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**Village Elections, Public Goods Investments  
and Pork Barrel Politics, Chinese-style**

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### Abstract

A key issue in political economy concerns the accountability that governance structures impose on public officials and how elections and representative democracy influences the allocation of public resources. In this paper we exploit a unique survey data set from nearly 2450 randomly selected villages describing China's recent progress in village governance reforms and its relationship to the provision of public goods in rural China between 1998 and 2004. Two sets of questions are investigated using an empirical framework based on a theoretical model in which local governments must decide to allocate fiscal resources between public goods investments and other expenditures. First, we find evidence—both in descriptive and econometric analyses—that when the village leader is elected, *ceteris paribus*, the provision of public goods rises (compared to the case when the leader is appointed by upper level officials). Thus, in this way it is possible to conclude that democratization—at least at the village level in rural China—appears to increase the quantity of public goods investment. Second, we seek to understand the mechanism that is driving the results. Also based on survey data, we find that when village leaders (who had been elected) are able to implement more public projects during their terms of office, they, as the incumbent, are more likely to be reelected. In this way, we argue that the link between elections and investment may be a rural China version of pork barrel politics.

Key words: Democratization, Elections, Public goods, Rural China

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In recent years there has been increasing interest in many subfields in the link between democracy and development. Based on cross-country empirical growth regressions, economists have demonstrated that democracy has a positive effect on economic growth (Barro, 1989; 1996; Grier and Tullock, 1989; Persson and Tabellini, 2006). Although the approaches are cast in somewhat different terms, the political economy literature generates similar findings (for example, Acemoglu et al., 2002).

A branch of the literature that is concerned about understanding the mechanism that underlies the relationship between democracy and growth has emerged centering on works that track the way that governance institutions affect public resources allocation and public goods investment. A number of papers, many of which focus on developed countries, study theoretically how democracy may be expected to influence the allocation of public resources by making public officials accountable (citations). In addition, there are a number of papers that seek to answer why elected officials respond to the demands of citizens, positing that democratic governments are responsive to public demands because citizens use periodic elections to sanction bad politicians and reward good ones (Fiorina 1981; Key 1966; Besley and Coate, 2003a). Empirically, the linkage between elections and public goods in developed countries also has been examined (Deacon, 2003).

In recent years, a number of theoretical and empirical papers have addressed these issues in the developing world, in countries in which it may be equally or even more important to study this issues, given the early stages of the democratic transition in which

in many countries find themselves and since public goods are often severely under-funded. Theoretically, some studies analyze the question of whether or not and how local governance affects the provision of public goods (Bardhan and Mookherjee 2000a, 2000b, 2001; Besley and Coate 2003b). Unfortunately, according to much of the work in the literature, the exact nature of the linkage between democracy and public goods investment is ambiguous. One exception, a paper by Rosenzweig and Foster (2003—henceforth RF). In their paper, RF derives the unambiguous result that links the election process to public goods investments by embedding a two-party voting model of democracy in a general-equilibrium model of the rural economy and finds that increasing the population weight of the poor segment of the population in a democracy induces public resource allocations in a direction that increases the welfare of the poor.

Although there is a desperate need to explore this issue empirically, applied researchers were precluded from studying the linkages between democracy and public goods empirically until recently because of the absence of detailed information (Dethier, 1999). However, the logjam has been broken. For example, Besley and Burgess (2002) use data from India to show that the election of local leaders has a positive effect on public food distribution and calamity relief. According to their analysis, democracy forces local leaders to react to the needs of their constituencies. When two communities have been affected by floods (or some other natural calamity), the one with the better electorate system ends up channeling the most effort and financial resources into relief supplies. Other research teams have shown that when there is a fair election process increasing the number of representatives of a specific sub-group (or interest group) on the

village council (through some mechanism, such as affirmative action or the reservation system) will increase the allocation of public resources to favor the group with the largest voting block (Chattopadhyay and Duflo, 2004). Finally, following from their theoretical work, Rosenzweig and Foster (2003) demonstrate that local democratization is positively correlated with the provision of local public goods. In their work they demonstrate that when the constituency of the leaders is composed mostly of farmers (in the case of India—large land owners in a governance system that is based on hereditary leadership), local leaders tend to allocate more investment funding to irrigation. In contrast, when the local voting population is made up mostly of landless laborers and there is a democracy, local leaders tend to invest more in roads.

Social scientists have examined similar sets of issues in China, a nation that is now into its fifth or sixth round of local elections in many rural villages. However, despite the intense attention from political scientists (e.g., O'Brien, 1994; Kelliher, 1997; etc.), there has been relatively little effort by economists to study the linkages between elections and public goods investment in rural China even though the conditions for studying the questions, such as the relationship between elections and public spending, would seem attractive to economists. Although China began having village-level elections in the 1980s, the pace of the emergence of elections and their quality vary both over time and across space (Zhang et al., 2004). Moreover, while there seems to be a high return to investment in public goods (Fan et al., 2004), village-to-village differences in investment is great (Zhang et al., 2006). Hence, it seems that there is great scope to study how the rise of elections and differences in public goods investments are related

over time and across China's vast rural landscape. It only has been in recent years that economists have begun to examine these issues. For example, Brandt and Turner (2003) find that village elections provide a strong disincentive to rent seeking. While this may mean that leaders might use less of a village's fiscal revenues on activities that improve their own personal welfare, they do not attempt to measure the effect. The only published paper that we know of to address the issue of the linkage between elections and public service provision in rural China (a concept somewhat broader than public goods investment) is by Zhang et al. (2004). Using survey data from 60 villages in Eastern China, it is found that when villages hold elections (regardless of the nature of the election), the village's leadership tended to tax constituents less and allocate more local resources to public service provision. The Zhang et al. (2004) paper, however, is based on data from only one region of China, it does not differentiate whether the village leader was directly elected or indirectly election and it does not seek to quantify the mechanism that is driving the election-investment relationship.<sup>1</sup>

In short, in a country—China—that has held more than 4 million local elections during the past two decades, there are a number of fundamental questions that have not been answered. When rigorous statistical sampling is used at the national level, can we find any relationship between the emergence of elections and public goods investments? Holding all other factors constant, when villagers directly elected their leaders, does the leader increase investment into public goods during his/her term of office? More fundamentally, why? When leaders are in office, do they increase investment into public goods in a way that it aids their effort to extend their terms in office?

The overall goal of this paper is to answer some of these questions as a way to better understand the relationship between rural governance reforms in China and investment into public goods. To meet this overall goal, we have three specific objectives: First, using survey data from a nearly national representative sample, we provide a profile of village elections, public goods investments and chart the way that they move together (or not). Second, we seek to understand if elections, all other things constant, lead to higher levels of public goods investment. Finally, we hope to push the empirical literature further than those have done in the past and seek to explain empirically the mechanism through which elections operate by testing whether or not leaders, who are in office, are able to enhance their chances for reelection by investing in public goods. In other words, we will try to show whether or not there is an emerging form of Pork-Barrel Politic, Chinese Style.

The plan for the rest of the paper is as follows. The next section seeks to provide a conceptual framework for understanding the relationship between democracy and public resources allocation, in general. We then use the framework to generate a set of testable hypotheses that we will test in the rest of the paper. Section 3 specifies the empirical model, the data sources and defines the main variables that will be used to examine the effect of directly electing leaders on public goods allocation. Section 4 examines both the descriptive and multivariate results showing the effects of directly electing the village leader on public goods investment. Section 5 seeks to answer the question of what the mechanism may be that is driving the relationship between elections and public goods investment. Section 6 concludes.

## **Local Governance and Public Goods Investment: A Conceptual Framework**

In this section the main goal is to establish a conceptual framework with which we can study the relationship between elections and public goods elections in rural China. Our conceptual framework parallels closely the theoretical model of the RF paper. As discussed above, in the RF model there is a two-party representative democracy with a voting model in which the only election issues is how the local government allocates public resources. The voting model is built in such a way that it includes a parameter, which when set at one extreme value produces an environment governed by democratic voting, and which when set at the other extreme value produces an environment governed by an aristocracy. RF uses comparative statics that are produced from the model to establish the relationship between the form of governance in the village and the public resource allocation decision.

In arguing that their theoretical model fits the case of rural India, RF make several assumptions. First, in rural India they assume that there are two kinds (or strata) of households, landowner and landless. Second, households in the different strata have different utility functions and preferences. Specifically, it is assumed that landowners prefer investments into land-oriented investments, such as irrigation investment. In contrast, it is assumed that landless can benefit more from investment into road construction because it will increase labor demand (which will result in higher wages). Finally, it is argued that elections empower the landless, since in villages without elections the landowners are the aristocracy which means that they exercise the most

power in such villages. In other words, when making decisions, the aristocrats only consider the demands of the landowners which means most village resources go for irrigation. In making the assumption that elections empower the landless, it is assumed that there is a mechanism which pushes leaders to act at least in part according to the wishes of the landless voters (which comprise a majority of the voting population). Based on this, RF make the final deduction that forms the basis of their hypothesis: as elections emerge, village leaders will begin to allocated more of the village's budget towards roads (investments that are demanded by the landless) and away from irrigation (land-oriented investments). In their empirical work evidence is found that supports their hypothesis: elections lead to greater investment into roads, the investment demanded by the citizens who are empowered by elections.

### **Adapting the Framework to Rural China**

In adapting the RF conceptual model to China, we need to do two things. First, we need to show that there are two distinct classes or strata. This is needed primarily because of the distinction between landed and landless does not pertain to China where all virtually 100% of households in every village in China received equal amounts of land within villages (Brandt et al., 2002).

But this does not mean that all households are created equal. According to Yan (1992), there are several types of households in rural villages which can be segregated into two distinct groups. On the one hand there is a category that we call the *elites*. The elites include cadres (both former and current ones that work in the village and in upper levels of government) and their family members, relatives and close friends. In addition,

there are the ordinary villagers (henceforth, simply called *villagers*), which constitute the rest of the people in the village. In villages that do not have elections, the strata are characterized mainly on the basis of the access that each group—the elites and villagers—has to public resources. Elites, who are mostly appointed to their positions (or who have “inherited” their positions by virtue of family ties), control the budget and prefer to spend the budget on those things that benefit the elites (for example, on banquets, office supplies, travel and office buildings). According to a World Bank report (Foch and Wong, 2005), even during the 2000s village leaders spent about half of village fiscal expenditures (44 percent) on official salaries, entertainment, administrative expenses and other related expenses (henceforth, called *entertainment expenditures* for short). Clearly, these kinds of expenditure have little if anything to do with villagers. In our paper we assume that these types of expenditures are the counterpart to expenditures on irrigation the RF paper.

The second assumption that we need to make to establish the validity of the conceptual framework of our paper is about the spending preferences of villagers who gain a voice in village affairs through elections. The first question to answer is whether there are any “third categories of spending” besides entertainment and public infrastructure. According to Fock and Wong (2005), public good infrastructure spending constitutes the other main spending category of villages. In fact, as a share of total spending, allocations to public goods investment account for 43 percent in the early 2000s—which is just a bit less than the share spent on entertainment. There is only minor amounts of spending on other categories, such as social security (4 percent); militia

training (2 percent); environmental protection (1 percent). Since there is almost no change in total fiscal revenues or expenditures during our study period (Fock and Wong, 2005), if we find that elections lead to greater spending on public goods, this means that there is less spending on entertainment.

With such little spending on the other categories, the remaining question is whether or not villagers have a strong preference for spending on public infrastructure. In fact, our survey (which is described in detail below) contains strong evidence that villagers have a strong demand for spending on village public goods infrastructure.<sup>2</sup> According to the data 70 percent of our sampled households responded that they believed that there has been an improvement in the level of public goods infrastructure between 1998 and 2004. Despite the fact that there have been improvements in rural public goods infrastructure over the years previous to the survey period, nearly 80 percent of households stated that they are still dissatisfied with the current level of infrastructure. This finding, based on our data, is consistent with the findings of the World Bank (2004) that public goods provision in rural areas of developing countries are far from sufficient and are often in high demand by villagers. Therefore, for these reasons we believe that there is support for our assumption that rural residents in rural China have high demand for infrastructure investments.

But, our data also contains more direct evidence. In our sample, villagers also appear to be willing to have resources directed towards those things with which they are dissatisfied. In our survey we asked villagers if the upper level government gave 50,000 yuan to the village how would they best want to spend the funds. Villagers were given

unlimited choices of answers (including infrastructure investments; investment into village office space; environmental projects and social welfare-oriented projects). In response, by far most of them (90 percent) stated that they would prefer that the funds would be spent on public goods investments (including investment into roads, irrigation, drinking water, schools and health clinics). In addition, when we asked their willingness to contribute to public goods investment with their own money (20 yuan per family member—or about 100 yuan per family), most (more than 60 percent) said they would be will to contribute.

Based on our assumption and the logic of the RF model, we can state our own version of the election-investment hypothesis. When there are no elections, elites have control over the (fixed) village budget and spend more on non-public goods infrastructure expenditures. When elections emerge, villagers gain more of a say over village affairs and village leaders begin to allocate more spending towards the things villagers demand, which in our case is public goods infrastructure. In short, the hypothesis to be tested is: Elections in rural China stimulate more spending on public goods infrastructure.

### **Data Sources and Empirical Model Specification**

To test the effect of village governance on public goods infrastructure we conducted a survey in rural China at village level in 2003. Although China initiated reforms aimed at transforming village governance in village more towards self-governance over the past two decades, the promulgation of the PRC Organic Law for

Villager Committees formally took place in 1998 (Shi, 2004). One of the most salient features of the Organic Law is that there is a clear message that village leaders are supposed to be elected. Because of this timing, we collected village information (based on both accountant records and village official recall) in 1997 as a baseline. The survey itself was conducted in late 2003, so the survey period covers 6 years—from 1998 to 2003.

To ensure the national representative nature of our sample, a standard procedure was used to choose the sample villages. In each of China's major agro-ecological zones, we randomly selected a sample province.<sup>3</sup> Sample counties and sample townships were also selected randomly. Within each township, we included all villages in the survey (except if there were more than 20 villages in the township, wherein we randomly chose 20 villages).<sup>4</sup> In total, we surveyed 2448 villages in 6 provinces, 36 counties and 216 townships.

In the survey form we mainly asked the respondents three sets of questions about sample villages. First, the survey included a section that elicited information about the general characteristics of the village (such as, its resource base (human and land), the economic structure of the village, income, geography, location of the village, the timing of other major reforms, ties to government officials in the township and county government, etc.). In the second part of the survey, there were a number of questions about public goods investment in the village. For each year of the survey, the size, timing, source of funding of each public goods investment was enumerated.<sup>5</sup> Finally, the survey had a section that examined the system of governance that prevailed in each year in each

sample villages. For example, we recorded the name, level of education and tenure of each village leader. Most importantly, we also asked how each village leaders took office—by direct election or by appointment. In this paper, a direct election is defined as one in which villagers vote for two or more candidates and the winner becomes the village leader. All other village leaders are considered to have been appointed. Among other things, this information allowed us to “count” how many different people served as village leader between 1998 and 2003 and created a list of all of the “terms.”<sup>6</sup>

### **Empirical Model, Variable Definition and Estimation Approach**

In the analysis we will have two broad sets of equations. The first, we call the *base-line analysis*, will be estimated by OLS and will include a number of time-invariant (as well as time-varying) variables. We also will take advantage of the panel nature of our data set and estimate a *fixed effects model*, which will entail dropping of the time invariant variables since they will be subsumed into the 2448 village dummy variables.

In order to empirically test the hypothesis of the China-version of the RF model, we assume that public goods investments are a linear function of village governance and other factors. Using the assumptions that will be used to conduct the baseline analysis, the relationship can be written as:

$$(1) \quad y_{ijt} = b_0 + b_1 D_{it} + b_2 V_i + b_3 V_{it} + m_i + e_{it} \quad \text{for each } j,$$

where the  $b$ 's are parameters to be estimated and  $y_{ijt}$  is a measure of the level village public goods investment (measured either as the number of projects per year or investment level per year) in village  $i$  for investments from source  $j$  during village leader's term  $t$ . Because not all investments are from the same source, we need to be

careful to understand the effect of governance on investments from different sources (identified by  $j$ ). Specifically, according to our survey, individuals in China villages contribute a large share of the funding of public goods investment (Zhang, 2006). Therefore, in equation 1, we specify the dependent variable in one of four ways. First, we estimate equation (1) for *total investment* which we will identify as sum of all sources of funds ( $j=1$ ). We also will run separate regressions for projects that are funded in one of three ways—solely funded by the village itself ( $j=2$ ); projects that are jointly funded by both the village and the upper-level government ( $j=3$ ); and projects that are solely funded from above ( $j=4$ ).<sup>7</sup>

On the right hand side of estimated equation the main variable of interest is  $D_{it}$ , the variable that represents the governance mode of village. As discussed above, we use the variable “Was the village leader elected directly (one if the village leader was elected directly)?” We use this in part because there is little error in this formulation of the governance variable and in part because it is argued in the political science literature that the direct election of the village leader is the most salient feature in China’s village governance (Louie, 2001). Though our measure of governance reforms is fairly rudimentary, what we give up in richness, we believe we gain in coverage. In our data set we observe the mode of governance in 7041 terms (in the 2448 villages and 6 years time period). We also have at least two observations for each village.

To obtain more consistent estimates of the coefficient  $D_{it}$ , in the baseline analysis we also add a number of control variables ( $V_i$  and  $V_{it}$ ) to the right hand side of equation (1). These variables come from our data set and they (or similar variables) have been

used by others that are empirically estimating similar equations (Rosenzweig and Foster, 2003; Besley and Case, 1995b; Chattopadhyay and Duflo, 2004; Banerjee et al, 2005; Miguel and Gugerty, 2005). In our equation the vector of time-invariant variables ( $V_i$ ) include socio-economic as well as locational, geographical and other factors.<sup>8</sup> We also include a number of time-variant variables ( $V_{it}$ ), including the level of education of the village leader (measured in years of attainment); the age of the village leader (measured in years); the occupation of the village leader (where the variable is equal to one if the village leader has never held an off farm job—or is a “pure farmer,” and zero otherwise); and a policy variable that is equal to one if the election term occurred after China’s Tax for Fee reform (a policy that has had a major effect on local fiscal management—Fock and Wong, 2005) and zero otherwise.

While the base-line analysis provides us with important information (it at least shows us correlations), it is necessary use caution in our interpretations of the results. The coefficient of interest ( $D_{it}$ ) may still be affected by unobserved heterogeneity. For example, the unobserved heterogeneity is caused by some unobserved village time-invariant factors (for example, it could be that a community has a long history of collective action and there is trust within the community). Although these factors may be difficult (or impossible) to measure, they still may affect both whether or not there is a direct election and the level of investment. To get a consistent estimation of the coefficient of variable  $D_{it}$ , we add a set of village dummy variables  $m_i$  on the right side of estimated equation to control for all village fixed effects. Fixed effects estimation can account for large part of unobserved heterogeneity because we also add a time trend

variable in our analysis (which is measured as the first year of the village leader's term). Even so, to account of the possible time-variant unobserved heterogeneity we also estimated the model using the following procedure (first difference and a GMM approach using lagged values of the direct election variable, and township government's regulations on the village leaders' turnover as instruments.).<sup>9</sup>

### **Empirical Results—Descriptive and Multivariate**

Despite the fact that villages are supposed to have been electing the village leader, there are still a significant number of villages that do not elected the village leaders (Table 1). Over the entire study period (1998 to 2003), although 79 percent of villages elected their leaders, 21 percent still did not. In some of these villages township and county leaders still appointed leaders by policy as a matter of course. In others villages just did not allocate the time to run an election (Table 1, row 1).<sup>10</sup> In other villages villagers nominated or elected a slate of representatives and the village leader was chosen from among the group by the group members themselves. In all of these cases, we count such villages as being run by a village leader that was not directly elected or (for simplicity) *appointed*.

Our data also show that there are notable differences in the propensity of villages to directly elect their village leaders across space and time. During the survey period nearly all (more than 90 percent) of villages in some provinces, such as Jilin, directly elected the village leader (Table 1, row 6). The record in villages in other provinces, for example Hebei province (only a little more than 65 percent), was less complete (row 7).

Despite the incomplete record on directly electing the village leader, the share of villages that do elect their leaders directly over time has risen (Table 1, rows 8 to 16). Because the village leaders are, by policy, supposed to serve three year terms, to look at the rise in the propensity of villages to choose their leaders over time, we divide our sample into three distinct sets of villages, based on the starting year of the normal term.<sup>11</sup> According to our data, no matter if we look at villages that run their regulation elections during election cycle 1 (or those that should hold their direct elections in 1995; 1998 and 2001) or election cycle 2 or election cycle 3, the share of villages that directly elect their leaders rises (from 77 to 86 percent; from 73 to 83 percent; from 62 to 79 percent).

### **Public Goods Investments**

On the basis of our data, during the time that elections were beginning to spread across China 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 over time and across villages (Appendix Table 1). Public goods investment in China's villages 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*). By far most of these projects (60 percent of them) can be considered core public goods projects (roads and bridges; schools; irrigation and drainage systems; drinking water and clinics). Public goods investment into these activities also has been rising over time. According to our data, the average village invested 60 thousand yuan into 0.63 projects per year between 1998 and 2000. Between 2001 and 2003, investment in the average village rose to 71 thousand yuan into 0.67 projects per year.

While public goods in many countries are almost entirely the responsibility of upper level governments, it is not difficult to see that households in China villages also

contribute a large share of funding to the public goods investment (Table 2). 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 2, 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. The number of projects and level of investments (and split among the sources) also differs by province (rows 1 to 6).

### **Elections and Investments**

While there are other factors that explain differences in the level of investment across villages (Zhang et al., 2006), our data suggest in a number of ways that investment is somewhat higher in villages that directly elect their leaders. When looking at average number of projects per year, villages that directly elect their village leaders have more projects overall (0.68/year) than those with appointed leaders (0.59/year). The differences appear for all types of investments (Appendix Table 2, rows 1 and 2; columns 2 to 4). The same pattern also appears when looking at the level of investment (Appendix Table 2, rows 3 and 4). Villages that directly elected their leaders investment more in yuan--- in total and in all different types of investments. In all of these cases, the differences in investment are significant in a statistical sense at least at the 10 percent level.

The relationship between elections and public goods investment is even clearer when looking at differences over time. When a village went from an elected leader to an appointed leader (or from an appointed leader to an appointed leader) there was **little change** in total investment (although still relatively small, the change is larger in terms of number of projects than in term of level of investment—Table 3, rows 1 and 4). Likewise, there was little change in village-funded only projects, above-funded only or co-funded projects.<sup>12</sup> However, when a village went from an appointed leader to a directly elected leader the number of projects per year and the level of investment per year both rose relatively more (Table 3, rows 2 and 5). In contrast, when a village went from a having a directly elected leader to an appointed leader, the number of projects and level of investment fell (for both total investment and village funded-only projects).

### **Multivariate Analysis**

Because descriptive statistics do not account for the impact of other observed and unobserved factors, we first use equation 1 to assess the effect of direct elections on public goods investment. In the first set of results, using the baseline model, we produce an initial set of estimates of whether or not directly elected village leaders have an effect on village public goods investment, while holding a number of other observables ( $V_i$ ) constant. The sample for use with the baseline model includes more than 7000 pairs of election/appointment-investment observations from 2448 villages. There are eight different versions of the baseline model equation, which use eight different measures of the dependent variables: four using the number of public goods (total number; from village fund-only projects; jointly fund projects and above fund-only projects) and four using the level of investment.

In running the model in equation 1 (in its eight different versions), the regression equations appear to perform well. In particular, roads, a number of the control variables

behave as expected. First, as also found in Zhang et al. (2006), poorer villages in China are shown to receive more projects that are fund from above-only; richer villages invest more of their own funds into village fund-only public goods (row 2, columns 2, 4, 6 and 8). Villages with higher levels of out migration, as expected, have lower levels on public goods investment (because there is little incentive to invest when a large of the villagers are living outside of the village (row 7, columns 2 and 6). The results also imply that political connections are important ways to raise investment; villages with more fellow villagers working in town and county governments have more public goods investments (Table 4, row 9).

Most importantly, the baseline results show the positive relationship between directly electing a village's leader and the number of projects and level of investment into public goods (Table 4, row 1). All of the sign are positive and most of them are significant at 10 percent level. Above all, when village leaders are elected directly, there is more village funded-only projects and higher level of investment (and the t-ratios of the coefficients are high—(row 1, columns 2 and 6). Importantly, although there is a positive coefficient, the average magnitude of the effects are relatively small (about 0.1 project more per year and around 10000 yuan more investment—a level equal to about 10% of the mean number of projects and level of investment.

**Fixed Effects Model.** Although the baseline analysis controls for a number of village-specific characteristics, it is still difficult, if not impossible, to control for all of the effects. If the unobserved factors also help explain public goods investment and if they are in some way correlated with the propensity of a village to directly elect their leader, the baseline results could be subject to endogeneity-induced bias. Because our sample contains multiple observations on elections and investment over time, we can use a fixed effects model by including a set of 2448 village dummy variables on the right

hand side. The village fixed effects control for village-specific factors that are fixed over time. We also include a time trend to control common time varying factors.

Despite the potential problem of endogeneity, in fact, when comparing the estimated coefficients from the baseline model with those of the fixed effects models, there is little change in sign or level of significance (and the magnitudes are about the same, at most, only a bit lower—Table 5, row 1). In other words, we find strong evidence that in villages that have directly elected leaders the number public goods projects and level of investment is higher. Moreover, the effect appears in all eight versions of the equations (although the t-ratio is low when looking at the level of investment into village funded-only and above funded-only public goods). Like the case of the baseline model (though most of the coefficients are larger in fixed effect estimates), the magnitude of the effect is still relatively reasonable. In this way, however, our results are somewhat like those of Rosenzweig and Foster (2003), Pande (2003) and Chattopadhyay and Duflo (2004) in that they find positive effects of changes in elections and political democracy (the effect are significant and the magnitude of the effect is not very large too).

To control possible time varying unobservables (as well as time invariant effects), we estimate the model using a GMM approach (Wooldridge, 2002). In this paper we use two instrumental variables. First, we lag the independent variables (which reduces our usable observations from 7041 to 4593). Second, we include two instruments that we believe reflect township-level election policy and hence may be expected to affect if an village directly elects their leader but will not likely have a direct effect on public goods investment.<sup>13</sup> Like the baseline and fixed effects results in Tables 4 and 5, the estimated coefficients are all positive and most of them have the same relative magnitude (although in several cases the magnitude and level of significance falls—Table 6, row 1). While the somewhat weaker results might be due to a somewhat more fragile actual relationship

between elections and public goods investment, Wooldridge (2002) also points out the standard errors could rise if we have relatively weak instruments (e.g., if there is not a high correlation between the instrumental variables and the endogenous variable. In fact, whether using the baseline, fixed effects or first difference IV (GMM) approach, it seems that the results are fairly robust.

### **Pork Barrel Politics, China Style**

While there are a number of reasons why village leaders that are directly elected might invest more into public goods, we examine if village leaders are doing so as part of their strategy to get re-elected. The assumption behind our test of motivating behavior is that village leaders gain utility (in some way) from holding their position. If, as shown above, villagers that vote demand public goods, then leaders who are able to influence the direction spending and increase allocations to public goods investment should be expected to enhance their reelection hopes.

### **Reelection Incentives: Theoretical Approaches and Empirical Records**

Internationally, a number of social scientists have tried to theoretically explain the issues that voters care about and the actions that elected leaders take. One of the earliest models in this area was developed by Barro (1973) which demonstrates how repeated elections (or the chance to get reelected) may induce office-holders to act on the preferences of electorate. Nordhaus (1975) investigates how different voting rules induce incumbent leaders subject to these rules to act differently on the demands of their constituents. Ferejohn (1986) extend the analysis and shows that when an incumbent is assumed to desire reelection (for whatever reason—for example, in order to take advantage of the perquisites of offices or to pursue their ideas about policy) there is an incentive to act in a way that will enhance his/her chances of being reelected. Finally,

List and Sturm (2006) show that when a system is characterized by periodic elections voters have a way to influence that actions of the incumbent which will affect the politician's choice of policy since voters reward those the deliver those things that voters want with reelection. Empirically (and theoretically), Besley and Case (1995a) show that voters are able to appraise the performance of incumbents and use voting as an incentive mechanism to discipline incumbents.

### **Reelection Incentives in Rural China**

While most of the literature focuses on the actions that leaders take to improve their chances for reelection, it is still not clear whether these effects exist in countries that are in the early stages of democracy. China provides an especially interesting case for several reasons. First, there are formal legal provisions in China that are pushing villages to hold direct elections for their elections. Second, there also are sharp differences among communities in the way that villages select their leaders (Oi, 1989; Kelliher, 1997; Oi et al., 2000; Morduch and Sicular, 2000; Paster and Tan, 2000; Tsai, 2002; Kennedy, 2002; Tan, 2004 and Shi, 2004). This diversity of governance environment actually is a benefit to econometricians who are interested in exploring these questions empirically. Third, since there are no term limitations on village leaders in rural China, this means that all incumbents will always face incentives to deliver those things demand by their constituents.

To test whether or not an incumbent's reelection depends on his/her ability to deliver public goods, the first step to take is to create a subsample of election cycle terms in which the village leader who was elected runs for office again and faces an election. Of the 5553 election terms in which the village leader was directly elected (which as shown above account for 79 percent of election terms), we need to drop a number of them. First, nearly 12 percent of the election terms were prematurely interrupted because

the leader resigned or was asked to step down. Second, around 7% of village leaders were promoted to party secretary so they do not run in the next direct election. After dropping these election terms, the election terms that remain in our sample include village leader incumbents that ran for office and won and incumbents that ran for office and lost.<sup>14</sup> In addition, we also look for comparisons purposes at a sample of village leaders that were appointed and subsequently were either reappointed or not.

In looking the empirical relationship public goods investment behavior and the propensity of a leader to be reelected, we also will look at two time periods—the first three years of our data (1998-2000) and the last three years (2001-2003). This dimension of the analysis is needed because it is possible that before 2000 villagers were more concerned about issues such as tax reform and family planning policy implementation (Yep, 2004; Li, 2006). Villagers started to become highly interested in public goods investment after 2000 after many of the tax and fee burdens began to be reduced.

In looking at the raw descriptive statistics, there is little evidence that is consistent with an argument that those village leaders that invest more into public goods are rewarded with reelection (Appendix Table 3, Panel A and B). In fact, before 2001 we see that those village leaders that invested in fewer project with less money were elected (Appendix Table 3, rows 1 and 5). The same results hold for those leaders that were reappointed (or not—Appendix Table 3, rows 3 and 7). Even after 2001 there is little evidence that reelection was related to public goods investment (although the direction of the shift between 1998/2000 to 2001/2003 supports the hypothesis).

However, if we divide the sample into villages that have relatively few (Table 7, Panel A) and relative more projects (Table 7, Panel B) and those that have relatively small (Table 7, rows 1 and 3) and large (Table 7, rows 2 and 4) sized projects, we find that the descriptive statistics, in fact, do suggest that there is a relationship between

public goods investment and reelection. In villages with few projects, when the average size of project was small, leaders got reelected 62 percent of the time (Table 7, row 1). In contrast, when there were more projects, and the average size of project was small, the reelection rate of men rose to 73 percent (and was statistically significant). When the average size project was large, however, the share of terms in which leaders got reelected actually fell (from 66 to 61) as the number of projects increased (Table 7, rows 2 and 4). One interpretation of this finding is that while villagers like more projects (and reward leaders with reelection if there are more investment projects) they do not like it when the size of the project is too big (since perhaps there is a perception that money and labor was being wasted). Hence, in those villages that projects were kept relatively small, villagers reelected those leaders that allocated more funding to public goods investment.

### **Multivariate Analysis**

To understand whether of not investment into public goods helps village leaders become reelected, we use a similar empirical strategy as Besley and Case (1995a) to test for the nature of the reelection incentives. The empirical function is as follows:

$$(2) \quad p_{it} = g_0 + g_1 I_{it-1} + g_2 V_{it} + m_i + m_t + e_{it}$$

where  $p_{it}$  is an indicator variable measuring if the incumbent leaders was reelected/reappointed (equaling one if the incumbent in village  $i$  during term  $(t - 1)$  was reelected as village leader in term  $t$ , and otherwise was zero). On the right hand side of the equation (2),  $I_{it-1}$  is a variable that is a measure of the number of public goods projects (or level of investment) that the incumbents in village  $i$  during term  $(t - 1)$  implemented. In this section  $\bullet_1$  is the coefficient of interest. We also include a number of control variables,  $V_{it}$ , such as the age and education of the village incumbent (etc.). We also add village fixed effects and year effects (trend variables) in order to hold constant all non-time varying unobservables.

According to our results of the estimation of the effect of public goods investment on the possibility of being reelected, there is a positive relationship. Although the magnitude of the coefficient is small, it is statistically significant in the reelection equations (Table 8, row 1, columns 1 and 3). In other words there is evidence that villagers rewarded incumbents with reelection if they implement more public goods projects. And, while the level of investment is not statistically significant (Table 8, column 2, row 5), when we hold the average size of the project constant (Table 8, rows 6 to 9), the number of above funded-only projects and village funded-only projects become a significant determinant of reelection. In the same way as seen in the descriptive statistics, villages apparently do not like village leaders to invest in frivolously large projects, but when accounting for the size of the project, the higher number the projects, the higher is the probability is that incumbents are reelected. In other words, our results are consistent with the story that China's rural leaders also are engaged in Pork Barrel Politics.

Interestingly, when look at the relationship between public goods investment and the propensity to be reappointed, it is absent (Table 8, Columns 5-8). Unlike the case of direct election where leaders are trying to please villagers that demand public goods projects, it seems that public goods projects/investments are not a major concern in the decision to reappointment or not. When village leaders are appointed, there appears less of an imperative to deliver "pork" to their villagers—at least in the form of public goods investments.

## **Conclusion**

The purpose of this paper has been to provide empirical evidence pertinent to theories of democratization using survey data in rural China. Based on a theoretical

framework developed by Rosenzweig and Foster (2003), through adapting their conceptual model to China, we then give evidence that what is the effect of democracy, in the form of direct election of village leaders in rural China, on the village resources allocation. After that, we then test the latent mechanisms that discipline the behavior of village leaders.

There are two major findings from our analysis of a nearly national representative data set (about 2450 villages in rural China) describing the public goods investments and local governance. First, compare to the traditional governance mode in rural China, the shift toward democracy (through the direct election of village leaders) results in the implementation of policies that villagers benefit more from it (in rural China case, more public goods projects/investments). In particular, we find that when village leaders were elected directly, they will implement more public goods projects/investments compare to the appointed village leaders. Through accounting the funding sources of public goods projects, our analysis shows the results are consistent for every types of projects.

Second, this paper also tests whether the reelection incentives---a mechanism used by villagers to discipline the incumbents through the voting, exist or not in an early democratization circumstance. Our results indicate that even in the early stage and in the micro community level, the reelection incentives still have effect on the behavior of incumbents because villagers' (voters) reward only those good incumbents. At the same time, we do not find any significant evidence that the appointment institution has the same reappointment incentives.

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Table 1 The way in which village leader acceded to their office in rural China, 1998-2003 ( %) <sup>a</sup>

	Elected directly	Appointed
Total	79	21
Jiangsu	72	28
Gansu	77	23
Sichuan	89	11
Shaanxi	81	19
Jilin	93	7
Hebei	68	32

**The difference in the ways village leaders acceded to their office by election cycles (over time)**

Starting year, election term cycle	Elected directly	Appointed
Term cycle 1		
1995	77	23
1998	84	16
2001	86	14
Term cycle 2		
1996	73	27
1999	79	21
2002	83	17
Term cycle 3		
1997	62	38
2000	74	26
2003	79	21

Data source: Authors survey.

<sup>a</sup> Based on 7041 village leaders terms in 2448 villages. In our survey, some villages belong to the 1995-1998-2001 term cycle, and the others villages belong to the other two term cycles.

Table 2. Sources of funding of 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 <sup>b</sup>	Value of investment by village <sup>b</sup>
		(Number of projects)			(Percent) <sup>a</sup>	
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	3,591	--	--
Percent of total <sup>c</sup>	100	36	18	46	53	47

<sup>a</sup> 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.

<sup>b</sup> Value of investment does not include value of in-kind labor investment by villagers.

<sup>c</sup> Percent in column 5 and 6 measures the weighted average of rows 1 to 6.

Data source: Authors' survey.

Table 3. The differences in the number (amount) of annual public goods projects (investments) and the way in which village leaders acceded to the offices over time in rural China, 1998 and 2003.

	The difference in the number of annual public goods projects between two terms			
	Total projects	Village funded projects	Above funded projects	Co-funded projects
No difference <sup>a</sup>	0.15	0.03	0.07	0.06
From appointed to direct elected village leader	0.31	0.07	0.12	0.12
From direct elected to appointed village leader	-0.07	-0.07	0.03	-0.03

	The difference in the amount of public goods investments between two terms			
	Total projects	Village funded projects	Above funded projects	Co-funded projects
No difference <sup>a</sup>	4.5	0.04	3.0	1.4
From appointed to direct elected village leader	42.4	3.2	9.3	29.8
From direct elected to appointed village leader	-24.3	-2.4	1.2	-23.1

Data source: Authors survey.

<sup>a</sup> “No difference” means that in between the two election terms there was no difference in the way that village leaders acceded to office. This includes that case when a directly elected leader followed a directly elected leader and when an appointed leader followed an appointed leader.

Table 4. Baseline analysis (OLS) of the impact of directly electing the village leader on rural public investment in rural China (1998-2003).

	Annual public goods projects in village leader's term				Annual public goods investment in village leader's			
	All sources	Village funded	Co-funded	Above funded	All sources	Village funded	Co-funded	Above funded
<b>The way village leader acceded to office</b>	0.09	0.06	0.01	0.02	10.1	3.0	3.9	3.2
(0=appointed, 1=elected directly)	(4.22)***	(5.18)***	(0.78)	(1.66)*	(1.53)	(2.85)***	(0.63)	(1.81)*
<b>Time invariant social-economic factors</b>								
Net per capita income in 1997(1000 yuan)	-0.012	0.049	-0.039	-0.022	7.917	5.314	5.159	-2.556
	(0.99)	(7.31)***	(4.68)***	(3.50)***	(2.05)**	(8.71)***	(1.44)	(2.44)**
Total population in 1997(1000 people)	0.04	0.01	0.02	0.01	14	2.4	7.1	4.5
	(3.57)***	(0.99)	(3.00)***	(1.91)*	(4.19)***	(4.58)***	(2.28)**	(4.99)***
Percentage of minority population in 1997(%)	-0.0003	-0.0001	-0.0003	0.00003	0.32	0.03	0.23	0.06
	(0.90)	(0.39)	(1.13)	(0.15)	(2.73)***	(1.40)	(2.12)**	(2.00)**
Per capita land in 1997 (mu)	-0.01	-0.01	-0.003	-0.001	2.9	0.1	2.1	0.7
	(2.27)**	(2.49)**	(1.01)	(0.44)	(1.94)*	(0.29)	(1.52)	(1.77)*
The illiterate rate of village labor force in 1997(%)	-0.03	-0.04	-0.01	0.02	31.1	-1.4	19.1	13.4
	(0.49)	(1.34)	(0.18)	(0.71)	(1.68)*	(0.47)	(1.11)	(2.68)***
The migrant ratio of village labor in 1997(%)	-0.19	-0.14	-0.02	-0.03	0.7	-9.0	18.5	-8.8
	(2.67)***	(3.66)***	(0.42)	(0.74)	(0.03)	(2.55)**	(0.89)	(1.46)
The number of village/group enterprise in 1997(each)	0.02	0.02	0.0003	-0.0005	50.7	2.7	48.3	-0.3
	(2.70)***	(4.98)***	(0.06)	(0.12)	(21.26)***	(7.12)***	(21.78)***	(0.50)
Number of fellow villagers working in township or county governments(each)	0.005	0.0003	0.004	0.001	1.3	0.1	0.9	0.3
	(4.22)***	(0.45)	(4.88)***	(1.30)	(3.34)***	(1.33)	(2.42)**	(3.23)***
<b>Time invariant locational-geographical factors</b>								
Hilly land over 25 degree in total land area in the village in 1997(%)	0.0006	0.00002	0.0002	0.0004	0.15	0.00003	0.04	0.11
	(1.54)	(0.08)	(0.80)	(1.83)*	(1.30)	0.00	(0.34)	(3.63)***
Percentage of effectively irrigated land in 1997 (%)	-0.001	-0.0001	-0.0002	-0.001	-0.04	0.04	-0.04	-0.04
	(4.04)***	(0.56)	(0.74)	(6.23)***	(0.38)	(2.61)***	(0.47)	(1.32)
The distance of the nearest road to the village seat in 1997(km)	-0.002	-0.002	0.0001	-0.0001	-0.40	-0.08	-0.36	0.04
	(1.97)**	(3.59)***	(0.16)	(0.23)	(1.72)*	(2.04)**	(1.67)*	(0.57)
The farthest distance between two small groups within this village in 1997(km)	0.004	-0.001	0.002	0.003	-1.1	-0.1	-1.1	0.2
	(1.44)	(0.65)	(1.13)	(1.96)**	(1.12)	(0.94)	(1.25)	(0.70)
The distance between village committee and township seat in 1997(km)	-0.001	0.001	-0.0004	-0.001	-0.20	-0.03	0.12	-0.29
	(0.75)	(0.60)	(0.38)	(1.57)	(0.36)	(0.32)	(0.24)	(1.98)**
<b>Time variant factors</b>								
Tax-for-Fee reform (after=1,before=0)	-0.34	-0.06	-0.17	-0.11	-35.5	-3.7	-25.3	-6.6
	(11.92)***	(3.90)***	(8.70)***	(7.50)***	(3.94)***	(2.58)**	(3.01)***	(2.70)***
Age of village leader	0.001	0.002	-0.001	0.001	0.41	0.12	-0.05	0.34
	(1.21)	(2.86)***	(1.15)	(0.81)	(1.09)	(1.98)**	(0.14)	(3.35)***
Education of village leader	0.02	0.02	-0.01	0.01	-1.9	0.9	-5.1	2.3
	(1.48)	(3.51)***	(1.64)	(1.30)	(0.48)	(1.41)	(1.37)	(2.12)**
Prior occupation of village leader (pure farmer=1,others=0)	-0.04	-0.03	-0.02	0.01	-7.6	-2.6	-3.9	-1.1
	(2.15)**	(2.58)***	(1.81)*	(0.94)	(1.33)	(2.85)***	(0.73)	(0.73)
<b>Province dummy</b>	yes	yes	yes	yes	Yes	yes	yes	yes
<b>Time trend</b>	yes	yes	yes	yes	Yes	yes	yes	yes
<b>Constant</b>	-130	-16	-56	-59	-6180	157	-3844	-2494
	(15.78)***	(3.49)***	(10.02)***	(13.65)***	(2.38)**	(0.38)	(1.59)	(3.55)***
<b>Observations</b>	7041	7041	7041	7041	7041	7041	7041	7041



Table 5. Fixed effect analysis of the impact of directly electing village leader on rural public investment in rural China (1998-2003)

	Yearly public goods projects in village leader's term				Yearly public goods investment in village leader's term			
	All sources	Village funded	Co-funded	Above funded	All sources	Village funded	Co-funded	Above funded
<b>The way village leader acceded to office</b>	0.16	0.04	0.08	0.04	35.5	2.2	29.0	4.2
(0=appointed,1=elected directly)	(4.67)***	(2.55)**	(3.38)***	(2.40)**	(3.83)***	(1.55)	(3.39)***	(1.52)
Age of village leader	-0.001	0.001	-0.003	0.0005	0.10	0.25	-0.31	0.15
	(0.44)	(1.59)	(2.23)**	(0.51)	(0.19)	(3.26)***	(0.67)	(1.02)
Education of village leader	0.005	-0.01	-0.01	0.02	-1.1	-0.3	-1.3	0.5
	(0.20)	(0.46)	(0.36)	(1.34)	(0.18)	(0.36)	(0.23)	(0.29)
Prior occupation of village leader	-0.03	-0.0005	-0.03	0.01	-6.4	-3.2	2.9	-6.0
(pure farmer=1,others=0)	(0.77)	(0.03)	(1.40)	(0.34)	(0.68)	(2.22)**	(0.33)	(2.15)**
Tax-for-Fee reform	-0.30	-0.05	-0.14	-0.11	-24.7	-3.2	-15.4	-6.1
(after=1,before=0)	(9.99)***	(3.36)***	(7.12)***	(7.31)***	(3.09)***	(2.55)**	(2.08)**	(2.55)**
Village fixed effect	yes	yes	yes	yes	yes	yes	yes	yes
Time trend	yes	yes	yes	yes	yes	yes	yes	yes
Constant	-129	-18	-52	-59	-4805	-245	-2144	-2416
	(15.3)***	(4.27)***	(9.36)***	(14.1)***	(2.17)**	(0.71)	(1.05)	(3.62)***
Observations	7041	7041	7041	7041	7041	7041	7041	7041

Absolute value of t statistics in parentheses, \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.  
Data source: Authors survey.

Table 6. GMM analysis (First difference and using the lag value as the instrument variable) of the impact of directly electing village leader on public investment in rural China (1998-2003).

	Yearly public goods projects in village leader's term				Yearly public goods investment in village leader's term			
	All sources	Village funded	Co-funded	Above funded	All sources	Village funded	Co-funded	Above funded
<b>The way village leader acceded to office</b>	0.12	0.02	0.07	0.03	42.3	2.2	29.8	10.3
(0=appointed,1=elected directly)	(1.91)*	(0.75)	(1.67)*	(1.10)	(2.52)**	(0.82)	(1.92)*	(1.94)*
Age of village leader	-0.002	0.001	-0.002	0.0001	0.18	0.21	-0.23	0.20
	(0.87)	(0.71)	(2.00)**	(0.09)	(0.36)	(2.49)**	(0.51)	(1.22)
Education of village leader	0.006	-0.010	0.001	0.01	4.82	-0.65	4.53	0.93
	(0.26)	(0.80)	(0.10)	(1.13)	(0.82)	(0.65)	(0.84)	(0.48)
Prior occupation of village leader	-0.00003	0.01	-0.03	0.02	-2.57	-2.5	5.9	-6.0
(pure farmer=1,others=0)	(0.00)	(0.62)	(1.08)	(0.74)	(0.28)	(1.59)	(0.69)	(1.94)*
Tax-for-Fee reform	-0.35	-0.07	-0.17	-0.12	-32.6	-4.0	-21.6	-7.0
(after=1,before=0)	(9.98)***	(3.68)***	(7.43)***	(6.46)***	(4.17)***	(3.03)***	(3.00)***	(2.73)***
First difference	yes	yes	yes	Yes	yes	Yes	yes	Yes
Time trend	yes	yes	yes	Yes	yes	Yes	yes	Yes
Constant	0.49	0.10	0.23	0.16	51	5	34	12
	(12.34)***	(4.67)***	(9.14)***	(9.27)***	(5.46)***	(3.26)***	(3.97)***	(3.90)***
Observations	4593	4593	4593	4593	4593	4593	4593	4593

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

Data source: Authors survey.

Table 7. Relationship between Public Goods Investment, Size of the Project and Reelection in Rural China, 1998-2003.

<b>Panel A. In Villages that implemented 0.5-1 public investments projects per year</b>			
Average size (level) of the average public goods investment (per project)	Reelected (%)	Not reelected (%)	Frequency
Low <sup>a</sup>	62	38	224
High <sup>a</sup>	66	34	223
<b>Panel B. In villages that implemented more than 1 public investment projects per year</b>			
Average size (level) of the average public goods investment (per project)	Reelected (%)	Not reelected (%)	Frequency
Low <sup>a</sup>	73	27	200
High <sup>a</sup>	61	39	200

<sup>a</sup> A project's average size investment was considered "low" if it fell beneath the median (about 50000 yuan per project); it was considered "high" if the average size of project fell above the median.

Data source: Authors survey.

Table 8. Fixed effects estimation of the effect of the annual number of public goods projects (amount of investments) in latest term and the re-election (re-appointment) of village leader in rural China.

	Re-elected (1=yes,0=no)				Re-appointed (1=yes,0=no)			
Public projects number	0.04		0.04		-0.02		-0.02	
	(1.72)*		(1.96)**		(0.54)		(0.56)	
Above funded public projects number			0.09				0.08	
			(2.05)**				(0.75)	
Village funded public projects number			0.08				-0.17	
			(1.84)*				(2.20)**	
Co-funded public projects number			0.01				0.03	
			(0.37)				(0.55)	
Public investment level		-0.0001				0.00000		
		(0.70)				(0.00)		
Average investment level per project			-0.0002				0.00002	
			(1.75)*				(0.17)	
Average investment level of above funded public projects			-0.0001				0.0004	
			(0.70)				(0.91)	
Average investment level of village funded public projects			-0.0004				-0.0003	
			(1.07)				(0.40)	
Average investment level of co-funded public projects			-0.0001				0.00001	
			(1.69)*				(0.12)	
Age of incumbent	-1.66	-1.68	-1.67	-1.68	-0.75	-0.74	-0.75	-0.72
	(12.70)***	(12.83)***	(12.75)***	(12.80)***	(4.35)***	(4.32)***	(4.34)***	(4.20)***
Education of incumbent	0.25	0.25	0.25	0.24	0.45	0.46	0.45	0.47
	(1.20)	(1.19)	(1.19)	(1.17)	(1.34)	(1.36)	(1.34)	(1.39)
Year Dummy	yes	yes	yes	Yes	yes	yes	yes	Yes
Village fixed effect	yes	yes	yes	Yes	yes	yes	yes	Yes
Constant	6.82	6.89	6.83	6.90	3.03	3.00	3.03	2.91
	(10.53)***	(10.63)***	(10.55)***	(10.64)***	(4.15)***	(4.11)***	(4.14)***	(4.00)***
Observations <sup>a</sup>	2686	2686	2686	2686	875	875	875	875

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

<sup>a</sup> this is unbalance panel data with some villages have one observation and the other have two observations.

Appendix Table 1 Number and size of public goods projects (regional population weighted), 1998-2003

Project	Number of projects	Average size (1000 yuan)	Accumulated distribution of projects
Roads and bridges	1556	135	20.1
School construction	983	175	32.9
Irrigation & drainage	964	90	45.4
Drinking water	777	101	55.4
Build clinic	203	26	58.0
Cable TV or Loudspeaker	771	60	68.0
Recreation center	286	61	71.7
Grain for Green	1092	66	85.9
Beautify environment	181	40	88.2
Watershed management	191	130	90.7
Forest closure	314	22	94.8
Land Leveling	216	82	97.6
Eco-forest	80	46	98.6
Land improvement	84	164	99.7
Other public project	25	132	100
N / mean	7723	99	--

Appendix Table 2. Annual number/amount of public goods projects/investments and the way in which the village leader acceded to the their offices in rural China, 1998 to 2003.

The yearly public goods projects number					
	Total projects	Village funded projects	Above funded projects	Co-funded projects	Frequency
Appointed village leader	0.59	0.162	0.155	0.27	1488
Elected village leader	0.68	0.194	0.187	0.30	5553

  

The yearly public goods projects investments					
	Total projects	Village funded projects	Above funded projects	Co-funded projects	Frequency
Appointed village leader	61.5	8.5	13.3	39.7	1488
Elected village leader	66.5	9.6	17.0	40.0	5553

Data source: Authors survey.

Appendix Table 3. The annual number/investments of public projects that were implemented during a leader's term in office and the propensity to be re-elected (re-appointed) in China, 1998 to 2003.

<b>Panel A. Number of projects</b>								
	All funding sources		Village funded only		Co-funded only		Above funded only	
	Re-elected	Not re-elected	Re-elected	Not re-elected	Re-elected	Not re-elected	Re-elected	Not re-elected
Before 2001	0.37	0.58	0.12	0.22	0.17	0.24	0.09	0.11
After 2001	0.77	0.75	0.20	0.21	0.36	0.35	0.22	0.19
	Re-appointment	Not Re-appointment	Re-appointment	Not Re-appointment	Re-appointment	Not Re-appointment	Re-appointment	Not Re-appointment
Before 2001	0.33	0.5	0.09	0.18	0.2	0.2	0.07	0.11
After 2001	0.82	0.74	0.18	0.23	0.5	0.3	0.16	0.17
<b>Panel B. Level of investment (thousand yuan)</b>								
	All funding sources		Village funded only		Co-funded only		Above funded only	
	Re-elected	Not re-elected	Re-elected	Not re-elected	Re-elected	Not re-elected	Re-elected	Not re-elected
Before 2001	40.8	60.9	5.4	13.0	26.5	34.7	9.0	13.3
After 2001	67.6	81.7	8.1	12.5	38.3	51.4	21.2	17.8
	Re-appointment	Not Re-appointment	Re-appointment	Not Re-appointment	Re-appointment	Not Re-appointment	Re-appointment	Not Re-appointment
Before 2001	37.7	47.2	4.6	10.4	26.2	26.1	6.9	10.8
After 2001	124.0	84.1	7.2	10.8	104.2	59.7	12.6	13.6

Data source: Authors survey.

## Endnotes

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<sup>1</sup> There are two unpublished working papers (to the best of our knowledge) that examine related issues. One (Shen et al, 2006) examines the impact of elections on income distribution; the other (Lin et al, 2006) looks that how an elected leader (compared to leader that was not elected) treats families that have incurred a large debt due to some catastrophic illness.

<sup>2</sup> We draw on a 100 village subset of the full data set and ask 2000 households to investigate the attitude and willingness of villagers on public goods investments and their demand on public goods, the following paragraph are the results of our subset analysis.

<sup>3</sup> The sample villages come from six representative provinces. Jiangsu represents the eastern coastal areas (Jiangsu, Shandong; Shanhai, Zhejiang, Fujian and Guangdong); Sichuan represents the southwestern provinces (Sichuan, 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 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 agroecological 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.

<sup>4</sup> On average, the attrition 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 the variable equaled one if the village did not come and zero otherwise. There were no variables that were significant.

<sup>5</sup> In China, villages invested in public projects that can be categorized into about 20 different types (e.g., roads and bridges, school construction, irrigation and drainage, grain for green, community public address systems, community recreation center, build clinic, beautify environment, watershed management, forest closure, land leveling, eco-forest, land improvement and other public project). Some types of investment projects, however, were much more popular than others and, in fact, 70 percent of public goods investment projects were made in one of five categories of projects—roads and bridges, Grain for Green, irrigation, school construction, and drinking water. As for the investment level in value terms, our survey data indicated that leaders invested about 80 percent of their funds in the above top five projects.

<sup>6</sup> A term in this paper is defined as the interval of time during which a person serves as village leader. A full election term in most villages is three years. If a leader served for three years and then was reelected for three more years, he would be said to have served for two terms. If a leader served for 1 (or 2) years of his full term and then left office (for whatever reason), the 1 year would be counted as 1 term. The time (1 or 2 years) for which the person who replaced the leader that left office served would also be counted as 1 term.

<sup>7</sup> According to our survey, 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, and eighteen percent of all public goods projects were funded solely by the village itself. In terms of 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).

<sup>8</sup> The time invariant control variables ( $V_i$ ) include the following socio-economic factors: net per capita income (measured in real 1000 yuan); the size of the village's population (measured in 1000 people); the share of the population that is of minority ethnic origin (%); per capita land size (in mu, which is 1/15<sup>th</sup> of a hectare); the rate of illiteracy of the village's labor force (%); the migrant ratio of village labor force in 1997(%); the number of collective enterprises that are operating in the village (each); the number of people from the village that are working in either a township or county (each). Meanwhile, there are also a number locational, geographical factors: the share of the village's total land area that is mountainous (that is land over 25 degrees—measured as percent); the share of total cultivated land that is effectively irrigated land in village (%); the distance between the village's center to the nearest road (in kilometers); a measure of the size of the village (measured as the furthest distance between the two small groups within village—in kilometers); and the distance between the office of the village committee and township seat (in kilometers);

<sup>9</sup> The IV we used in the estimation include “whether or not the slate of village candidates must be approved by township government” (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.), and “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

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round of elections 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).

<sup>10</sup> During our interviews and periods of survey we were told a number of stories by officials and villagers about why there was no election. In some villages that refused to elect their leaders it was because no one would run. In some villages officials and farmers told us that because there was so much control from the township (because the township controlled the nomination process), villagers decided that they did not want to have an election.

<sup>11</sup> 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.” Though a large of village leaders turnover occurred in 1995, 1998 and 2001, there were still some village leaders acceded to the office in other years for the time of village leader turnover were different between regions. In addition, there were still some (about 10 percent) irregular terms because of reasons such as village leaders were resigned, died or fired, etc. In these cases, some villages replaced their village leaders by running a new election or just appointed a new village leader. Thus to account of these irregular term, we use the average public goods investment in the term (per year) instead of the total public goods investment in one term.

<sup>12</sup> For public goods projects/investments from all sources, when we divide the “no difference across terms in the mode of governance” into 2 groups (elected-to-elected and appointed-to-appointed), there is almost no difference.

<sup>13</sup> The definition of the instrument variables see endnote 8, according to our estimates, the IV in the first stage regression have a significant effects on the endogenous variable, in this case, The way village leader acceded to office and the Hansen over-identification test also suggest that the IVs are all valid.

<sup>14</sup> One thing need to mention is that in the 5553 election terms, only 3718 of the village leaders we can observe whether or not they were reelected, the other 1835 incumbents were still in office, which means they did not finish their term in 2003. Unfortunately, in our sample of 2400+ villages we can not distinguish between leaders that ran and lost and those that decided not to rerun at the end of their terms. In one way, if we assume that these leaders (or most of them) did not run because they believed they would have lost anyhow, combining these two groups together will not affect the results. It is possible, however, that public investment behavior in both of these groups are different. Fortunately, we are able to draw on a 100 village subset of the full data set to look at the nature of the influence that is caused by the fact that we were not able to identify those leaders that were elected, served a term and then decided not to run. According to this more detailed data only 5 percent of incumbents decided not to run again when they finished their term. This small share should not overly affect our results.