking up an ever-increasing share of per capita income of rural residents (Tao et al., 2005).

By the end of 1990s the heavy burden imposed on villages by local government became one of the most serious concerns of national leaders and triggered the third round of fiscal reform. In the rest of the paper we call this reform the Tax for Fee Reforms. In their initial effort, a pilot experiment of the Tax for Fee Reforms was implemented in several rural counties in Anhui province. According to the design of the Tax for Fee Reforms, there was supposed to be a standardized tax system that would replace the range of taxes, fees and levies (henceforth *local fees*) that had previously been imposed on farmers. In return for losing local fees, the county government was supposed to increase direct transfers to offset the decline in revenues with an Agricultural Tax Surcharge rebate (given from the upper level government back to the village after the Agricultural Tax—which replaced local fees—was collected by village leaders and remitted upwards. In addition, the reform policies set restrictions on the corvee assessments that local officials could demand from farm households. In 2001 the pilot experiment was expanded. In 2002 the Tax for Fee Reforms was formally launched in almost all provinces—although the pace of implementation differed among regions (GUOBANFA, 2002).

Unfortunately, when being implemented, the Tax for Fee Reforms did not always follow the original plan. According to Yep (2004), the Tax for Fee Reforms did,

as planned, reduce fees charged to farmers. For example, in Anhui province, after the first year of the reform the tax/fee burden of farmers throughout the whole province was reduced by 31 per cent. As expected, this affected the revenue side of the balance sheet. The typical village in Anhui suffered nearly a 40 percent drop in revenues when they were forced to stop fee collections. However, despite promises to the contrary, according to other research (Li, 2006), transfers from above failed to fully compensate villages. In fact, there are reports that village balance sheets suffered dramatic falls in revenues and that villages responded to these fiscal shortfalls by cutting back on public goods investments (Fock and Wong, 2005).

We believe that the papers by Yep, Li, Fock and Wong, in fact, are representative of the general situation across rural China. According to a dataset collected by the authors in 2005 from leader interviews and using information from the books of accountants in 100 randomly-selected, national representative villages (see Zhang et al., 2006a for details), the Tax for Fee Reforms radically altered the balance sheet of villages. When examining the revenues of the average village in rural China, it can be seen that revenue growth not only failed to keep up with the growth of income, it was unfolding in a way that was unsustainable and certainly detracted from the village's ability to make public investments (Table 1). Whereas village income per capita rose by 5 percent annually in the sample of villages between 2000 and 2004, revenues per capita rose by only 0.8 percent (from 79 yuan/capita to 82 yuan—row 1). Moreover, current revenues (or those revenues that a village can expect to collect on an annual basis) actually fell by 10 percent (from 49 to 44—row 2). To merely keep total

revenues from falling, villages had to rely on extraordinary forms of revenue generation (e.g., from land and assets sales), which clearly are unsustainable (rows 7-9).

A closer look at that source of revenues shows clearly that the Tax for Fee Reforms was primarily due to government's failure to compensate villages fully for their Tax for Fee-related losses in revenues and this led to declining fiscal health. The Tax for Fee Reforms were completely successful in reducing Local Fees (from 30 yuan/capita in 2000 to 0 in 2004—row 3). However, above-level government transfers back to the village made up for only a bit more than half of the revenue fall. Revenues from transfers rose only by 17 yuan/capita, increasing from 5 yuan/capita in 2000 to only 22 yuan in 2004. This fall in revenue was taking place a time when Zhang et al. (2006a) showed that there was a great increase in the demand for investment into public goods by farmers.

Although it can be understood why the Tax for Fee Reforms have been welcomed by villagers (since its implementation has reduced the direct fee/tax-paying burden of farmers), there also potentially may have been adverse impacts (Jia and Zhao, 2002). While rural development certainly requires that individual incomes increase, in the long run a healthy development path also needs investment into public goods. Public goods provision, however, must be financed by the government—either through formal government channels from above or by local governments (or quasi government bodies). All investments, of course, require access to fiscal resources. Hence, while the Tax for Fee Reforms may have succeeded in helping ease the burdens of farmers from locally-assessed taxes and fees, they also may have had the unintended

effect of reducing the resources available for public goods investment. Because of this possibility, it is necessary to examine whether this phenomenon occurred and how big was the size of the effect of the Tax for Fee Reforms on rural public goods provision. The results from such analyses could be useful to policymakers as they decide to expand or limit their fiscal reform program in the future as well as help them decide in what ways they can adjust their investment plans.

Data Source and Descriptive Statistics

The data used in this paper to examine the linkages between investment and governance and fiscal reforms were collected in a survey by the authors and their collaborators in late 2003. The field work team conducted the data collection effort in 6 provinces, 36 counties, 216 townships and 2459 villages and the final dataset can be considered as a nearly nationally representative sample. In each of China's major agro-ecological zones, we randomly selected a sample province. Sample counties and sample townships were also selected randomly¹

Within each township we also used a standard procedure to select the sample villages. When there were 20 or less villages in a township, all villages were surveyed; if there were more than 20 villages in a township, then 20 villages (also randomly selected) were surveyed. In all of the sample townships, more than 90 percent of villages were surveyed. On average, enumerators surveyed 11 villages in each township.² The range of the number of villages that were surveyed was from 4 to 20.

The survey collected a great deal of information about village affairs. In addition to survey blocks enumerating the basic characteristics of villages, there were three sections of the survey that collected information that forms the basis of this analysis. First, there was a long section on public goods investment in the village. During this part of the survey, enumerators asked the respondent to recount all investment projects made during the five year period (1998-2003). The sizes, dates of execution of all projects (including the starting and ending dates), sources of funding (solely from above; solely from the village; and jointly funded), coverage (number of households; amount of physical area in hectares) and other characteristics were enumerated. Second, the survey had a section that examined the governance systems in the sample villages. After creating a list of all leaders that had been in office since 1991, we then asked how each leader took office—by direct election or by appointment.³ Finally, the survey also had a section about the general regulatory environment of the village, including policies that affected the village’s fiscal management (including the exact date of the start of the Tax for Fee Reforms in each village) and the number of regulations through which the township government managed its villages, in general, and the elections in the villages, in particular.

Village Investments into Public Goods Projects

On the basis of our data, villages invested in a wide variety of different types of public goods projects and there was also a great deal of heterogeneity in the number of and investments levels into projects across villages. While villages invested in projects

that can be categorized into more than 20 different types of projects (e.g., roads and bridges, school construction, irrigation and drainage—henceforth called *total investment*), about half of public goods projects fell into one of three categories of projects: roads and bridges (henceforth, *roads*), irrigation and drainage systems (henceforth, *irrigation*) and *schools* (Table 2, columns 1 and 3). According to our data, roads accounted for 21.2 percent of all public goods projects. More than 800 villages invested in irrigation projects. Almost the same number invested into school construction.⁴ When measured in value terms, roads, irrigation and schools accounted for an even larger share of total investment (60 percent). Henceforth, we call roads, irrigation and schools, rural China's *major public goods projects* and make these the focus of most of the rest of this paper.

While public goods in many countries are almost entirely the responsibility of upper level governments, it is not difficult to see that in China villages also contribute a large share of funding to the public goods investment. To show this, we divide all *total investment* into three sub-categories according to their funding sources—projects that are solely funded from above, projects that are solely funded by the village itself and projects that are jointly funded by both the village and the upper-level government. While 36 percent of projects are fully funded from above (as is the rule in most countries), nearly half (46 percent) are funded with matching funds from the villages and upper level government (Table 3, row 8). Eighteen percent of all public goods projects were funded solely by the village itself. In terms of *total investment* levels (denominated in real yuan), villages in China were funding 47 percent of their public

goods investments; only a little less than the contribution of funds came from above (53 percent). Moreover, the level of *total investment* in our study does not count the investment by China's villagers in in-kind labor contributions. If the labor days that villagers invested into projects were monetized (at 10 yuan per day, less than half of the going daily, unskilled wage rate), the overall contribution of the local village into their community's public goods *total investment* would far exceed 50 percent.

Governance and Public Goods Investment

One of the most notable findings of our survey of villages across China is that governance is changing rapidly and differs across our sample villages. According to our survey, there were 7261 village leaders that took up leadership positions between 1998 and 2003, an average of 2.95 per village.⁵ Since according to national policy, village leaders are supposed to be chosen anew each three years (henceforth, *governance terms*), on average, each village experienced at least two governance terms during the study period. During these terms, there were 5606 (or about 77 percent) village leaders that were elected directly (Table 4, row 7). Although it can not be seen from Table 4, the proportion of village leaders that acceded to office by election rose from 70 percent in 1998 to 85 percent in 2003.⁶

In addition to changes over time, our data also show that the incidence (measured in governance terms) of village leaders acceding to office through direct election differs across space. In Jiangsu and Hebei provinces, between 1998 and 2003 more than 30 percent village leaders were appointed, less than 70 percent were directly elected (Table 4, rows 1, 6). In contrast, the percentage of directly elected village

leaders in Sichuan and Jilin provinces (around 90 percent) was higher than the other provinces (Table 4, rows 3 and 5).⁷

While in no way suggesting causality (since this section is based on descriptive statistics), our data show a degree of systematic correlation between the way that the village leader ascended to his/her office and total public goods investment activity (Table 5). For example, in 25 percent of the villages with directly elected leaders there was at least one road project, slightly more than in villages without direct elections (23 percent). It seems that direct elections also have some effects on irrigation and school projects according to our data (Table 5, rows 4 and 7). The effect of the Tax for Fee Reforms was also evident in the case of public goods projects funded by the village itself (Table 5, rows 2, 5 and 8).⁸

There were even greater differences when looking at the levels of investment (measured in 1000 yuan). Regardless of the type of investment project, the level of investment in villages that had direct elections was higher than in those villages without (Figure 1, Panel A). For example, in villages that elected their village leaders, there was on average 30 thousand yuan invested in the three public goods; only 23 thousand yuan was invested in villages without elected leaders. Importantly, the same pattern of results holds up when we consider differences in village funded-only investments and above funded-only investments (Figure 2, Panels A and C).

Fiscal Reform and Public Goods Investment

The primarily goal of the Tax for Fee Reforms was to reduce the burden of farmers. The thinking behind this is that rural incomes need to rise for two reasons.

First, higher income is needed in order to give rural residents the assets to invest in their future (e.g., for financing the education of their children). Second, higher incomes are needed to directly improve the welfare of rural residents (which is important for many reasons, not the least of which is so that the rural environment remains stable).

As discussed above, public goods also are necessary for development. The services provided by the public goods are also demanded by farmers. According to our survey, nearly 80 percent of households state that they are dissatisfied with the current level of infrastructure. At the same time, 90 percent of households state that, if a grant was provided to their village (from some “source from above”), they would support the expenditure of these funds on public goods. Additionally, 60 percent of them stated that they would be willing to contribute 20 yuan per capita (or about 100 yuan per household) to support the village’s effort to invest in public goods. Since it is possible that the Tax for Fee Reforms had the unintended consequence of reducing public goods investment, it can be seen how policy makers that were charged with implementing the reforms were facing a real tradeoff.

Fiscal reform, although pushed by the national government, has affected different villages at different times. According to our data, leaders in 460 villages reported that fiscal reforms began as early as 2001. These villages, after checking with county and prefecture officials, were found to be part of their area’s pilot program. With the onset of the effort to promote the Tax for Fee Reforms nationally, the number of villages implementing the program accelerated. The other villages began to implement Tax for Fee Reforms at different times during 2002.

Taking advantage of the heterogeneity in the implementation of the reforms overtime, our data can be used to demonstrate that the implementation of public goods investment projects in a village may have been affected systematically by the Tax for Fee Reforms. In examining the incidence of investment in a village before and after the time that the Tax for Fee Reforms were implemented, it can be seen that investment—especially the part contributed by the villages—systematically falls. For example, before rural Tax for Fee Reforms, 15 percent of villages implemented at least one school project; and 18 percent implemented at least one irrigation projects (Table 6, rows 4 and 7). After the Tax for Fee Reforms, however, the percentage of villages implementing roads, schools and irrigation projects all fell (to 24.3, 10.2 and 14.0 percent). The effect of Tax for Fee Reforms was also evident for village funded-only projects (Table 6, rows 2, 5 and 8); although in part (or fully) this was offset after the Tax for Fee Reforms by increased funding of above-funded only projects, such as in road and school projects (Table 6, rows 3 and 9). In the case of irrigation projects, however, like the case of village-only funded projects, the number of above-funded only irrigation projects also fell.⁹

When comparing the level of public goods investment (measured in 1000 yuan) before and after the Tax for Fee Reforms, systematic variation also can be found. With the exception of roads, the level of investment into other public goods (that is, irrigation and schools) before the Tax for Fee Reforms exceeded that of the level after the implementation of the reform (Figure 1, panel B). The differences in the levels of public investment before and after the Tax for Fee Reforms are even more striking

when looking at village funded-only projects (Figure 2, Panel B). In the case of roads, irrigation and schools the level of investment was significantly higher before the Tax for Fee Reforms. This trend, however, is not the same when looking at above funded-only investments on road and school projects (Figure 2, Panel D).

In summary, we find the relationship between public goods investment and recent governance policy initiatives in rural China to be complex. From the descriptive analysis, there is largely a positive correlation between direct elections and investment into three of the major types of public goods, especially on the part of investment that comes from the villagers' themselves. Although we so far have been unable to assess the mechanism by which the correlation is created, it may be that when elections produce a legitimate leader, he/she both has an incentive and mandate to invest in public goods (since it has been seen the villagers demand public goods) and, above all, is better able to mobilize resources within the village. In contrast, the Tax for Fee Reforms is even more complicated. Although after the implementation of the Tax for Fee Reforms investment from above increased for roads and schools, investment from the village itself declines fairly sharply for all three investment types. One explanation that is consistent with the facts is that Tax for Fee officials not only cut the taxes of farmers and capped their fees that could be assessed by local leaders, they also increased the amount of funding coming from above. However, the restrictions on the fund-raising initiative of local leaders that came with the Tax for Fee Reforms appear to have partly negated the gains from additional investments since they are either unable or unwilling to mobilize as many resources from the village itself.

Multivariate Analysis

In order to examine whether direct elections and the Tax for Fee Reforms have significant effects on public goods provision in rural China, we conduct a series of regression analyses. To do so, we use probit analysis to test whether local governance policies and the Tax for Fee Reforms impact the implementation of roads, irrigation or school projects (that is: yes or no—was there a project?). Next, we use tobit analysis to test whether governance policy and the Tax for Fee Reforms have also affected the level of public goods investments in villages (measured in 1000 yuan).¹⁰ Based on the descriptive analysis in the previous section, our most basic hypotheses are: direct election will increase public goods provision; Tax for Fee Reforms will have a negative impact on public goods provision (especially on village funded-only investment projects).

Since village funded-only projects and above funded-only projects may be determined by different factors (or be affected differently by a given set of factors), we run regressions separately using total investment (projects), above funded-only investment (projects) and village funded-only investment (projects) as the dependent variables. Thus, in our analysis for each type of project (roads, irrigation and schools), we have six different dependent variables: a.) whether or not a village had an investment (funded from any source) between 1998 and 2003 during each official election term;¹¹ b.) whether or not a village had an above funded-only project; c.)

whether or not a village had a village funded-only project; d.) the level of investment (in yuan) into a project (funded from any source) between 1998 and 2003 during each official term; e.) the level of investment into above funded-only projects; and f.) the level of investment into village funded-only projects. At the heart of our analysis, then, we seek to understand the effect on public goods investment of village elections (measured as a dummy variable: “Was the village leader elected directly?”) and Tax for Fee Reforms (measured as a dummy variable: “Was Tax for Fee Reforms in place when the investment made?”).

In order to control for the effects of other factors when explaining the effect of local rural governance policies on public goods investment, we assume that there are three sets of explanatory variables in addition to our measures of local governance policy. The specification of our equations uses a number of the control variables that are found elsewhere in the literature (e.g., Banerjee et al, 2005; Besley and Burgess, 2001; Eddleman, 1974; Miguel and Gugerty, 2005; Rosenzweig and Foster, 2003; Yep, 2004; Zhang et al, 2004; Zhang et al, 2006b). First, we include a set of socio-economic factors that should be expected to affect the level of public goods investment—for example: net per capita income—in linear and squared form (in 1997); the size of the village’s population (in 1997); the share of the population that is of a minority ethnic origin (in 1997); per capita land size (in 1997); the number of people from the village that are working in either the township or county (in 1997); and the rate of illiteracy of the village’s labor force (in 1997). Second, we include a set of location and geographical factors—for example, the share of total cultivated land that is effectively

irrigated land in village (in 1997); the share of the village's total land area that is mountainous (that is land over 25 degrees in 1997); the distance between the village's center to the nearest road (in 1997); a measure of the size (in land area) of the village (measured as the distance—in kilometers—between the two small groups within each village that are furthest away from each other); and the distance (in kilometers) between the office of the village committee and township seat (in 1997). Finally, we include a variable in each equation to hold constant the state of the infrastructure in the time period before our analysis begins. In the roads equation we use a variable called "Is there a major road that passes by the village—in 1997." In the irrigation equation we use a variable called "The ratio of irrigated land in the village—in 1997." In the school equation we use a variable called "Duration since last major investment—prior to 1998."

In summary, then, the model to be estimated can be written as:

$$(1) \text{ Public goods investment} = f(\text{Village elections; the Tax for Fee Reforms; Other factors})$$

where the dependent variable is one of the six types of investments (as discussed above); the variable measuring the village election is a dummy variable (which is equal to 1 if the village leader was directly elected; and 0 otherwise); the Tax for Fee Reforms variable also is a dummy variable (which is equal to 1 if the election term in which an investment was made was after the implementation of the Tax for Fee Reforms; and 0 if before); and the other factors matrix includes all of the socio-economic and location/geographical variables discussed above.

In order to estimate equation (1), we organized the data so we could match the term of office of the elected (or appointed) village leader with the period of time in which the project was begun.¹² Hence, the number of observations in each of the regressions should have been equal to the total number of election terms (that is 7261).¹³ In the case of schools, the number of observations is lower (only 4564), because many villages did not have a school (and so were not included in the sample—how could a village invest in the school if the school district did not have one in the village?).¹⁴

Results of Multivariate Analysis

In reporting the findings, we examine two sets of results. The first set will be the basic probit and tobit results. The two variables of interest—the direct election variable and the Tax for Fee Reform variable—will be considered to be exogenous to the decision making authority of the village. More specifically, we will assume that there will not be any correlation between the direct election or the Tax for Fee Reforms variable and the residual of the investment equation. While there is some validity to the assumption, given the fact that township and county level government officials are making the election and fiscal reform decisions (and in many cases they are imposed on the village from above without regards to the level of public investment volume), this assumption will be relaxed in the next section.

Probit and Tobit Regression Results

In running the model in equation 1 (in its six different versions for each type of investment project), the regression equations appear to perform well. For example, in

the case of roads, a number of the control variables behave as expected. If the village has its own villager (one or more) in a government position in the township or county government, it is more likely to have a road project (as well as have higher levels of investment in roads—especially from above—Table 7A, columns 1, 2, 5 and 6, rows 13). Likewise, villages that are richer, tend to invest more in village funded-only projects (columns 3 and 4, rows 3 and 4). While the Pseudo R-square statistics are low, this is not unusual for cross section analysis.¹⁵

Although the signs and levels of statistical significance may vary for a number of the control variables when they appear in equations using the different specifications of the dependent variables (e.g., yes/no project or level of investment), the source of investment (all sources; above funded-only; village funded-only) and type of investment (roads, irrigation and schools), the sign on the direct election variable is consistently positive and significantly different from zero in 16 of the 18 models (Tables 7A, 7B and 7C, row 1). The positive coefficients mean that, everything else held equal, villages that directly elect their village leaders have higher levels of public investment. The coefficients on the direct election variables in the village funded-only equations are all positive and the t-ratios are particularly high. The interpretation of this finding (given the assumptions of the model) is that there is something about the election process that is boosting investment in villages that have directly elected their leaders. It could be that directly elected leaders are more responsive to villager demands for public investment. It also could be that the legitimacy bestowed on

leaders by the election process gives them a greater ability to lobby those from above as well as organize funding from the village.

But while direct elections increase public goods investment—especially from village funded-only sources for irrigation and schools (but also for irrigation and school investment from all sources), the Tax for Fee Reforms are limiting it. According to Tables 7B and 7C (row 2), *ceteris paribus*, in the election term after the Tax for Fee Reforms, the propensity and level of investment by the villagers in their own village funded-only projects fall. This “drag in investment” from the village itself may be holding down investment from all sources. Apparently, the increased controls put on the actions by village leaders to collect fees and assessments from villagers (as well as limits on ability to draft corvee labor) have led to reductions in investment, other things held constant. Certainly, this is an unintended consequence of the Tax for Fee Reforms which were supposed to improve the lives of rural individuals and their environment.

The case of roads is somewhat different, perhaps because the Tax for Fee Reforms came right before the government launched its major “road to every village” campaign (Table 7A). As part of this national effort, the central government has invested tens of billions of yuan annually into road building projects during the past several years. It is likely that because of this centrally-guided effort, roads from all investment sources and those from above funding-only sources rose significantly (columns 1, 2, 5 and 6, row 2). Interestingly even though, unlike the case of irrigation and schools, the sign on the Tax for Fee Reforms variables in the village only-funded

models are not significantly different from zero. The fact that they are zero (instead of negative as in the case of irrigation and schools) is important because this means that there is no increase in village funding of road despite the official requirement of most projects that villages contribute to their own road building projects. Such a finding suggests that Tax for Fee Reforms is limiting the ability of villages from meeting these obligations and increasing their own investment into roads.

Beyond the analysis of the effect of the Tax for Fee Reforms and elections on specific types of public goods, we can also demonstrate that the same results generally hold when we try to explain total investment. When using a Tobit estimator, direct elections of the village leader uniformly leads to higher numbers of projects and more investment from all sources—in total; from village funded only investments; and from above funded only investments. In contrast, the Tax for Fee Reforms reduces investment in all cases (Appendix Table 1).

Accounting for the Endogeneity of Direct Elections

While in the first stage of our estimation, we ignored the possible presence of endogeneity (as a way to establish a baseline and examining the uncorrected relationship among the main variables), it is possible that the coefficient on the direct election variable is biased from several sources.¹⁶ First, it is possible that there is reverse causality. Directly elected village leaders may not only generate more investment; investment activity could make it attractive enough to become village leader so more candidates would find it worth it to announce their candidacy and compete for a leadership position. Second, there could be a set of unobserved factors

that both affect the level of investment and are correlated with presence of direct elections. In either of these cases, the coefficient on the direct election variable could be biased.

In order to account for the endogeneity of the direct election variable we adopt a Bivariate Probit approach. While the village has considerable authority over and plays a role in deciding how its leaders are elected, as seen in the discussion above, policy also plays a role. Our strategy relies on the assumption that election rules and effort exerted by the part of the township government responsible for managing village elections will have some effect on the propensity of the village to elect its leader. There is no reason to believe, however, that the effort of this part of the township government apparatus will have any independent effect on the amount of investment activity.

To measure the effect of the township government on the election process we use two variables from our data. During the survey, we asked local officials and villages whether or not the township election committee had a rule about whether or not the slate of village candidates needed to have the official approval of township leadership. Our logic is that such a rule may increase the probability that there be an appointed village leader since the township government election committee is taking control away from the village and reducing the choice (decision-making powers) of the village. In other words, when this rule is in place it gives upper-level officials more control over the election and will diminish the interest of villagers in the election process, which will increase the probability that they will not be willing to go through with the time-consuming procedure (and the village will end up with an appointed

leader). Control over the nomination process also was often a way in which the township could directly appoint a leader (by approving one candidate but not the other—which essentially left only one candidate on the ballot—a township appointee).¹⁷ Of the 7261 elections that were held in our sample villages, 68 percent were subject to township approval of the nomination slate. Although the correlation coefficient between the presence of the approval rule and direct elections was small, it was significant at the one percent level.

We also asked the township informant how many official meetings were convened to plan village elections. Specifically, we made a count of the number of meetings for each village that were attended by both township/county officials and village leaders during the period of time between the official notification of a new round of elections (which came down from the county's bureau of civil affairs) and the day of the election. The logic of this variable is that the more meetings that were held, the more closely the village would have to follow county election protocol (which was designed to end in a direct election). On average, township and county officials held 5.30 meetings, ranging from 0 to 10. The correlation coefficient between the number of meeting variable and direct election also was significant at the one percent level.

Descriptive statistics from our data and statistical tests both suggest that the choices of instrumental variables (IVs) are satisfactory. Because we are looking for a variable that is correlated with the endogenous variable (direct election) but is not correlated with the outcome variable (investment) except through its impact on direct elections, we would like to look at the correlations between the IVs and the

unobservables that are causing the endogeneity. By definition, of course, this is impossible. But if any of the unobservables are correlated with the variables that we do observe (and included as control variables in the analysis), one way to examine the validity of the IVs is to see if there is any correlation between the IVs and the control variables. In Appendix Table 2, we show that when we divide the sample into those villages that have nomination approval rules (column 1) and those that do not (column 2), there is little difference in the level of the control variables (rows 1 to 8). The same is true when we divide the sample into those villages in which county and township officials had less than five meetings (column 3) and those in which there were more than five meetings (column 4). In addition, the Hausman overidentification test also supports the notion that the IVs are not correlated with the residual from the investment equation (See Appendix Table 3, rows 1-4 for road project investments; rows 5-8 for irrigation project investments; and rows 9-12 for school project investments). In other words, by logic and from our statistical analysis the identification strategy appears to be sound.

Bivariate Probit Results

The bivariate probit estimates of the coefficients of the effects of direct election and the Tax for Fee Reforms on investments from all sources and investments from village funded-only projects are reported in Table 8. For the most part they are consistent with the probit and tobit estimates in Tables 7A, 7B and 7C—although the levels of significance of some of the coefficients have fallen.

According to our results, direct elections continue to have some positive effect on investment (Table 8, row 1). In all of the six regressions, the sign on the coefficient of the direct election variable is positive. It is significant (at the 10% level, at least) in four of the six equations. It is interesting that all of the coefficients in the village funded-only equation (columns 4 to 6) are positive (although the coefficient in the irrigation equation is not significant). Even after controlling for the endogeneity of the election process, there appears to be a positive effect of direct elections on investment. The marginal effects are between 1 and 15 percent (Table 8, row 1—see the figures inside the brackets).

In contrast, except for the roads variables (as was discussed above), the signs on all of the coefficients of the Tax for Fee Reforms variables are negative (and they are significant in the irrigation and school equations). Clearly the finding in the probit and tobit analysis above remains. The Tax for Fee Reforms, for all of the benefits that the policy has brought to villages through reduced taxes and fees, are coming at a cost to public goods investment in the village. It is almost certain that only the large increase in the volume of investment into roads by the central government in recent years (through a different program) has kept the total level of investment into roads from falling (as it has happened in the case of the other types of investment projects)

Conclusions

Rural China has recently undertaken broad policy changes in both the areas of local governance and fiscal management. We have seen that across both time and space

that the implementation of local governance policies—for elections and fiscal management—has not been uniform or necessarily smooth. The results of our paper suggest that the start and stop nature of the local reforms have an effect on the public infrastructure of rural villages. On the one hand shifts in policies that promote elections, while slow in getting started and not universal, appear to be creating an atmosphere that is conducive for more investment. When villages elect their own leader, for some reason, there is a significant amount of new investment effort that arises in the village. If public goods investment can be raised by improvements in the ways that villages choose their leaders, continuing reforms to provide local leaders with more legitimacy may lead to an even more vibrant village development environment.

However, at the same time that the promotion of village elections are helping improve the village's public goods environment, the Tax for Fee Reforms appear to be reducing the ability or willingness of villages to invest in themselves. That is not to say that villagers do not like the Tax for Fee Reforms. In a fundamental way, officials are giving farmers a tax cut and this is almost certainly leading to higher current incomes. Our results demonstrate, however, that the individual benefits of the Tax for Fee Reforms could be coming at a cost—reduced investment from the villagers themselves. The exact mechanism has not been found (certainly an interesting topic for future research), but it is likely to have something to do with restrictions on the ability of leaders to raise assessments for projects, specifically, and the deterioration of the fiscal health of villages that has generally been caused by the Tax for Fee Reforms (Zhang et al., 2005).

There also may be an additional adverse effect of the Tax for Fee Reforms that could actually lead to a reduction in the positive effect that appears to have been induced by more competitive election. Recent research by World Bank (2005) shows that in recent years, the years after the Tax for Fee Reforms, fiscal health and public goods investment by villages have not only fallen, it also appears as if the restrictions imposed by the Tax for Fee Reforms are discouraging more capable villagers from seeking or staying in village leadership positions. Between 2002 and 2004, the average education of leaders has fallen. Their age has risen. Their experience in the migrant labor force and as entrepreneurs working in self-employed enterprises also has fallen. In other words, the overall human capital of village leaders is falling and it indirectly may be due to the Tax for Fee Reforms. If so, then large transfers (such has been done with roads) may not be enough. Even if there are enough fiscal resources present, the investments from above need to be managed better, which will become more difficult if the human capital of those willing to serve as leaders falls. Clearly, a reassessment of the way that Tax for Fee Reforms are being implemented is needed.

Table 1. Village Revenues before (2000) and after (2004) Tax for Fee Reforms (real yuan per capita)

	2000	2004
Village revenues	79	82
Annual revenues	49	44
<i>Local fees</i> (collected from farmers)	30	0
<i>Transfers</i> from above-level governments ^a	5	22
Contract payment for land ^b	8	12
Contract payment from enterprises	6	8
Extraordinary revenues	30	39
From sales of land or assets	16	23
Others	14	16

^a Transfers from above-level governments includes all funds transferred to the accounts of villages from township and county financial officials, including the Agricultural Tax Surcharge Rebate.

Data source: Authors' survey.

Table 2. Number and size of public goods projects in rural China, 1998-2003.

Project	Number of projects	Average size (1000 yuan)	The distribution of total expenditures on public goods projects
Roads and bridges	1266	112	0.32
School construction	850	99	0.12
Irrigation & drainage	819	65	0.11
Drinking water	636	75	0.05
Community public address systems	379	60	0.03
Recreation center	262	50	0.01
Build clinic	163	25	0.01
Beautify environment	157	24	0.10
Watershed management	151	298	0.01
Forest closure	140	34	0.04
Land Leveling	124	136	0.004
Eco-forest	55	34	0.01
Land improvement	52	110	0.01
Build pasture	19	134	0.32
Other public project	10	244	0.19

Data source: Authors' survey.

Table 3. Source of funding for village public goods projects by province in rural China, 1998-2003.

Province	Total	Funded by Above only	Funded by Village only	Jointly funded	Value of investment from above ^b	Value of investment by village ^b
		(Number of projects)			(Percent) ^a	
Jiangsu	1,646	436	392	818	26	74
Gansu	1,085	481	67	537	77	23
Sichuan	1,037	567	92	378	64	36
Shaanxi	1,352	525	142	685	72	28
Jilin	1,130	420	135	575	45	55
Hebei	1,473	318	557	598	50	50
Total	7,723	2,747	1,385	3591	--	--
Percent of total ^c	100	36	18	46	53	47

^a Percent measures share of total value of investment from above—which is investment from any non-village source—and share of total investment of value from village.

^b Value of investment does not include value of in-kind labor investment by villagers.

^c Percent in column 5 and 6 measures the weighted average of rows 1 to 6.

Data source: Authors' survey.

Table 4. Process by which village leader (*cunzhuren*) assumes leadership position in China's rural villages, 1998-2003.

Province	Elected directly ^a	Not elected directly ^b	Total number of times village leader acceded to office (column1+2)	Percent of directly elected (column1/3)
Jiangsu	1279	578	1857	69
Gansu	562	117	739	76
Sichuan	879	113	992	89
Shaanxi	912	232	1144	80
Jilin	907	85	992	91
Hebei	1067	470	1537	69
Total	5606	1655	7261	77

^a Village leader counted as “directly elected” if he/she assumed office by means of direct vote of villagers through the ballot process.

^b Village leaders not directly elected assumed the leadership position via a.) appointment by above (761 times); b.) appointment by the village committee (680 times); and c.) some other channel (214 times).

Data source: Authors' survey.

Table 5. The method of accession of village leader to his/her position and investment into public goods projects in rural China, 1998-2003.

<i>Share of villages that have at least one of following projects</i>	<i>Village leader was elected directly (%)</i>	<i>Village leader was not elected directly (%)</i>
Roads		
Total ^a	25.4	23.3
Village funded only	9.5	8.2
Above funded only	3.9	3.0
Irrigation		
Total ^a	13.6	13.4
Village funded only	5.7	5.4
Above funded only	3.5	3.8
Schools		
Total ^a	17.7	15.5
Village funded only	6.7	4.4
Above funded only	3.6	2.9

^a “Total” means funds of the project came from any source: funded from above + funded by village (including jointly funded projects).

Data source: Authors’ survey.

Table 6. Rural tax reform and investment into public goods projects in rural China, 1998-2003.

<i>Share of villages that have at least one of following projects</i>	<i>Before the rural tax reform (%)^b</i>	<i>After the rural tax reform (%)^b</i>
Roads		
Total ^a	24.3	27.0
Village funded only	9.2	8.9
Above funded only	3.3	4.3
Irrigation		
Total ^a	15.1	10.2
Village funded only	6.2	4.7
Above funded only	4.0	2.7
Schools		
Total ^a	18.2	14.0
Village funded only	6.9	3.8
Above funded only	3.4	3.6

^a “Total” means funds of the project came from any source: funded from above + funded by village (including jointly funded projects).

^b Investments are counted as “before” and “after” if the investment project was started (month/year) before or after the date (month/year) that Tax for Fee Reforms began to be implemented in the village.

Data source: Authors’ survey.

Table 7A. The regression analysis of the impact of village leader election and Tax for Fee Reforms on road project investment in rural China, 1998-2003.

	All funding sources		Village funded only		Above funded only	
	Have or no road project	Road project investment level	Have or no road project	Road project investment level	Have or no road project	Road project investment level
	(Probit)	(tobit)	(Probit)	(tobit)	(Probit)	(tobit)
Village leader elected directly(yes=1,no=0)						
Dummy of rural Tax for Fee reform(before=0,after=1)						
Net per capita income in 1997(yuan)						
Net per capita income square in 1997						
Total population in 1997 (person)						
The ratio of irrigated land in the village-in1997(%)						
Per capita land in 1997(mu)						
Percentage of effectively irrigated land in 1997(%)						
Hilly land over 25 degree in total land 1997(%)						
The distance of the nearest road to the village in 1997 (Km)						
The farthest distance between two in 1997(Km)						
The distance between village and township seat in 1997(Km)						
Number of fellow villagers working county governments(person)						
The illiterate rate of village labor force in 1997(%)						
Is there a major road that passes by the village-in 1997 (yes=1, no=0)						
Province Dummy						
Constant						
Observations	7261	7261	7261	7261	7261	7261
Pseudo R ^{2a}	0.03/0.1/0.75	0.02/0.1	0.04/0.1/0.95	0.03/0.1	0.05/0.1/0.97	0.02/0.1

Note: Absolute value of t statistics in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%

a According to Veall (1996) and Long and Freese (2006), We report not only the Macfadden's Pseudo R²(the first number), but also the McKelvey-Zavoina R², and for the Probit mode l, we also report the Count R²(the third number).

Data source: Authors' survey.

Table 7B The regression analysis of the impact of village leader election and Tax for Fee Reforms on irrigation project investment in rural China, 1998-2003.

	All fund source		Village funded only		Above funded only	
	Have or no irrigation project	Irrigation project investment level	Have or no irrigation project	Irrigation project investment level	Have or no irrigation project	Irrigation project investment level
	(Probit)	(tobit)	(Probit)	(tobit)	(Probit)	(tobit)
Village leader elected directly(yes=1,no=0)	0.14 (3.01)***	4.7 (3.23)***	0.15 (2.49)**	2.42 (2.48)**	0.08 (1.09)	1.95 (0.63)
Dummy of rural Tax for Fee reform(before=0,after=1)	-0.24 (5.54)***	-7.7 (5.54)***	-0.18 (3.09)***	-3.12 (3.39)***	-0.15 (2.20)**	-7.19 (2.37)**
Net per capita income in 1997(yuan)	-0.0001 (1.02)	-0.003 (1.61)	0.00010 (1.38)	-0.0004 (0.34)	0.0001 (0.66)	0.005 (0.92)
Net per capita income square in 1997	1E-09 (0.09)	0.0000004 (1.20)	-3E-09 (0.21)	5E-07 (2.61)***	-5E-08 (1.57)	-2E-06 (1.42)
Total population in 1997 (person)	-6E-05 (2.67)***	0.000 (0.45)	-0.0001 (4.43)***	-0.001 (2.75)***	-2E-05 (0.67)	-0.0004 (0.27)
Percentage of minority population in 1997(%)	0.000 (0.44)	0.08 (2.31)**	-0.002 (0.89)	-0.05 (1.52)	0.003 (2.24)**	0.16 (2.45)**
Per capita land in 1997(mu)	-0.02 (1.24)	-0.76 (1.55)	-0.036 (1.37)	-0.26 (0.67)	-0.014 (0.64)	-0.60 (0.64)
The ratio of irrigated land in the village-in1997(%)	0.0036 (5.19)***	0.084 (3.72)***	0.005 (5.24)***	0.08 (4.96)***	-0.002 (2.13)**	-0.10 (2.04)**
Hilly land over 25 degree in total 1997(%)	-0.003 (2.99)***	-0.09 (3.00)***	-0.0034 (2.31)**	-0.06 (2.51)**	-0.0020 (1.41)	-0.07 (1.04)
The distance of the nearest road to the village in 1997(Km)	-0.0056 (2.30)**	-0.20 (2.54)**	-0.010 (2.04)**	-0.14 (1.90)*	-0.005 (1.34)	-0.15 (0.99)
The farthest distance between two in 1997(Km)	-0.022 (2.26)**	-1.03 (3.23)***	-0.015 (0.99)	-0.30 (1.24)	-0.02 (1.10)	-1.04 (1.59)
The distance between village and township seat in 1997(Km)	-0.005 (1.06)	-0.17 (1.09)	-0.003 (0.44)	-0.10 (0.85)	-0.009 (1.09)	-0.08 (0.24)
Number of fellow villagers county governments(person)	0.004 (1.62)	0.11 (1.36)	-0.006 (1.41)	-0.13 (1.87)*	0.003 (0.72)	0.16 (0.96)
The illiterate rate of village labor force in 1997(%)	-0.46 (2.85)***	-1E+01 (2.26)**	-0.32 (1.32)	-3.85 (1.01)	-0.26 (1.14)	-8.29 (0.81)
Province Dummy						
Constant	-0.75 (6.67)***	-28.90 (7.89)***	-1.53 (9.87)***	-25.48 (9.67)***	-1.32 (7.08)***	-66.0 (7.41)***
Observations	7261	7261	7261	7261	7261	7261
Pseudo R ^{2a}	0.06/0.1/0.9	0.02/0.1	0.1/0.3/0.98	0.08/0.3	0.03/0.1/0.9	0.02/0.1

Note: Absolute value of t statistics in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%

^a According to Veall (1996) and Long and Freese (2006), We report not only the Macfadden's Pseudo R²(the first number), but also the McKelvey-Zavoina R², and for the Probit mode l, we also report the Count R²(the third number).

Data source: Authors' survey.

Table 7C The regression analysis of the impact of village leader election and Tax for Fee Refor ms on school project investment in rural China, 1998-2003.

	All fund source		Village funded only		Above funded only	
	Have or no school project	School project investment level	Have or no school project	School project investment level	Have or no school project	School project investment level
	(Probit)	(tobit)	(Probit)	(tobit)	(Probit)	(tobit)
Village leader elected directly(yes=1,no=0)	0.18 (3.31)***	21.00 (3.47)***	0.23 (2.88)***	5.23 (3.06)***	0.22 (2.36)**	17.60 (2.73)***
Dummy of rural Tax for Fee reform(before=0,after=1)	-0.15 (2.71)***	-14.90 (2.54)**	-0.31 (3.89)***	-6.25 (3.67)***	0.05 (0.63)	5.12 (0.91)
Net per capita income in 1997(yuan)	-8E-05 (0.96)	-0.035 (3.83)***	-3E-05 (0.27)	0.001 (0.27)	-3E-04 (1.44)	-0.013 (1.04)
Net per capita income square in 1997	-1E-08 (0.55)	8E-06 (3.88)***	2E-08 (1.01)	4E-07 (0.79)	-4E-09 (0.09)	-1E-06 (0.49)
Total population in 1997 (person)	3E-05 (1.10)	0.0060 (1.98)**	2E-05 (0.57)	0.0014 (1.88)*	-4E-05 (0.83)	-0.0010 (0.32)
Percentage of minority population in 1997(%)	0.001 (0.64)	0.22 (1.62)	-0.004 (1.90)*	-0.09 (1.75)*	0.003 (1.43)	0.18 (1.53)
Per capita land in 1997(mu)	-0.035 (2.74)***	-3.73 (2.62)***	-0.073 (2.85)***	-1.35 (2.51)**	0.016 (1.14)	0.97 (1.02)
The ratio of irrigated land in the village-in1997(%)	0.0002 (0.22)	-0.016 (0.17)	-0.00002 (0.02)	-0.008 (0.33)	0.0039 (2.66)***	0.304 (3.09)***
Hilly land over 25 degree in total land 1997(%)	-0.0020 (1.77)*	-0.188 (1.55)	-0.0009 (0.58)	-0.035 (1.04)	0.0007 (0.38)	0.090 (0.74)
The distance of the nearest road to the village in 1997(Km)	-0.0007 (0.30)	-0.07 (0.27)	-0.0044 (1.16)	-0.08 (1.05)	-0.0003 (0.07)	-0.06 (0.23)
The farthest distance between two in 1997(Km)	0.011 (1.09)	0.22 (0.20)	-0.002 (0.11)	-0.24 (0.74)	0.021 (1.28)	1.07 (0.94)
The distance between village and township seat in 1997(Km)	0.0062 (1.17)	-0.27 (0.47)	0.0163 (2.31)**	0.27 (1.89)*	-0.0083 (0.86)	-0.89 (1.35)
Number of fellow villagers working county governments(person)	0.005 (1.93)*	0.45 (1.56)	0.006 (1.59)	0.09 (1.17)	0.011 (2.87)***	0.73 (2.90)***
The illiterate rate of village labor force in 1997(%)	-0.07 (0.42)	-6.64 (0.36)	-0.27 (1.01)	-4.17 (0.74)	0.13 (0.50)	8.66 (0.51)
Duration since last major investment-prior to 1998 (year)	0.009 (5.20)***	0.69 (3.69)***	0.007 (2.92)***	0.12 (2.24)**	0.005 (1.62)	0.31 (1.66)*
Province Dummy						
Constant	-9E-01 (6.24)***	-101 (6.33)***	-2E+00 (9.16)***	-43.5 (9.37)***	-2E+00 (6.51)***	-117 (6.42)***
Observations	4564	4564	4564	4564	4564	4564
Pseudo R ^{2a}	0.04/0.1/0.8	0.01/0.1	0.08/0.2/0.9	0.04/0.2	0.07/0.1/0.9	0.04/0.1

Absolute value of t statistics in parentheses, * significant at 10%; ** significant at 5%; *** significant at 1%

^a According to Veall (1996) and Long and Freese (2006), We report not only the Macfadden's Pseudo R² (the first number), but also the McKelvey-Zavoina R², and for the Probit mode l, we also report the Count R² (the third number).

Data source: Authors' survey.

Table 8. Biprobit analysis of the impact of village leader elections and Tax for Fee Reforms on road, irrigation and school project in rural China, 1998 -2003

	<i>All source funded project</i>			<i>Village funded project only</i>			<i>Other controls</i>
	Road	Irrigation	School	Road	Irrigation	School	
Coefficient (and marginal effect) on direct election of village leader (yes=1,no=0)	0.86[0.15] (1.79)*	1.22[0.1] (5.05)***	0.04[0.01] (0.06)	1.30[0.07] (5.07)***	0.35[0.02] (0.47)	1.64[0.04] (13.2)***	Geography, Society and economic factors
Coefficient (and marginal effect) on Tax for Fee Reforms (after=1,before=0)	0.12[0.03] (3.13)***	-0.2[-0.02] (4.46)***	-0.15[-0.03] (2.71)***	-0.02[-0.001] (0.38)	-0.18[-0.01] (3.10)***	-0.18[-0.01] (3.09)***	
F test value of the instrument variable	17.65	33.37	9.81	16.45	30.68	10.64	

Marginal effect in bracket; Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Data source: Authors' survey.

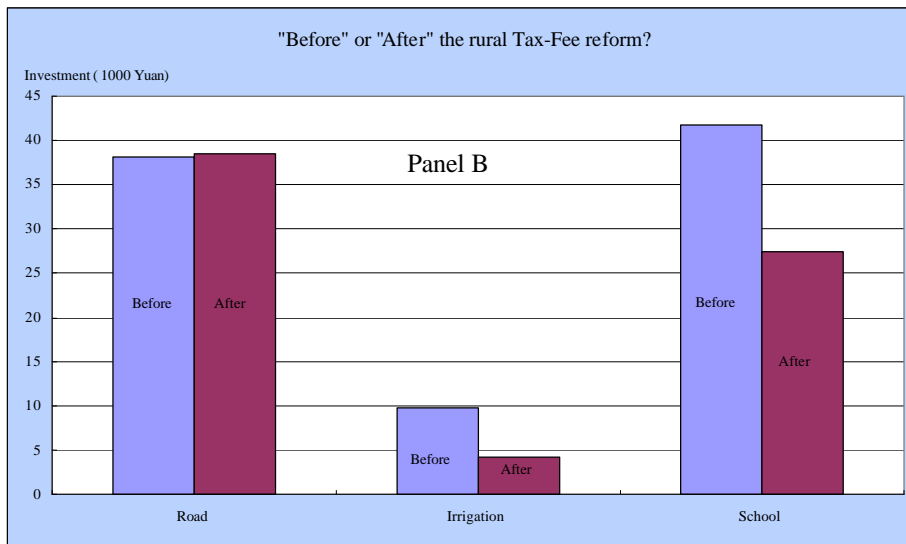
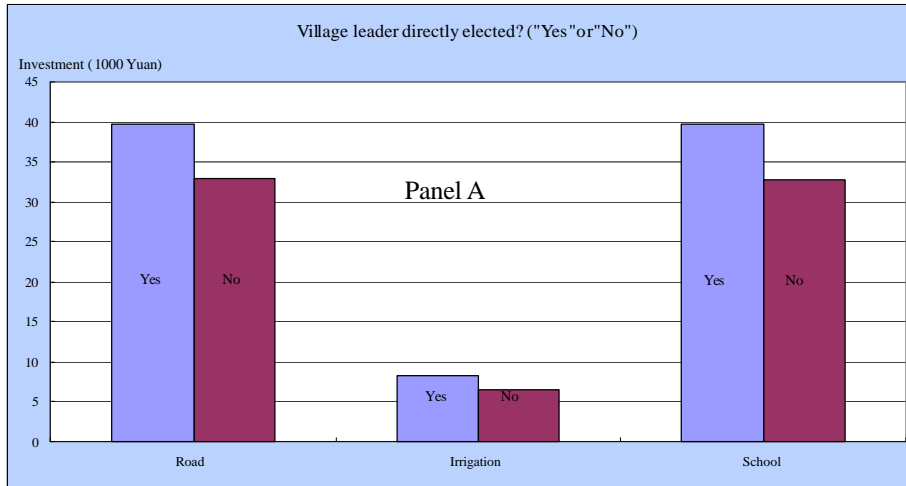


Figure 1. The relationships between direct election, the rural Tax for Fee Reforms and the average investments on road, irrigation, school.

Note: Investment includes value of investment from village funded only, above funded only and joint funded;

Data source: Authors' survey.

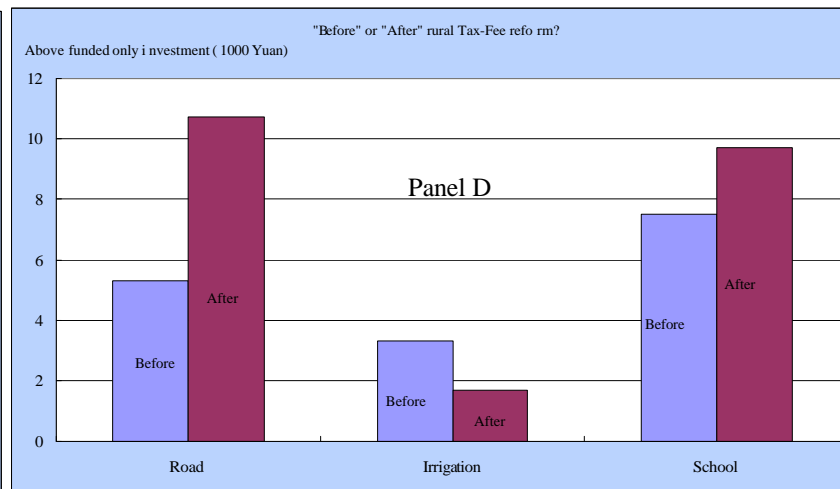
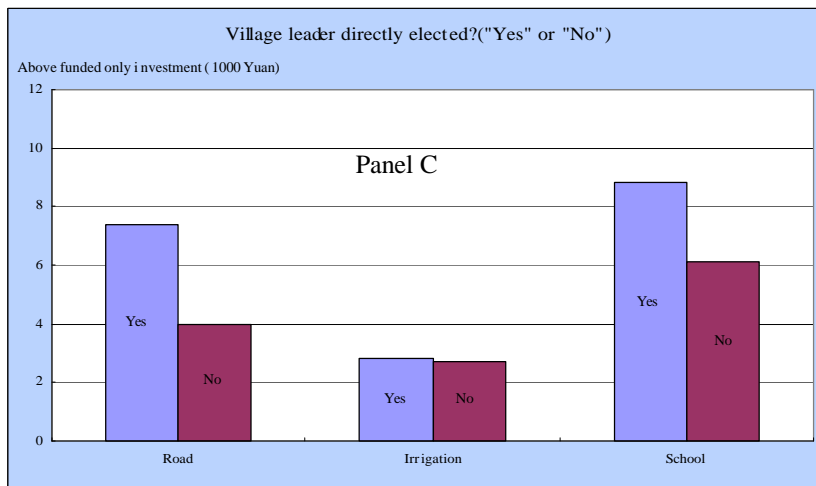
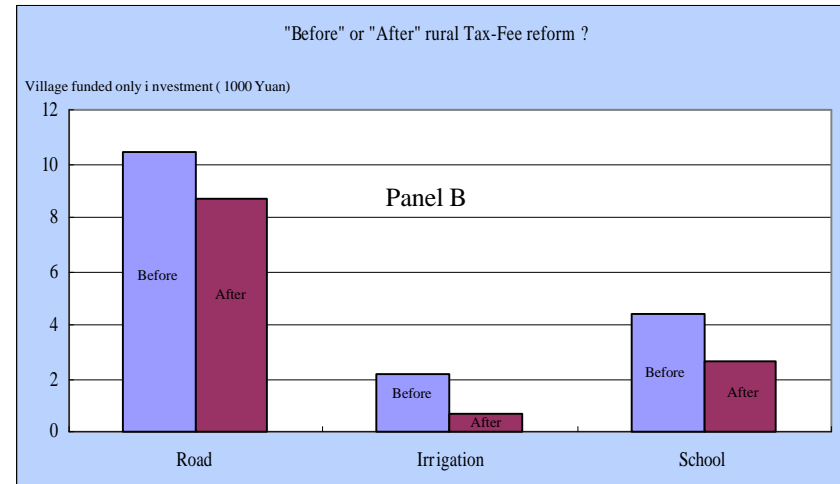
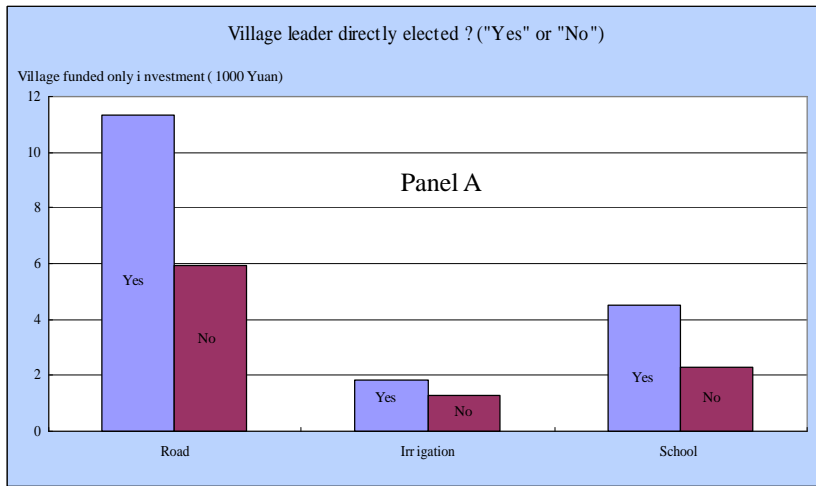


Figure 2. The relationship between direct election, the rural Tax for Fee Reforms and the average investments on village funded and above funded only road, irrigation, school.

Data source: Authors' survey.

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Appendix Table 1. The analyses of the impact of village leader election and Tax for Fee Reforms on village total investment in rural China, 1997-2003.

	All fund sources		Village funded only		Above funded only	
	Number	Investment level	Number	Investment level	Number	Investment level
	(Tobit)	(Tobit)	(Tobit)	(Tobit)	(Tobit)	(Tobit)
Village leader elected directly(yes=1,no=0)	0.31 (5.16)***	72.7 (3.71)***	0.40 (4.82)***	30.8 (4.31)***	0.16 (2.05)**	38.5 (2.90)***
Dummy of rural Tax for Fee reform(before=0,after=1)	-1.54 (18.72)***	-310.7 (11.54)***	-0.74 (6.44)***	-55.7 (5.65)***	-1.27 (12.29)***	-163.9 (9.28)***
Net per capita income in 1997(yuan)	-0.08 (1.02)	-7.8 (2.96)***	0.4 (3.41)***	2.5 (2.70)***	-0.02 (1.86)*	-3.6 (1.95)*
Net per capita income square in 1997	0.000002 (0.84)	0.002 (3.98)***	-0.00001 (0.57)	0.0005 (0.96)	0.0000001 (0.04)	-0.0002 (0.29)
Total population in 1997 (person)	0.10 (3.43)***	41 (4.33)***	-0.2 (0.00)	6.7 (2.06)**	0.09 (2.39)**	23 (3.57)***
Percentage of minority population in 1997(%)	-0.0015 (1.40)	0.60 (1.72)*	-0.0014 (0.85)	-0.07 (0.50)	-0.0002 (0.13)	0.15 (0.70)
Per capita land in 1997(mu)	-0.023 (1.71)*	2.43 (0.56)	-0.084 (3.41)***	-5.42 (2.50)**	0.002 (0.14)	2.81 (1.12)
The ratio of irrigated land in the village-in1997(%)	-0.003 (3.80)***	-0.28 (0.95)	-0.001 (0.45)	0.20 (1.88)*	-0.007 (5.78)***	-0.76 (3.76)***
Hilly land over 25 degree in total land in the village in 1997(%)	0.002 (2.06)**	0.62 (1.83)*	-0.001 (0.41)	-0.08 (0.61)	0.003 (2.46)**	0.75 (3.49)***
The distance of the nearest road to the village in 1997(Km)	-0.005 (2.49)**	-1.57 (2.22)**	-0.017 (4.76)***	-1.31 (4.12)***	-0.003 (1.24)	-0.52 (1.13)
The farthest distance between two small groups in 1997(Km)	0.013 (1.52)	-0.87 (0.31)	-0.001 (0.06)	0.36 (0.33)	0.015 (1.45)	2.13 (1.17)
The distance between village and township seat in 1997(Km)	-0.003 (0.54)	-1.12 (0.69)	0.010 (1.37)	0.44 (0.69)	-0.005 (0.88)	-1.17 (1.11)
Number of fellow villagers working in township or county governments (person)	0.013 (3.85)***	3.81 (3.51)***	0.001 (0.30)	0.22 (0.56)	0.006 (1.45)	1.65 (2.33)**
The illiterate rate of village labor force in 1997(%)	-0.15 (0.91)	26.84 (0.49)	-0.44 (1.80)*	-51.82 (2.35)**	0.06 (0.30)	63.47 (1.90)*
Constant	-395 (16.64)***	-7E+04 (9.51)***	-127 (3.88)***	-9E+03 (3.11)***	-466 (15.08)***	-6E+04 (11.37)***
Province dummy	yes	yes	yes	yes	yes	yes
Observations	7261	7261	7261	7261	7261	7261

Absolute value of t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix Table 2. The relationship between IV and other control variables

	The candidate should be approved by upper government		Meetings hold by county and township for election	
	Yes	No	More than fifth	Less than fifth
Per capita land in 1997	1.9	2.3	1.9	2.1
Net per capita income in 1997	1621	1352	1751	1412
The illiterate rate of village labor force in 1997	0.1	0.1	0.08	0.11
Number of fellow villagers working in township or county governments	5.6	4.9	6	5
% of hilly land over 25 degree in total land in the village in 1997	21	25	21	24
The distance of the nearest road to the village seat in 1997	6.5	5.6	5.2	6.7
The distance between village and township seat in 1997	5.3	5.2	5.0	5.4
The farthest distance between two small groups in this village in 1997	2.7	2.5	3.2	2.4

Data source: Authors' survey.

Appendix Table 3. The hausman test and the over identification test of the IV

<i>Dependant variable</i>		<i>Have or no road project</i>	<i>Have or no Village funded road project</i>
Hansen-Sargan over identification Test	Chi-sq(1)	1.98	0.295
	P-value	0.1598	0.587
Hausman Test	Chi-sq(1)	0.0526	1.503
	P value	0.8226	0.2202

<i>Dependant variable</i>		<i>Have or no irrigation project</i>	<i>Have or no Village funded irrigation project</i>
Hansen-Sargan over identification Test	Chi-sq(1)	2.63	0.237
	P-value	0.105	0.626
Hausman Test	Chi-sq(1)	1.029	0.014
	P value	0.311	0.906

<i>Dependant variable</i>		<i>Have or no school project</i>	<i>Have or no Village funded school project</i>
Hansen-Sargan over identification Test	Chi-sq(1)	0.01	0.20
	P-value	0.931	0.656
Hausman Test	Chi-sq(1)	0.414	4.90
	P value	0.520	0.03

Note: Variable with endogeneity is “Is the village leader elected directly ” and the instrument variable is “Should the candidate be approved by upper government” and “How many meetings hold by county and township for election” .

¹ The sample villages come from six representative provinces. Jiangsu represents the eastern coastal areas (Jiangsu, Shandong; Shan ghai, Zhejiang, Fujian and Guangdong); Sichuan represen ts the southwestern provinces (Sichuan, Gui zhou 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 and Xinjiang); Hebei represents the north and central provinces (Hebei; 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 agoecological zones, the reali ties 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 age ncies demanded that we choose at least two provinces in the northwest. Our budget did not allow us to add another central province (e.g., Hunan or Hubei) to the sample. 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 industri al output (GVIO). GVIO was used on the basis of the conclusions of Rozelle, 1990 and Rozelle, 1996 that GVIO is one of the best pred ictors 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 eac h 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.

² On average, the attriti on rate was only 6 percent. 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 th e variable equaled one if the village did not come and zero otherwise. There were no variables that were significant.

³ In some villages, leaders were elected directly by villagers using ballots . Henceforth, these village leaders are called "elected by direct election." In other villages, village leaders were either appointed

by the village committee or nominated by the village representative body or directly appointed by officials in the township government. Henceforth, these village leaders are deemed “appointed.”

⁴ Many villages also invested into Grain for Green, a large national forestry program begun in 1999 which was designed to pay farmers to set aside cultivated land and plant forest 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). According to our survey, there are nearly 900 Grain for Green projects in our sample village between 1998 and 2003, and the average investment per project was 67 thousand yuan. Since the main beneficiaries of such projects were located in downstream areas, Grain for Green can not be considered a public goods investment project of the traditional kind.

⁵ In counting the number of village leaders that acceded to their positions, if a village leader was elected in 1999 and re-elected in 2002, we counted this as “2.” If we only counted re-election as “1,” there would have been 5779 instead of 7261.

⁶ In a minority of the villages, elections had not started by 1998, the first year of our study period. In these villages, the village leaders were still being appointed and were not counted as being directly elected. In addition, if a village leader dies or resigns, in some villages there are direct elections (in which case the new leader would be considered “directly elected”) and in other cases, the replacement village leader is appointed (in which case the new leader would not be considered “directly elected”).

⁷ We were concerned that the nature of accession to the position of village leader may have been associated mostly with some crisis in a village and that most of the appointments were mainly for filling open village leader positions for partial terms (which might have implications for the effect on public investment). However, when we compare the average length of the term of a village leader that was elected (2.96 years) with that of a village leader that was appointed (3.01 years), there is little difference (and the difference is not statistically significant).

⁸ According to the correlation analysis between whether or not the village directly elected their leader and if there was an investment in one of the key public goods, we found almost all correlation coefficients are all positive (except above funded only irrigation project). In the case of roads and schools, the correlation coefficients are significantly different than zero—at least at a 10 percent level of significance.

⁹ The correlation coefficients between whether or not the village had implemented the Tax for Fee Reforms and if there was an investment in one of the key public goods were also calculated. The

results show the correlation coefficients are negative except for in the case of “total road projects,” “above funded only road” and “school projects.” In all of the cases in which the coefficients were negative, they are significantly different than zero—at least at a 5 percent level of significance.

¹⁰ The reason for including the number of projects and value of projects is for the sake of robustness. Although the number of projects and value of projects contains somewhat the same information about public investment in the village, as measures of investment, they have somewhat different characteristics. The number of projects is likely to be measured with less error (because it is easier to observe—or recall—and count). While the estimates of village leaders may have contained somewhat more error than the number of projects, as a measure of investment, it does contain more information. Therefore, our logic for using both measures is that if the analysis using different measures of investment gives the same answer, then we will have more confidence to say that the results are robust.

¹¹ In the analysis the dependent variable (and all time-varying independent variables) is defined so that the unit of observation is the official election term. In most cases this is the time that is congruent with the regular three year election term. In some cases, if the leader is appointed for a part of a term or if the elected leader resigns, the elapsed time of the unit of observation can be less than 3 years.

¹² In order to make sure that we accurately align the period of tenure of each elected/appointed leader and the projects that were done under his/her term of office, the survey collected detailed information on the month and year in which each election (or appointment) took place and the month and the year in which each investment project was begun.

¹³ When measuring public goods investment as the incidence of investment (that is: public goods investment = 1, if an investment was made during an election term and 0 otherwise), it was possible that there were two projects implemented in a village during the same election term. If so, we still included just a dummy variable. Fortunately, this rarely happened (1 percent in the case of roads; 0.6 percent in the case of irrigation projects; 0.5 percent in the case of schools).

¹⁴ In rural China, after the education reforms in the 1990s, basic education was provided jointly by governments at the county-, township- and village-levels. In general, villages (with the help of upper level governments) were responsible for building the school infrastructure and upper level governments were responsible for operating the schools. There are, however, some villages that do not have their own schools; children in these villages must travel to other villages to attend school.

Therefore, in villages with no school, there is almost never any reason to invest in school buildings. Therefore, we had to make a decision in our empirical modeling about whether or not to include the villages without schools in the sample (and say that they have zero projects and zero investment) or to exclude them and only include villages with schools. We decided to drop villages without schools, which left us with a sample of 4564 instead of 7261. In order to see the consequences of this decision, we reran the Tobit analysis (although we do not report the results for space reasons) with the entire sample using the same specification, but added a dummy variable which equaled 1 if the village had a school and zero if it did not. The results are largely consistent.

¹⁵ When using probit and tobit estimators, in general, one typical way of reporting “goodness of fit” statistics is to rely on McFadden’s Pseudo- R^2 measures. Unfortunately, this particular measure of goodness of fit is not conducive for making comparisons with measures from different type of estimators (Veall, 1996). If we used a goodness of fit measure that is more comparable, then it can be seen that the goodness of fit of our equations is not bad. For example, if (instead of running probits or tobits) we had used a linear probability model, which produces a traditional R-square measure, the goodness of fit would be around 0.3 (which is not low for cross-section analysis). Alternatively, if we use a “count R-square” (which is a measure of the ratio of the correct predictions of the dependant variable, as shown in Long and Freese (2006), then we can see that our model makes the right predictions more than 75 percent of the time (sometimes it was more than 90 percent, which is not low).

¹⁶ There is relatively less reason to believe that the implementation of Tax for Fee is endogenous. This clearly is an example of a top-to-down policy if there ever was one, being one of the most high profile initiatives of China’s central government. The differences in timing are mostly a function of differences in the length of time that policy planning and execution took to move from the provincial Tax for Fee Reform commission to the prefecture, county, town and village.

In contrast, there are a number of possible reasons that elections may be endogenous in the public investment equation. For example, it could be that a community has a long history of collective action and there is trust within the community. These factors may be difficult to measure, but they may affect both whether or not there is an election and the level of investment. Therefore, one source of endogeneity may be unobserved heterogeneity. It is for this reason that we need to adopt an instrumental variable approach in the event that this is distorting.

¹⁷ In fact, in the regression the coefficient of this variable (the IV) in the first stage of the IV/biprobit system (the equation explaining direct elections—which is not shown) is significant and the sign is as expected.