

**Local Elections and Consumption Insurance:
Evidence from Chinese Villages***

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Abstract

While the literature on consumption insurance is growing fast, little research has been conducted on how rural consumption insurance is affected by democracy. In this paper we examine how consumption insurance of Chinese rural residents is affected by whether the local leader is democratically elected. Exploring a unique panel data set of 1400 households from 1987 to 2002, we find that consumption insurance is more complete when the households live in villages with elected village leaders. Furthermore, democracy improves consumption insurance only for the poor and the middle-income farmers, but not for the rich. These findings underline the importance of democratic governance for ensuring better rural consumption insurance and poverty reduction.

JEL codes: D1, H4, I1, O1.

Key Words: consumption insurance, democracy, election, village.

World Bank Policy Research Working Paper 4205, April 2007

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* We are grateful for financial support on this project of the World Bank (RF-P087657) as well as CAPH of Peking University.

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I. Introduction

Rural residents in developing countries face substantial income risks such as weather shocks and technological changes. Economists have long investigated the extent of such risks, how to deal with them, the extent to which consumption is insured, and what mechanisms are available for consumption insurance (Alderman and Paxson, 1992; Deaton, 1992; Townsend, 1994, 1995; Morduch, 1995; Jalan and Ravallion, 1999). They find that risks are widespread in developing countries, that consumption insurance is incomplete, and that local communities play a significant role in providing consumption insurance. Townsend (1994) and Jalan and Ravallion (1999), for example, find that richer residents are better insured in their consumption. Townsend (1994) finds that consumption insurance depends on occupation: entrepreneurs in rural Thailand are less insured than people of other occupations. Health status is also found to affect consumption insurance (Townsend, 1994; Gertler and Gruber, 2002), along with the access to microfinance programs (Gertler, Levine and Moretti, 2001). To summarize, the existing literature on the determinants of consumption insurance has found that consumption insurance tends to be more complete for households with more physical and health assets and with access to microfinance programs.

Most of the existing literature on consumption insurance concerns the private means of providing consumption insurance, i.e., through household asset holding, health, or changes in labor supply. However, another important way to attain consumption insurance is through social provision. Village residents could rely on governance mechanisms within the village to attain better consumption insurance. Given the large risks faced by rural residents, most villagers, including the poor and the middle-income farmers, should benefit from such insurance provision. Whether and how much consumption insurance is provided clearly depend on the details of governance within the community. One noteworthy detail of governance is whether local leaders are democratically elected. Presumably elected village leaders in China should have stronger incentives to satisfy local residents relative to appointed village leaders, who are more accountable to the upper level of government and may instead care more about goals such as paying taxes, finishing family planning requirements and delivering grain quota (Lin et al., 2003). Would democracy affect the provision of consumption insurance? Who would

be the main beneficiary of elections in terms of insurance against adverse shocks? The median voter theorem suggests that elections would lead to policies that favor the median voters. If the median voters' demand for consumption insurance is not satisfied under non-democracy--a scenario we expect given the significant lack of consumption insurance for the majority of rural residents (Townsend, 1995)--there is a good reason to expect that elections would improve consumption insurance for the median voters and the poor.

In this paper we use a unique panel data set of Chinese households to investigate how consumption insurance depends on whether village leaders are elected, and whether the insurance effect differ for the rich, the middle-income earners and the poor. The data set covers approximately 1400 households in 49 villages of eight Chinese provinces from 1987 to 2002, and has detailed information on consumption, income, household characteristics, and a number of village characteristics. Particularly interesting is that we supplement the existing data with our own survey of village characteristics including information on village elections. During the sample period, Chinese governments and our villages began to implement village elections, and due to the experimental and decentralized nature of Chinese reforms, there are both time series and cross sectional variations in the timing of elections, thus offering nice variations in village elections for our sample. While the implementation of elections is potentially endogenous to the levels of consumption, we find no evidence that the election is endogenous to the growth of consumption by using a set of plausible instrumental variables. Moreover, we note that a subset of our provinces implemented elections on a relatively rapid pace and elections in such provinces are likely to be less selective. This sub-sample allows us to investigate the robustness of the effects of elections on consumption insurance.

Our investigation suggests that rural residents are better insured in consumption when their villages are governed by elected leaders. Furthermore, democracy improves consumption insurance the most for the poor and the middle-income earners. We find no evidence that elections are endogenous with respect to consumption growth. Besides, we obtain similar results when using the subsample of the provinces that rapidly implemented elections within a province, a subsample that the selectivity of elections

should be less serious. The qualitative results are also similar when the election is treated as endogenous.

Our paper is related to two strands of literature. The first is the consumption insurance literature. Previous literature has focused on examining how the degree of consumption insurance is determined by private means such as health, wealth and labor supply. A few exceptions look at how consumption insurance is affected by the access to microfinance programs. To our knowledge, there has been no research that has examined how consumption insurance is affected by democracy and governance. Second, our paper is related to the recent empirical microeconomic literature investigating the effects of elections and governance on economic outcomes. Zhang et al. (2004), for example, offer evidence that elections in Chinese villages in the 1990s led to reduced tax burdens for villagers and improvements in the allocation of public expenditures. Besley and Burgess (2002) show that better information and active electorate improves government responsiveness. Besley and Coate (2003) find that states with elected regulators tend to be more pro-consumer in their regulatory policies (relative to appointed regulators). Foster and Rosenzweig (2001) find that democratization in Indian villages tends to give the poor, landless farmers more voice in the provision of public goods, and improve their welfare and reduce poverty. Chattopadhyay and Duflo (2004) use a randomized policy experiment in India to show that women leaders tend to invest more in infrastructure that is directly relevant to the needs of their own gender. All of these papers suggest that elections tend to have beneficial effects in improving public expenditure or reducing poverty, but none deals with the issue of how democracy affects consumption insurance.

In the rest of the paper, we first offer a conceptual framework to discuss how consumption smoothing might be affected by democracy in section II. We then introduce our data and discuss the measurements for our empirical investigation in section III. We present the findings in section IV, and conclude in section V.

II. Conceptual Framework

The framework for testing consumption insurance is fully developed and used to test for consumption insurance in developing countries by Deaton (1992) and Townsend

(1994).¹ The framework can be derived from the central planner maximizing a social welfare function of the households to allocate resources under uncertainty in a community. If we assume CRRA (constant relative risk aversion) utility function, we can derive the following testable specification from the first order condition of the optimization problem:

$$\Delta \ln c_{ivt} = b\Delta \ln y_{ivt} + \sum_{j=1}^V \gamma_j \delta_{jvt} + \varepsilon_{ivt} \quad (1),$$

where i , v and t stand for household, community and year, respectively. c refers to consumption per household member, y income per household member, and Δ means first differencing.² V is the number of communities in our sample. δ_{jvt} is a village-year dummy variable that is one when j is v and the year is t , and zero otherwise. The equation thus represents a regression of the growth of consumption per household member onto the growth of income per household member and a set of community-year dummies.

The magnitude of the coefficient for the percentage change of income, b , has major implications for consumption insurance. If b is not significantly different from zero and the community-year dummies are jointly significant, changes in household consumption is then completely determined by changes in community-year aggregate resources, which implies complete household consumption insurance. If b is significantly different from zero, and the community-year dummies are jointly insignificant, then there is no risk sharing within the community, and consumption is a pure household behavior. If b is significantly different from zero, but the community-year dummies are also jointly significant, then there is some but nevertheless imperfect risk sharing within the community. A larger b means less consumption insurance offered by various arrangements within the community.

To accommodate other factors not explicitly modeled in our framework, we also control for changes in household characteristics, ΔX , which include changes in household size, in the number of old residents in the household (i.e., 60 years old and

¹ In addition, Grimard (1997) finds evidence of risk sharing among ethnic groups in Cote d'Ivoire. Cochrane (1991) and Mace (1991) test consumption insurance in developed countries.

² Other functional form assumptions of the utility function could lead to a linear specification, which we have also tried in empirical explorations. For simplicity, we adopt the more widely-used form of the log linear specification.

beyond), and in the number of children (i.e., 15 years old or younger). Specified in this way, the specification becomes a fixed-effect specification, and allows for changes in household structure to directly affect changes in consumption. It is also plausible that X may enter into the equation in levels. The household size captures economy of scale in household production, which may affect consumption growth. The demographic structure of a household may also imply a different preference for consumption and therefore the rate of consumption growth. We thus will also run a specification in which household characteristics enter in levels. In general we find that it makes little differences for our key parameters whether we include X or ΔX . For ease in specification, we shall adopt the base specification in which ΔX is controlled for. Equation (1) is then augmented as follows:

$$\Delta \ln c_{ivt} = b\Delta \ln y_{ivt} + \sum_{j=1}^V \gamma_j \delta_{jvt} + \alpha' \Delta X + \varepsilon_{ivt}. \quad (2)$$

Some may be concerned that the household structure may be endogenous. For instance, adverse shocks may lead to the reduction in household size by inducing some family members to migrate. To check the sensitivity of our results to the endogeneity of either the levels or the changes in family structure, we also report results without including the household characteristics variables. The results tend out to be very similar, and the endogeneity of X or ΔX is therefore not a major concern.

Now suppose the election, denoted E and is a dummy variable, may affect both consumption growth and consumption insurance. We thus modify (2) as follows:

$$\Delta \ln c_{ivt} = b\Delta \ln y_{ivt} + \beta \Delta \ln y_{ivt} \cdot E + \alpha_r E + \sum_{j=1}^V \gamma_j \delta_{jvt} + \alpha' \Delta X + \varepsilon_{ivt}. \quad (3)$$

The direct effect of elections on consumption growth is captured by the term $\alpha_r E$. The degree of consumption insurance is then characterized by $b + \beta E$. A negative β then means that consumption insurance improves where elections occur.

The governance structure of villages should matter for consumption insurance. Since the 1980s the Chinese government experimented and allowed village elections in tens of thousands of villages. Elections would make village leaders more accountable to village residents' needs. The simplest model of democracy, the median voter theorem, predicts that the onset of democracy would provide incentives for the leaders to deliver what the median village residents need. Indeed, this is consistent with recent micro

evidence, which shows that elections tilt government behavior toward the interests of local constituents (Besley and Burgess, 2002; Besley and Coate, 2003; Zhang et al., 2004; Wang and Yao, 2006).

Since poor rural residents bear an enormous amount of risks, and the majority of rural residents face incomplete insurance for their consumptions (Townsend, 1995), it is plausible that the median residents and the poor would demand subsidies in various ways when adverse shocks occur, or would demand investment in infrastructure that would benefit the median and the poor residents disproportionately to cushion the impact of adverse shocks. For example, they can demand village leader candidates to provide community-subsidized healthcare, micro finance at the community level, temporary loans when their crops die due to idiosyncratic shocks, and food subsidy when farmers lose their capacity for work. Under village democracy, the chance of being re-elected as village leaders would depend on whether the median residents' demands are met, and this gives the elected leaders a stronger incentive to provide such subsidies than in the case of appointed leaders. Moreover, elections give the local constituents chances to select leaders with better ability and public service orientation, which increases the chance of pushing through the policies that favor the median and poor residents (Besley, 2005). Finally, even the rich residents have incentives to support the improvement in consumption insurance for the relatively poor. The reason is that the rich tend to suffer from negative externality when the poor and the median residents do not have good consumption insurance--the relatively poor tend to borrow from the rich within the same village in case of adverse shocks, and such norms-enforced lending tends to reduce the welfare of the rich. The rich residents therefore also tend to support policy initiatives to help the majority of residents to have better consumption insurance. As a result, the onset of democracy should lead to transfers of various forms in the case of adverse shocks and/or new investments in infrastructure that help the relatively poor. Since these transfers and new infrastructure should help reduce the strength of the link between household consumption and household income for the median voters and the poor residents, we expect elections to increase consumption insurance for these rural residents.

In contrast, the increase in consumption insurance due to elections should be less pronounced for the rich than for the median and the poor residents. Past research has

shown that the rich tends to have more complete consumption insurance since they have access to many private means of dealing with income shocks such as borrowing, saving, and the sales of assets (Townsend, 1995). Consumption insurance for rich residents is therefore unlikely to be an important issue for them, and they are likely to use their votes to push for other agenda that they care more about. Moreover, since most villages are still relatively poor, the increases in village-wide transfers after the democracy likely would yield a much smaller impact on their consumption amounts relative to their income for the rich residents when compared with the non-rich residents. As a result, the rich residents are expected to experience a smaller or no reduction in consumption insurance relative to the non-rich residents.

Indeed, several pieces of evidence are consistent with elections' effects in helping rural residents in general and the median voters and the poor in particular. Using the same data set, Wang and Yao (2006) find that rural elections in China increase accountability to rural residents, increase the share of public expenditures in the village budget, reduce the share of administrative costs and income handed to township government, and reduces the amount of tax paid by village residents. Since reducing tax burden is likely to benefit the poor and the median voters more than the rich, this aspect of the effects of elections would help the median and the poor to a greater extent. In addition, Li, Xu and Yao (2006) find that rural elections reduce the amount of borrowing for villagers, lead to a higher likelihood of establishing a local healthcare plan, and ultimately reduce the negative impacts of a health shocks on farmers' incomes. There can thus be several channels through which elections reduce the vulnerabilities of the median and the poor farmers: reducing tax burden, increasing public expenditure, and establishing local healthcare plans.

III. Data and Measurements

Our data come from two sources. The first is the National Fixed-Point Survey (NFS) maintained by the Ministry of Agriculture of China. NFS is a longitudinal survey of about 320 villages and 24,000 households distributed in all continental Chinese provinces. It started in the mid-1980s and the villages and households are surveyed every year. The survey adopts a stratified sampling approach. For each province, it first

randomly selects a number of counties, and then randomly selects a number of villages within each county. If a village is selected, a randomly selected number of households of the village are surveyed. Because of the budget constraint of our research fund, the retrospective survey was only conducted in a sub-sample of the full NFS sample. In particular, we randomly select 48 villages in 8 provinces to conduct the retrospective survey. The eight provinces are Guangdong, Zhejiang, Hunan, Henan, Shanxi, Jilin, Sichuan, and Gansu, and are reasonably representative of the various regions in China.

The second source of our data is a retrospective survey conducted by the authors in the spring of 2003. This survey was conducted using the NFS sampling frame.³ The survey was done in the same eight provinces. As a result, 49 villages and 1428 households remained in the survey. Of the eight provinces, Henan, Hunan, Gansu, Shanxi and Sichuan are relatively poor, while Jilin, Guangdong and Zhejiang are significantly richer. The average GDP per capita (in constant value of year 2002) in 1996 is 9,513 Yuan for the richest province of Guangdong, and 2901 Yuan for the poorest province of Gansu. The farmers in the richest province are thus about three times richer than those in the poorest one in our sample. Our sample therefore includes a wide range of provinces at different levels of economic development.

One empirical issue is that, with the attrition of data the survey organization assigned the same ID for a household that was added to the sample to replace a lost household over time. To make sure that the households with the same identification numbers (IDs) are indeed the same households in our retrospective survey, we used several criteria based on household characteristics (the size of the household, land area, and the age of the household head) to identify and match households. Consequently, in the eight provinces covered by our survey, 1,354 households remain in the sample.⁴ The NFS has already provided information on village and household characteristics, so our supplemental survey only asked questions related to individual health history and village governance. The household data provided by the NFS cover the period 1987 to 2002, but do not have information for 1990, 1992, and 1994 when no surveys were conducted due

³ One drawback of the NFS is that it does not maintain a consistent indexing system for the households. To establish the panel structure, we had to use a set of household variables to match the same household across time. Ex post random checks showed that the match had very good accuracy.

⁴ The reduction in sample size is likely to be random as no systematic attrition and change of households were reported in the NFS. As a result, our samples can be treated as a stratified random sample.

to budgetary problems. Among the 49 sample villages, the number of surveyed households per village ranges from 7 to 90, with a median of 35 households.

NFS includes detailed information on household income, consumption, and demographics, which allow us to test whether households have full consumption insurance. The 2003 retrospective survey collected additional information on village characteristics including detailed information on the history of village elections. Other information includes the number of surnames, the share of households with the most populous surnames, the timing of the passage of the election law in our sample provinces.⁵ These village characteristics will be used to examine the endogeneity of the election dummy variable.

Consumption is measured as non-medical consumption per household member.⁶ Income per capita is constructed as net household income per household member, which in turn is computed as the total income subtracting operating expenses and transfers to other people. Income growth was substantial over the period of 1987-2002. The average per-capita income in 2002 was 2.2 times of that in 1987,⁷ which implies an average annual growth rate of 5.4%. The asset holding of a rural household is measured as the year-end value of fixed assets per household member. This variable has a quite large standard deviation—its coefficient of variation is 4.6. All variables related to consumption, income and asset are measured in Yuan of constant value of year 2002.

Our sample period witnesses an important transition in village governance: from government-appointed local leaders to democratically-elected ones.⁸ Village leaders used to be appointed by upper levels of government. They were supposed to collect taxes and levy fees, implement family planning, fulfill grain procurement quota, and provide public goods and services (Lin et al., 2003). Since the upper levels of governments place a higher value for the first three responsibilities (relative to public goods for village

⁵ Even though the election law is national in nature, each province also passes a law for the implementation specifics, and the timing may differ. The number of provinces that passed the provincial election law in our sample is: 2 in 1988, 5 in 1991, 6 in 1997, and 8 after 1998.

⁶ The share of medical expenditure is relatively small; our empirical results do not hinge on whether we include it in the consumption variable or not.

⁷ The average income in our sample is higher than the national average in 2002. NFS relies on household bookkeeping to collect data, so it oversamples larger and better-educated households when it first started in 1986 because these households were more able to maintain good bookkeeping.

⁸ See Zhang et al. (2004) for detailed information on the implementation of village elections in Chinese villages.

residents), and village leaders were not accountable to local residents, village leaders had little or no incentive for providing public goods to village residents. Instead, traditional village leaders would allocate their time and energy geared toward promotion into becoming officials of upper levels of government. Starting from the mid-1980s, however, the central government began to experiment with village elections (O'Brien and Li, 2000). After a few years of experimentation, the central government called for a widespread implementation in the early 1990s. However, the implementation timing and details varied widely across and within regions. Figure 1 plots the share of villages with elected leaders in our sample. The share started around 20 percent in 1987, rose steadily to roughly 70 percent in late 1990s, and ended up at 100 percent starting from year 2000. This trend is comparably with what was observed with the data in Zhang et al. (2004), which was based on 60 villages in Jiangsu province.⁹ The variations are both across villages and times series. Table 1 exhibits the time-series pattern of elections across provinces. It clearly shows that provinces (and villages) differed significantly in the timing of implementing elections. For instance, 100% of sample villages in Sichuan Province had elections by 1991, while only 0.3% of the villages in Guangdong Province had elections by 1995.

IV. Empirical Results

We now present estimates of specifications (2) and (3) respectively. In our empirical implementation, we keep a household-year observation if none of the variables are missing. In initial explorations we find that $\Delta \ln c$ has some significant outliers. To reduce the sensitivity of our results with respect to measurement errors, we replace the values of $\Delta \ln c$ in the top and the bottom 1 percents with the values at 99 and 1 percentiles.¹⁰ Since *Election* only vary at the village-year level, and our primary interest is to investigate the effects of elections, to avoid overstatement of estimation prevision we allow the error term for the household-year observation to be correlated within the village (Moulton, 1986).

⁹ In their sample, the percentage started at 35 percent in 1985 and stopped at 85 percent in 1999.

¹⁰ We have also tried dropping the top and bottom 0.25%, 0.5%, and 1%, and the results are similar.

The correlation coefficient between the percentage change of consumption, $\Delta \ln c$, and the percentage change of income, $\Delta \ln y$, is 0.354, with a significance level of 0.000. The correlation coefficient is 0.367 for household-years without elections, and 0.349 for observations with elections, both statistically significant. Thus elections are associated with better consumption insurance. Table 2 reports the summary statistics and definitions of our dependent and independent variables. On average, consumption growth is positive, at 2.8 percent. Income per household member grows at a faster pace at 3.7 percent. In our sample, roughly two thirds of village-years have elected leaders. The typical village has 418 households.

Base results

Table 3 reports the estimates of equation (2) where the election dummy is not included. In the first three columns, we do not control for region-year dummies.¹¹ In column (1) we do not control for household demographic variables. In columns (2) and (3) we control for changes in the number of household members. In columns (2) we also control for the composition of the household, while in column (3) we instead control for the *differences* in the composition of the household. The contrast between columns (2) and (3) is aimed at checking the robustness of our results with respect to alternative specifications of household demographic structure.¹² In columns (4) to (6), we control for village-year dummies. Since there could be risk pooling in a wider regional context, the cross section unit for risk pooling could therefore be provinces instead of villages.¹³ In columns (7) to (9), we thus control for province-year dummies to see whether and how our results on risk sharing are sensitive to the unit of the region.

Overall the estimates for b appear to be quite stable, in a tight neighborhood ranging from 0.32 to 0.35. Moreover, the F-test invariably rejects the null hypothesis that

¹¹ We have also tried regressing first-differenced consumption level on first-differenced income level. The qualitative results remain similar. For instance, the coefficient of income per household member remains statistically significant, with a magnitude of around 0.30 for the specification including village-year dummies. The log linear specification appears to be preferred since it leads to a higher R squared than the linear specification with the same degree of freedom. Since residents differ so much in their income and consumption levels, it makes more intuitive sense to assume the log linear rather than the linear specification.

¹² In the literature and in informal discussions, some prefer the level and others prefer the difference.

¹³ The villages tend to be in different counties, so using county as the cross sectional unit does not help much.

the region-year dummies are not significantly different from zero. These findings imply that within-region risk sharing mechanisms are working to a certain extent, and that we can reject the hypothesis of full consumption insurance. Consumption growth of households is at least partly determined by aggregate shocks, and partly by household income shocks. We have also found that the results remain similar if we use robust regression to minimize the effect of outliers (the results are not reported but are available upon request). Note that the estimates of b are very similar whether we use village-year or province-year dummies. This finding suggests that we can use province-year dummies to capture risk sharing at the aggregate level when we examine how elections affect b , the extent of risk sharing. This facilitates our empirical task a great deal since village-year dummies would be perfectly collinear with the election dummy, and using province-year dummies to control for aggregate shocks allows us to identify the effects of elections on consumption growth and consumption insurance.

The findings on other controls indicate that an increase in household sizes is associated with a slower consumption growth. Moreover, households with more old members (kids) tend to have slower (faster) consumption growth. In addition, households with an increase in the number of kids experience a slower consumption growth rate. Note that our key results on b are largely insensitive to whether we include the variables related to the household structure, and it does not matter whether we include the variables of the household structure in level or in difference. We have also experimented with including other household controls such as the education levels of the household head and his spouse, and they do not have any explanatory power. These education indicators are thus left out of our base specifications.

Elections and Consumption Insurance

Table 4 allows consumption insurance to depend on *Election*, the dummy variable of having village leaders elected. Before we present the results, it is perhaps useful to discuss the potential endogeneity of *Election*. Some may worry that the timing of elections may be endogenous to consumption growth. It is possible that villages with high (or low) consumption levels may be chosen to conduct elections earlier within a province, therefore the timing of elections may be endogenous with respect to the level of

consumption. However, it may no longer be the case once we take first difference in consumption.

We can formally test the exogeneity of *Election* for the consumption growth equation via the Hausman's test using some plausible instruments suggested by the literature. While studying the effects of rural elections on fiscal behavior in China in roughly the same period, Zhang et. al (2004) suggests that the distribution of surnames within the village is a good source of identifying information. Zhang et al. have done field studies and found that the timings of elections are related to civil conflicts within villages, while most conflicts in rural China are related to clashes between family clans. They conclude that population heterogeneity has predictive power for the occurrence of elections. Besides what Zhang et al. propose, we also consider another source of information: the passage of the election law within a province. The passage of the election law is at the discretion of the provincial government and should have nothing to do with household-level consumption growth.

Accordingly, the sources of the maintained exogenous instrumental variables for *Election* are the following: the dummy variable of passing provincial law for the election (*provincial election law*), the share of household heads in the village with the most populous surname, the logarithm of the number of surnames in the village, the dummy of having only one surname in the village, and the dummy of having two to four surnames in the village. While by controlling the number of surnames in the village we have already controlled for the heterogeneity of family clans, the dummy variable of only one surname and that of having two to four surnames allow for some non-linearity. Since there are no conflicts related to family clans when there is only one family clan, we need to control for this special case. In addition, the dynamics for family clan conflicts may differ significantly for the case of a small number of family clans, and this explains why we also control for the dummy of having two to four surnames in the village. When the number of family clans surpasses the threshold of five, the logarithm of the number of surnames should take care of the family-clan heterogeneity.

All the instrument variables except *province election law* are time-invariant,¹⁴ and cannot explain the timing of village elections. However, if we assume that upon the passage of provincial election law the other time-invariant variables start to affect the chance of the village election, it makes sense to allow these variables to interact with *provincial election law*. In our empirical implementation, all the variables related to surnames are all interacted with *provincial election law*. Since *provincial election law* is perfectly collinear with our control variables (i.e., province-year dummies), we cannot directly include it in our instruments. However, its interactions with the variables related to the surname allow us to use the timing information contained in *provincial election law* to instrument *Election*.

Empirical tests suggest that these instruments are indeed reasonable ones. To ensure that we have strong instruments, we have examined the first-stage regression, and these variables are jointly significant, with an F statistics of 86.7, far surpassing the threshold of 10 for strong instruments (Bound, Jaeger, and Baker, 1995).¹⁵ In the first stage regression, the share of the most populous surname is positive and significant for predicting the incidences of elections, the number of surnames is positive and significant, and the case of only one surname has an extra positive effect (up and above those being predicted by the logarithm of the number of surnames). The Hausman's test yields a p-value of 0.297, and the null hypothesis of exogenous *Election* thus cannot be rejected. We have also conducted the overidentifying restrictions test for the joint exogeneity of the instruments, and the p-value for the Hansen's J statistic is 0.331. We therefore cannot reject that we have proper instruments. Since the instruments are plausible and strong and they pass the over-identifying restrictions test, and we cannot reject the exogeneity of *Election*, we shall treat *Election* as exogenous in future regressions. As a robustness check, we shall also report the results that treat *Election* as endogenous, and instrument them with the afore-mentioned instrumental variables. Since in the case of exogenous *Election*, instrumental variable estimation is supposed to be less efficient than in the

¹⁴ While theoretically the distribution of names may differ over time, they change very slowly over time. In our data, these variables come from ex post phone interviews with villages, and represent cross-sectional data at the end of our sample period.

¹⁵ All the test statistics are based on the specification in which we do not control for household structure. The results based on the alternative specification in which we control for household structure are very similar.

ordinary least square estimation, we expect the estimates for *Election* and its interaction term with income growth to be less precisely estimated.

Another way to see if the results are sensitive to the endogeneity of *Election* is to examine whether the results are robust when we include only a subset of provinces in which the implementation of elections are more uniform. In this subsample, the election is less subject to selectivity based on village characteristics and household characteristics, and the estimated effects of elections on consumption insurance should therefore be less contaminated by selectivity bias. Note that we do control for province-year dummies so selectivity at the aggregate level is already held constant. From Table 1, one can see that Jilin, Hunan, Guangdong, Sichuan and Zhejiang villages adopted the election in more uniform paces, while the other three provinces showed much more variations in the timing of adoption. We thus also report the results using only the sub-sample of the five "quickly-adopting" provinces as mentioned above.

Table 4 reports the results. Since the Hausman's test cannot reject the exogeneity of *Election*, columns (1) to (3) report the OLS results: column (1) does not control for variables related to household structure, while columns (2) and (3) control for either the levels of or the differences in the household structure variables. The results are similar. The interaction term of *Election* and income growth is negative, and close to being statistically significant. In terms of magnitude, village elections reduce the sensitivity of consumption growth to household income growth by roughly 18%.

Columns (4) to (6) replicate the results with the subsample of quickly-adopting-election sub-sample. The qualitative results are again very similar. Now the interaction term is statistically significant. The drop in the sensitivity of consumption growth to income growth is now about 23%.

Table 5 reports the GMM estimates of how elections affect consumption insurance. The instruments for *Election* is as mentioned earlier, and those for *Election* times income growth are the interaction terms of income growth with those instruments. The overidentifying restrictions tests are all passed so that we have reasonable instruments. In the first three columns we control for province-year dummies, and in the second three columns we do not. Again, we try various combinations of controls of household characteristics. In all specifications, the reduction in b is between 14% to 18%,

very similar to what we find earlier with the OLS specification. As expected, the results are less precisely estimated.

Elections and Consumption Insurance: By Quartile of Asset Ownership

Another hypothesis we posit is that elections should mainly help the poor and the median voters and not the rich in consumption insurance. Table 6 confirms this hypothesis. We run the regressions for the top and bottom quartiles, along with the middle two quartiles, and see if indeed the extent of reduction in b is greater for the non-rich subsample. In the first three columns, we use the pooled sample, and in the second three columns, we use the quickly-adopting-election subsample. Note that the sample size (when adding up the three columns' observations) has been reduced somewhat; the reason is due to the missing value for the classification variable, the household asset.

The hypothesis is invariably accepted in our now familiar configurations of specifications. For the rich residents of the top quartile, elections do not help consumption insurance at all: the interaction term of *Election* and $\Delta \ln y$ is never statistically or economically significant. Yet for the poor quartile and the middle class quartiles, the interaction term is negative and largely statistically significant. The estimated reduction in b is between 26% and 35%, and the middle class benefits similarly in the increase in consumption insurance as the poor. So the poor and the middle class achieve better consumption insurance from the implementation of elections. Note that in the specification we control for changes in household characteristics. We have also tried not controlling for them or controlling for the level of household characteristics, and the results remain very similar.

V. Conclusions

Using a panel data set of Chinese rural households over an interesting period of 16 years that cover important institutional changes, this paper examines whether the degree of consumption insurance is affected by elections, and how various income groups benefit differently. We find that rural residents have been able to achieve better consumption insurance when the village leader is elected, perhaps because they are more accountable to the interests of local constituents. Moreover, we find that it is the poor

and the middle class (but not the rich) who benefit in consumption insurance after elections. Our results appear to be quite robust in terms of variations in estimation methods and in specifications.

While the literature on rural consumption insurance is rich, our research suggests that the relationship between risks and institutions may still be a fruitful avenue for future research. Our study suggests that institutions may play an important role in reducing the vulnerabilities of poor villagers, and that the poor's welfare may increase with proper governance.

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Figure 1. Share of villages with elected village leaders

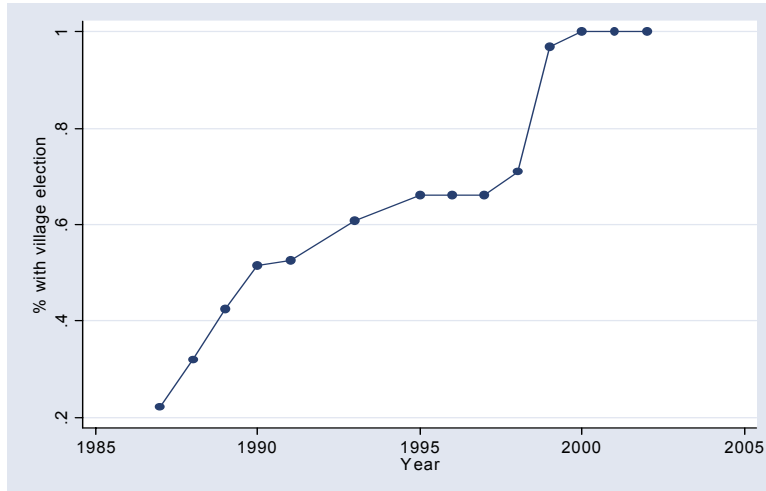


Table 1. Share of villages with elected leaders

	1987	1991	1995	1999	2002
Shanxi	26	41	80	80	100
Jilin	0	69	100	100	100
Zhejiang	38	85	100	100	100
Henan	50	75	75	100	100
Hunan	32	83	100	100	100
Guangdong	0.3	0.3	0.3	100	100
Sichuan	30	100	100	100	100
Gansu	26	50	67	100	100

Table 2. Summary Statistics

Variable	Definitions	Obs	Mean	St. Dev.
$\Delta \ln c$	First difference in $\ln(\text{consumption per household member})$. Consumption is measured in 2002 value.	13546	0.028	0.602
$\Delta \ln y$	First difference in $\ln(\text{net income per household member})$. Net income is measured in 2002 value.	13424	0.037	0.609
$\Delta \ln n$	First difference in $\ln(\text{number of household member})$.	13552	-0.013	0.258
$\ln N_{kid}$	Logarithm of the number of kids (plus one). Kids are defined as those with ages 15 or lower.	19941	0.611	0.535
$\ln N_{old}$	Logarithm of the number of old (plus one). The old are defined as all household members with age 60 or above.	19941	0.285	0.412
Election	The dummy variable indicating that the head of the village is elected.	19670	0.663	0.473

Table 3. First-Difference Estimates of Consumption Insurance

	<i>no control of region-year dummies</i>			<i>control for village-year dummies</i>			<i>control for province-year dummies</i>		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta \ln(\text{income PC})$	0.351 (0.023)***	0.335 (0.023)***	0.335 (0.023)***	0.345 (0.023)***	0.328 (0.023)***	0.329 (0.023)***	0.339 (0.036)***	0.321 (0.039)***	0.322 (0.039)***
$\Delta \ln(\text{number of HH members})$		-0.244 (0.033)***	-0.242 (0.033)***		-0.233 (0.033)***	-0.231 (0.033)***		-0.248 (0.038)***	-0.246 (0.038)***
$\ln(\text{number of kids} + 1)$		0.010 (0.005)*			0.007 (0.004)			0.006 (0.005)	
$\ln(\text{number of old} + 1)$		-0.035 (0.007)***			-0.037 (0.006)***			-0.036 (0.007)***	
$\Delta \ln(\text{number of kids} + 1)$			-0.042 (0.019)**			-0.030 (0.019)			-0.032 (0.021)
$\Delta \ln(\text{number of old} + 1)$			-0.027 (0.037)			-0.036 (0.035)			-0.037 (0.029)
village-year dummies	no	no	no	yes	yes	yes	no	no	no
province-year dummies	no	no	no	no	no	no	yes	yes	yes
P for F-test: joint significance of region-year dummies				0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Observations	13353	13347	13347	13353	13347	13347	13413	13347	13347
R-squared	0.13	0.14	0.14	0.21	0.22	0.22	0.15	0.16	0.16

Note. *, **, and *** indicate statistical significance at the 10, 5 and 1 percent levels.

Statistical errors (in parentheses) allow for clustering at the village level.

The dependent variable is $\Delta \ln c$. The coefficient of the intercept is not reported.

Table 4. Consumption Insurance and Election

	Pooled sample			Quickly-adopting-election sample		
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \ln(\text{income PC})$	0.391 (0.044)***	0.372 (0.042)***	0.372 (0.043)***	0.432 (0.048)***	0.416 (0.045)***	0.415 (0.045)***
election	0.010 (0.020)	0.008 (0.020)	0.009 (0.019)	0.035 (0.039)	0.030 (0.038)	0.030 (0.038)
election * $\Delta \ln(\text{income PC})$	-0.070 (0.046)	-0.068 (0.044)	-0.067 (0.044)	-0.098 (0.052)*	-0.096 (0.049)*	-0.095 (0.049)*
$\Delta \ln(\text{number of HH members})$		-0.247 (0.033)***	-0.246 (0.033)***		-0.211 (0.033)***	-0.211 (0.033)***
$\ln(\text{number of kids} + 1)$		0.006 (0.004)			0.003 (0.005)	
$\ln(\text{number of old} + 1)$		-0.036 (0.006)***			-0.033 (0.007)***	
$\Delta \ln(\text{number of kids} + 1)$			-0.034 (0.018)*			-0.047 (0.023)*
$\Delta \ln(\text{number of old} + 1)$			-0.044 (0.036)			-0.024 (0.044)
Province-year dummies	yes	yes	yes	yes	yes	yes
Observations	13111	13105	13105	9590	9590	9590
R-squared	0.15	0.16	0.16	0.16	0.17	0.17

Note. *, **, and *** indicate statistical significance at the 10, 5 and 1 percent levels.

Standard errors (in parentheses) allow for clustering at the village level.

The dependent variable is $\Delta \ln c$.

The intercept is not reported.

Table 5. Consumption Insurance and Election: GMM Estimates

	Controlling for province-year dummies			Not controlling for province-year dummies		
	(1)	(2)	(3)	(4)	(5)	(6)
election	-0.169 (0.135)	-0.125 (0.134)	-0.138 (0.133)	-0.009 (0.016)	-0.006 (0.017)	-0.011 (0.016)
election * $\Delta \ln(\text{income PC})$	-0.049 (0.039)	-0.046 (0.038)	-0.046 (0.038)	-0.074 (0.038)*	-0.071 (0.038)*	-0.071 (0.038)*
$\Delta \ln(\text{income PC})$	0.374 (0.031)***	0.354 (0.031)***	0.354 (0.031)***	0.404 (0.031)***	0.385 (0.031)***	0.386 (0.031)***
$\Delta \ln(\text{number of HH members})$		-0.250 (0.025)***	-0.249 (0.025)***		-0.246 (0.025)***	-0.244 (0.025)***
$\ln(\text{number of kids} + 1)$		0.009 (0.010)			0.012 (0.009)	
$\ln(\text{number of old} + 1)$		-0.036 (0.012)***			-0.036 (0.012)***	
$\Delta \ln(\text{number of kids} + 1)$			-0.032 (0.023)			-0.046 (0.023)**
$\Delta \ln(\text{number of old} + 1)$			-0.056 (0.034)			-0.044 (0.035)
Control for province-year dummies	yes	yes	yes	no	no	no
Observations	12932	12926	12926	12932	12926	12926
p value for Hansen's J statistics	0.185	0.117	0.144	0.360	0.318	0.304

Note. *, **, and *** indicate statistical significance at the 10, 5 and 1 percent levels.

Standard errors (in parentheses) allow for clustering at the village level.

The dependent variable is $\Delta \ln c$.

The intercept is not reported.

The instruments for election are *provincial election law* times each of the following variables: the share of the surname that accounts for the most families in the village, logarithm of the number of surnames in the village, the dummy variable of only one surname in the village, of two to four surnames in the family. The instruments for election * $\Delta \ln(\text{income PC})$ is $\Delta \ln(\text{income PC})$ times all the afore-mentioned instruments.

Table 6. Consumption Insurance and Election: by quartiles

	<i>Pooled sample</i>			<i>Quickly-adopting subsample</i>		
	<i>(1) bottom quartile</i>	<i>(2) middle two quartiles</i>	<i>(3) top quartile</i>	<i>(4) bottom quartile</i>	<i>(5) middle two quartiles</i>	<i>(6) top quartile</i>
$\Delta \ln(\text{number of HH members})$	-0.168 (0.055)***	-0.248 (0.057)***	-0.332 (0.064)***	-0.115 (0.068)*	-0.225 (0.060)***	-0.286 (0.063)***
$\Delta \ln(\text{number of kids} + 1)$	0.014 (0.051)	-0.044 (0.033)	-0.028 (0.073)	-0.007 (0.070)	-0.064 (0.036)*	-0.028 (0.080)
$\Delta \ln(\text{number of old} + 1)$	-0.006 (0.074)	0.018 (0.064)	-0.226 (0.103)**	0.019 (0.073)	0.028 (0.069)	-0.229 (0.132)*
$\Delta \ln(\text{income PC})$	0.451 (0.075)***	0.428 (0.058)***	0.267 (0.039)***	0.510 (0.106)***	0.466 (0.056)***	0.288 (0.038)***
$\text{election} * \Delta \ln(\text{income PC})$	-0.117 (0.072)	-0.123 (0.062)*	-0.004 (0.044)	-0.170 (0.098)*	-0.164 (0.061)***	-0.002 (0.053)
election	-0.017 (0.050)	-0.002 (0.026)	0.085 (0.061)	0.215 (0.130)	-0.003 (0.033)	0.008 (0.112)
Observations	2616	5064	2671	1622	4442	2149
R-squared	0.19	0.17	0.14	0.22	0.18	0.15

Note. *, **, and *** indicate statistical significance at the 10, 5 and 1 percent levels.

Standard errors allow clustering at the village level.

The dependent variable is $\Delta \ln c$.

The intercept is not reported.