The Economic Benefits of Mixed Decentralization: Evidence from China's First Secretary Program

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Abstract

Bureaucratic decentralization involves tradeoffs between local expertise versus access to centralized resources. We study the First Secretary Program (FSP), which consigned officials from higher-level agencies to implement antipoverty initiatives in impoverished Chinese villages, with the objective of connecting communities to expertise in higher-level governments, while also ensuring localized implementation. Focusing on the 1,844 villages in a prefecture-level city and exploiting the program's staggered rollout, we use a generalized difference-in-differences design to evaluate the program's effects. We show that the FSP increased village incomes by 2.5 percent; emphasizing the importance of accessing resources from higher-level agencies, the benefits appear for villages paired with city or provincial agencies, but not for (lower-level) township ones. Our granular data allow us to explore the sources of these improvements, which are primarily derived from income from village-level cooperative projects. We offer tentative evidence that improved returns come from better project management rather than project selection. Our findings indicate the potential for a less stark trade-off in bureaucratic design via "mixed decentralization."

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1 Introduction

Bureaucratic decentralization involves numerous trade-offs: corruption of centrally appointed bureaucrats versus capture by local elites (Bardhan and Mookherjee, 2006*a*); the tailoring of programs to local preferences versus underprovision of public resources (Besley and Coate, 2003). Both theoretical models and empirical assessments of these trade-offs tend to present decentralization as a binary choice (Besley and Coate, 2003; Bardhan and Mookherjee, 2006*b*). Yet many governance institutions involve a mix of centralized and decentralized elements. For example, while municipal leaders may have considerable fiscal autonomy, they are generally subject to central audit and evaluation (Vannutelli, 2021); and while officials may be appointed by the central government, they may be embedded in and well integrated into the local community.

This question of local integration is central to the context in which we study the efficacy of what we call mixed decentralization. Specifically, we study the First Secretary Program (FSP), implemented as part of a wider set of anti-poverty reforms in China in 2013, under the Targeted Poverty Alleviation (TPA) campaign. The FSP was started in May 2015 and by the end of 2020, more than 3 million officials had been deployed nationwide (we provide further details on the program in Section 2). The appointed individuals were drawn from a wide range of administrative ranks (though most often lower-level officials), and an array of government agencies at the prefecture (city), county, and township levels.[1] In brief, villages were paired, in a manner that was uncorrelated with village attributes, with specific agencies, which were then tasked with selecting an employee to serve as first secretary (FS) of the partner village. Given the FSP's prominence and the very high priority placed on successful implementation of the TPA plan overall, there was considerable incentive for agencies to take seriously the selection and evaluation of their FS assignments. And the FSs themselves were thus similarly well-motivated to improve conditions in their assigned villages.

The FSP's effectiveness in improving local communities has been a matter of some debate, with the sources of disagreement stemming very directly from core questions in the decentralization

[1]There are on average about 9 county-level divisions per prefecture. In our data from one prefecture-level city, there are 15 county divisions. Below the county, the next-lowest administrative level is the township, with an average of 13 per county (195 towns in our sample city).

literature. Some have argued that having an FS with ties to higher levels of government could serve as a driving force to direct resources to promote economic development in impoverished areas and, at the same time, act as an intermediary between the central government and local grassroots organizations to help implement poverty alleviation policies (Liu, Tu and Shi, 2019). Alternatively, others have suggested that the FSP may have even undermined the role played by local organizations that had a history of working with rural societies, so that the FSP was a net detriment to rural communities (Li, Ji and Buchinsky, 2023). Yet others have questioned the program's efficacy on the grounds that many FSs remained detached from the local communities they served (Xu and Li, 2017).

In our empirical analysis, we evaluate the net effects of the FSP program, which we see as useful in assessing the efficacy of mixing elements of centralized versus delegated governance. Additionally, we use detailed information on sources of village income and specific development projects, and information on village-agency pairings, to understand the mechanisms through which the FSP program impacted village development, which in turn may speak to the trade-offs that come with more or less centralization.

In our main analysis, we use a generalized difference-in-differences (two-way fixed effects) model to estimate the effect of the FSP, exploiting its staggered rollout across the 1844 villages in the city we study. We find a discrete and sustained increase in incomes of households identified as at-risk or impoverished in "FSP-treated" villages and a decrease in poverty rates. The income benefits we document are concentrated among the poorest households (among the already-poor sample for which we have data) within each village, consistent with the FSs furthering the central poverty-reduction objective for which they were assigned. (While official income and poverty statistics may be subject to manipulation, we find very similar effects in impoverished households' electricity usage, which prior work has taken as a credible indication of income improvements.)

We then turn to analyze *how* the FSP improved the incomes of the poor. We find that the strongest improvements are in villages where the FS was paired with a city-level agency, while the weakest improvements are among those paired with township agencies. This pattern suggests that FSs with ties to (better-resourced) higher-level agencies may be more effective in extracting resources to

foster development. When we also control for the administrative rank of the FS (which we take as a reflection in part of individual ability), we find that the agency level rather than individual rank is predictive of village-level outcomes.

We next turn to a decomposition of the sources of income improvements and poverty reduction. FSP benefits come primarily via income derived from collective village projects, which comprise a wide range of activities including land leasing and sales, cash-generating enterprises, and income streams from collective power projects. We explore whether these improvements come from greater access to capital or the more efficient deployment of resources, by assessing changes in investment as well as rates of return for village projects around the FS's arrival. We find a role for both sources of income gains. For "operational" investment in village projects, we find a very clear increase that is precisely timed to the first secretary's arrival (and once again, the improvements are seen primarily for FSs drawn from city-level agencies). For a particular type of investment, photovoltaic power stations, we can observe the source of investment funds. Consistent with the FS playing a direct role in securing funds from government entities, we find that the investment increase we observe overall comes almost exclusively from government funding. These findings reinforce the interpretation that at least some of the income improvements from the FSP come from closer connections to higher-level governments.

The increase in project-level returns that we document could result from better project selection or improved project management. We capture the latter effect by looking at project returns before versus after the FS's arrival in a village, including a specification with project-specific fixed effects that isolates how a given project is managed before versus after the FS arrives. We find a strong positive management effect in this analysis; in contrast, we find no role for project selection based on cross-project comparisons of investments initiated before versus after the arrival of a FS.

Naturally, not all potential social benefits are captured in income improvements. In fact, to the extent that FSs were incentivized to reduce poverty headcount, it is possible that the improvements we describe above resulted from the redirection of resources toward income-generating activities and away from other public goods provision. We thus also examine village-level changes in investments that had no income-generating opportunities for households, such as village parks and new roads, and

also household-level investments that involved a mix of profit- and non-profit-oriented projects. We also find very clear increases in these other investment types.

In summary, we find that the local appointments of centrally-connected officials led to higher incomes. Interestingly, these improvements come primarily via income derived from village-level projects that receive more investment after a FS's arrival (particularly from government sources, as shown in our solar power results), and also generate higher returns. Overall, our results suggest a crucial role for expertise in navigating and exploiting a centralized bureaucracy's resources in implementing 'mixed' decentralization.

Our work sits at the intersection of two vast literatures: the political economy of decentralization and the personnel economics of the state. As we observed earlier, previous work has emphasized the trade-offs invoked by decentralization; see, e.g., Mookherjee (2015) for a summary of the theoretical and empirical literatures on the broader set of trade-offs involved in the decentralization decision. Our findings emphasize the benefits enjoyed by communities with a more direct link to higher-level governments, in part through assistance in obtaining resources controlled by centralized authorities. Given the manner in which FSs were embedded in local communities, we also see our work as highlighting the continuum of decentralization options: the program we study aimed to include both elements of centralized and localized structures in its design.

Our focus on decentralization via human capital (versus, say, fiscal decentralization) links our work to a broader body of research on personnel economics in the public sector (see Finan, Olken and Pande, 2017 for a survey focused on field experiments), and the role of bureaucracy in promoting development (Besley et al., 2022). Whereas much prior work in this area has emphasizes selection into public service (e.g., Dal Bó, Finan and Rossi, 2013; Hanna and Wang, 2017) or the incentives of public officials (e.g., Bertrand et al., 2020; Jia, Kudamatsu and Seim, 2015), we look at the potential importance of the allocation of the stock of human capital within a larger bureaucracy. Again, our main takeaway is the value of allocating individuals in such a way as to bridge different levels of government. Our approach and findings are very much in line with the agenda laid out in Besley et al. (2022), which emphasizes the importance of understanding "interactions between different departments within a

bureaucracy" as a central (and understudied) feature of government performance.

Finally, given that the FSP was implemented under the larger umbrella of the Targeted Poverty Alleviation program, our work also contributes to the vast amount of research on how best to deploy public resources to improve the incomes and well-being of the poor (see Banerjee et al., 2024 for a recent survey focused on social protections). Whereas much recent work indicates the crucial role of monitoring and oversight to prevent leakage (Banerjee et al., 2018; Alatas et al., 2019; Andersen, Johannesen and Rijkers, 2022), our emphasis is on the efficacy of public officials tasked with implementing anti-poverty efforts. We also relate to a small number of papers that look at various features of China's TPA program specifically. These include efforts to characterize the overall implementation of the TPA via survey and study the overall impact of the TPA on household income (Li, Su and Liu, 2016; Li et al., 2023, 2024).[2]

2 Institutional Background

2.1 Targeted Poverty Alleviation in China

China launched the Targeted Poverty Alleviation (TPA) campaign in 2013, with the stated objective of eradicating extreme poverty by 2020. China has a long history of anti-poverty initiatives and targets as articulated in its various Five-Year Plans. The TPA program, one of a number of reforms initiated by incoming President Xi Jinping, aimed to distinguish itself from earlier efforts in its focus on individual- rather than regional-level targeting. That is, the TPA was to keep track of every household and individual in poverty rather than instituting programs aimed at improving incomes in entire counties, towns, or villages. The TPA thus required local governments to identify and assist individual poor households (see, e.g., Liu, Liu and Zhou, 2017, or Li et al. (2023), for more details on the TPA program).

The TPA program encompasses a wide range of policies, including industrial projects (e.g., business training and support for households to start their own businesses), housing support and

[2]Several papers have looked at more specific elements of the TPA. Li, Ji and Buchinsky (2023) also studies the assignment of FSs as a way to reduce favoritism by local leaders.

relocation, employment assistance (including education support), social security programs, financial access, healthcare, support, and infrastructure investment (for example, safe drinking water programs for rural residents and paved road construction). The TPA also aimed to promote local industries in order to create sustainable income sources.

As with many Chinese government programs, the TPA program operated under a hierarchical institutional structure, with the central government providing directives to provincial governments that in turn assumed responsibility for rollout in their area, and with city and county governments directly overseeing program implementation. Also as in many government programs, promotion of local officials was directly linked to achieving anti-poverty targets, which served as a strong incentive for local governments to implement policies set by higher-level governments (Zhou et al., 2018).

According to government figures, per capita disposal income of rural residents in the poorer areas targeted by the TPA more than doubled between 2013 and 2020, reducing the poverty headcount in these areas by approximately 99 million.[3] The central government claims that much of this improvement is attributable to the TPA program (Zeng, 2020; Office, 2021). To the extent that there is indeed a causal link from TPA implementation to poverty reduction, there are many possible explanations for the program's success. Our goal is to examine the extent to which the improvements described above are associated with human capital deployment via the FSP.

2.2 The First Secretary Program

2.2.1 Background

The First Secretary Program (FSP) was a central feature of TPA implementation. Under the FSP, impoverished villages were assigned well-trained bureaucrats, "borrowed" from higher-level government agencies. Known as First Secretaries, these officials were tasked with working with local residents and their governments to identify community needs, develop a poverty reduction plan, and ensure that appropriate resources from (higher-level) city and county governments were devoted to this objective.[4]

[3] https://www.stats.gov.cn/xxgk/jd/sjjd2020/202210/t20221011_1889191.html, last accessed May 6, 2025.

[4] The FS's role was formalized in a Central Government directive issued in April 2015, "Guidance on Selecting and Sending Excellent Cadres from Agencies to Villages as the 'First Secretary."

Each appointed FS was required to spend most of their workweek (five days and four nights) in their appointed village, generally for a term of at least 2 years. A specialized working team from the same department as the FS was also commandeered and dispatched to the village to provide the necessary support in implementing TPA objectives. The support team provided primarily informational and monitoring roles, by collecting information on villagers' needs and challenges, and aiding in the oversight of local government employees to minimize misconduct and corruption. The FS themselves oversaw all work and took full credit or blame for performance.[5]

Crucial for our purposes, the rollout of the FSP was uneven across villages, so that we may use a staggered difference-in-differences approach to identify its impact. As the timing of FS assignment to villages was not purely random, in Section 4.2 we examine whether it was correlated with any village-level attributes, as part of our broader discussion of identification concerns. We find that FS assignment and timing are uncorrelated with village attributes such as minority and poverty headcounts. While it is somewhat surprising that rollout is not even correlated with village poverty rates given the TPA's objectives, this is in line with Li, Ji and Buchinsky (2023), which also shows that FS designations as well as their timing are uncorrelated with village characteristics.

2.2.2 Selection of the First Secretary

Each village assigned to receive a FS was paired with a higher-level agency or state-owned enterprise (SOE). The government agencies may have been at the provincial, prefectural (i.e., municipal), or county level, and included a wide range of departmental types – to name just a few examples, provincial and prefectural education departments and institutions, hospitals, and county finance departments; the SOEs include companies from a broad array of sectors (e.g., banks, telecommunications, tobacco). The agency, called the "designated assistance unit" was then tasked with selecting a work team to send to the village, headed by the individual appointed as FS.

The FS was chosen from the managerial ranks of the agency or SOE that was paired with the village. As we describe in more detail in the next section, the FS position is potentially a desirable one,

[5] As of December 2020, over 3 million FSs and other village-based officials have been deployed nationwide, spread across 255,000 village-based work teams (Office, 2021).

as strong performance can lead to awards and promotion (conversely, there is the risk of censure from poor performance). FSs drawn from higher-level agencies generally have higher administrative ranks, though there is a highly imperfect correspondence between agency level and individual FS rank.[6]

2.2.3 First Secretary Incentives

First secretaries are motivated to achieve poverty reduction targets via promotion incentives, and the strength of these performance incentives are an indication of the TPA's importance to the central government. Assessment methods for the FS are clearly laid out in central government guidelines, with evaluations conducted on an annual basis.[7] Evaluation criteria, also laid out in central government directives, include success in obtaining funds for local development and initiating development projects that utilize these funds. FSs are further assessed based on poverty improvements in their assigned village, as well as direct performance feedback ("democratic evaluations") from village officials, party members, and local residents. These evaluations are recorded in the FS's personnel file and serve as a primary consideration for promotion at the end of their two-year term, as well as recognition for employee distinction more generally.

Those with sufficiently poor performance may be recalled to the sponsoring agency, and may be disciplined; in some cases their rank may be frozen for several years. The consequences of poor performance may extend up the chain of command, with relevant sponsoring agency leaders facing rebuke in their annual review.[8] To further limit the chances of such outcomes, FSs are extensively monitored. Provincial governments are required to conduct at least one random inspection every year, and cities and counties carry out additional inspections at random intervals. Feedback from these audits is then provided to the FS, who are urged to respond to any shortcomings revealed by inspections.

[6] In the Chinese civil service, employees are divided into 11 levels of seniority, further subdivided into 27 ranks. The FSs in our sample are generally drawn from employees in levels 7-10.

[7] See https://www.gov.cn/zhengce/2017-12/24/content_5250001.htm, last accessed May 6, 2025.

[8] The risk of punishment was non-trivial. See, for example, the following document for details of disciplinary actions taken by the government against five officials for poor performance and misconduct: https://www.ccdi.gov.cn/yaowen/201805/t20180516_171911.html, last accessed May 6, 2025.

2.2.4 Poverty alleviation programs and the First Secretary: Potential mechanisms for poverty reduction

As we observed at the beginning of this section, the TPA program included a number of distinct elements, which we now turn to in greater detail, with particular attention to how they may have been facilitated by the arrival of a FS loaned by a higher-level government. Since we can to examine village-level improvements along a number of dimensions (e.g., investment income; subsidies and transfers; employment) we will be able to assess which of the channels below most plausibly account for any overall improvement.

Resources, financial and otherwise, for TPA projects could be obtained from higher-level governments. Based on official government statistics, the resources available for anti-poverty efforts grew substantially under the TPA, with central government funds allocated to poverty reduction increasing from 39.4 billion Yuan (almost US$5.4 billion) in 2011 to 146.1 billion Yuan in 2020. There were similar increases for poverty alleviation in lower-level government budgets as well. Overall, in the sample city we study, a total of nearly 1.8 billion Yuan was spent on poverty reduction projects in 2020, of which nearly 1.1 billion Yuan was drawn from specially earmarked poverty alleviation funds at various levels of governments.

Poverty alleviation funds could be deployed across a wide range of projects, including road construction, reservoir construction, canal, roads, and other forms of infrastructure; the establishment of photovoltaic power stations, farms, plantations, agricultural processing and other industrial projects; household solar projects; housing renovation and sanitation improvements, among others.

Since we have particularly fine-grained data on photovoltaic power projects, we provide some additional details on their implementation and potential role in improving local livelihoods and living conditions. These power stations were constructed using poverty alleviation funds, with technical assistance from the National Energy Administration. The installations generally had capacity in the 100 to 300 kilowatt range (enough to provide power to 140 four-person households for a year); A 300 kW poverty alleviation village-level photovoltaic power station in Hebei generates an average of 1,200 kWh per day, which amounts to 1,200 × 365 = 438,000 kWh annually (http://www.jiapv.

com/category/201711/22/16319.html)), and were constructed on village-owned land and owned by the village collective. The income generated by such projects was distributed to poor households based on a predetermined and publicly-available distribution plan (actual income distributions were also publicly posted ex post).

On a smaller scale, household solar projects use roof or courtyard space of poor households to install 3 to 5 kilowatt generation systems; these solar panels are owned by the household, which has claims on any income generated. (Other income-generating assets created through poverty alleviation funds include, for example, planting, animal husbandry, handicrafts, and rural tourism.) Again, poor households receive dividends from these projects based on a preset and publicly disclosed plan, which took into account such factors as the household's poverty level, household size, and participation in a specific project.[9]

Returning to the FSP overall, with this as background, it is more straightforward to appreciate the FS's potential impact on investments aimed at poverty reduction. On the funding side, given their connections to and experience in the governmental institutions that provided poverty alleviation funding, the FS may be better positioned to access earmarked funds. This is particularly true for the FS's own agency, which is often an key source of funding. On implementation, the FS plausibly offers greater organizational expertise than village leadership. And just as the FS may have been more capable in accessing financial resources from higher-level government, they may similarly be better informed on available expertise for implementation of investment projects.

As a result of pre-deployment training as well as high-powered incentives, the FS also may have been able and motivated to help poor households access subsidies and employment opportunities that were offered via the TPA. Subsidies included rural subsistence allowances, special hardship allowances, old-age insurance premiums, disability subsidies, temporary assistance subsidies, education subsidies, disaster relief funds, and other income transfers. A suite of rural employment opportunities was launched via the TPA, including migrant worker subsidies, work skills training, and small bank loans for self-employment.

[9]For a sample distribution plan, see http://www.zhangshu.gov.cn/zssrmzf/zwgkhfpq/202309/4f6fcc0fc745437cbc6fea930887a5db.shtml, last accessed Aug 19,2025.

3 Data

3.1 Sample

Our primary dataset builds on the records of the National Poverty Alleviation Information System (NPAIS), which is the poverty registration and tracking database created under the TPA. It was launched in 2014 to identify all rural individuals with net income below the poverty line set annually by the central government (it was 2736 Yuan in 2013, and had risen to 4000 Yuan by 2020). Based on household surveys conducted in 2014, approximately 128,000 villages were identified as impoverished.[10] A total of 29.48 million poor households were identified, consisting of 89.62 million individuals.

After the initial "poverty census," updates were made annually, with some households added to the panel (especially in earlier years) or removed from it. In order to minimize incentives to manipulate reported income by households trying to maintain TPA assistance, while the government marks residents as "escaped poverty" once they exceed the poverty threshold, they remain in the data tracking system (and hence are visible to us). By remaining on the list they continue to receive the benefits they received in previous years, including living allowances, medical insurance, and education subsidies (see Li, Zhang and Zheng, 2020, for further discussion).

Our main dataset is a subset of this national database. We focus on a prefecture-level city in eastern China, for which we were able to obtain information on the arrival date and characteristics of FSs in each of the 1,844 rural villages in the prefecture. Our data include more than 78,000 households that were initially identified and documented as in poverty and thus included in the poverty database, as well as others added during 2013 to 2020. Our data include detailed information on family demographics, income structure, education, social security, employment, and village characteristics (location, population, number of identified poor household members, etc.).

In Appendix Table A2, we show the number of households in the dataset in each year, as well as entry and exit. The sample grows substantially in 2014 and 2016. The growth in 2014 is simply

[10] A village was labeled as "impoverished" if its poverty headcount ratio was more than double that of its province; see http://keywords.china.org.cn/2021-01/11/content_77102863.html, last accessed May 6, 2025.

because the initial census continued into the 2014 calendar year. There was a lack of clarity in standards and procedures for identifying impoverished households in the initial census, which led to a follow-up survey in 2016 to remove inaccurately identified individuals and to add previously overlooked ones, which accounts in large part for the 2016 increase.[11] Consistent with the government's claim that households continued to receive benefits after exceeding the poverty threshold, only 3,555 households were removed from the survey between 2013 and 2020.

One natural concern with the data is that, since FSs are evaluated based on poverty reduction, they may have had an incentive to manipulate reported figures. While it is not possible to rule out such concerns completely, there are several reasons to expect that our results are not primarily the result of misreporting. First, income data were verified and checked by a separate and independent local body, the National Rural Revitalization Administration(NRRA). At a minimum, this monitoring entity raised the cost of attempted manipulation (Fanghua, Yangyang and Xinye, 2020). Second, in Section 5.4, we consider an alternative measure of economic activity based on electricity usage by impoverished households. Electricity usage has been shown in previous work to be highly correlated with income, but is much less subject to manipulation (Henderson, Storeygard and Weil, 2012; Chen, Qiu and Zhang, 2022).

From NPAIS, we collected data on all FSs stationed in our sample prefecture for 2013-2020. Most importantly, this information includes the date that and village assignment for all FSs, which allows us to construct our treatment variable. (Note that while the FSP was officially launched in 2015, the system was implemented in some regions even in prior years, so that for just under 20% of villages, the treatment year is 2013 or 2014; please see Appendix Figure A1 for the distribution of initial treatment dates for the full set of villages in our sample.) Once a village has been assigned an FS, in every case the village continues to have a FS throughout the sample, i.e., in no case does treatment status revert to $FS = 0$. We also collected data on the FSs themselves, including name, gender, age, and their dispatching unit. Overall, these data enable us to match the characteristics of FSs with the villages and households to which they were assigned, to examine how the presence of a

[11] See https://cn.chinadaily.com.cn/a/202102/10/WS60235401a3101e7ce973f7dd.html, last accessed May 6, 2025.

FS affected various outcomes at the household and village level.

Finally, we obtained project-level data on poverty alleviation investments (i.e., investment via the TPA) for 2013-2020. As we noted in the previous section, these include a range of investment types, for example road building, reservoir construction, canal, roads, and other forms of infrastructure; the establishment of photovoltaic power stations, farms, plantations, agricultural product processing and other industrial projects; household solar projects; housing renovation and sanitation improvements. For all projects, we observe the time of initiation, investment amount, completion time, and project category. These data also come from NPAIS, which uses the following categories: Public (e.g., parks and roads); Business (e.g., farming enterprises or solar power stations); and Household (e.g., sanitation renovations and small-scale farming). For solar projects, we additionally observe investment amount disaggregated by funding source (government, business, charitable donation, and loan), and can also observe electricity generation and the number of beneficiary poor households. This more detailed data on solar investment are also obtained from the NPAIS.[12].

3.2 Descriptive Statistics

We present summary statistics for the main variables in our analysis in Table 1, and definitions of each variable in Appendix Table A1. Across all sample years, the average annual income per individual is 6,282 Yuan, with the distribution exhibiting considerable variation. Most households have non-zero wage income, and almost all have at least some transfer income, reflecting the fact that the sample is comprised of low-income households that would be eligible for social assistance. Other forms of income are zero for most households. For household production, 49.50% of household-year observations are positive, while the fraction is 22.97% and 9.77% respectively for asset income (derived from village-level property use and cooperative projects) and asset income specifically from TPA projects respectively.

Also reflecting households' high-poverty status, average years of schooling among adults is only 6.4. Turning to village-level variables, we make several observations. First, given that our starting

[12]The additional granularity available on solar-based poverty alleviation projects owes to the particular focus this sector has been given by the central government. In contrast to other forms of investment, it is straightforward to monitor generation and income from village collective photovoltaic power stations connected to the grid, to obtain data that is readily comparable across projects.

sample is impoverished villages eligible for "treatment," it is largely as expected that approximately half of observations have $FS = 1$; the year of "treatment" varies from 2013 to 2020. Roughly comparable proportions of FSs come from town- and county-level agencies, while a somewhat smaller proportion (8%) comes from city or provincial agencies. Finally, we observe that the village-level investment variables are relatively sparse for specific investment types. For public investment, 39.5% percent of village-year observations have non-zero values, while for investment in home-based and business projects, the proportions are 16.7% and 20.4% respectively.

4 Empirical Strategy

4.1 Econometric Specification

Our main empirical strategy is a generalized difference-in-differences (two-way fixed effects) model:

$$Outcome_{ivt} = \alpha \times FS_{vt} + \beta \times X_{ivt} + \rho_i + \mu_t + \varepsilon_{ivt} \tag{1}$$

where i indexes an individual household in village v, and t indexes year. $Outcome$ is a household-level outcome such as income level or poverty status. The key independent variable is FS, which measures whether village v has been "treated" in year t with a First Secretary assigned to oversee TPA implementation. X is a vector of time-varying household-level attributes. In all specifications, we cluster standard errors at the village level, as that is the relevant level of variation for our treatment "assignment." (Some of our analyses will involve village-level measures such as poverty headcount or the performance of village enterprises, in which case the analysis is aggregated in a straightforward way; clustering is still at the village level.)

To capture the dynamics of the effect over time, we also implement an event-study version of the specification in Equation (1). In particular, we substitute for the FS_{vt} indicator variable with a

collection of indicators for each event year from 3 years before to 6 years after the arrival of the FS[13]:

$$Outcome_{ivt} = \sum_{q=-3}^{6} \alpha_q \times FS_{vq} + \beta \times X_{ivt} + \rho_i + \mu_t + \varepsilon_{ivt} \quad (2)$$

where we combine the periods leading up to the third year preceding and years following the sixth year post-implementation into two binary variables $FS_{v,q\leq -3}$ and $FS_{v,q\geq 6}$. Other variables are defined exactly as in Equation (1).

As discussed in Section 2.2, the FS can help direct resources, financial and otherwise, to promote economic development in impoverished villages, and the effect is likely to be greater for those with ties to higher-level governments relative to lower-level ones. We thus disaggregate the FS_{vt} dummy variable into three indicators based on the level of the assigned FS's agency ($City\_FS_{vt}$, $County\_FS_{vt}$, and $Town\_FS_{vt}$), and examine their differential impact in the following specification:

$$Outcome_{ivt} = \alpha_1 \times City\_FS_{vt} + \alpha_2 \times County\_FS_{vt} + \alpha_3 \times Town\_FS_{vt} + \beta \times X_{ivt} + \rho_i + \mu_t + \varepsilon_{ivt} \quad (3)$$

where $City\_FS_{vt}$, $County\_FS_{vt}$, and $Town\_FS_{vt}$ are dummy variables that take the value of one if the FS is from a province/city, county, or township agency, respectively.

4.2 Identification

FS assignment to villages – Our primary identification concern is that FS assignments are plausibly nonrandom. China's poverty reduction efforts focused on allocating financial resources to villages designated as "poor" by county governments, so it is natural to expect that, for example, the very poorest villages would be more likely to receive FS assignments, and to get them sooner. Therefore, we study the determinants of FS rollout assignment in Appendix Table A6, by comparing whether villages that were assigned FSs differed from other villages for various dimensions of characteristics, including geography and number of households with certain characteristics (see column (1)). In columns (2) and (3), we also compare "treated" villages that were assigned a FS early versus late, and

[13] The asymmetric time frame is chosen due to (1) the sample period spanning 2013-2020 and (2) the first year of FS entry is 2015 in our sample.

those assigned FSs from high versus low-ranked agencies. The results suggest little explanatory power from village-level variables in FS assignment or timing. While on the one hand, this is surprising given the FS's anti-poverty objectives, it is worth noting that *all* villages that received a FS were impoverished ones, so the variation in timing that we capture is within this subsample of very poor communities. Furthermore, our results here are in line with the observation in Li, Ji and Buchinsky (2023), in which they also show that FS designations as well as the timing of these designations are uncorrelated with villages' attributes.

Bias in Staggered DID – Researchers typically interpret α given by the two-way fixed effects (TWFE) estimator in Equation (3) as the average causal effect of the treatment on the outcome of interest from the shock. The recent DID literature highlights that the TWFE estimate is essentially a weighted average of all of the potential 2×2 DID estimates among three groups: an early-treated group, a later-treated group, and a never-treated group. When there are heterogeneous treatment effects across cohorts or time, this can make post-treatment periods for earlier treated units no longer a valid comparison for later treated units. Thus, some of the 2×2 DID estimates may enter the average with negative weights, introducing biased estimates that dilute the true treatment effect (De Chaisemartin and d'Haultfoeuille, 2020; Sun and Abraham, 2021; Callaway and Sant'Anna, 2021; Goodman-Bacon, 2021; Borusyak, Jaravel and Spiess, 2024). To evaluate potential bias, in Section 5.4, we assess the robustness of our findings using the imputation estimator outlined in Borusyak, Jaravel and Spiess (2024) and report the results in Section 5.4. Compared to other methods (Callaway and Sant'Anna, 2021), a notable advantage of imputation approaches is their flexibility in accommodating unbalanced panel data (Bellégo, Benatia and Dortet-Bernadet, 2024).[14]

Other confounding policies – It is possible that our estimates or interpretation of the results may be confounded by other national or regional regulations that are correlated with FS rollout. However, we could not identify any concurrent policies whose geography and timeline significantly coincided with the FS program studied in this paper. Moreover, any confounding impact of these policies (unless exactly coincident with FS rollout) could be captured by the extensive set of spatial and temporal

[14] Wooldridge (2021) offers an ATT estimator that is numerically equivalent to the imputation method by Borusyak, Jaravel and Spiess (2024).

controls that we deploy in our econometric models.

In Table A8, we highlight the role of the Poverty Alleviation Relocation Program (PARP), which is another central, large-scale component of China's poverty alleviation strategy.[15] It aims to relocate poor individuals from remote and inhospitable areas to more prosperous locations. In this robustness check, we confirm that the assignment of FS is not associated with any significant changes in the number of households participating in the PARP. In Table A9, we also provide a robustness check to ensure that the income improvements we document are not driven by registration effects. Specifically, we show that FS assignment is uncorrelated with significant the number of households registered as poor or in the number of villagers registered as having disabilities or recipients of social allowance.

5 The First Secretary Program's Effect on Income

5.1 Baseline Estimation

In Table 2, we begin by looking at two overall measures of household improvement, the log of per capita income (*Income PC*) and an indicator variable denoting that household per capita income is above the poverty threshold designated by the central government (*I(Out of Poverty)*).[16]

In the first three columns, we focus on per capita household income, including progressively more stringent controls. In column (1) we include only village fixed effects, to account for the baseline level of prosperity in the community, and also town-by-year fixed effects to control for the possibility that some areas may be growing while others are in decline. In the second column, we include a range of household-level controls, and in column (3) we include household fixed effects, in addition to town-by-year fixed effects. In all specifications, the coefficient on FS is positive and significant at the 1% level, and its magnitude changes little with the addition of controls. Given the log scale, the point estimate implies an increase in household income of 2.5 percent as a result of the FS's arrival.

[15] The relocation program began in 2001, initially in four pilot provinces (Inner Mongolia, Guizhou, Yunnan, and Ningxia), and later introduced to an additional 13 provinces. In 2016, the PARP was further expanded to a total of 22 provinces (Zhang, Xie and Zheng, 2023).

[16] We obtain near-identical results for total household income rather than the log of per capita income; this is unsurprising since the two differ only because of household size, which we already include as a control. The national poverty standard is calculated based on the annual per capita disposable income of farmers, and it is adjusted annually. For instance, in 2013, individuals with an annual income below 2,736 Yuan (just under US$450 at the 2013 exchange rate of 6.08 Yuan/USD) were below the poverty threshold.

In columns (4)-(6) we repeat the exercise for above-poverty status as the outcome, and obtain similar results: for all specifications, the point estimate on FS is positive and significant at the 1% level. Its magnitude implies a 3.7 percentage point increase in the probability that a household is out-of-poverty after the FS's arrival, a large effect relative to the baseline out-of-poverty rate of 48.6 percent (recall that by definition, FSs are sent to high-poverty villages).

In Figure 1, we show analogous event plots for both measures of household earnings, allowing the effect of FS to vary as a function of time relative to the FS's arrival. We label as $t = 0$ the FS's arrival date and set as the omitted category $t = -1$, i.e., the year prior to "treatment." As noted earlier, we combine all observations three or more years prior to arrival in the group $t \leq 3$, and all observations six or more years post-arrival in the group $t \geq 6$. We use the most stringent specification from columns (3) and (6) to estimate the First Secretary effects in the event plot. The figure shows that both income and poverty are statistically indistinguishable from the $t - 1$ value during the pre-period, while both outcomes increase substantially and significantly immediately afterward. As may be expected given a period of adjustment, both outcomes continue to improve for at least a couple of additional years.[17]

5.2 Heterogeneity in impact by FS agency and administrative ranks

In this section, we examine heterogeneity in the FS's impact as a function of the level of both the FS's agency (i.e., whether it is a town-, county-, or city-level agency) as well as the FS themselves (i.e., their administrative rank), which will be informative for understanding the mechanisms through which FSs most likely improved village incomes. This will complement our analysis in the next section, which explores how the FS Program impacted different income sources.

In Panel A of Table 3, we show our main results from Table 2, but distinguish between FSs drawn from town, county, and city/province governments. Interestingly, the arrival of a FS from a town-level agency has no discernible impact on incomes or poverty rates. By contrast, the arrival of a FS from a city-level agency is associated with very large improvements — an increase in incomes of approximately 8.7 percent, and an increase in the likelihood that a household is above the poverty line

[17] For robustness, we also report the plot of the event study coefficients estimated under different specifications in Appendix Figure A2. Each β shows the estimated effect on *Income PC* in Panel A (or *I(Out of Poverty)* in Panel B). The patterns are consistent across specifications, with treatment and control groups following parallel trends prior to the policy, then diverging after the FS's arrival.

of 8.4 percentage points; for county-level officials the effect is between the two (2.4 percent and 3.95 percentage points for income and above-poverty respectively).

One likely interpretation of this pattern is that, as we discussed in the introduction, FSs drawn from agencies in higher-level governments may have greater access to resources – financial and otherwise – relative to those drawn from agencies in lower-level governments. It is also the case that higher-level agencies are generally staffed by higher-ranked bureaucrats, so an alternative interpretation is that the FSs drawn from these higher-level governments are themselves more connected and/or higher-ability (both of which may be reflected in individual administrative rank). In column (2) we thus examine whether there are heterogeneous effects by FS rank.

We distinguish among three administrative ranks: section head or higher (rank 6 or above); section member or deputy section head (ranks 4 or 5); and ordinary or unranked staff (ranks 2 and 3) as well as those without any rank information, since those with missing rank information are most commonly newly hired or of low rank[18] .

In Panel B of Table 3, we explore how the impact of the FSP varies with the FS's administrative rank. Mirroring the preceding results, income improvements appear primarily for higher-ranked FSs. The correspondence between agency level and individual administrative rank is far from perfect. The raw correlation is 0.7302, and as the cross-tab of agency level and city rank in Appendix Table A4 makes clear, FSs at every administrative rank have been recruited from agencies at all levels of government. There is thus sufficient independent variation in the two rank variables to examine which dominates when included simultaneously. We do so in Panel C. In these "horse race" regressions, we find that the coefficient on agency rank is very similar to our Panel A estimates. By contrast, once we partial out the role of agency level, there is no additional explanatory power from administrative rank.

While such heterogeneity analyses are naturally only suggestive, our reported findings are more readily reconciled with higher-level FSs serving as a bridge to funding, expertise, and market opportunities from higher-level governments, rather than directly providing greater human capital.

[18] We include three ranks so as to parallel the amount of variation we have in agency level, which is similarly split into three groupings. Note also that in practice, the results we report here are insensitive to the precise choice of cutoff. The patterns are virtually identical, for example, if we use a rank of 5 or 7 as the cutoff for $High$ instead.

5.3 Disaggregating Income

To better understand the particular role played by FSs in improving overall incomes, we decompose household income into four distinct components: wages; transfers; household production; and "property and asset" income (referred to below simply as asset income) derived from land rental or earnings, combined with profit shares from village cooperative enterprise production (see Section 3 for discussion, and Appendix Table A1 for variable definitions). These results appear in the first four columns of Table 4.

Interestingly, we observe no change in wage or transfer incomes, nor income derived from household production. We emphasize that we were agnostic on the source of improvements under the FS program, given FSs' broad mandates in improving local economic conditions. Many transfer programs, for example, are administered by higher-level government agencies and thus could, in theory, be impacted by the presence of a FS who would be better placed to navigate agency bureaucracies.

All observed improvements come from asset income, as observed in column (4); in columns (5) and (6) we disaggregate cooperative project income into the portion generated from projects funded via TPA programs versus all others. Interestingly, we observe comparable effects of the FSP for both TPA- and non-TPA-funded projects, consistent with the FS playing a broader role in village development than simply that which was mandated under the TPA. In Appendix Table A7 we allow these effects to vary as a function of agency level. As expected given our earlier results, there is little relationship between the presence of a FS and wage or transfer income as a function of agency level. For asset income – the outcome that was strongly correlated with the presence of a FS overall – we see a substantially larger impact for FSs drawn from higher-level agencies.

In Figure 2 we provide event plots for each of the four income components, including wage, transfer, operation and property income. In all cases, we observe a sustained increase after the FS's arrival, with the pattern more clearly discernible for asset income.

5.4 Robustness Checks

Staggered Rollout As discussed in Section 4.2, to evaluate the potential bias due to staggered treatment, we follow the intuition laid out in Borusyak, Jaravel and Spiess (2024) to assess the robustness of our baseline results. Specifically, we fit a TWFE regression using observations only for units and time periods that are not yet treated, and infer the never-treated potential outcome for each unit using the predicted value from the regression. This analysis provides an estimate of the treatment effect for each unit, which can be aggregated to form an estimator for the treatment effect on the treated.

Figure A3 presents the event study figures and shows that the estimates are consistent with the parallel trends assumption across all three measures of household poverty. The estimated coefficients prior to the assignment are close to zero and show treatment effects in the post periods ranging from 2% to 5%, similar to our baseline findings.

Alternative Measurement of Income As we discussed in Section 3, a concern with our outcome measure is incentives for the manipulation of income statistics, given the priority placed on poverty reduction by the central government. As noted in our earlier discussion, there is a separation of those implementing anti-poverty initiatives and those tasked with measuring poverty, which mitigates this concern somewhat. It is nonetheless possible that, broadly speaking, there may have been pressure to show the success of the TPA in general, and the FSP specifically.

While we cannot rule out this possibility completely, we can explore whether we see similar patterns to those we observe for income based on a proxy that is less subject to gaming. We follow Henderson, Storeygard and Weil (2012); Auffhammer and Wolfram (2014); Chen, Qiu and Zhang (2022) in using household electricity usage as an income proxy.[19] We do not have such data for the entire prefecture, but we have obtained monthly electricity usage for its largest county, with a 2024 population of just over 800,000. In Table A10, we show results that parallel those of Table 2 for

[19] Prior research validates the use of electricity usage as an income proxy. For example, Henderson, Storeygard and Weil (2012) show that lights growth provides a very useful proxy for long-term GDP growth and also tracks short-term fluctuations in growth, while Auffhammer and Wolfram (2014) shows that in Chinese provinces with a higher fraction of the population above the poverty line, the number of appliances per household is higher. Chen, Qiu and Zhang (2022), also focused on China, shows that households below the poverty line consume minimal energy to service only basic needs, while those above the poverty threshold have higher energy consumption because of greater use of electric appliances.

electricity use as the outcome variable; we similarly find that $FS = 1$ is associated with household improvements, as captured by an increase in electricity consumption of just over 1.5%.

6 Project Investment and Returns

There are two reasons to explore how investment changes around the arrival of a FS as a complement to our income analyses. First, some capital expenditures may not be income-producing but nonetheless welfare-improving, including those promoted by the TPA – for example, village parks, roads, and water treatment. Second, we are interested in assessing whether incomes increase from higher investment versus the more efficient use of capital.

6.1 Investment

As we observed in Section 3, data are available for investment made through the TPA. In Table 5, we examine how total village investment in poverty alleviation projects changes around the FS's arrival; we also show results for investment in each of the three categories used by the National Rural Revitalization Administration (NRRA): Public (e.g., parks and roads); Business (e.g., farming enterprises or solar power stations); and Household (e.g., sanitation renovations and small-scale farming). Throughout, we focus on a specification that includes both village fixed effects and town-year fixed effects, and employ a log scale $(1 + x)$ for the outcome variable.[20]

Looking first at total investment in column (1), the point estimate on FS of 0.67 indicates a nearly 70 percent increase in investment after the FS's arrival. We show, as before, that the increase is most pronounced for FSs from city-level agencies, and nonexistent for those from town-level agencies (column (2)). Comparing different investment types (columns (3)-(8)), the sharpest increase is for public investment, and by far the smallest increase is for household investment.

In Figure 3, we show event plots for total investment and for each of the three investment categories. For all but household investment (for which there was only a modest overall effect) we observe clear increases that are precisely timed to the FS's arrival.

[20] We obtain very similar results if we instead estimate a Poisson Pseudo Maximum Likelihood model to accommodate zero values as well as the long right tail in the distribution of investment.

Photovoltaic Power Stations and Investment Sources

One limitation to the preceding analysis is that the investment data available from the NRRA are at the project-level, and do not distinguish among funding sources. However, for solar power projects specifically, the central government requires the NRRA also to report whether investment funding came from government, private firms, donations (e.g., from funds donated by public agencies, individuals, and companies), or bank loans.

We begin in Table 6 by showing that investment in solar *overall* increases with the arrival of a FS – the point estimate in column (1) indicates that $FS = 1$ is associated with a nearly 40 percent increase in investment in photovoltaic power stations, and column (2) shows that this increase is concentrated among FSs from higher-level agencies. Columns (3) and (4) show that there is similarly an increase in household income from shares in solar power operations. Columns (5) and (6) focus on the impact on the number of households that benefit from solar power stations. We observe a more than 30 percent increase relative to the pre-FS level, indicating that income gains were spread across a wider set of low-income villagers after the FS's arrival as well.

In Table 7, we disaggregate investment to look at each funding source as a dependent variable. As is clear from the point estimates, by far the biggest increase associated with $FS = 1$ is from government sources, which is as expected if the FS is better positioned to help their village access resources from higher levels of government. In the even-numbered columns, we disaggregate FS based on the FS's agency, and once again find that the largest benefit comes from FSs drawn from city/province-level agencies and the smallest increase from town-level agencies.

For completeness, we also show event plots for the change in solar investment overall, and for government-funded investment specifically, in Figure 4. In both cases, we can see a clear increase that is timed precisely to the FS's arrival.

6.2 Returns

In our final set of analyses, we look at the determinants of return on investment at the project-level, using the sample of all business-focused projects funded by the government's poverty alleviation funds.

Let $Returns_{tp}$ be the returns for project p in village $v(p)$, realized at time t. We are interested in examining whether returns are higher if the village has been 'treated' with a FS at the time that returns are realized (i.e., $FS_{tv(p)} = 1$). Note that this combines three "types" of investments: those initiated before a FS's arrival ($FS = 0$) with all returns realized also at dates with $FS = 0$; those initiated at $FS = 1$, which by definition also generate returns only with $FS = 1$; and those initiated in years with $FS = 0$, but with returns continuing after the arrival of a FS. For this final type of investment, project selection is done prior to the FS's arrival, but with returns generated both before and after the FS arrives. When we pool all three types, in the analysis we present first, we measure the combined effects of project selection and project management/implementation on returns. We will return to provide suggestive evidence to distinguish between the two, primarily by focusing on the last type of investment, later in this section.

In all specifications, we include a rich set of project-level controls, including project duration (measured in years, starting from the first year of the project), project types (indicator variables for, e.g., crops, photovoltaic power stations, others, infrastructure livestock, poultry, machinery and equipment, orchards, aquaculture, etc.), and operational arrangement.[21]

We report our overall return results in Table 8. In the first two columns, we use raw returns, predicting returns based on FS (column (1)) and indicator variables that account for the FS's level of government (column (2)). Columns (3) and (4) provide the same results, but with inflation-adjusted returns. Focusing on column (1), FSs are associated with an increase in project returns of approximately 2.96 percentage points, a very large gain relative to mean returns of just over 7.6 percent. Once again, we find the benefits to be concentrated among FSs from city/province-level agencies. The results are virtually unaffected (though the point estimates are slightly reduced) by the inflation adjustment.

As we noted at the outset, higher returns may come from better project selection or better management. To shed light on which may be driving our overall returns results, we begin by categorizing

[21] Operational arrangement describes the control and cash flow rights over the project. Possible arrangements include self-managed entities where the village collective directly oversees the project, as well as a range of arrangements in which the collective manages the project (and receives returns) in cooperation with some other entity. These include joint-operation-equity and joint-operation-fixed-income arrangements, in which the village collective works with another entity such as local enterprise or individual business owner, and receives either share-based returns or fixed dividends. The two other categories are rental, in which the collective pays a (fixed) rental fee to the entity that owns the means of production, and "other" (i.e.local public welfare organizations, such as the Women's Federation, public welfare foundations) – a catch-all category covering 16.2 percent of projects.

projects into three types based on project timing and the FS appointment year: (1) *Type A*: Projects that end at or before the year of the FS appointment; (2) *Type B*: Projects that are initiated prior to the FS appointment but continue after their arrival; (3) *Type C*: Projects that start after the FS appointment.

We focus on Type B projects to isolate the effect of project management. Intuitively, these are cases for which all project selection is done pre-FS, and thus we may rule out any project selection effect. By comparing (within-project) returns before versus after the FS appointment date, any observed differences (particularly when we also include project vintage and year fixed effects) can be attributed to differences in FS management. To test for potential selection effects, we focus on the post-FS years for the sample of Type B and Type C projects. For this sample, we hold project management constant, but Type C projects were selected by the FS while Type B projects were not. Thus, any difference in returns between Type C and Type B projects in these later years is plausibly due to different selection by FSs.

Our results are presented in Table A11, where we examine management effects in columns (1) and (2), and selection effects in columns (3) and (4). Focusing first on management effects (i.e., Type B projects), in column (1) we present a specification that includes project-specific controls, as well as village, town-year, and project start date fixed effects.

The point estimate on FS implies that returns are approximately 3.6 percentage points higher when a given project is managed under the direction of a FS. When we add project fixed effects in column (2), the coefficient drops marginally, to 2.73, and is significant only at the 10 percent level.

Turning to the role of selection, we limit observations to those *after* the FS's arrival. We omit the first year of all projects: by definition, those will capture both management and selection effects. We also face the concern that the vintage of Type B projects will be lower than that of Type C projects on average, since we only capture the years after the FS arrives. We account for this in our analysis in two ways. First, we have project vintage fixed effects, so that we only compare projects of the same age. Second, to have a more comparable support of project vintage, we limit the observations that enter into our analysis to those with vintage less than or equal to 5 years (column (3)) or 6 years (column (4)). Our main covariate of interest is an indicator variable, $I(FS\ Selected)$, which is equal

to zero for Type B projects and one for Type C projects. The coefficient in both columns (3) and (4) is negative, though in neither case does it approach statistical significance. [22]

Overall, we take these results to suggest that the improved returns for village investments under the FS is via improved project management rather than better project selection.

7 Conclusion

In this paper, we evaluate the impact of China's First Secretary Program, which deployed bureaucrats from higher-level government agencies to lead village-level poverty alleviation efforts. We see the program as an opportunity to study a program that mixed elements of centralized governance – since all officials had links to higher-level government agencies – with decentralization – as all officials were required to physically reside in their assigned villages throughout their deployment.

While the program was successful overall, our findings indicate a pivotal role for links to higher-level bureaucracies. We base this conclusion on several findings. First, the program had very little impact when the FS was drawn from a lower-level agency, and indeed the largest effects were from those drawn from city or provincial agencies. Furthermore, this pattern is unlikely to be attributable to differential skill across bureaucrats in higher-level agencies: An individual bureaucrat's rank is uncorrelated with FS efficacy, once one accounts for their agency level. Finally, the increase in income associated with the FS program is entirely from income-generating cooperative projects, which often rely on funding and expertise sourced from higher-level governments. Further, as we show with our more detailed data on solar projects, the increased investment associated with the FS program comes mainly from government funding, and is observed primarily for FSs from higher-level agencies.

Naturally, every setting has its distinct features – China has strong and well-funded central authorities; the TPA was a centerpiece of the central government's post-2013 agenda, so officials were well-motivated and incentivized to achieve its objectives. But, broadly speaking, our findings speak precisely to the importance of having some means through which officials that are charged with local implementation can readily interact with those with power to distribute resources, financial or

[22] We obtain qualitatively similar results (i.e., always a negative coefficient on $I(FS\,Selected)$) if we use a shorter window of project vintages.

otherwise. The approach taken in the FS program of drawing officials directly from such agencies appears to offer one possibility, but it is also plausible that other arrangements could serve similar purposes, for example central funding offices devoted to local appropriations requests or centralized expertise provision via agricultural or industrial extension programs.

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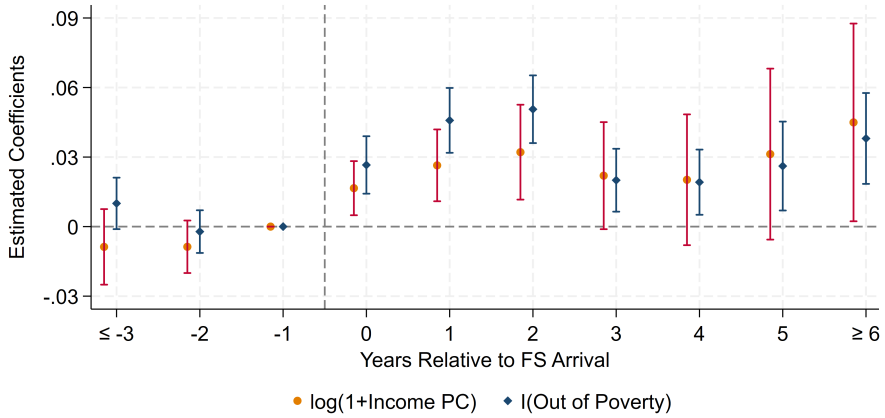
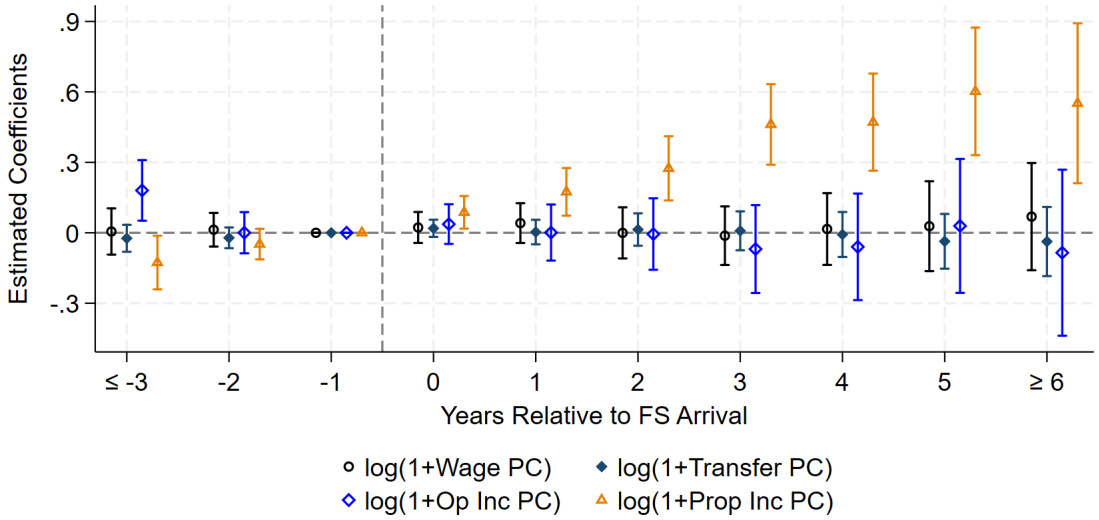
Figure 1: Dynamic Effect of FSP on Household Income



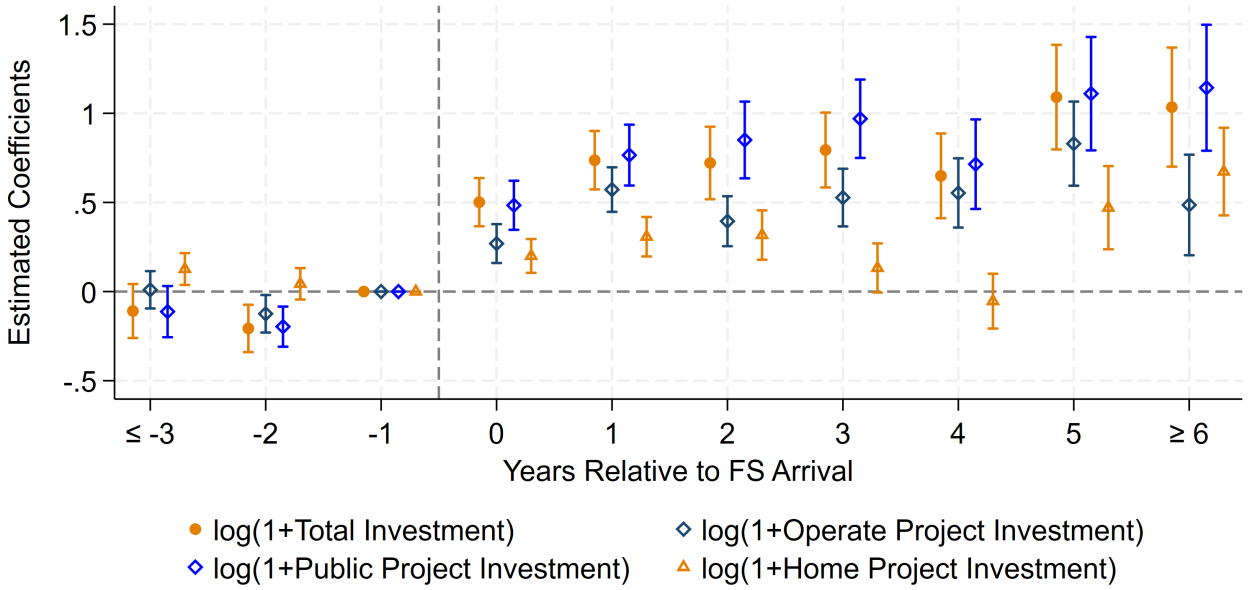
This figure shows coefficients as well as 95% confidence intervals from a regression of the log of per capita income PC or an indicator for income above the poverty line ($I(Out\,of\,Poverty)$) as a function of years since the FS assignment to a given village. Event quarter -1 is normalized to 0. The underlying regression controls for household characteristics, household and town-year fixed effects as in column 3 and 6, Table 2. Standard errors are clustered at the village level.

Figure 2: Dynamic Effect of FSP on Household Income: Decomposition



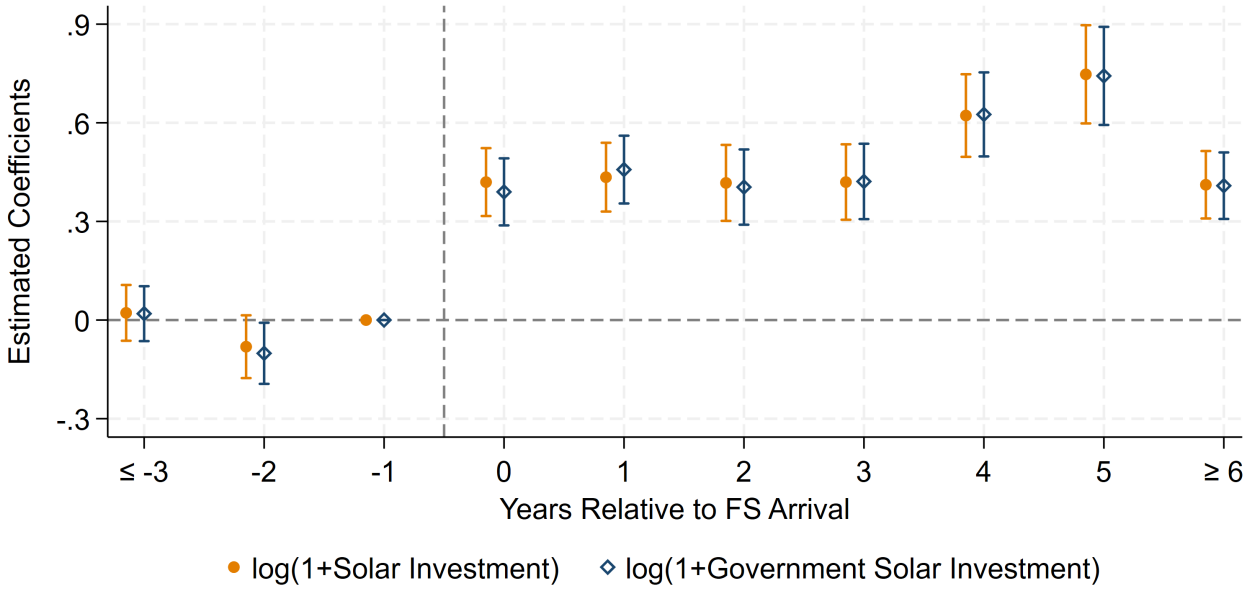
This figure shows coefficients as well as 95% confidence intervals from a regression of each of the four income components as a function of years since the FS assignment to a given village. Event quarter -1 is normalized to 0. The underlying regression controls for household characteristics as well as household and town-year fixed effects, following the specification in column 3, Table 2. Standard errors are clustered at the village level.

Figure 3: Dynamic Effect of FSP on Project Investment



This figure shows coefficients as well as 95% confidence intervals from a regression of total investment and its subcategories including investment in operating projects (e.g., village-level cattle farming and seedling), public projects (e.g., roads, reservoir, village park) and home projects as a function of years since the FS's assignment to a given village. Event quarter -1 is normalized to 0. The underlying regression controls for household characteristics, as well as household and town-year fixed effects as in column 3, Table 2. Standard errors are clustered at the village level.

Figure 4: Dynamic Effect of FSP on Solar Panel Investment



This figure shows coefficients as well as 95% confidence intervals from a regression of solar power station investment and solar investment finance by the government specifically, as a function of years since the FS assignment to a given village. Event quarter -1 is normalized to 0. The underlying regression controls for household characteristics, as well as household and town-year fixed effects as in column 3, Table 2. Standard errors are clustered at the village level.

Table 1: Summary Statistics

Variable	N	Mean	SD	Min	p25	p50	p75	Max
Panel A Household-level Variables								
Income PC	573191	6282	4807	876.7	2844	4550	8374	25191
I(Out of Poverty)	573191	0.486	0.5	0	0	0	1	1
Wage Income	573191	3347	4137	0	0	2000	5000	20000
Transfer Income	573191	2233	2207	0	599.3	1522	3230	10485
HH Prod Income	573191	520.4	1045	-960	0	0	600	6000
Asset Inomce	573191	112.4	374.5	0	0	0	0	4400
TPA Asset Income	573191	39.88	206.2	0	0	0	0	2450
Non-TPA Asset Income	573191	112.4	374.5	0	0	0	0	4400
HH size	573191	3.32	1.695	1	2	3	4	13
Years Education	573191	6.427	2.698	0	6	6.75	8.25	12
No. Workers	573191	1.484	1.092	0	1	1	2	4
No. with Serious Illness	573191	0.747	0.731	0	0	1	1	3
No. with Disablitiy	573191	0.398	0.584	0	0	0	1	2
No. below 5	573191	0.138	0.401	0	0	0	0	2
No. above 65	573191	0.491	0.674	0	0	0	1	2
Panel B Village-level Variables								
First Sectary Assignment								
FS	573191	0.428	0.495	0	0	0	1	1
FS_city	573191	0.08	0.271	0	0	0	0	1
FS_county	573191	0.177	0.381	0	0	0	0	1
FS_town	573191	0.172	0.377	0	0	0	0	1
Village Project Investment								
Total Investment	14696	30.93	74.81	0	0	1.5	21	464.9
Production investment	14696	6.657	19.33	0	0	0	0	123.5
Public investment	14696	16.57	44.64	0	0	0	10	288.9
Home investment	14696	5.702	23.8	0	0	0	0	170
Village Solar Power Station								
Solar Investment	14696	2.955	10.94	0	0	0	0	60
Solar Beneficiaries	14696	1.587	6.919	0	0	0	0	50
Solar Income	14696	0.049	0.221	0	0	0	0	1.43
Gov Solar Inv.	14696	2.866	11.78	0	0	0	0	160.5
Firm Solar Inv.	14696	0.044	0.655	0	0	0	0	32
Donation Solar Inv.	14696	0.049	1.551	0	0	0	0	96
Loan Solar Inv.	14696	0.203	2.316	0	0	0	0	75
Other Village Variables								
No. Relocation	8012	3.528	5.018	0	0	1	5	22
No.Poverty HH	14618	129.2	96.27	5	60	104	171	470
No. with Disability	14618	18.15	11.1	0	10	16	24	54
No. with Social Allowance	14618	40.36	28.24	1	20	34	54	140
No. Minority HH	14618	0.179	0.618	0	0	0	0	4
No. Mandarin HH	14618	127.2	95.33	5	59	102	168	462
No. with Critical Illness Medical Insurance	14618	129	96.17	5	60	104	171	469
No. with Medical Insurance	14618	95.69	102.1	0	2	70	142	445
Distance to Urban	14618	3.442	4.223	0	1.258	2.929	4.767	121.7
Project Return								
Return(%)	9020	7.604	27.44	0	0	0	5.98	791
Return_inf(%)	9020	6.765	24.23	0	0	0	5.305	685.3

This table presents descriptive statistics for variables used in our main analyses. Please see Appendix Table A1 for further details on the income and investment variables. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 2: The Anti-Poverty Impact of First Secretary Program: Baseline Results (Household-year)

	Income PC (log)			I(Out of Poverty)		
	(1)	(2)	(3)	(4)	(5)	(6)
FS	0.0253***	0.0257***	0.0240***	0.0393***	0.0390***	0.0368***
	(0.0069)	(0.0069)	(0.0069)	(0.0054)	(0.0054)	(0.0055)
house_size		-0.0642***	-0.0947***		0.0087***	0.0052***
		(0.0009)	(0.0019)		(0.0009)	(0.0013)
aeducation		0.0087***	0.0099***		0.0046***	0.0013**
		(0.0004)	(0.0007)		(0.0004)	(0.0005)
labor_num		0.0699***	0.0447***		0.0509***	0.0197***
		(0.0016)	(0.0017)		(0.0011)	(0.0011)
diseases_num		-0.0241***	-0.0166***		-0.0200***	-0.0098***
		(0.0013)	(0.0018)		(0.0011)	(0.0014)
disability_num		-0.0351***	-0.0221***		-0.0357***	-0.0043*
		(0.0016)	(0.0032)		(0.0015)	(0.0024)
kid_num		-0.0227***	0.0040*		-0.0187***	-0.0156***
		(0.0017)	(0.0021)		(0.0017)	(0.0016)
old_num		0.0259***	-0.0250***		0.0200***	-0.0020
		(0.0013)	(0.0021)		(0.0013)	(0.0015)
Observations	573,191	573,191	573,127	573,191	573,191	573,127
R-squared	0.7460	0.7610	0.8462	0.5595	0.5777	0.7189
House FE	NO	NO	YES	NO	NO	YES
Village FE	YES	YES	NO	YES	YES	NO
Town-Year FE	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village

This table presents main results for the effect of FSP on household income per capita estimated from a staggered Difference-in-Differences regression in Equation 1. The outcome variables are (1) Income PC (log), the logarithm of household income per capita; (2) I(Out of Poverty), which equals one if the household is out of poverty in year t, and zero otherwise. FS equals one if village i in year t has a first secretary, and zero otherwise. Standard errors are clustered at the village level. Appendix Table A1 presents variable definitions. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: The Anti-Poverty Impact of First Secretary Policy: Heterogeneity Across Levels of Dispatching Agencies and FS (Household-year)

	Income PC(log)		I(Out of Poverty)	
	(1)	(2)	(3)	(4)
Panel A: Levels of Dispatching Agencies				
FS_City	0.0914***	0.0873***	0.0889***	0.0835***
	(0.0120)	(0.0119)	(0.0088)	(0.0087)
FS_County	0.0253***	0.0240***	0.0415***	0.0395***
	(0.0079)	(0.0079)	(0.0066)	(0.0066)
FS_Town	-0.0061	-0.0068	0.0120**	0.0112*
	(0.0076)	(0.0076)	(0.0056)	(0.0057)
Observations	573,191	573,127	573,191	573,127
R-squared	0.7613	0.8465	0.5781	0.7193
Panel B: Administrative rank of first secretary				
High_Ad_Rank	0.0406***	0.0368***	0.0443***	0.0402***
	(0.0116)	(0.0116)	(0.0087)	(0.0087)
Med_Ad_Rank	0.0111	0.0120	0.0228***	0.0236***
	(0.0083)	(0.0083)	(0.0060)	(0.0061)
Low_Ad_Rank	-0.0009	0.0008	0.0137**	0.0146**
	(0.0102)	(0.0103)	(0.0068)	(0.0069)
Observations	573,191	573,127	573,191	573,127
R-squared	0.7610	0.8462	0.5776	0.7188
Panel C: Dispatching agency and administrative rank				
FS_City	0.0897***	0.0856***	0.0852***	0.0799***
	(0.0141)	(0.0139)	(0.0098)	(0.0097)
FS_County	0.0250**	0.0230**	0.0386***	0.0358***
	(0.0098)	(0.0098)	(0.0072)	(0.0074)
FS_Town	-0.0059	-0.0075	0.0093	0.0075
	(0.0096)	(0.0096)	(0.0067)	(0.0068)
High_Ad_Rank	0.0052	0.0035	0.0071	0.0057
	(0.0131)	(0.0130)	(0.0094)	(0.0094)
Med_Ad_Rank	0.0016	0.0036	0.0061	0.0083
	(0.0102)	(0.0102)	(0.0066)	(0.0067)
Low_Ad_Rank	-0.0074	-0.0048	-0.0001	0.0021
	(0.0113)	(0.0114)	(0.0071)	(0.0072)
Observations	573,191	573,127	573,191	573,127
R-squared	0.7613	0.8465	0.5781	0.7193
Controls	YES	YES	YES	YES
Village FE	YES	NO	YES	NO
Household FE	NO	YES	NO	YES
Town-Year FE	YES	YES	YES	YES
Cluster	Village	Village	Village	Village

This table presents the differential effect of the FSP on household income by different levels of dispatching agencies (Panel A), ranks of first secretary (Panel B), and a "horse race" test of the two (Panel C). The outcome variables are (1) Income PC (log), the logarithm of household income per capita; (2) I(Out of Poverty), which equals one if the household is out of poverty in year t, and zero otherwise. FS_City, FS_County, and FS_Town are dummy variables that take the value of one if the FS is from a provincial/city, county, or township agency respectively. High_Ad_Rank (or Med_Ad_Rank or Low_Ad_Rank) is a dummy variable that equals one if the administrative rank of first secretary for village i is high (or middle or low) and zero otherwise. Standard errors are clustered at the village level. Appendix Table A1 presents variable definitions. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: The Anti-Poverty Impact of First Secretary Policy: Decomposing Income (Household-year)

	Dep. Var. = Income PC (log)					
	Wage	Transfer	Operation	Property	Property Income	
					TPA Project	Non-TPA
	(1)	(2)	(3)	(4)	(5)	(6)
FS	0.0149	0.0306	-0.0013	0.1237***	0.1202***	0.1245***
	(0.0396)	(0.0228)	(0.0506)	(0.0436)	(0.0319)	(0.0437)
Observations	573,127	573,127	573,127	573,127	573,127	573,127
R-squared	0.7553	0.6979	0.5535	0.5791	0.5306	0.5783
Controls	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village

This table presents the effect of the FSP on different component of household income. Column (1) – (4) presents the effect on each of four income components, including wage income, transfer income (the total transfer payments from the state, units, and social groups to the household), operation income (obtained through production and management by the family unit, e.g., farming, forestry) and property income (generated through participation in cooperative village-level activities). In column (5) and (6), we further decompose property income based on whether or not it is undertaken as part of the targeted-poverty-alleviation program. FS equals one if village i in year t has a first secretary, and zero otherwise. Please refer to Appendix Table A1 for detailed definitions and further examples of the four income components. (**), (*), and (*) denote significance at the 1%, 5%, and 10% levels, respectively.

Table 5: Channel Tests: The effect of the FSP on different types of project investment

	Total Investment (log)		Production (log)		Public (Log)		Home (Log)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FS	0.6651***		0.4163***		0.6880***		0.1747***	
	(0.0697)		(0.0442)		(0.0729)		(0.0434)	
FS_City		1.7526***		0.8141***		1.9306***		0.5967***
		(0.1125)		(0.0743)		(0.1184)		(0.0753)
FS_County		0.8081***		0.4741***		0.8186***		0.2783***
		(0.0779)		(0.0559)		(0.0805)		(0.0504)
FS_Town		0.0588		0.1883***		0.0314		-0.1136**
		(0.0763)		(0.0528)		(0.0797)		(0.0527)
Observations	14,696	14,696	14,696	14,696	14,696	14,696	14,696	14,696
R-squared	0.6846	0.6965	0.6013	0.6046	0.5924	0.6113	0.6389	0.6453
Village FE	YES	YES	YES	YES	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village	Village	Village

This table examines the effect of the FSP on project investment in the village, including total investment in columns 1 and 2 and the three main subcategories of investment. These include investment in production projects (e.g., village-level cattle farming and seedling, columns 3 and 4), public projects (e.g., roads, reservoir, village park, columns 5 and 6) and investment in home projects (e.g., water supply, home solar electric system, columns 7 and 8). FS equals one if village i in year t has a first secretary, and zero otherwise. Please refer Appendix Table A1 for variable definitions. (**), (*), and (*) denote significance at the 1%, 5%, and 10% levels, respectively.

Table 6: Case Study: Solar Power Station Income (Village-Year)

	Solar Investment (log)		Solar Income (log)		Solar Beneficiaries (log)	
	(1)	(2)	(3)	(4)	(5)	(6)
FA	0.4333***		0.0723***		0.3457***	
	(0.0336)		(0.0058)		(0.0283)	
FS_City		0.6634***		0.1145***		0.4999***
		(0.0547)		(0.0101)		(0.0481)
FS_County		0.5248***		0.0849***		0.4312***
		(0.0394)		(0.0070)		(0.0338)
FS_Town		0.2375***		0.0410***		0.1878***
		(0.0402)		(0.0067)		(0.0336)
Observations	14,696	14,696	14,696	14,696	14,696	14,696
R-squared	0.6005	0.6043	0.5015	0.5058	0.5774	0.581
Controls	NO	NO	NO	NO	NO	NO
Village FE	YES	YES	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village

This table reports the results of the effect of the FSP on investment in solar power stations at the village-year level. We focus on three outcomes: (1) the logarithm of solar power station investment (Solar Investment); (2) the logarithm of income generated from the solar power station (Solar Income) and (3) the logarithm of the number of (beneficiary) poverty households covered by solar power station investment. FS equals one if village i in year t has a first secretary, and zero otherwise. FS_City, FS_County, and FS_Town are dummy variables that take the value of one if the FS is from a provincial/city, county, or township agency. Appendix Table A1 presents variable definitions. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Solar Power Station Investment: Funding Sources

	Gov Solar Inv.		Firm Solar Inv.		Donation Solar Inv.		Loan Solar Inv.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FS	4.5343***		0.0329*		0.2673***		0.0091	
	(0.3994)		(0.0195)		(0.1020)		(0.0559)	
FS_City		5.8354***		0.0453		0.6817**		0.1086
		(0.6785)		(0.0312)		(0.2850)		(0.0913)
FS_County		5.7382***		0.0411*		0.2278***		0.0030
		(0.4840)		(0.0228)		(0.0845)		(0.0640)
FS_Town		2.6715***		0.0188		0.1399**		-0.0253
		(0.5273)		(0.0242)		(0.0709)		(0.0636)
Observations	14696	14696	14696	14696	14696	14696	14696	14696
R-squared	0.5678	0.5700	0.5204	0.5204	0.2221	0.2238	0.5558	0.5559
Village FE	YES	YES	YES	YES	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village	Village	Village

This table reports the results of the effect of the FSP on funding sources (in logarithms) of solar power station investment, including the government investment, investment by (affiliated) firms, donations, and bank loans. FS equals to one if village i in year t has a first secretary and zero otherwise. Appendix Table A1 presents variable definitions. (**), (*), and (*) denote significance at the 1%, 5%, and 10% levels, respectively.

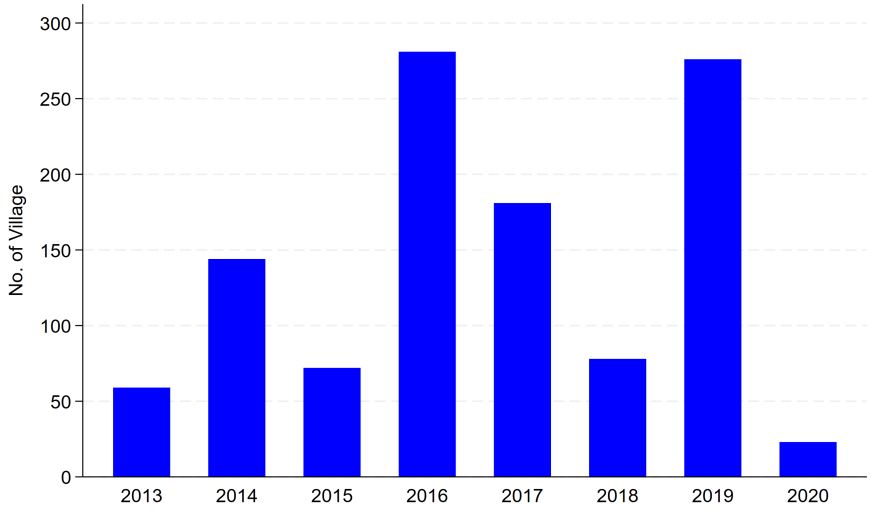
Table 8: First Secretary Policy and Project Return (Project-Year)

	Return (%)		Return(%, infl adj)	
	(1)	(2)	(3)	(4)
FS	2.9594**		2.7579**	
	(1.2240)		(1.1017)	
FS_City		5.7479***		5.3994***
		(2.1286)		(2.0005)
FS_County		2.5572**		2.3814**
		(1.2955)		(1.1676)
FS_Town		2.5550**		2.3668**
		(1.1975)		(1.0694)
Observations	9,020	9,020	9,020	9,020
R-squared	0.4469	0.4470	0.4493	0.4494
Controls	YES	YES	YES	YES
Project FE	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES
Cluster	Village	Village	Village	Village

This table presents the effect of the FSP on village project returns, estimated from a staggered difference-in-differences regression. The unit of observation is the project-year. The sample includes all village-level operational projects funded by the government's poverty alleviation funds. The main outcome variable is Return, which equals project earnings divided by initial investment at year t. We also provide results based on inflation-adjusted returns in column 2, using the national annual inflation rate. The independent variable is FS, which equals one if village i in year t has a first secretary, and zero otherwise, and also FS_city, FS_county, and FS_town, which equal one if the first secretaries are dispatched by city, county, and township level units respectively, and zero otherwise. We control for project duration (measured in years, starting from the first year of the project), project types via a series of indicator variables for each of crops, photovoltaic power stations, others, infrastructure, intercropping, livestock, poultry, machinery and equipment, orchards, aquaculture, water supply network), and operational modes via indicator variables for independent operation, operation dividend type, fixed dividend type, rental/loan, and so forth. Appendix Table A1 presents variable definitions. ***, **, and * denote significance at the 1%, 5%, and 10%, respectively.

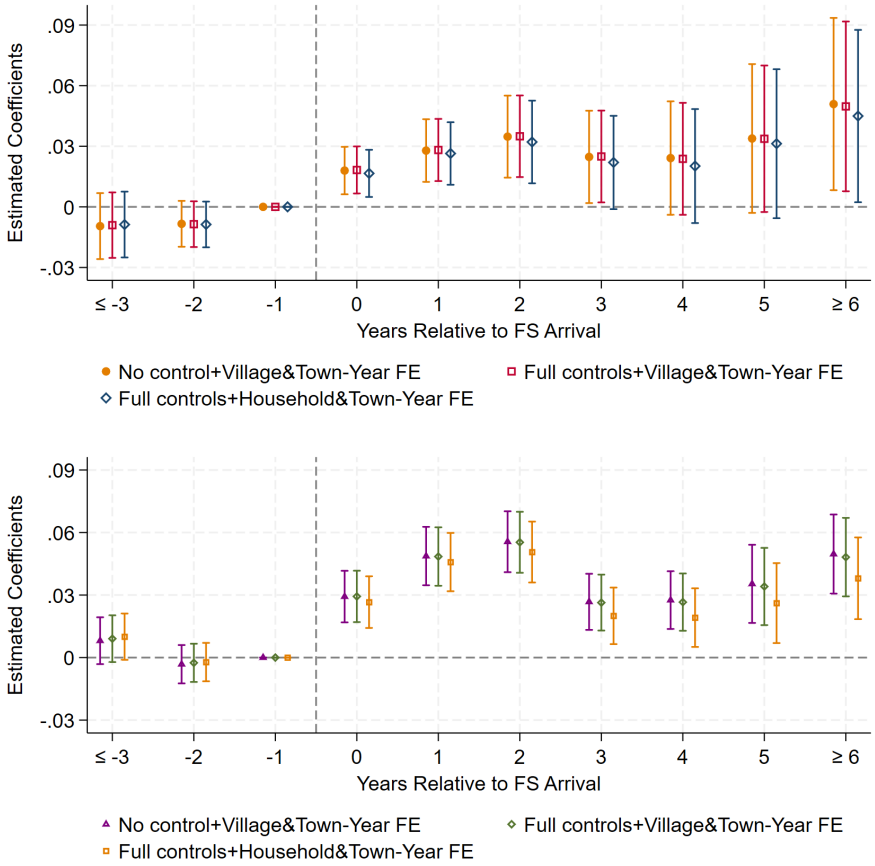
Appendix – For Online Publication Only

Figure A1: FS Assignment by Year



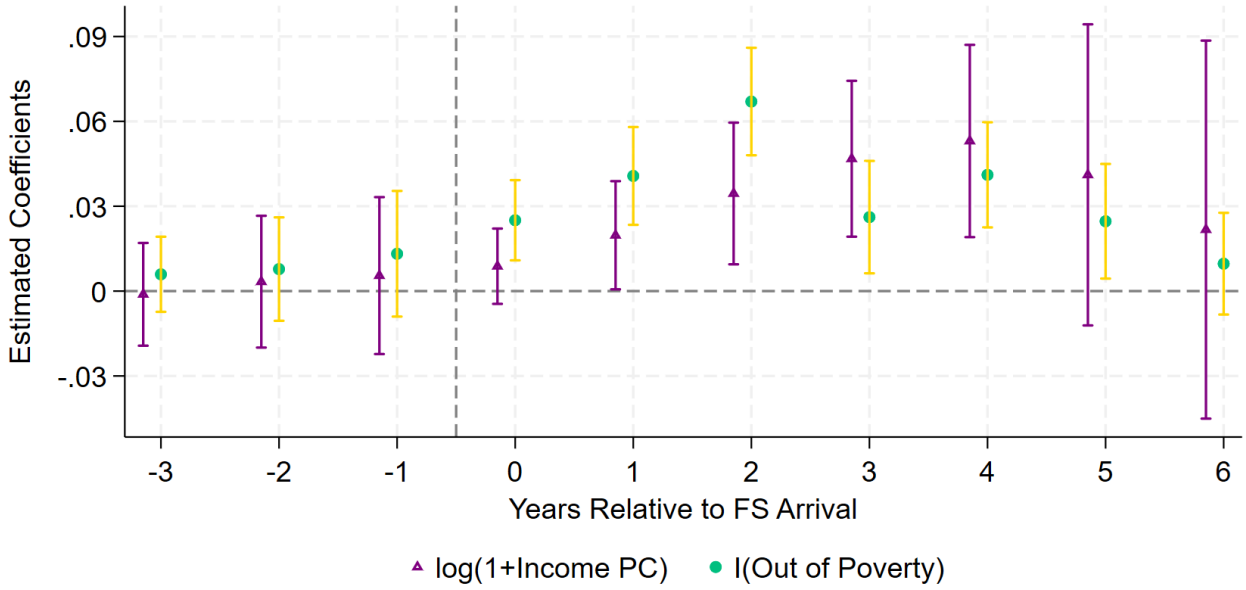
The figure shows the number of villages receiving their first FS assignment between 2013 and 2020.

Figure A2: Event Study Estimates under Different Fixed-Effect Assumptions



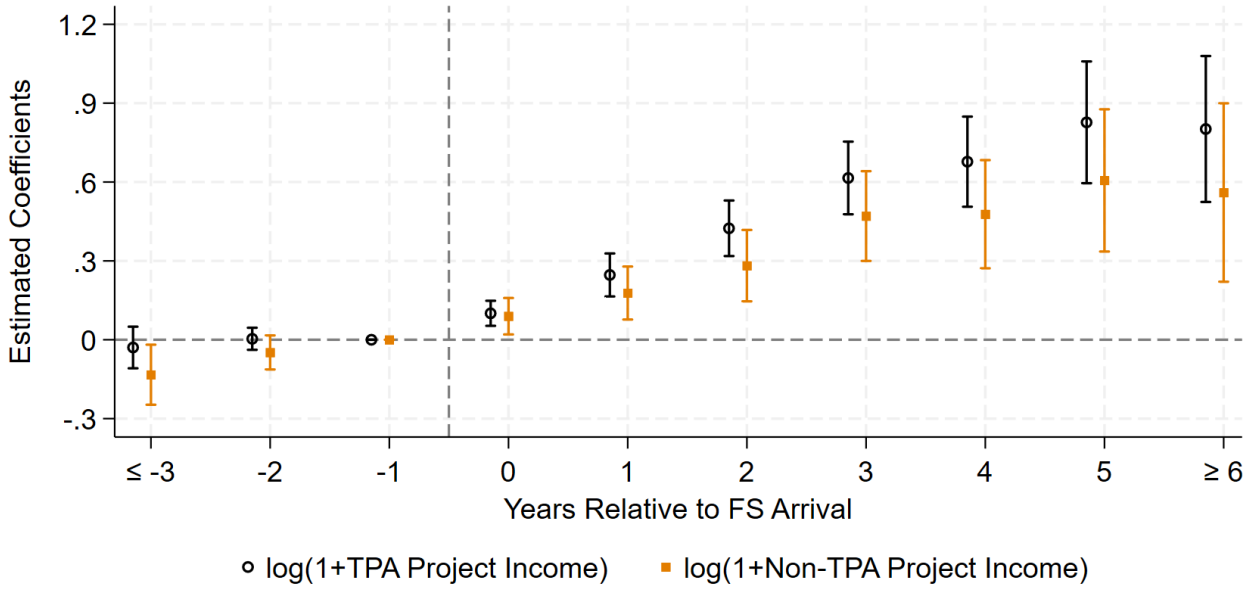
The figure illustrates the coefficients from a regression of Income PC (log) in Panel A and I(Out of Poverty) in Panel B, as a function of the event-year dummies in Equation (2), along with two-tailed 95% confidence intervals based on standard errors clustered at the village level. The point estimates come from three different specifications labeled in the legend (estimates in period -1 is normalized to one).

Figure A3: Event Study Estimates using the estimator of Borusyak et al (2024)



The figure presents the event plots constructed using the imputation estimator outlined in Borusyak, Jaravel and Spiess (2024) for Income PC (log) and I(Out of Poverty). The bars represent 95 percent confidence intervals. Standard errors are clustered at the village level.

Figure A4: Dynamic Effect of FSP on TPA and Non-TPA Property Income



The figure illustrates the coefficients from a regression of property income from TPA and non-TPA projects as a function of the event-year dummies in Equation (2), along with two-tailed 95\% confidence intervals based on standard errors clustered at the village level.

Table A1: **Variable Definitions**

Variable	Definition/Examples
	Panel A Household-level Variables
Household Income	
Income PC	Annual household income per capita (Yuan)
I(Out of Poverty)	Indicator variable whether the household's per capita income is above the poverty threshold designated by the central Government (please refer to footnote 12 for the national poverty standard)
Disaggregated Household Income	
Wage Income	Annual household wage income per capita (Yuan)
Example	1. Ordinary labor income 2. Wage income from employment in farm cooperatives, industrial bases farms, village-level photovoltaic poverty alleviation power stations, etc.
Transfer Income	Annual household transfer income per capita (Yuan)
Definition	Total transfer payments from the state, units, and social groups to the household
Example	1.Rural subsistence allowances, support for the extremely poor 2. Pension insurance 3. Disability subsidies, temporary assistance, winter and spring assistance, distressed children's subsidies, family planning funds
HH Prod Income	Annual household operation income per capita (Yuan)
Definition	Income obtained by the farming household through production and management activities with the family as the production and management unit
Example	1.farming 2. entrepreneurship - including the development of agriculture, forestry, animal husbandry, and fishery breeding, e-commerce sales, setting up street stalls, opening convenience stores, opening restaurants, going out to roast lamb, opening online Taobao stores
Asset Income	Annual household property income per capita (Yuan)
Definition	Income generated through participation in cooperative village-level activities (i.e., enterprises and projects)
Example	1. Dividend income from cooperative village-enterprises 2. Solar power stations 3. Land acquisition compensation (from conversion to commercial use)

Table A1: **Variable Definitions, Continued**

	4. Interest, rent, and patent income from the transfer of property use rights (mostly land leasing)
TPA Asset Income	The portion of property income that is generated from projects or assets financed by poverty alleviation funds from the government (Yuan)
Non-TPA Asset Income	The portion of property income that is not generated from projects or assets financed by poverty alleviation funds from the government (Yuan)
Other Household Characteristics	
HH size	The number of household members
Years Education	Average years of education in the household
No. Workers	Number of laborers in the household
No. with Serious Illness	The Number of members with serious illness in the household
No. with Disability	Number of members with disabilities in the household;
No. below 5	Number of household members aged ≤ 5
No. above 65	The number of household members aged > 65
Panel B Village-level Variables	
First Sectary Assignment	
FS	Equals to one if village i in year t has a first secretary, and zero otherwise.
FS City	Equals to one if the first secretary is dispatched by a city or provincial agency and zero otherwise.
FS County	Equals to one if the first secretary is dispatched by a county agency and zero otherwise.
FS Town	Equals to one if the first secretary is dispatched by a town agency and zero otherwise.
Village Project Investment	
All Investment	Total investment amount for all types of projects in the village
Business Investment	Total investment amount for all business projects in the village

Table A1: **Variable Definitions, Continued**

Definition	Investment in operational projects, including industrial, production and processing facilities, buildings, tourism service facilities, e-commerce service facilities, operational infrastructure, equipment, solar power station, poverty alleviation workshops, village collective enterprises, and new business entities
Example	Village-level cattle farming and seedling
Public Investment	Total investment amount for all public projects in the village
Definition	Investment in public welfare infrastructure and public service fixed assets
Example	Roads, reservoirs, village parks
Home Investment	Total investment amount for all home projects in the village
Definition	Investment in projects that aim to help poor households with production and improve living conditions
Example	Water supply, home renovation
Village Solar Power Station	
Solar Investment	Total annual investment amount ('0000 Yuan) for solar power station
Solar Beneficiaries	Number of impoverished households covered by solar power station investment
Solar Income	Annual income generated from the solar power station
Gov Solar Inv.	Government funding amount ('0000 Yuan) of photovoltaic power station investment
Firm Solar Inv.	Firm funding amount ('0000 Yuan) of photovoltaic power station investment
Donation Solar Inv.	Donation funding amount ('0000 Yuan) of photovoltaic power station investment
Loan Solar Inv.	Bank loan funding amount ('0000 Yuan) of photovoltaic power station investment
Project Return	
Return(%)	Project return defined as the project earnings divided by initial investment at year t.
Other Village Variables	
No. Relocation	Number of households participated in the anti-poverty relocation program in the village.
No. Poverty HH	Number of registered poor household members in the village
No. Minority HH	Number of minority household in the village

Table A1: **Variable Definition, Continued**

No. Mandarin HH	The number of Mandarin-speaking households
No. with Social Allowance	Number of household that receives subsistence allowance
No. with Disability_num	Number of disabled family members
No. with Medical Insurance	Number of residents have commercial medical insurance
No. with Serious Illness	Number of residents have critical illness
Distance to Urban	Distance to the nearest municipality

Table A2: The Composition of Poor Household Sample by Year

Year	2013	2014	2015	2016	2017	2018	2019	2020
No. of Households (year-end)	61,298	67,258	68,163	74,184	75,104	76,123	75,773	75,288
No. of Newly-Added HHs	61,298	6,148	1,107	6,438	1,682	1,736	405	29
No. of HHs removed	0	188	202	417	762	717	755	514

This table shows the dynamics of the poor household sample composition by year with the number of households at year-end along with entry and exit figures

Table A3: Definition for Income Decomposition

Note: Project Income = Operation + Property Income		
Wage Income	Definition	All wage income of all persons in the household for the year
	Examples	1. Ordinary labor income 2. Wage income from employment in farmer cooperatives, industrial bases, farms, village-level photovoltaic poverty alleviation power stations etc.
Transfer Income	Definition	Various transfer payments from the state, units, and social groups to resident families
	Examples	1. Rural subsistence allowances, support for the extremely poor 2. Pension insurance 3. Ecological compensation for returning farmland to forest 4. Disability subsidies, temporary assistance, winter and spring assistance, distressed children's subsidies, family planning funds, etc.
Operation Income	Definition	Income obtained by the farming household through production and management activities with the family as the production and management unit
	Examples	1. Farming households' farming income 2. Farming households' entrepreneurship - including the development of agriculture, forestry, animal husbandry, and fishery breeding, e-commerce sales, setting up street stalls, opening convenience stores, opening restaurants, going out to roast lamb, opening online Taobao stores 3. Household photovoltaic power station income
Property Income	Definition	Income generated through participation in cooperative village-level activities involving capital, technology, and management factors
	Examples	1. Dividend income from cooperative village-enterprises 2. income of village-level photovoltaic poverty alleviation power stations 3. Land acquisition compensation (especially from conversion to commercial use) .

Table A4: Cross-Tab: Personal Administrative Rank and Unit Level

		Unit Level (Low to High)			
		Town or below	County	City	Provincial
Personal Admin Rank (Low to High)	Missing 1	655	875	277	35
	Unranked 2	229	194	59	10
	Ordinary Staff 3	294	406	53	4
	Section member 4	202	96	6	0
	Deputy-Section-Head 5	433	362	104	3
	Section-Head 6	168	136	203	15
	Deputy-Division-Head 7	5	22	55	37
	Division-Head 8	0	4	14	11
	Deputy-Bureau-Director 9	0	0	2	0
	Bureau-Director 10	0	0	4	0

Table A5: Sample City versus Other Cities in China

	Sample City (1)	25th (2)	50th (3)	75th (4)
GDP (Billion Yuan)	160.17	79.83	124.21	220.28
GDP per capita (Yuan)	31530	23669	36954	57402
Manufacturing Sector/GDP	56.08	45.22	51.36	56.59
Service Sector/GDP	35.8	31.09	34.955	40.75
GDP growth rate(%)	13.2	3.4	6.1	10.1
Population(000)	5081	2364	3705	5721
Area(sq km)	19078	7434	12154	18799
Annual Urban Income(Yuan)	39517.68	38523.32	43042.54	48420.26
GDP growth rate (%)	12.79	7.66	10.2	12
Fiscal Expenditure (Billion Yuan)	33.82	16.03	22.34	31.74
Deposit Balance (Billion Yuan)	96.34	49.92	86.56	133.67

This table presents comparison of the characteristics of the city we study veresus the 25th, 50th, and 75th percentiles of all cities in China. The data come from the China City Statistical Yearbook.

Table A6: Probability of FS Assignment: Pre-FS

	FS_Final	Early_Appoint	Start_Year_FS	Rank_FS_Final
No. Poverty HH	0.0210	-0.0225	0.0250**	0.0032
	(0.0255)	(0.0204)	(0.0116)	(0.0065)
No. Minority HH	-0.0783	-0.1639	0.0952	-0.0020
	(0.1061)	(0.1238)	(0.0873)	(0.0375)
No. Mandarin HH	-0.0072	0.0179	-0.0197**	-0.0016
	(0.0203)	(0.0160)	(0.0088)	(0.0047)
No. with Serious Illness	-0.0008	0.0110	-0.0111	-0.0004
	(0.0152)	(0.0124)	(0.0075)	(0.0044)
No. with Medical Insurance	0.0006	-0.0006	0.0004	0.0000
	(0.0013)	(0.0011)	(0.0010)	(0.0004)
Distance to Urban	-0.0114	0.0125	-0.0043	0.0057
	(0.0166)	(0.0122)	(0.0090)	(0.0042)
Observations	1,825	1,111	1,111	1,111
Pseudo R2	0.1043	0.0413	0.0151	0.0138

The probability of FS assignment is estimated using cross-sectional logit models. In column 1, the dependent variable is FS, equal to one if the village has a FS during our sample period, and zero otherwise. In columns 2 and 3, the outcome variables include Start_year_FS, the year when an FS is first appointed and Early_Appoint, which equals one if the first FS of the village is appointed during 2013-2016, and zero otherwise. In column 4, the dependent variable denotes levels of Dispatched Agencies (=1/2/3 if FS is from the city/ county/town level department. The village characteristics, measured in 2013, include No. Poverty HH, No. Minority HH, No. Mandarin HH, No. with Serious Illness, No. with Medical Insurance, and Distance to Urban. See Appendix Table A1 for definitions. ***, **, and * denote significance at the 1%, 5%, and 10%, respectively.

Table A7: The Anti-Poverty Impact of First Secretary Policy: Decomposing Income (Household-Year)

	Dep. Var. = Income PC(log)					
	Wage	Transfer	Operation	Property	Property Income	
					TPA Project	Non-TPA
	(1)	(2)	(3)	(4)	(5)	(6)
FS_City	0.1397*	0.0671*	0.1525*	0.3308***	0.3635***	0.3323***
	(0.0723)	(0.0396)	(0.0910)	(0.0780)	(0.0574)	(0.0781)
FS_County	-0.0187	0.0466*	-0.0590	0.1619***	0.1244***	0.1631***
	(0.0479)	(0.0273)	(0.0607)	(0.0541)	(0.0417)	(0.0543)
FS_Town	-0.0096	-0.0043	-0.0140	-0.0178	-0.0023	-0.0178
	(0.0415)	(0.0244)	(0.0563)	(0.0496)	(0.0381)	(0.0498)
Observations	573,127	573,127	573,127	573,127	573,127	573,127
R-squared	0.7553	0.6979	0.5535	0.5795	0.5315	0.5787
Controls	YES	YES	YES	YES	YES	YES
Household FE	YES	YES	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village

This table presents the effect of the FSP on different component of household income by various levels of dispatching agencies. Columns 1-4 present the effect on each of four income components, including wage income, transfer income, operational income, and property incom. Column 5 and 6 further decomposes property income based on whether it is undertaken via the targeted poverty alleviation (TPA) program. FS_City, FS_County,and FS_Town are dummy variables that take the value of one if the FS is from a provincial/city, county, or township agency. Please refer to Appendix Table A1 for detailed definitions and examples of the four income components. (**), (*), and (*) denote significance at the 1%, 5%, and 10% levels, respectively.

Table A8: FSP and the Anti-Poverty Relocation Program

	Relocation_num		LnRelocation_num	
	(1)	(2)	(3)	(4)
FS	-0.0171		-0.0061	
	(0.0179)		(0.0074)	
FS_City		-0.0363		-0.0121
		(0.0314)		(0.0136)
FS_County		-0.0214		-0.0090
		(0.0188)		(0.0077)
FS_Town		-0.0067		-0.0018
		(0.0169)		(0.0077)
Observations	8,012	8,012	8,012	8,012
R-squared	0.9983	0.9983	0.9928	0.9928
Village FE	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES
Cluster	Village	Village	Village	Village

This table reports the relationship between the FSP and the Anti-Poverty Relocation Program, as captured by the number of households in a village that participated in the relocation program. FS, FS_city, FS_county and FS_town are equal to one if village i in year t has a first secretary, and the first secretaries are dispatched by city, county and township level units respectively, and zero otherwise. Appendix Table A1 presents variable definitions. ***, **, and * denote significance at the 1%, 5%, and 10%, respectively.

Table A9: FSP and Registration of Villagers

	No. Poverty HH		No. with Disability		No. with Social Allowance	
	(1)	(2)	(3)	(4)	(5)	(6)
FS	0.4615		-0.0320		0.5644	
	(0.7956)		(0.1015)		(0.5713)	
FS_City		0.9689		-0.1591		3.8447***
		(1.8572)		(0.2201)		(1.2244)
FS_County		0.6934		-0.0091		0.8242
		(0.9010)		(0.1178)		(0.6829)
FS_Town		-0.0005		-0.0052		-1.0636
		(0.9225)		(0.1246)		(0.6856)
Observations	14,618	14,618	14,618	14,618	14,618	14,618
R-squared	0.9884	0.9884	0.9825	0.9825	0.9277	0.9281
Village FE	YES	YES	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES	YES	YES
Cluster	Village	Village	Village	Village	Village	Village

This table reports the relationship between the FSP and registration of villagers. The dependents variables are *No. Poverty HH*, *No. with Disability* and *No. with Social Allowance*, which are the number of identified poor household members, the number of disabled villagers and the number of Dibao recipients in the village, respectively. FS, FS_city, FS_county and FS_town, are equal to one if village i in year t has a first secretary, and the first secretaries are dispatched by city, county and township level units respectively, and zero otherwise. Appendix Table A1 presents variable definitions. ***, **, and * denote significance at the 1%, 5%, and 10%, respectively.

Table A10: First Secretary Policy and Electricity Use

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A Dep. Var. = Log(Electricity Usage)						
FS	0.0157***	0.0154***	0.0171***	0.0167***	0.0178**	0.0167**
	(0.0058)	(0.0058)	(0.0057)	(0.0057)	(0.0070)	(0.0072)
Observations	532,941	532,941	532,941	532,941	532,941	532,941
R-squared	0.5262	0.5268	0.4210	0.4215	0.4216	0.4222
Panel B Dep. Var. = Log(Electricity Fee)						
FS	0.0159***	0.0154***	0.0174***	0.0169***	0.0170**	0.0158**
	(0.0057)	(0.0058)	(0.0057)	(0.0057)	(0.0071)	(0.0072)
Observations	532,941	532,941	532,941	532,941	532,941	532,941
R-squared	0.5263	0.5270	0.4244	0.4250	0.4250	0.4257
Controls	NO	YES	NO	YES	NO	YES
Year FE	NO	NO	YES	YES	NO	NO
Year-Month FE	YES	YES	NO	NO	NO	NO
House FE	YES	YES	YES	YES	YES	YES
Town-Year FE	NO	NO	NO	NO	YES	YES
Cluster	Village	Village	Village	Village	Village	Village

This table presents the effect of the FSP on electricity use. The unit of observation is household-month. We exclude household-month pairs if monthly electricity usage falls below a certain threshold (30 Kwh per month; results are robust to other choices), as this may indicate the residents are working away from the village. The outcome variables are (1) Log(Electricity Usage), which equals the logarithm of family electric use (in Kwh) in Panel A; (2) Log(Electricity Fee), which equals the logarithm of family electric fee (in Yuan) in Panel B. The main independent variable is FS, which equals one if village i in year t has a first secretary, and zero otherwise. Appendix Table A1 presents variable definitions. ***, **, and * denote significance at the 1%, 5%, and 10%, respectively.

Table A11: First Secretary Policy and Project Return: Selection versus Management Skill

	(1)	(2)	(3)	(4)
Outcome	Return (%)			
Sample	Type-B only		Type B vs C (Post-FS only)	
			2<=Age<=5	2<=Age<=6
FS	3.6218**	2.7288*		
	(1.7896)	(1.6512)		
D(Type-C)			-1.7747	-2.6654
			(3.4061)	(3.4357)
Observations	2,606	2,551	4,231	4,343
R-squared	0.6071	0.8562	0.5460	0.5410
Controls	YES	NO	YES	YES
Village FE	YES		YES	YES
Project Start Year FE	YES		YES	YES
Project FE		YES		
Project Vintage FE	YES	YES	YES	YES
Town-Year FE	YES	YES	YES	YES
Cluster	Village	Village	Village	Village

This table examines the possible channels underlying the FS effect on project performance shown in Table 8. We investigate the potential management effect in columns 1 and 2, in which we focus on type-B projects (those whose project life spans the year of FS appointment) and compare annual project returns before and after the FS appointment, both with and without project fixed effects. We then explore the potential selection effect in columns 3 and 4. Specifically, we focus on post-FS years for type B projects (those with life spans the year of FS appointment) and C (those that starts after the FS appointment) projects, comparing the first N years of B projects with the first N years of C projects, where $2 \geq N \leq 5$ in Column 3 and $2 \geq N \leq 6$ in Column 4. Project vintage fixed effects are included in both columns. The outcome variable is $Return$, which equals the project earnings divided by initial investment at year t, per capita respectively. FS equals one if village i in year t has a first secretary, and zero otherwise. We control for the project duration (measured in years, starting from the first year of the project), project types (with indicator variables for crops, photovoltaic power stations, others, infrastructure, intercropping, livestock, poultry, machinery and equipment, orchards, aquaculture, water supply network), and operational modes (with indicator variables for independent operation, operation dividend type, fixed dividend type, rental/loan and other forms). Appendix Table A1 presents variable definitions. *** p<0.01, ** p<0.05, * p<0.1.