Blessing or Curse: A Study of China's Place-based Pro-agriculture Poverty Alleviation Program*

Zhichao Wei†
Brown University

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Abstract

This paper evaluates the effects of China's second-wave, place-based poverty-alleviation program from 1994 to 2000. The results using regression discontinuity design show that the supported sector---especially grain production and the number of livestock---grew faster in the counties receiving aid compared to those counties not receiving aid. However, this aid also drove people out of other production---especially non-farm activities---that played an increasingly important role in rural earnings. Thus, the supported counties had a greater increase in agricultural income, but that increase might be almost mediated by a smaller increase in other income sources, causing the overall effect on income to be negligible. The paper suggests that the traditional place-based policy in China caused significant distortions and that a more efficient way of helping the lagging regions is needed.

Key words: Poverty Alleviation, Lagging Regions, Regression Discontinuity

JEL: H0, O1, Q1

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† Department of Economics, Brown University, Providence, RI. Email: Zhichao_Wei@brown.edu

1 Introduction

The inequality in regional development is one of the most pressing socioeconomic problems that governments face in both developed and developing countries. Equity considerations have led to policies and programs for disadvantaged regions and/or the populations in those regions. Some well-known examples are America's Appalachian Regional Development Program, Brazil's SUDENE program in its earlier years, and, more recently, the European Union's Structural Funds and Cohesion Funds, and Mexico's Oportunidades. Even now, people continue to hotly debate the proper approach to help the lagging regions. Should help go to distressed places or to distressed people? The standard argument among economists, as Glaeser and Gottlieb (2008) clarify, is that people-based policies of supporting job training and facilitating household mobility are far superior to potentially wasteful place-based policies. However, place-based programs are still widely implemented, and existing ones continue to expand (Greenbaum and Landers, 2009). Well-known examples include America's Empowerment Zone Program and the European Union's Regional Policy Program.

Although there are many reasons, such as political concern, for expansion, as Greenbaum and Landers (2009) argue, a key factor is that solid evaluation of the programs is rare (Greenstone and Looney, 2010). People may reach very different conclusions simply because they use different estimation strategies in their analyses[1]. Simple OLS regression—especially the fixed-effect model—is widely used, but the estimate is very likely to be biased since the lagging regions are, in general, different from other regions. Matching could be an option, but it relies on the strong assumption of conditional independence,

[1]For example, there is disagreement over the effect of the Appalachian Regional Development Program (ARDP). Isserman and Rephann (1995) constructed a "twin" county to serve as the counterfactual and found a seminal positive effect of the program. However, Glaser and Gottlieb (2008) adopted a more standard multivariate regression model in their analysis and found little evidence of ARDP's effectiveness. Ziliak (2010) used a differences-in-differences-in-differences approach and again found a positive effect. Another example is that Greenbaum and Landers (2009) found that multiple evaluations of California's Empowerment Zone Program came to varying conclusions.

which is difficult to hold. Valid IV estimates are still very rare in the literature[2]. Governments typically spend large and ever-growing amounts on these programs, and not having a rigorous estimate to justify these expenditures is a serious problem[3].In addition, although there is extensive theoretical and empirical literature on the effects of these programs, very few papers have tried to pin down the mechanism of the programs and have focused, instead, on an overall evaluation[4]. In general, the programs target some specific industries or firms. It is interesting to know the programs' effects on those industries or firms, and it is equally interesting to know their effects on other, unsupported industries or firms. In addition, it is more important to know how these effects occur and through what channels. However, such discussion is very rare. Partly because of that, the discussion of why the programs are effective or ineffective lacks solid evidence. Thus, policy makers can easily disregard the little focused research that exists since it fails to provide clear recommendations for program improvements.

China is no exception to this. Regional inequality has continued to increase since the mid-1980s and remains a worry for China's government (Fan et al., 2010). Between 1986 and 2010, the government launched three waves of large-scale, place-based poverty-alleviation programs to help poor regions. These programs focus mainly on helping rural households with agricultural production[5], with the objective of increasing their income[6].

[2]Criscuolo et al. (2009) exploited multiple changes in the area-specific eligibility criteria and constructed an IV to estimate the effect of the Regional Selective Assistant Program in the U.K.

[3]The Appalachian Regional Committee disbursed $13 billion in the thirty years after 1965. Brazil's government provided $10 billion in subsidized loans for the SUDENE program between 1989 and 2002. The latest Structural Funds and Cohesion Funds of the European Union for the programming period 2007-2013 have already reached 347 billion euros.

[4]Bondonio and Greenbaum (2007) is one of the few exceptions that discuss the program effect more than the overall evaluation. They found that the state Empowerment Zone Program had positive effects on the new and existing establishments, but had negative effects on firms that close or leave the area. They argue that this is the reason they get the null overall mean impact in their estimation.

[5]At first, the program funds were used mainly for household agricultural production. In the late 1980s, the emphasis switched to supporting TVE and other county enterprises. In the mid-1990s, agricultural production became the focus again. Wang (2004) and Rozelle et al. (1998) have more details on that.

[6]Before 1978, China followed the Soviet industrialization strategy, which involves taxing agriculture to fund industrial investment. After the 1978 reform, the elimination of the exploitative taxation of agriculture helped agriculture develop very quickly between 1978 and 1984. In the 1980s, agriculture played a far more important role than other sources in reducing poverty and improving income in rural

More importantly, food security is always a top concern of China's government, and it is harder for the poor regions to be self-sufficient. Therefore, grain production is always the main focus of government programs. In particular, in the mid-1990s, grain production was regarded as the top priority due to concerns about the high price of grain.[7]. China's governments took lots of measures to guarantee the goal of maintaining grain sufficiency. Few observers deny that China made remarkable progress in its war on poverty after the reform. We know that the lagging regions in China have grown very fast and that a lot of people have gotten out of poverty. However, we are not clear about the role of the poverty-alleviation programs in this process. The questions remain: Have these programs been effective? Why or why not? Good answers to these questions can help guide policy makers in their future decisions regarding poverty alleviation.

So far, a few papers have evaluated the programs, and they suffer from the limitations listed above. Rozelle et al. (1998, 2003) used fixed-effect regression and found that the program had a modest positive effect on agricultural production in Shaanxi Province from 1986 to 1991 and in Sichuan Province from 1985 to 1995, respectively. Fan et al. (2002) used provincial-level panel data from 1970 to 1995 and found that poverty investments (measured as poverty loans) matter somewhat for growth and poverty alleviation. Park et al. (2002, 2010) used matching in their analysis and found the programs' effect decreasing over time, even though the poverty-alleviation funds kept growing[8]. Li and Meng (2010) used a regression-discontinuity approach and found a positive effect between 1994 and 2004. However, all of these papers focused only on the estimation of the overall effect of the program on income or production. They said little about the program's effect on other characteristics. Thus, we are still unclear about why the programs were effective or

China (Ravallion and Chen, 2007). That is the reason why China's poverty-alleviation program focused on agricultural production.

[7]The grain price increased dramatically in late 1993, and the high price continued until 1997.

[8]They found that in the included counties or communities, per capita income increased by 2.28 percent per year between 1985 and 1992 and by 0.91 percent between 1992 and 1995, but by almost zero between 2001 and 2004, even though program funds kept increasing.

ineffective.

This paper aims to fill the research gap with a more rigorous and comprehensive analysis based on the general-equilibrium framework. It evaluates China's second-wave poverty-alleviation program from 1994 to 2000,[9] which focused on agricultural production, especially grain production. In 1994, the poverty-alleviation program was expanded, and newly-targeted counties were included based on their per capita rural income. If the county's per capita rural income was below 400, then it was, in principly included. We make use of the discontinuity of program assignment at the eligibility threshold to construct an instrumental variable for the actual treatment status, as Li and Meng (2010) do in their paper. Utilizing 11-year, county-level panel data, the IV estimation results show that the poverty-alleviation program did have a positive impact on grain production and agricultural income. However, the program attracted more rural labor out from township and village enterprises(TVE), and thus, had a crowding-out effect on rural industrial production. More importantly, the treated counties benefited from the support to agriculture and the unusually high prices of agricultural goods from 1994 to 1996. However, they lagged behind the untreated counties in industrial production, which proved to be more important in the future. As the prices of agricultural products dropped after 1997, the benefits of more agricultural production got smaller, and the gaps in non-farm activities might have gotten larger, possibly making the supported counties worse off in the long run.

This paper also has implications for the regional-development literature. First, it is one of the few papers that provide rigorous evidence by dealing with the endogeneity problem. The results show that the place-based regional policy did not work well in China from 1994 to 2000. More importantly, other than getting the estimate of the overall effect on the income variable—as most of the other papers do—this paper tries to

[9] The poverty-alleviation program had three waves: 1986-1993, 1994-2000, and 2001-2010. I will talk more about that in Section 2.

pin down the mechanism through analyzing the general equilibrium effect of the poverty-alleviation program. It reveals that the pro-grain program caused distortion in favor of grain production and that it harmed other production, especially the non-farm activity that would play a more important role in rural income later on. In addition, the paper shows that factor (labor and capital) mobility is the channel of the distortion ignored in the literature. Furthermore, it reveals that place-based strategy lacks flexibility since the support was still agriculture-biased even when the grain price fell after 1997.

This paper sheds light on the prospect of helping lagging regions in China which experienced a big transition from agricultural to industrial economy. Although pro-agriculture or pro-grain policy worked well to fight poverty in the 1980s (Ravallion and Chen, 2007), it might not have been a good option in the mid-1990s—or beyond. In a transitional economy like China, it is hard to always choose the right industry to support. A better option is people-based strategy which has more flexibility. People can respond to changes more quickly and make adjustment to adapt to the new environments faster than the government. Furthermore, when a large-scale program is designed, the general equilibrium effect and factor mobility should be taken into consideration.

The paper is organized as follows: Section 2 describes the policy background. Based on that, in Section 3, I construct a simple model to clarify the mechanism and make some predictions. Then, I discuss the data I use in the paper in Section 4, and in Section 5, I present the empirical strategy and the results. Finally, I offer concluding remarks.

2 Background

2.1 Time line of the program

After the mid 1980's, inequality grew as the economy developed in China. Fan et al. (2010) show that the Gini and Theil index of regional inequality kept increasing after mid 1980's (Figure 1). China's government was concerned about this and wanted to help the

poor. So, in 1986, it launched the first-wave large-scale poverty alleviation program targeting more than 200 counties, called the National Designated Poverty (NDP hereafter) Counties[10]. The government put a lot of resources into those NDP counties for improving rural infrastructure and agricultural production conditions, hoping that these improvements would help the poor in the long run. In 1993, the central government decided to expand the program, called the 8-7 plan, to include 592 counties, which accounted for 28 percent of the total counties in China. These 592 counties continued to receive support from 1994 to 2000. In 2001, the government made some changes to the program[11], and the program went on until 2010. This paper will focus on the second-wave program, which took place from 1994 to 2000, since many counties were added to the program during that period. Figure 2 shows the geographical distribution of the NDP counties in this wave—most of them located in the central or the west region of China, both of which are regarded as relatively poor.

2.2 Measures of the program and achievement

The poverty alleviation program was a preferential policy focused on developing agricultural production and improving living and production conditions. Former President Jiang Zemin gave a keynote speech at the Poverty Reduction Conference in 1996 stating the emphasis of the poverty alleviation program: Grain production was the top priority, and other crops and animal husbandry should be developed only if grain self-sufficiency was not a problem. Beyond that, the rural processing industry could develop to some extent.[12].

[10] Every year after 1986 and until 1990, some new counties were added to the list. In 1990, the total number was 331.

[11] There are two important changes. First, the government removed some counties and added others to the list based on some criteria. Second, the government targeted more on villages or communities instead of counties. For the details and the evaluation, please see Park and Wang (2010).

[12] Specifically, as Wang et al. (2004) point out, the goals of the 8-7 plan were to: (1) assist poor households with land improvement, increased cash crop, tree crop and livestock production, and improved access to off-farm employment opportunities; (2) provide most townships with road access and electricity, and improve access to drinking water for most poor villages; and (3) accomplish universal primary education and basic preventive and curative health care.

Specifically, the support package contained three different instruments: subsidized loans, food-for-work (FFW), and Ministry of Finance development grants. The interest rate, which was set by the Central Bank of China, was well below the market rate, as Table 1 shows. In addition, the CPI was quite high in the early 1990s, so the real interest rate was, in fact, negative before 1997. The farmers mainly used the loans to by or rent the agricultural machines[13], buy fertilizers, buy various agricultural seeds or young livestock. The second most important program was the food-for-work (FFW) projects. [14]. Building roads, constructing terraced fields, improving soil, building small-scale hydraulic engineering projects (e.g., drains and ditches), and improving the drinking-water and irrigation systems were supposed to improve the infrastructure and agricultural production conditions. The third instrument, Ministry of Finance development grants, was intended to boost rural development in general.[15].

The amount of poverty alleviation funds kept increasing in nominal values and went up dramatically after 1997 (Table 2). In addition, from table 2 we can see that the subsidized loan program, accounting for over one half of the total poverty funds while the other two programs account for 20-30% respectively. According to Wang et al. (2004), in 1996, for example, the program provided 11.6 billion yuan (or $1.4 billion), an amount equal to five percent of central government expenditures and more than five percent of the rural household income in poor counties. Table 3 shows that poverty alleviation funds were equal to 30 percent of the total fiscal revenue for NDP counties, on average. The government had strict control over the allocation of these funds. For FFW and development grants, the process is like the following: first, the village officials collected information

[13]The agricultural machinery includes various sizes of tractors, tractor-towing farm machinery, loader, harrow, harvester, milling machine, sprayer, etc.

[14]FFW is widely regarded as a good method to help the poor. It not only builds up material foundations for regional economic growth, but also provides short-term job opportunities and income for the poor. For the details of FFW in China, please refer to Zhu and Jiang (1994).

[15]In reality, its focus was the improvement of the rural infrastructure, the extension of new agricultural technology or better seeds, the training of farmers, and the improvement of education and health conditions.

from the farmers, wrote proposals and submitted them to the township government. The township officials chose the proposals to send to the next level, the county government. The corresponding professional departments then examined the proposals and forwarded their selections to the county officials for approval. If approved, the proposals were then forwarded to the prefectural- and provincial-level governments. The provincial governments made the final decision and then transmitted the funds downward to the county officials and through the successive levels. The subsidized loan is a little different. It is mainly manged by the Agricultural Bank of China (ABC thereafter), one of the state-own big banks in China. County-level ABCs worked closely with county-level governments and managed the final allocation and utilization of the subsidized loans. Specifically, to qualify for subsidized loan, a project needed first to be approved by county-level governments, and then confirmed by county- level ABC, which could reject the project based on its risk.[16]

The proposals had to survive several rounds of screening, and the government used this procedure to guarantee that the funds would be used to improve agricultural production and living conditions, as the government expected. The central government thought that agricultural production, especially grain production, played a central role in increasing rural farmers' income, so they tended to approve proposals that had promised for improving agricultural production and grain production in particular. Especially after 1996, in order to prevent the misuse of money, the central government put more effort into monitoring how funds were actually used.

The government pronounced the program a great success, especially in agriculture and infrastructure.[17]. In its official summary report issued in 2001, the government described the 8-7 plan's major achievements: 601 billion mu (100 billion acres) of basic farmland

[16] Wang et al. (2004) describe the programs in more detail.

[17] There is no detailed information about the allocation of the poverty alleviation funds before 1997. Wang et al. (2004) find that between 1998 and 2001 in 519 counties, 46 percent of poverty funds were allocated to agriculture, 20 percent to infrastructure, 14 percent to industry, six percent to transportation and three percent to education and health care.

were formed; 535 billion people's and 484 billion livestock's drinking-water problems were resolved.

2.3 Program Assignment

The choice of counties to participate in the program was based on a set of characteristics, especially in the first-wave program, with the rural net income per capita[18] being the most important one[19]. In 1993, the central government decided to expand the coverage to include 592 counties. The announced standard was that the new NDP counties' rural net income per capita had to have been below 400 in 1992. One political concern was that the counties included in the first-wave program were difficult to remove from program. The cutoff for them was a net per capita income of 700[20]. The expansion was approved in 1993, and the 1992 rural net income per capita had been released before the meeting. So, although the county officials had an incentive to manipulate the index data, they were not able to.

2.4 China's structural change and grain policy

To understand the effect of the program, it helps to know the background of China's development in this period. China's development after the reform can be divided into several stages: 1978-1984, 1985-1992, 1993-2002, and 2003-present. In the first stage, the contribution of agriculture was very large (Lin, 1992; Fan, 1991; and others). China's central government initiated further reform in 1992, and China began to experience big structural change in the early 1990s. The panel A of Figure 3 describe the changes

[18] The formula of calculating the rural net income per capita is rural net income per capita= (Total income- Operation fee-Tax-Fee-Depreciation-Survey subsidy-Gifts to relatives and friends)/ number of household residency. Each year, the rural household survey team of NBS randomly chose 100 households in each county and calculated the rural net income per capita based on the formula.

[19] The NDP's rural net income per capita should have been below 150 yuan in 1985. The cutoff was raised to 200 for revolutionary counties and counties with large minority populations and to 300 for the minority counties in Inner Mongolia, Qinghai and Xinjiang. As Park et al. (2002) point out, the standard was not strictly enforced.

[20] It turned out that only 30 counties were removed from the list.

of the of various components in rural net income per capita. We can see that the wage income went up dramatically after 1994 and kept increasing much faster than other income sources. It even surpassed the plantation farming as the major source of earnings in 2003. As shown in panel B of Figure 3, the share of wage income increased from around 20 percent in the early 1990s to 40 percent in 2009, while the share of plantation decreased from around 50 percent to 30 percent over the same period[21]. These figures indicate that China experienced a big change towards non-farm activities after the early 1990s. Not only the urban, but also the rural residents were affected by and benefited from the transformation. Based on the above figures, it is natural to assume that we should reconsider the tradition of supporting agricultural production in the poor areas.

China has a long history of concern of grain production. Grain insufficiency was always the cause of farmers' uprisings in feudal China. In 20th century, the big famine in 1959-1961 haunts the Chinese leaders. Food security is always a social hot topic in China. So the grain production was always one of the top priorities of China's government. In 1993, China initiated further reform in the circulation system of agricultural products[22]. However, as Figure 4 shows, in late 1993 and early 1994, the grain price unexpectedly went up dramatically[23]. At the same time, the inflation rate was also very high, and the government was concerned because of the big problems caused by the inflation of 1988. They thought that the inflation might be due to the shortage in supply, so they raised the procurement price by a great amount, hoping to stimulate grain production. However,

[21] As Cai and Wang (2009) pointed out, the contribution of wage income to rural income is underestimated because some rural migrants are not counted as rural residents if they stay longer than half a year in the urban areas.

[22] For more details, please see the Appendix.

[23] There are a few reasons for that. The most important reason is related to the inflation expectation. The inflation rate in 1993 was very high (14.7% for 1993, 24.1 for 1994, 17.1% for 1995). The farmers expected the increase and preferred to hold up the stock so the grain supply was less in the market. At the same time, the buyers expected the price increase and tried to buy more grain so the grain demand was more in the market. Thus the price increased. In addition, grain self-sufficiency was loosed a bit in that period so the coastal regions gave up grain production and bought the grain from inland regions which caused the grain price in inland regions to go up. The inland regions tried to block the market trade but failed. Furthermore, international grain price increased at the same time.

The price increase continued[24], and Lester Brown's 1995 book, "*Who will feed China*?", only intensified the worry of China's leaders. The provinces were required to attain self-efficiency, and the government promised to buy any amount of grain at the procurement price, which was was very close to the market price, especially before 1997. However, the high price of grain did not last long and the grain price dropped sharply after 1997[25]. Because of that, income from agriculture increased significantly from 1993 to 1997 and leveled off after that.[26]

3 The Model

This section develops a simple general-equilibrium framework for understanding the effects of the poverty alleviation program. A key feature of the model is that the effects of agricultural development are mediated by labor flows, which might not be expected. Suppose that a rural household can choose to either work in agricultural sector or industrial sector. The agricultural sector was supported by the government. When the program kicked in, the food-for-work and the public infrastructure construction improved the production conditions of the agricultural sector. In addition, it was easier for the agricultural sector to get subsidized loans. I want to use this model to show how that will affect the flows of factors (capital and labor) and, thus, the production in each sector and overall income. Specifically, I will show that labor and capital will flow to the agricultural sector, and, thus, the output in this sector increases. In addition, labor flows out of the industrial sector.

Below are the key assumptions of the model:

[24] It intensified farmers' expectation of price increase which drove the price to be higher. Regarding the reasons for the price increase please see Johnson and Song, 1999; Lu, 1999; and Lu and Peng, 2002.

[25] There are two major reasons for the price drop. First, the inflation rate went down a lot in 1996-1997 so the farmers do not hold up the stock any more. Second, the government bought a lot of grain with hight prices in 1994-1996 and accumulated a huge loss which was not sustainable so the government changed the policy and furthered the reform.

[26] For the detailed information of the grain price in this period in China, please refer to Huang et al. (2006).

- Two sectors: The household is self-employed and engages in agricultural and industrial production. In the agricultural sector, the rural household in China does not hire laborers for its agricultural production. In the industrial sector, most laborers work in TVEs before the mid-1990s. Most of TVEs were collectively owned so it can be assumed that they are self-employed. Some of the farmers were wage earners and their numbers kept increasing in the late 1990s when the privatization began. For simplicity, I assume that rural people were self-employed[27].

- The capital price is fixed. In the 1990's, the capital price was determined mainly by the central government. From another point of view, the "poor counties" can be regarded as a "small economy" whose scale will not have an impact on the capital price at the national level. In addition, since the capital markets were separate for the agricultural and industrial sectors in China I assume that the capital is not interchangeable across sectors.

- Closed labor market: The household could freely allocate their labor in those two sectors. The labor market was closed locally. This assumption, together with the first one, simplifies the analysis in the sense that the "treatment effect" is constrained within the "poor counties" by cutting off the flow of labor and capital cross the treated and untreated counties. Therefore, before continuing, it is worth clarifying that the "general-equilibrium" refers to the interaction between sectors within the "poor counties."

3.1 Parameterization of production functions

Assume that the production function is Cobb-Douglas in both sectors. To ensure an interior solution of the optimization problem, assume that the productions have decreasing returns to scale. Specifically, assume that the production function of the agricultural

[27] I can assume they are wage earners as well but the change of assumption will not affect the conclusion.

sector is

$$F = f(K_1, L_1) = A_1 K_1^{\alpha} L_1^{\beta} \tag{1}$$

where A_1 is the TFP in the agricultral sector. Decreasing returns to scale requires that $\alpha + \beta < 1$.

Similarly, for the industrial sector, I assume that the production function is

$$G = g(K_2, L_2) = A_2 K_2^{\theta} L_2^{\delta} \tag{2}$$

where A_2 is the TFP in the industrial sector and is assumed to be exogenous at this point. $\theta + \delta < 1$.

Note that in this model, K_1 and K_2 are not interchangable. Assumption 2 implies that the capital prices r_1 and r_2 are exogenous. Assumption 3 implies that labor can flow across sectors freely within the county's border. Therefore, in equilibrium, we must have

$$w_1 = w_2$$

$$L_1 + L_2 = \bar{L}$$

where w_1 and w_2 are the implicit wages for the two sectors respectively.

Assume that the price of the final product of the agricultural sector is 1, and that of the industrial sector is p. The maximization problem can be set up as follows:

$$Max : I = A_1 K_1^{\alpha} L_1^{\beta} + p A_2 K_2^{\theta} L_2^{\delta} - r_1 K_1 - r_2 K_2$$

s.t.

$$L_1 + L_2 = \bar{L}$$

Based on the background above, we know that the program gave rural people subsi-

dized loans in the treated counties. We can characterize that as the decrease of r_1. In addition, the government also helped rural people improve agricultural production conditions. We can characterize this as the increase of A_1. So, we want to see how the decrease of r_1 and the increase of A_1 affect other variables such as the capital use and labor allocation in the two sectors. More importantly we want to know the effect on income.

3.2 Comparative Statics

Set up Langrangian as

$$\mathcal{L} = A_1 K_1^{\alpha} L_1^{\beta} + pA_2 K_2^{\theta} L_2^{\delta} - r_1 K_1 - r_2 K_2 + \lambda(\bar{L} - L_1 - L_2)$$

The FOCs are

$$\frac{\partial \mathcal{L}}{\partial K_1} = \alpha A_1 K_1^{\alpha-1} L_1^{\beta} - r_1 = 0 \tag{3}$$
$$\frac{\partial \mathcal{L}}{\partial K_2} = \theta p A_2 K_2^{\theta-1} L_2^{\delta} - r_2 = 0 \tag{4}$$
$$\frac{\partial \mathcal{L}}{\partial L_1} = \beta A_1 K_1^{\alpha} L_1^{\beta-1} - \lambda = 0 \tag{5}$$
$$\frac{\partial \mathcal{L}}{\partial L_2} = \delta p A_2 K_2^{\theta} L_2^{\delta-1} - \lambda = 0 \tag{6}$$

Solving it, I get

$$r_1 = B(\bar{L} - L_1)^{\frac{1-\delta-\theta}{1-\theta} \cdot \frac{1-\alpha}{\alpha}} {L_1}^{-\frac{1-\alpha-\beta}{\alpha}}$$

while $B = \alpha\beta^{\frac{1-\alpha}{\alpha}} \delta^{-\frac{1-\alpha}{\alpha}} \theta^{-\frac{\theta}{1-\theta}\frac{1-\alpha}{\alpha}} A_1^{\frac{1}{\alpha}} {A_2}^{-\frac{1}{1-\theta}\frac{1-\alpha}{\alpha}} r_2^{\frac{\theta}{1-\theta}\frac{1-\alpha}{\alpha}}$

$$\frac{\partial r_1}{\partial L_1} = B(-\frac{1-\delta-\theta}{1-\theta}\cdot\frac{1-\alpha}{\alpha}(\bar{L}-L_1)^{\frac{1-\delta-\theta+\delta\alpha+2\theta\alpha}{(1-\theta)\alpha}}L_1^{-\frac{1-\alpha-\beta}{\alpha}} - \frac{1-\alpha-\beta}{\alpha}(\bar{L}-L_1)^{\frac{1-\delta-\theta}{1-\theta}\cdot\frac{1-\alpha}{\alpha}}L_1^{-\frac{1-\beta}{\alpha}}) < 0 \tag{7}$$

so we know that $\frac{\partial L_1}{\partial r_1} < 0$ as well. And we know immediately that $\frac{\partial L_2}{\partial r_1} > 0$, $\frac{\partial K_1}{\partial r_1} < 0$, $\frac{\partial K_2}{\partial r_1} > 0$, $\frac{\partial F}{\partial r_1} < 0$, $\frac{\partial G}{\partial r_1} > 0$ and $\frac{\partial I}{\partial r_1} < 0$.

Similarly, I can get $\frac{\partial L_1}{\partial r_1} > 0$, $\frac{\partial L_2}{\partial A_1} < 0$, $\frac{\partial K_1}{\partial A_1} > 0$, $\frac{\partial F}{\partial A_1} > 0$, $\frac{\partial G}{\partial A_1} < 0$ and $\frac{\partial I}{\partial A_1} > 0$.

At the same time, $w = \lambda = \delta p A_2 K_2^{\theta} L_2^{\delta-1} = \delta p \theta^{\frac{\theta}{1-\theta}} A_2^{\frac{1}{1-\theta}} r_2^{-\frac{\theta}{1-\theta}} L_2^{-\frac{1-\delta-\theta}{1-\theta}}$. We know that

$$\frac{\partial w}{\partial L_2} = -\frac{1-\delta-\theta}{1-\theta}\delta p \theta^{\frac{\theta}{1-\theta}} A_2^{\frac{1}{1-\theta}} r_2^{-\frac{\theta}{1-\theta}} L_2^{-\frac{2-\delta-2\theta}{1-\theta}} < 0 \tag{8}$$

Then we know that $\frac{\partial w}{\partial r_1} = \frac{\partial w}{\partial L_2}\cdot\frac{\partial L_2}{\partial r_1} < 0$, $\frac{\partial w}{\partial A_1} = \frac{\partial w}{\partial L_2}\cdot\frac{\partial L_2}{\partial A_1} > 0$.

Based on the above deduction, I get the following propositions:

Proposition 1 *The subsidy, which lowers the capital price in the supported agricultural sector, will increase the labor allocation, capital input and the production in the supported agricultural sector. At the same time, it will decrease the labor allocation, capital input and the production in the unsupported industrial sector. Overall, it will increase the rural household's income.*

Proposition 2 *In addition, the increase of A_1 (the total factor productivity) in the supported agricultural sector, will increase the labor allocation, capital input and the production in the supported agricultural sector. At the same time, it will decrease the labor allocation, capital input and the production in the unsupported sector. Overall, it will increase the rural household's income.*

The economic intuition behind the model is straightforward. Take the decrease of r_1 for example. If r_1 decreases, the capital cost decreases, and people will invest more capital in the agricultural sector. Since there is more capital in the agricultural sector,

the MPL_1 increases. Thus people will devote more labor to the agricultural sector. Since both capital and labor increase in the agricultural sector, agricultural output and income will increase. At the same time, since the labor supply is fixed, people will devote less labor to the industrial sector, which means that MPK_2 decreases. Then, people will invest less capital in the industrial sector. Since both capital and labor decrease in the industrial sector, industrial output and income will decrease. Overall, the increase in agricultural income is mediated by the decrease in industrial income but the mean effect on rural income per capita is positive. The analysis for the increase of A_1 is similar and will lead to the same conclusion.

Although the above model is a static setup, it is, in reality, a dynamic process. The rural households wanted to maximize their income when the program kicked in, and they did get more income from their agricultural production. The high prices of agricultural products keep them engaging in agriculture, especially in grain production. However, they did not expect that non-farm income would take off after 1994. So they engaged less in the rural, non-farm sector, such as rural industry. The greater increase in agricultural income in the supported counties was mediated by a smaller increase in the non-farm sectors. It became less profitable to grow crops when the prices went down significantly after 1997. The rural households that had engaged mainly in agriculture were locked into the agricultural production, and it was harder for them to switch to non-farm activities. So, we can assume that they were at least a little worse off in income after 1997. The rapid transformation after 1994 was highly unexpected, so I did not integrate that into the model.

4 Data

In this paper, I use mainly county-level panel data from the Ministry of Agriculture for the period 1990-2000. These data contain information on the agricultural variables, including: the total population the rural net income per capita; the total agricultural

output in values; the total sown area for various agricultural products; the total output in tons for various agricultural products such as grain, cotton and oil crops; the total use of agricultural inputs like the total agricultural mechanical power,[28] fertilizer, membrane; the total number of livestock; the total employees of TVEs and the rural industrial output[29]. The MOA data, are based on reports made by village, township, and county officials. It is perhaps the only estimate available for all counties in 1990's[30]. Beyond that, I also use the data the government used for choosing the NDP counties in 1993. The data are from the National Bureau of Statistics (NBS thereafter) and contain variables such as rural net income per capita; the population; the size of labor force; the total output of grain; the local fiscal revenue and expense; the amount of savings in banks; the terrain condition of the county; whether or not the county is a minority county; whether or not the county is a border county; and whether or not the county is a revolutionary county. According to Park and Wang (2001), the rural income per capita statistics from NBS are generated through a reporting system supervised by the Division of Regional Economy under NBS[31]. Since the price levels changed dramatically in the 1990s and prices differed over time, I also use a set of provincial-level spatial price deflators constructed by Brandt and Holz (2006) to calculate the real value of the variables of interest based on 1992 price.

5 Empirical Strategy

Consider an equation characterizing the causal relationship between being counted as an NDP county, described by the dummy variable indicator NDP_i and outcome Y_{it} :

[28] It is hard to standardize the use of the agricultural machinery. In general we use the total agricultural mechanical power as the indicator for that.

[29] Some variables are not available for some years. For example, rural industrial output is available only until 1997.

[30] Park and Wang (2001) discussed the shortcoming of the self-reported data in more detail. For example, they claimed that their interviews showed the reporting was subject to revisions by upper-level governments. There are still concerns about the determination of the official statistics and independent source of verification is needed.

[31] If the county belongs to the national rural household survey sample county (35% of all counties), the county-level NBS may or may not use the household data for county average. For other counties, they might use the provincial household survey data or the MOA data. For more details, please refer to Park and Wang (2001).

$$\ln Y_{it} = \alpha + c_i + Year_t + \sum_{\tau=1991}^{2000} NDP_i \times 1(Year = \tau) \times \beta_\tau + \sum_{\tau=1991}^{2000} Income400_{i,92} \times 1(Year = \tau) \times \gamma_{1\tau}$$
$$+ \sum_{\tau=1991}^{2000} Income400_{i,92}^2 \times 1(Year = \tau) \times \gamma_{2\tau} + \sum_{\tau=1991}^{2000} Income400_{i,92}^3 \times 1(Year = \tau) \times \gamma_{3\tau} \quad (9)$$
$$+ \sum_{\tau=1991}^{2000} X_{i,90} \times 1(Year = \tau) \times \delta_\tau + \sum_{j=2}^{31} Z_j \times Year \times \eta_j + \varepsilon_{it}$$

where NDP_i is a dummy indicating whether or not the county is an NDP county, $income400_{i,92}$ is the standardized income that is the rural net income in 1992 deducted by 400, $X_{i,90}$ is a vector of region-specific variables that include total population and acreage in year 1990, α is a constant, c_i is a county fixed effect, $Year_t$ is a year fixed effect and Z_j is a provincial dummy that interacts with *year* to control for the provincial time trends. The dependent variable is the log value of the variables we are interested in. Since it is panel data, I make use of them and do a panel data regression. The reason I choose 1990 as the base year is because we can detect if there were pre-trends before the program since it ran from 1994 to 2000. Direct application of OLS to equation (9) may lead to biased estimates of β_τ for the usual reasons: There are some unobservables in the regression that might cause the error term to be correlated with the variable of NDP status.

The selection of NDP counties was not random. In general, because the NDP counties tended to be backward, poorer counties, we might expect divergence. However, since the convergence story also seems plausible, the poor might have grown faster than the rich and caught up in the end. To tackle the problem, in addition to controlling for the initial log of income, I truncate the sample to only include those counties with income around the cutoff. Even after that, there are still concerns. As I mentioned above, although the selection was based mainly on some objective characteristics, especially the rural net income per capita, there are other factors that might have affected the choice of counties. Those selecting the counties had worked on poverty alleviation programs for years, so they had a good sense of poor counties' real situations and might have known which counties might benefit more from the program. Those unobserved factors

could contaminate the estimates. In addition, there is some anecdotal evidence showing that lobbying may have played a role in the decision process[32]. If that is true, it can complicate the estimates. It is possible that the counties that were better at lobbying were more likely to have more resources or to make better use of their resources. So the OLS estimate will be biased upward. However, it is also possible that officials in the counties that successfully lobbied for NDP status were more corrupt. They may have been more interested in getting funds from the upper-level governments than in developing the local economy. So the OLS estimate will be biased downward. In China, whether or not to lobby depended largely on the top government officials, who may have had differing perceptions of the value of being an NDP county. Some may have thought that the title would bring the county more support, while others might have thought that the NDP title would scare potential investors away. And the top leaders' preferences could have affected the local economy, thus biasing the estimates. I construct an IV using the discontinuity of the program assignment-the county with rural net income per capita below 400 was in principle included into the program- to handle the selection issue.

As described above, the program assignment was determined mainly by the rural net income per capita in 1992. Figure 5 shows the relationship between the rural net income per capita and the program assignment for the new NDP counties[33]. We can see that the lower the rural net income per capita in the county, the more likely the county was to be included in the program. In particular, there was a sharp jump at around 400. The probability of being an NDP county was around 80 percent if the county's rural net income per capita was just below 400. The probability dropped dramatically, to around 30 percent, if the county's rural net income per capita was just above 400. From figure 5, we know that the rural net income per capita was a major determinant of being an

[32] "Caijing," an influential magazine in China, reports the lobbying for NDP county status with a case study in 2008.

[33] Since the 400 cutoff applied only to the new NDP counties, I removed the old NDP counties (the first-wave NDP counties) from the program assignment analysis.

NDP county, but other characteristics could also have played a role. Also from Figure 5, we know the probability of program assignment did not jump from one to zero; this is a "fuzzy" regression discontinuity (Lee and Lemieux, 2010), so the causal effect of being an NDP county is:

$$\tau_{FRD} = \frac{\lim_{x\uparrow 400} E(Y|income = x) - \lim_{x\downarrow 400} E(Y|income = x)}{\lim_{x\uparrow 400} E(NDP|income = x) - \lim_{x\downarrow 400} E(NDP|income = x)} \tag{10}$$

The estimation in equation (10) is equivalent to an IV regression, where the reduced form regression[34] is:

$$\begin{aligned}\ln Y_{it} = \alpha + c_i + Year_t + \sum_{\tau=1991}^{2000} Below400_i \times 1(Year = \tau) \times \beta_\tau + \sum_{\tau=1991}^{2000} Income400_{i,92} \times 1(Year = \tau) \times \gamma_{1\tau} \\ + \sum_{\tau=1991}^{2000} Income400^2_{i,92} \times 1(Year = \tau) \times \gamma_{2\tau} + \sum_{\tau=1991}^{2000} Income400^3_{i,92} \times 1(Year = \tau) \times \gamma_{3\tau} \\ + \sum_{\tau=1991}^{2000} X_{i,90} \times 1(Year = \tau) \times \delta_\tau + \sum_{j=2}^{31} Z_j \times Year \times \eta_j + \varepsilon_{it}\end{aligned} \tag{11}$$

where $Below400_i$ is a dummy indicating if the county's rural net income per capita was below 400 in 1992. β_τ is our main parameter of interest; it measures the local average treatment effect at the point in the income distribution where the cutoff falls. This is an estimation based on compliers, the counties that would not have been selected as NDP counties and given generous support from 1994 to 2000 if their rural net income per capita had been above 400 in 1992, but would have been chosen as NDP counties and enjoyed the benefits if their income had been below 400 in 1992.

5.1 RD validity

First, we might worry about sorting, which might cause the continuity assumption to be violated. As I mentioned above, the administrator used the 1992 data to make the

[34] The first-stage regression is hard to write since there are multiple endogenous variables in the regression function. Joint test is needed for this case and F-value will be shown in the regression results.

decision, so sorting is technically not possible. Figure 6, which shows the histogram based on the rural net income per capita in 1992, does not show any evidence of sorting around the cutoff. Second, I carry out validity tests of the smoothness assumption using observables, eight of which are depicted graphically in Figures 7 and 8. Rural population, rural labor, fiscal income, fiscal expenditure, total agricultural mechanical power and fertilizer use vary smoothly at the boundary, with differences that are neither large enough to be important nor statistically significant. Third, Table 4 shows the comparison of various characteristics between the two groups around the 400 cutoff. I divided the counties into two groups according to their rural net income level in 1992: One group is composed of those counties with income between 350 and 400, and the other group is composed of counties with income between 400 and 450. Table 4 shows that they are statistically the same. Furthermore, Figure 2 shows that the NDP counties are geographically clustered, which is true for both old and new NDP counties. However, when I trimmed the samples to those counties with income between 350 and 450, Figure 9 shows that the counties are geographically dispersed.

5.2 Specification

Misspecification of the functional form typically generates a bias in the treatment effect; the estimation of Rd designs has generally been viewed as a nonparametric estimation problem since Hahn et al. (2001). However, the RD setting poses a particular problem because we need to estimate regressions at the cutoff point. Nonparametric regression generally does not work very well for these boundary problems. Partly because of the reason above, along with the simplicity, applied papers more often use parametric regression. In order to correct for the bias of using simple linear terms, people include polynomial functions of forcing the variable in the regression model. Lee and Lemieux (2009) suggest that it was better to try to report a number of specifications to see to what extent the results are sensitive to the order of the polynomial. In practice, I follow their advice and

try different orders of polynomial terms. The results are not sensitive to that, so I show only the results with the linear terms. The selection of bandwidth, the tradeoff between validity and efficiency, is always a concern for the regression discontinuity approach. Since the sample size is not very big, I choose the bandwidth to be 100 for each side to avoid the small sample problem. As a robustness check, I also narrow the bandwidth to 50, and the coefficients fluctuate slightly although the variances are larger due to the size of the sample.

6 Results

According to the model's prediction, we expect that after the program the rural farmers in the NDP counties used more capital on and devoted more labor to the agricultural production than did the non-NDP counties. As a result, agricultural output and agricultural income would have increased more in the NDP counties. At the same time, rural farmers used less capital and devoted less labor to industrial production than did their counterparts. Thus the industrial output and income should increase less in the NDP counties. And the rural farmers in the treated counties would be expected to have had a greater increase in rural net income. Ideally I can use the data to test the hypothesis for all the variables. Unfortunately I have only a portion of the variables. But the results shown below are consistent with the model's predictions, which support my hypothesis. Since the regressions using the full sample might be problematic, as I explained above, I will discuss the results based on the regressions of the trimmed samples.

Before the discussion, let me describe the dependent variables I will use for the regressions. First, I will use total agricultural mechanical power and fertilizer use as the proxies for agricultural inputs. In terms of agricultural output, I will use mainly the total grain output (in tons) for the discussion. In addition, I will also look at the total number of livestock that could be agricultural input or output. In any case I expect to see positive effects. Furthermore, I will look at the effect on agricultural income. For the industrial

side, the data are less available. I do have the data for the TVE employees. According to Naughton (2007), most of the rural laborers worked in TVEs if they engaged in industrial production before the late 1990s. So, I will use the TVE employees as the proxy for the labor force in rural industrial sector. Unfortunately, I do not have the proxy variable for capital use in the rural industrial sector and industrial income but I can look at the effect on rural industrial output. In the end, I will discuss the overall effect on the rural net income per capita.

I begin with the analysis of the impact of the poverty alleviation program on the agricultural capital input. Table 5 and table 6 show that the treated counties did have more increase in the total agricultural mechanical power and the fertilizer use respectively. The effects kept increasing after 1994 and peaked at around 1997. As I mentioned in the background section, the government emphasized agricultural production, especially the grain production. It is interesting to see if that emphasis actually helped. Table 7 presents the impact of the program on grain production, and the results confirm that, indeed, the poverty alleviation program did increase grain production. The coefficients are significantly positive and stable after 1994. Another focus of the poverty alleviation program was to increase access to drinking water. One of the main achievements claimed by the government is that the program gave 53.5 million persons and 48.4 millions animals in the NDP counties access to the drinking water. In poor counties, a lot of farmers used working animals for agricultural production[35]. In addition, the program encouraged husbandry, so we can expect that the farmers raised more live stocks[36] when the conditions improved and that they also have demand due to the need for grain production. Table 8 confirms our expectation, showing that more live stocks were raised in NDP counties than in the non-NDP counties during the program.

However, as I discussed in the model section, although the program might have in-

[35] According to China's Statistical Yearbook 1996 by NBS, the total number of Large Animals in 1995 was 158.716 million, and 88.12 million of them were used as working animals

[36] Live stocks include cows, horses, donkeys, camel and mules.

creased production of the supported sector, it might also have had crowding-out effects. Since the farmers had time constraints, they would be expected to put less effort into production in the unsupported sectors. According to the model, households also had an incentive to reduce their labor input in the industrial sector. Table 9 shows that the employment of TVE also increased less in the supported counties than in the unsupported counties. Table 10 further confirms our supposition that rural industrial output increased less in the supported counties than in the unsupported counties[37]. Since we do have the variable of capital input in the rural industry, we cannot test the program effect on that.

Since the program had positive effects on grain production and livestocks but negative effects on rural industrial production, the effect on rural income is ambiguous. It quite depends on the prices or profitability of the product. Figure 6 shows the change in grain prices over time in China. The price increased dramatically in 1994, reached its peak in 1995 and remained high until 1996. From 1997, it began to fall sharply and stayed low until 2003. We can expect that rural income from agriculture increased for the period 1994-1996 and remained stable after 1997. Table 11 presents the results when we use agricultural income as the dependent variable. It confirms that the supported counties benefited from the increase in grain production and the increase in prices of agricultural products for the period 1994-1997. However, after the prices of agricultural products fell, the treated counties did not experience an increase in agricultural income, although their grain production still increased more than the unsupported counties'. The overall program effect on the rural net income per capita is shown by table 12. We know that the NDP counties grew more slowly than the non-NDP counties if we use the whole sample. The coefficient of NDP is negative and significant at all times. However, the results using the trimmed samples are very different. The NDP coefficients are insignificant in all years. This comparison shows that the endogeneity problem is serious. Simple OLS or matching

[37]Because there was a reform in term of ownership for TVEs in late 1990s, it is hard to do the statistics for TVEs, so the data are unavailable for the period after 1997.

methods will be biased. In addition, the estimates are almost negative, except for the period 1995-1997. The IV estimates are negative before 1994 and change to positive in 1995-1997 and change back to negative after 1998. It implies that the program might have slightly positive effect in 1994-1997 when the grain prices were very high. It is consistent with our story that the more increase of agricultural income might be mitigated by less increase in other sources such as wage income.

The main objective of the program was to increase the income of rural households by helping them develop their agricultural production. The program was successful, especially in grain production; however, the development of grain production crowded out other production through labor mobility, which policy might not have expected. As I show in panel A of Figure 3, wage income doubled from 1994 to 2000, while income from agriculture increased less than 25 percent in this period. Although the rural people in the supported counties enjoyed the benefits of the high prices of agricultural products in 1994-1997, they might have been worse off when the prices dropped since they were less likely to engage in non-farm activities, which were more promising after 1997. From the results, we can see that the supported counties did benefit from the program by producing more grain and, thus, having more agricultural income. However, this benefit seems to have been almost mediated by less growth in other income sources, which played a more important role in the long run.

Through the analysis of the results, we know that people will respond to regional policies through labor flows and capital flows. While it is always interesting to know the program's effect on the target industry, the effect on other industries should not be neglected. The results based on an overall evaluation can be deceiving since the effect might be positive for this and negative for that and the effects cancel each other out. Policy makers need to take this response into consideration. Place-based policies are intended to support some industries in the lagging regions, but it is hard to know which industries should be supported. In China's case, agricultural support was one of the major reasons

for the agricultural success of early 1980s in China. However, things often change and it might no longer have been efficient to support agriculture in 1990s. Place-based policies are, in general, launched by the government, so they are very inflexible. It is hard for the government to adjust to a new environment. In the case of China, the government's place-based program caused a big distortion. The government did not respond to the distortion when the grain price dropped because the policy was essentially "locked in" until 2000. In this respect, people-based program is better since individuals respond to change much more easily than do governments.

7 Conclusion

This paper made use of the regression-discontinuity approach to estimate the effect of China's second-wave place-based poverty-alleviation program. I found that the program successfully increased agricultural production, especially grain production—in line with the government's plan and expectations. However, the support for grain production crowded out other agricultural production and non-farm activities by driving labor out of the unsupported sectors. Although the rural people in the supported counties enjoyed more agricultural income at the beginning of the program due to the unusually high prices of agricultural products, the increase in income was mediated by a smaller increase in other production, especially in non-farm activities. The dramatic drop in the prices of agricultural products made people worse off since they were less likely to engage in the non-farm activities that played an increasingly important role in rural earnings.

The policy implications of this paper are far-reaching. First, it reveals that people will vote with their feet, so policy makers need to take the general-equilibrium effect into consideration. More importantly, it provides rigorous evidence that place-based poverty-alleviation programs did not work well and even caused distortion, leading to worse results. When non-farm activity becomes more important, rather than clinging to the traditional method of helping the poor with agricultural production, China's government might need

to try other, more efficient ways, such as people-based policies that have been widely regarded as successful in Mexico and followed by many other countries.

Partly due to the availability of the data, this paper could not fully address the following issues. Capital mobility is also important for us to understand the transformation, but I did not have the necessary data to examine it. In addition, although the effect on rural income was not that encouraging, the people in the supported counties might have gained more welfare since their living conditions were improved. And last but not the least, the contribution of agriculture to improving conditions for the poor varies enormously, not only at different stages of development for a given country, but also across and within countries, because of local contexts. The government needs to take that into account.

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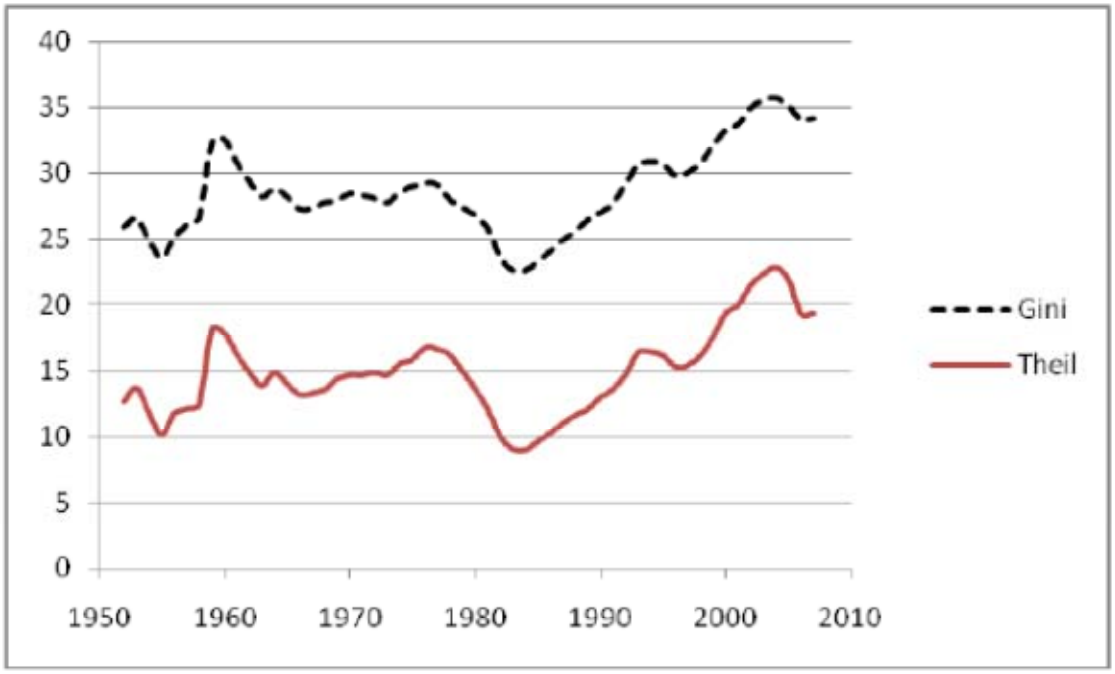
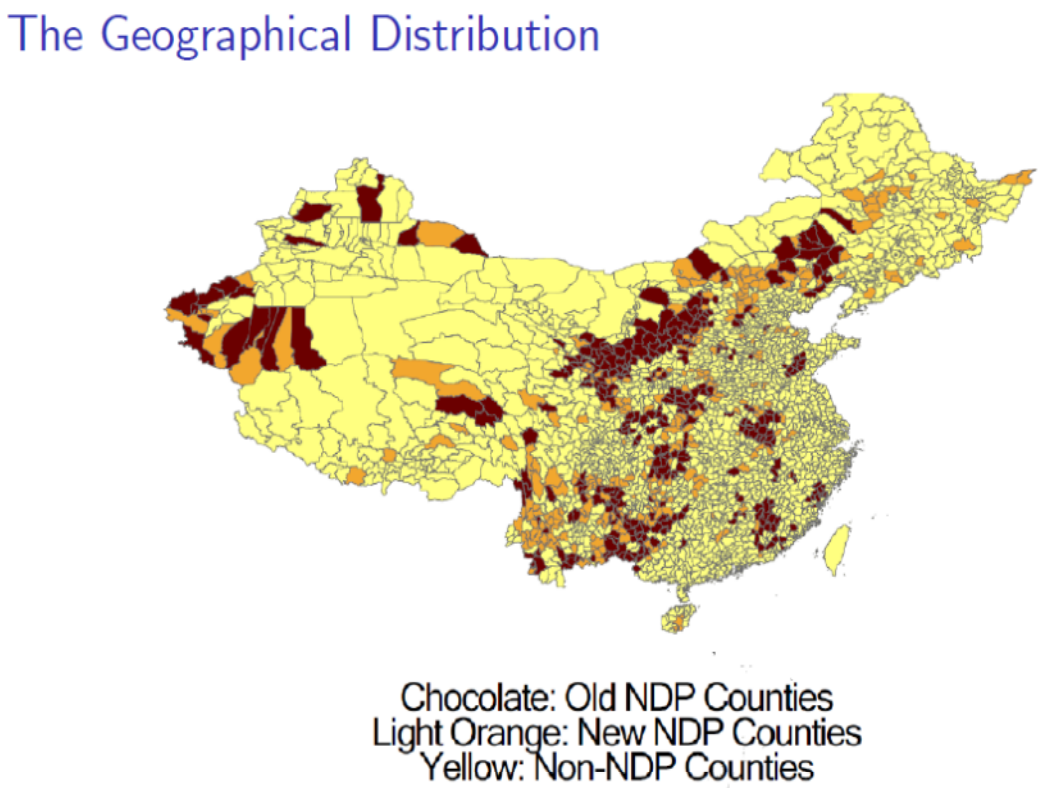
Figure 1 Regional Inequality in Per Capita Consumption



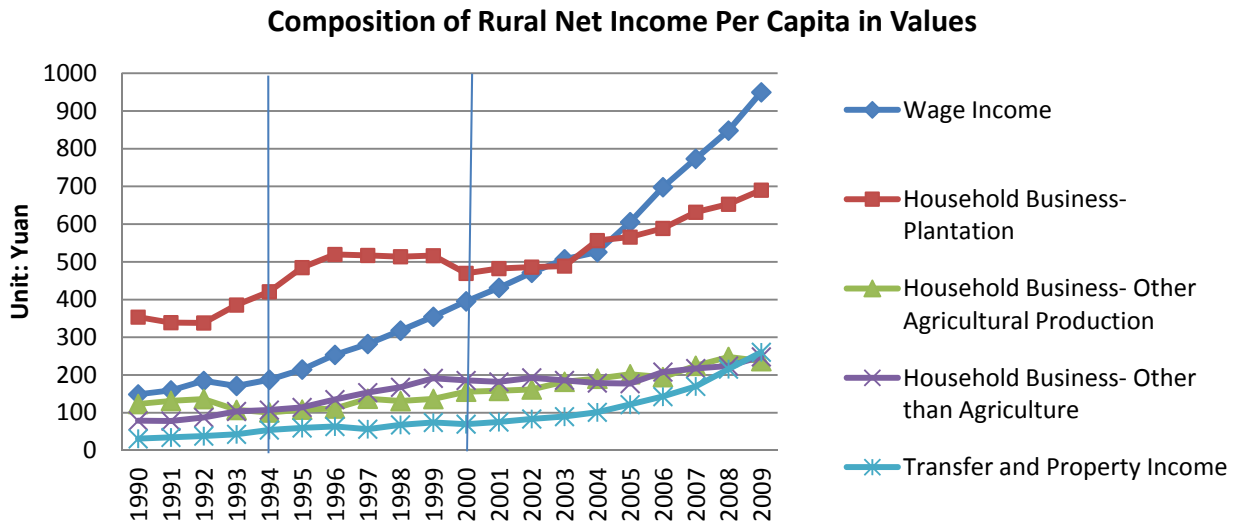
Source: Fan et al. (2010). The regional inequality measures are the Gini Coefficient and Theil Index (with c=1), calculated by authors based on population weighted real per capita consumption at the provincial level in rural and urban areas. The data are from Comprehensive Statistical Data and Materials on 50 Years of New China (China National Bureau of Statistics, 2000) and various issues of *China Statistical Yearbook* (China National Bureau of Statistics, various issues).

Figure 2: the Geographical Distribution of NDP Counties



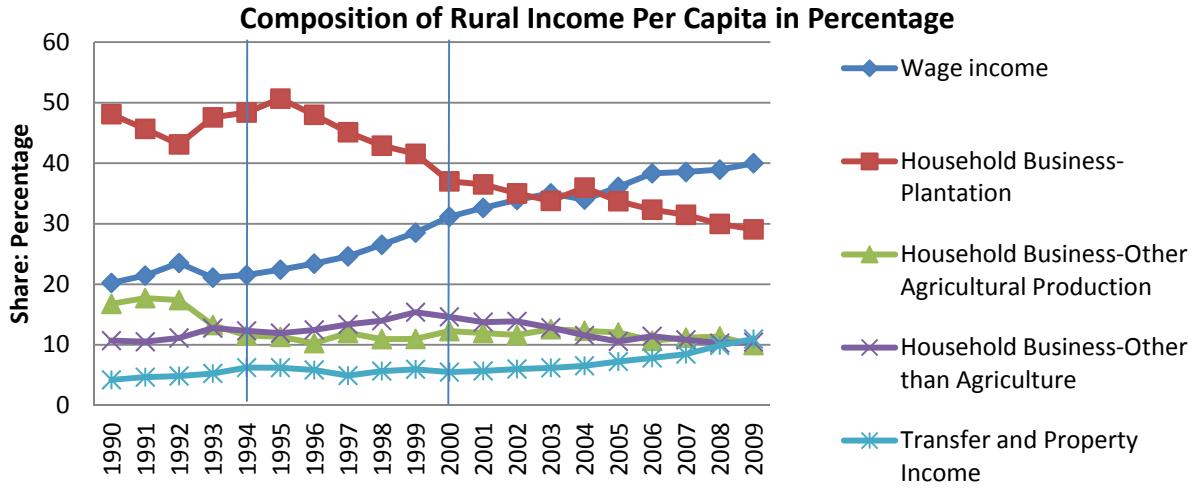
Note: The chocolate-colored counties, which I call the Old NDP Counties, are included in both the first-wave and the second-wave programs. The light-orange counties, which I call the New NDP Counties, are newly included in the second-wave program. The yellow counties indicate other counties.

Figure 3
Panel A



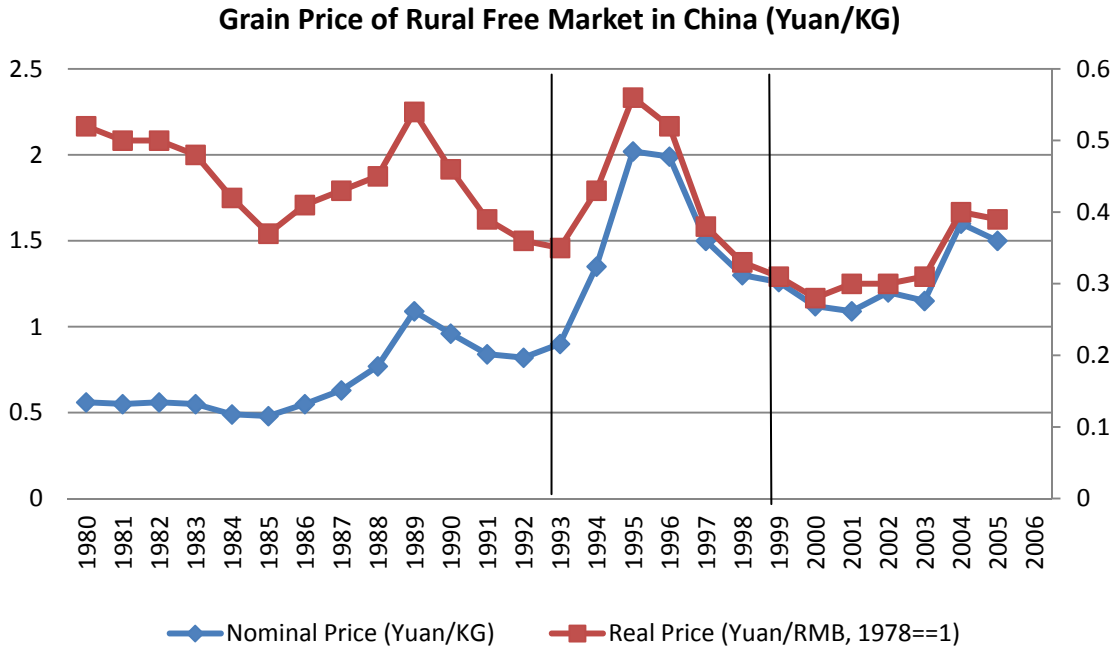
Note: 1) Assume the price in 1992 is 1, all the numbers above are calculated based on the 1992 price. 2) There are three sources of rural net income: (1) Household's own business. The rural household can engage in agricultural production, which includes plantation, forestry, husbandry, fishery and side industries (The last four consist of the part of "other agricultural production"). Beyond that, the rural household can also engage in off-farm activities such as craft, manufacturing or other service industries (All of these are part of "other than agriculture.") (2) Wage income. The farmers work in firms and earn wages. (3) Transfer and property income, which includes income transfer, bank interest and stock dividends. The two blue lines indicate year 1994 and year 2000. Source: China Statistical Yearbook 2011.

Panel B



Note: There are three sources of rural net income: (1) Household's own business. The rural household can engage in agricultural production, which includes plantation, forestry, husbandry, fishery and side industries (The last four comprise "other agricultural production"). Beyond that, the rural household can also engage in off-farm activities such as craft, manufacturing or other service industries (All of are part of "other than agriculture.") (2) Wage income. The farmers work in firms and earn wages. (3) Transfer and property income, which includes income transfer, bank interest and stock dividends. The two blue lines indicate year 1994 and year 2000. Source: China Statistical Yearbook 2011.

Figure 4

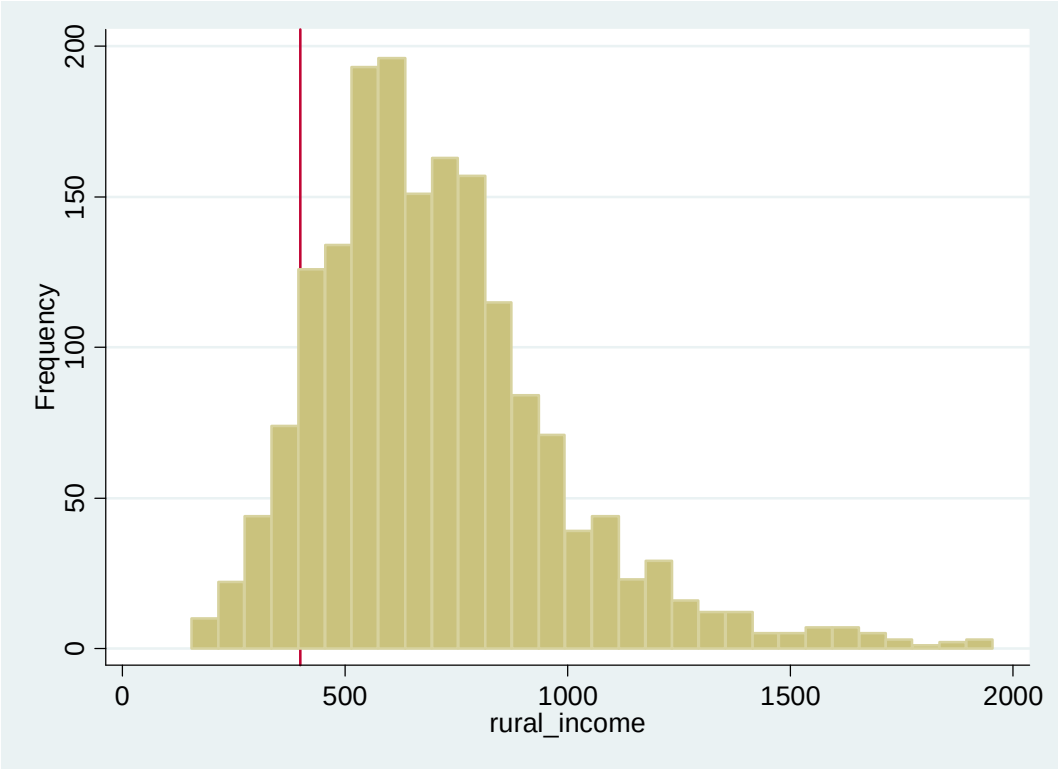


Source: Lu (2007). This figure only shows the grain price in the rural free market. For more detailed information of the quote price and the negotiated price, please refer to Huang et al. (2006). The two solid lines indicate year 1994 and year 2000.

Figure 5 Program Assignment of the Second-wave Poverty Alleviation Program

Note: X axis indicates the rural net income per capita in 1992, Y axis indicates the program assignment. The blue solid line plots nonparametric predictions of the program assignment from an unweighted uniform kernel smoother with the bandwidth of 0.05 for the counties with their rural net income per capita between 200 and 800 in 1992. The red line indicates that the rural net income per capita is 400.

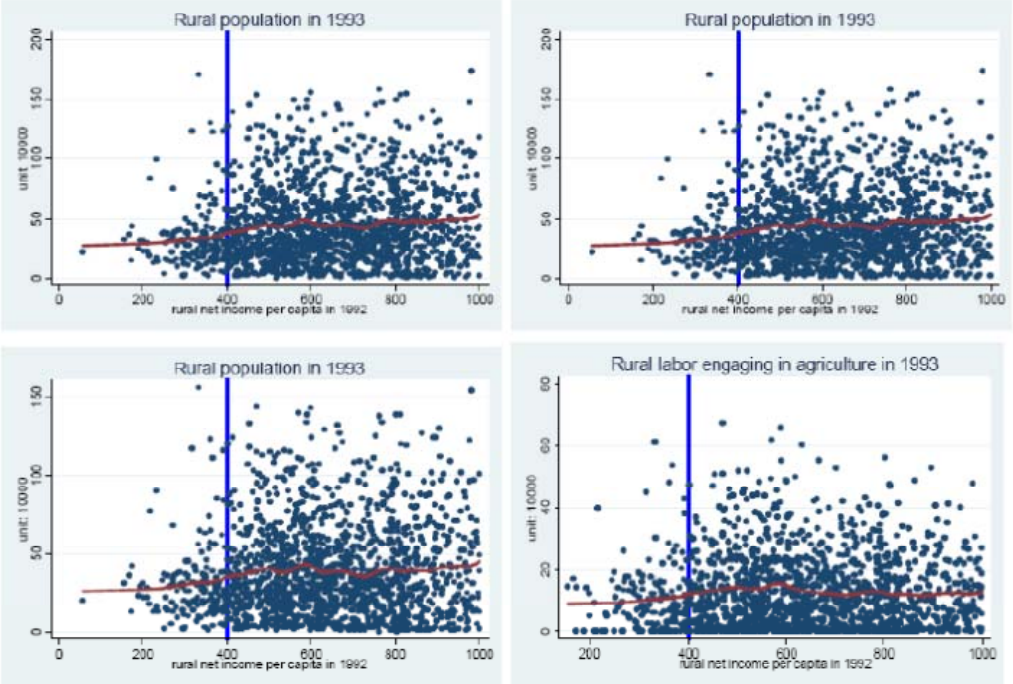
Figure 6 Histogram of rural net income per capita in 1992



Note: the red line indicates that the rural net income per capita is 400.

Figure 7

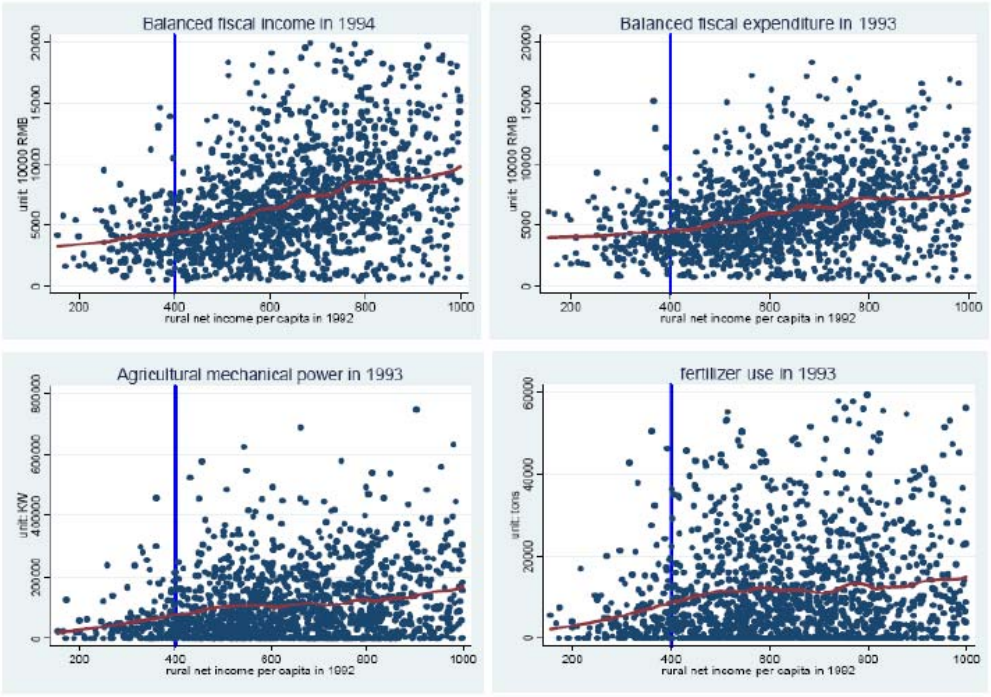
RD validity: Changes of Variables around the Cutoff (I)



Note: the blue line indicates that the rural net income per capita is 400. The blue dots are the scatter plots. The red solid line plots nonparametric predictions of the various variables from an unweighted uniform kernel smoother with the bandwidth of 0.1 for the counties with their rural net income per capita between 200 and 1000 in 1992.

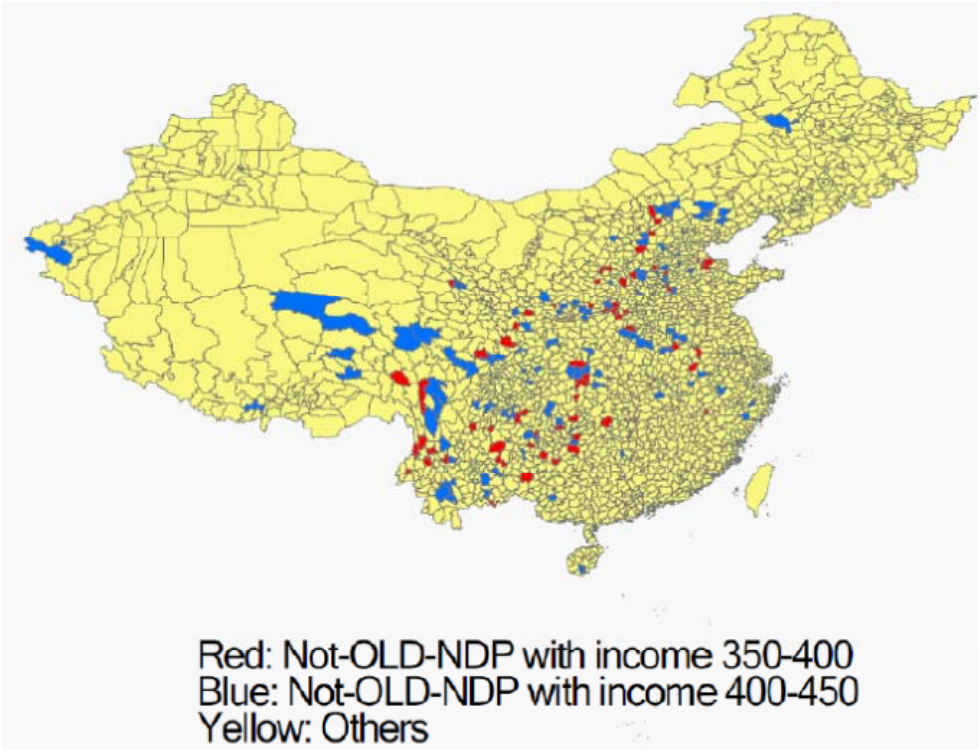
Figure 8

RD validity: Changes of Variables around the Cutoff (II)



Note: the blue line indicates that the rural net income per capita is 400. The blue dots are the scatter plots. The red solid line plots nonparametric predictions of the various variables from an unweighted uniform kernel smoother with the bandwidth of 0.1 for the counties with their rural net income per capita between 200 and 1000 in 1992.

Figure 9: RD validity: Geographic Distribution of the Trimmed Samples



Note: All the counties included in the first-wave poverty alleviation program are excluded from the comparison here. 350-400 is a group of counties with rural net income per capita between 350 and 400 in 1992; 400-450 is a group of counties with rural net income per capita between 400 and 450 in 1992.

Table 1 The Comparison of Interest Rates between Commercial Ones and the Subsidized Ones

Year	Nominal interest rate of subsidized loans (%)	Nominal interest rate of commercial loans (%)	Real interest rate of subsidized loans (%)	Real interest rate of commercial loans (%)	Inflation rate (CPI)
1991	2.88	8.64	-0.5	5.07	3.4
1992	2.88	8.64	-3.31	2.11	6.4
1993	2.88	9.36	-10.3	-4.66	14.7
1994	2.88	10.98	-17.1	-10.57	24.1
1995	2.88	12.06	-12.14	-4.3	17.1
1996	2.88	10.98	-5	2.47	8.3
1997	2.88	8.64	0.08	5.68	2.8
1998	2.88	7.92	3.71	8.79	-0.8
1999	2.88	5.85	4.34	7.35	-1.4
2000	2.88	5.85	2.47	5.43	0.4

Note: The nominal interest rates for subsidized loans and business loans are benchmark interest rates set by the Central Bank of China. The real interest rates are calculated after adjusting for inflation. All of the interest rates are one-year interest rates. Source: People's Bank of China

Table 2 China's Central Government Poverty Alleviation Funds 1986-2000 (Billion Yuan at current price)

Year	Subsidized loans (billion)	Share	Food for work(billion)	Share	MOF development funds(billion)	Share	Total
1986	2.3	54.76	0.9	21.43	1	23.81	4.2
1987	2.3	54.76	0.9	21.43	1	23.81	4.2
1988	3.1	75.61	0	0	1	24.39	4.1
1989	3.1	73.81	0.1	2.38	1	23.81	4.2
1990	3.1	64.58	0.6	12.5	1.1	22.92	4.8
1991	3.6	46.15	1.8	23.08	2.4	30.77	7.8
1992	4.1	49.4	1.6	19.28	2.6	31.33	8.3
1993	3.5	37.63	3	32.26	2.8	30.11	9.3
1994	4.6	40	4	34.78	2.9	25.22	11.5
1995	4.6	40.35	4	35.09	2.8	24.56	11.4
1996	5.5	49.55	4	36.04	1.6	14.41	11.1
1997	8.5	47.49	4	22.35	5.4	30.17	17.9
1998	10	49.5	5	24.75	5.2	25.74	20.2
1999	15	58.37	6	23.35	4.7	18.29	25.7
2000	15	56.6	6	22.64	5.5	20.75	26.5
Total	88.3	55.45	41.9	27.44	41	17.11	171.2

Source: Park et al. (2002) and Dongmei Liu (2003)

Table 3 The Comparison Between the Fiscal Revenue and the Poverty Alleviation Fund

Year	Average local revenue of NDP counties	Average total revenue of NDP counties	Average poverty alleviation funds of NDP counties	Average poverty alleviation funds (FFWMOF grant) of NDP counties	(4)/(2) (%)	(3)/(2) (%)
1994	1746	4531	1639	878	19	36
1995	2369	5460	1655	895	16	30
1996	3166	7003	1824	895	13	26
1997	3686	8416	2584	1149	14	31
1998	4056	8989	3091	1402	16	34
1999	4156	10213	4358	1824	18	43
2000	4435	11766	4476	1959	17	38

Note: (1) the NDP counties mean the NDP counties that are included in the second-wave poverty alleviation program; (2) local revenue includes the locally collected tax and fees; (3) total revenue not only includes local revenue, but also includes the transfer from the upper-level governments. However, it does include extra-budget income, such as land-sale income. (4) column 4 includes only the funds of food-for-work and MOF development grant.

Table 4 Comparision of Charateristics Between Counties in Different Income Intervals

	350-400		400-450		Diff	P-value
Population	35.58	(3.56)	36.39	(2.69)	-0.81	0.86
Rural population	32.32	(3.31)	33.61	(2.53)	-1.28	0.76
Rural labor	15.71	(2.05)	15.79	(1.30)	-0.08	0.97
Rural labor in agriculture	12.5	(1.64)	13.28	(1.07)	-0.78	0.68
Bank deposit	12679	(1252)	15098	(1876)	-2419	0.37
Old revolutionary counties	0.06	(0.03)	0.09	(0.03)	0.03	0.40
Minority counties	0.37	(0.06)	0.30	(0.04)	0.07	0.32
Fiscal revenue	2682	(274)	2335	(137)	347	0.21
Balanced Fiscal income	4493	(368)	3392	(185)	500	0.18
Balanced fiscal expediture	4541	(332)	4267	(175)	274	0.43
Agricultural mechanical power(kw)	58689	(10282)	78155	(8567)	-9466	0.49
Fertilizer use (tons)	8085	(1322)	9358	(1105)	-1273	0.47
Agricultural output	22470	(3310)	24568	(2227)	-2098	0.59
Industrial output	19559	(3777)	18639	(3584)	920	0.84
Grain output(tons)	106840	(11913)	127128	(10749)	-20288	0.22
Gevernment employee	7539	(532)	7979	(493)	-440	0.56
Fiscal transfer	1313	(126)	1181	(74)	133	0.33
Observations	65		105			

Note: All the counties that are included in the first-wave poverty alleviation program are excluded from the comparison here. 350-400 is a group of counties with rural net income per capita between 350 and 400 in 1992; 400-450 is a group of counties with rural net income per capita between 400 and 450 in 1992.

Table 5

	Dependent Variable: Log of the Total Agricultural Mechanical Power							
	Full Sample				300-500			
	OLS		IV		OLS		IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1991	-0.00	-0.01	0.02	0.02	0.00	0.01	0.09	0.08
	(0.02)	(0.02)	(0.04)	(0.04)	(0.03)	(0.03)	(0.12)	(0.11)
1992	0.01	0.00	0.02	0.02	0.00	0.01	0.07	0.07
	(0.02)	(0.02)	(0.05)	(0.05)	(0.03)	(0.03)	(0.09)	(0.12)
1993	0.02	0.02	0.06	0.06	0.02	0.02	0.11	0.12
	(0.02)	(0.02)	(0.05)	(0.05)	(0.04)	(0.03)	(0.12)	(0.12)
1994	0.02	0.01	0.12***	0.10***	0.02	0.03	0.17	0.17
	(0.02)	(0.02)	(0.05)	(0.05)	(0.04)	(0.04)	(0.12)	(0.12)
1995	-0.00	-0.00	0.06	0.06	0.01	0.01	0.24**	0.24**
	(0.02)	(0.02)	(0.05)	(0.05)	(0.05)	(0.04)	(0.12)	(0.12)
1996	-0.01	-0.02	0.10**	0.10**	0.05	0.06	0.27**	0.26**
	(0.02)	(0.02)	(0.05)	(0.05)	(0.05)	(0.04)	(0.12)	(0.12)
1997	0.01	0.01	0.14**	0.16**	0.04	0.05	0.37***	0.39***
	(0.02)	(0.02)	(0.06)	(0.06)	(0.05)	(0.05)	(0.12)	(0.12)
1998	0.03	0.02	0.14**	0.16**	0.00	0.00	0.26*	0.26*
	(0.02)	(0.02)	(0.06)	(0.06)	(0.05)	(0.05)	(0.12)	(0.12)
1999	0.03*	0.03*	0.14**	0.18***	-0.00	0.00	0.29**	0.30**
	(0.02)	(0.02)	(0.06)	(0.06)	(0.06)	(0.05)	(0.12)	(0.12)
2000	0.03*	0.04*	0.16**	0.20***	-0.01	-0.01	0.25**	0.28**
	(0.02)	(0.02)	(0.06)	(0.06)	(0.06)	(0.06)	(0.12)	(0.12)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-Value							39	40
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total agricultural mechanical power in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 6

	Dependent Variable: Log of the Fertilizer Use							
	Full Sample				300-500			
	OLS		IV		OLS		IV	
1991	-0.01	-0.01	0.04	0.04	-0.01	-0.02	-0.01	-0.02
	(0.02)	(0.02)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1992	0.03	0.01	0.02	0.02	0.01	0.01	-0.02	-0.02
	(0.02)	(0.02)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1993	0.02	0.00	0.00	-0.02	0.02	0.03	0.01	0.02
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1994	0.03	0.02	0.04	0.02	0.06	0.05	0.11	0.14
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.15)
1995	0.02	0.01	-0.06	-0.04	0.06	0.05	0.12	0.13
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1996	0.01	-0.00	0.10	0.12	0.03	0.04	0.16	0.19
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1997	0.03	0.02	0.14*	0.14*	0.05	0.05	0.22*	0.23*
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1998	0.01	-0.01	0.12	0.12	0.04	0.03	0.23*	0.25*
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
1999	0.02	0.01	0.14*	0.12	0.10**	0.09**	0.18	0.19
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
2000	0.02	0.02	0.04	0.06	0.07	0.08	0.12	0.11
	(0.03)	(0.03)	(0.08)	(0.08)	(0.05)	(0.05)	(0.14)	(0.14)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-Value							39	40
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total fertilizer use in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 7

	Dependent Variable: Log of the Total Grain							
	Full Sample				300-500			
	OLS		IV		OLS		IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1991	-0.02	-0.02	0.04	0.02	-0.01	0.02	0.09	0.08
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1992	-0.01	-0.01	-0.06	-0.06	0.02	0.02	-0.02	-0.01
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.11)	(0.10)
1993	-0.03	-0.03	0.00	0.02	-0.07	-0.06	0.06	0.06
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1994	-0.01	-0.01	0.02	0.02	0.05	0.05	0.17	0.18*
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1995	0.06**	0.04*	0.10*	0.14**	0.10***	0.08**	0.20*	0.22**
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1996	0.09***	0.07***	0.14**	0.16***	0.14***	0.13***	0.26**	0.29**
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1997	0.08***	0.07***	0.14**	0.18***	0.12***	0.11***	0.30***	0.32***
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1998	0.08***	0.07***	0.12**	0.16***	0.14***	0.13***	0.20*	0.22**
	(0.02)	(0.02)	(0.06)	(0.06)	(0.04)	(0.04)	(0.11)	(0.10)
1999	0.08**	0.06***	0.14**	0.16***	0.12***	0.11***	0.21*	0.20**
	(0.02)	(0.02)	(0.06)	(0.04)	(0.04)	(0.04)	(0.11)	(0.11)
2000	0.04	0.03	0.10*	0.10*	0.03	0.03	0.15	0.17
	(0.03)	(0.03)	(0.06)	(0.06)	(0.04)	(0.04)	(0.12)	(0.11)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-value							40	39
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total grain output in tons in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 8

	Dependent Variable: Log of the Number of Livestock							
	Full Sample				300-500			
	OLS		IV		OLS		IV	
1991	0.00	0.00	0.02	0.02	-0.01	-0.01	0.01	0.01
	(0.01)	(0.01)	(0.06)	(0.06)	(0.02)	(0.02)	(0.06)	(0.08)
1992	0.00	0.00	0.09	0.08	0.00	0.00	0.04	0.04
	(0.01)	(0.01)	(0.06)	(0.06)	(0.03)	(0.03)	(0.08)	(0.08)
1993	0.01	0.01	0.06	0.04	0.01	0.01	0.10	0.11
	(0.02)	(0.02)	(0.06)	(0.06)	(0.03)	(0.03)	(0.08)	(0.08)
1994	-0.02	-0.02	0.10*	0.11**	0.05*	0.04*	0.22***	0.23**
	(0.02)	(0.02)	(0.06)	(0.06)	(0.03)	(0.03)	(0.07)	(0.08)
1995	-0.01	-0.01	0.02	0.03	0.06**	0.06**	0.30***	0.31**
	(0.03)	(0.03)	(0.07)	(0.07)	(0.03)	(0.03)	(0.08)	(0.08)
1996	-0.01	-0.01	0.04	0.04	0.08**	0.07**	0.25***	0.26***
	(0.03)	(0.03)	(0.07)	(0.07)	(0.03)	(0.03)	(0.09)	(0.09)
1997	0.03	0.03	0.10	0.13*	0.07**	0.07**	0.27***	0.28***
	(0.03)	(0.03)	(0.07)	(0.07)	(0.03)	(0.03)	(0.09)	(0.10)
1998	-0.00	-0.00	0.06	0.08	0.04	0.04	0.24***	0.24***
	(0.03)	(0.03)	(0.07)	(0.07)	(0.03)	(0.03)	(0.09)	(0.09)
1999	0.02	0.02	0.08	0.10	0.03	0.03	0.25***	0.25***
	(0.03)	(0.03)	(0.07)	(0.07)	(0.04)	(0.04)	(0.09)	(0.09)
2000	0.01	0.01	-0.00	0.02	0.04	0.04	0.23***	0.23***
	(0.03)	(0.03)	(0.07)	(0.07)	(0.03)	(0.03)	(0.09)	(0.09)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-Value							39	40
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total number of livestock in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 9

Dependent Variable: Log of the Labor Forces in TVEs								
	Full Sample				300-500			
	OLS		IV		OLS		IV	
1991	-0.00	0.03	-0.02	-0.02	0.00	0.01	-0.09	-0.05
	(0.02)	(0.02)	(0.10)	(0.10)	(0.05)	(0.05)	(0.15)	(0.14)
1992	-0.04	-0.02	-0.02	-0.02	-0.01	-0.02	0.05	0.02
	(0.03)	(0.02)	(0.10)	(0.10)	(0.05)	(0.05)	(0.15)	(0.14)
1993	-0.07**	-0.02	0.00	-0.00	-0.03	-0.02	0.03	0.03
	(0.03)	(0.02)	(0.10)	(0.10)	(0.06)	(0.06)	(0.16)	(0.14)
1994	-0.10***	-0.08**	-0.04	-0.04	-0.07	-0.06	-0.13	-0.15
	(0.03)	(0.03)	(0.10)	(0.10)	(0.05)	(0.05)	(0.16)	(0.14)
1995	-0.07**	-0.05*	-0.08	-0.07	-0.10*	-0.09	-0.18	-0.24
	(0.03)	(0.03)	(0.10)	(0.10)	(0.06)	(0.05)	(0.15)	(0.14)
1996	-0.09***	-0.08*	-0.19*	-0.18*	-0.11**	-0.10**	-0.29*	-0.28*
	(0.03)	(0.03)	(0.10)	(0.10)	(0.06)	(0.05)	(0.17)	(0.15)
1997	-0.15***	-0.09**	-0.21**	-0.22**	-0.11**	-0.10**	-0.30*	-0.30**
	(0.03)	(0.03)	(0.10)	(0.10)	(0.06)	(0.05)	(0.16)	(0.16)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-Value							39	40
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total labor force in TVEs in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 10

	Dependent Variable: Log of Total Rural Industrial Output							
	Full Sample				300-500			
	OLS		Reduced form		OLS		IV	
1991	-0.12***	-0.13***	-0.14	-0.18	-0.06	-0.07	-0.04	-0.01*
	(0.04)	(0.04)	(0.12)	(0.12)	(0.06)	(0.06)	(0.22)	(0.20)
1992	-0.06	-0.06	-0.04	-0.04	-0.01	-0.02	0.14	0.10
	(0.04)	(0.04)	(0.12)	(0.12)	(0.06)	(0.06)	(0.22)	(0.20)
1993	-0.10**	-0.10***	-0.10	-0.10	-0.03	-0.04	0.04	0.06
	(0.04)	(0.04)	(0.12)	(0.12)	(0.06)	(0.06)	(0.22)	(0.20)
1994	-0.19***	-0.20***	-0.26**	-0.24**	-0.08	-0.10*	-0.18	-0.19
	(0.04)	(0.04)	(0.12)	(0.10)	(0.06)	(0.06)	(0.22)	(0.20)
1995	-0.22***	-0.23***	-0.32**	-0.35***	-0.10	-0.14**	-0.24	-0.21
	(0.04)	(0.04)	(0.12)	(0.12)	(0.06)	(0.06)	(0.22)	(0.20)
1996	-0.22***	-0.25***	-0.37***	-0.38***	-0.12*	-0.17***	-0.26	-0.28
	(0.04)	(0.05)	(0.12)	(0.12)	(0.06)	(0.06)	(0.22)	(0.20)
1997	-0.25***	-0.28***	-0.41***	-0.40***	-0.14**	-0.21***	-0.29	-0.23
	(0.04)	(0.04)	(0.12)	(0.12)	(0.06)	(0.06)	(0.22)	(0.20)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-Value							39	40
Sample Size	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total labor force in TVEs in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 11

	Dependent Variable: Log of the Agricultural Income							
	Full Sample				300-500			
	OLS		IV		OLS		IV	
1991	0.00	-0.01	0.04	0.04	-0.01	-0.01	-0.00	-0.01
	(0.03)	(0.03)	(0.08)	(0.08)	(0.04)	(0.04)	(0.12)	(0.11)
1992	-0.02	-0.02	-0.04	-0.04	0.02	0.02	0.03	0.01
	(0.03)	(0.02)	(0.08)	(0.08)	(0.04)	(0.04)	(0.12)	(0.11)
1993	-0.04	-0.03	-0.08	-0.10	0.05	0.04	0.08	0.08
	(0.03)	(0.03)	(0.08)	(0.08)	(0.04)	(0.04)	(0.12)	(0.11)
1994	-0.03	-0.02	-0.10	-0.12	0.05	0.05	0.06	0.08
	(0.03)	(0.03)	(0.08)	(0.08)	(0.04)	(0.04)	(0.12)	(0.11)
1995	-0.02	-0.01	-0.04	-0.04	0.09**	0.08**	0.18	0.19*
	(0.03)	(0.03)	(0.08)	(0.08)	(0.04)	(0.04)	(0.12)	(0.11)
1996	-0.02	-0.03	-0.06	-0.06	0.07*	0.07*	0.19	0.23**
	(0.03)	(0.03)	(0.08)	(0.08)	(0.04)	(0.04)	(0.13)	(0.12)
1997	-0.00	-0.02	-0.10	-0.14*	0.06	0.05	0.18	0.16
	(0.03)	(0.03)	(0.08)	(0.08)	(0.04)	(0.04)	(0.13)	(0.11)
1998	-0.04	-0.05	-0.12	-0.12	0.08**	0.07*	0.15	0.14
	(0.03)	(0.04)	(0.08)	(0.08)	(0.04)	(0.04)	(0.13)	(0.12)
1999	-0.06**	-0.08**	-0.06	-0.12	0.03	0.05	0.11	0.15
	(0.03)	(0.04)	(0.08)	(0.08)	(0.04)	(0.04)	(0.13)	(0.12)
2000	-0.07**	-0.09**	-0.06	-0.10	0.04	0.03	0.10	0.11
	(0.03)	(0.04)	(0.08)	(0.08)	(0.04)	(0.04)	(0.13)	(0.12)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-Value							39	40
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of the total rural industrial output in the years from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.

Table 12

	Dependent Variable: Log of the Rural Net Income Per Capita							
	Full Sample				300-500			
	OLS		Reduced form		OLS		IV	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1991	-0.02	-0.00	0.00	-0.00	-0.01	-0.00	-0.01	-0.02
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1992	0.00	-0.03	-0.01	-0.00	0.01	0.01	0.01	0.01
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1993	-0.01	-0.03	0.03	0.04	-0.01	-0.01	0.04	0.05
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1994	-0.02	-0.00	-0.05	-0.06	0.02	0.01	0.08	0.09
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1995	-0.01	-0.03	-0.08**	-0.08**	0.04	0.03	0.12	0.14
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1996	-0.03	-0.03	-0.08**	-0.08**	0.03	0.02	0.10	0.12
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1997	-0.04**	-0.05**	-0.10**	-0.09**	0.02	0.02	0.03	0.05
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.10)
1998	-0.06**	-0.04**	-0.11**	-0.11**	0.01	0.02	0.07	0.09
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.11)
1999	-0.07***	-0.08***	-0.12***	-0.12***	0.02	0.01	-0.03	-0.02
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.11)
2000	-0.03*	-0.04**	-0.15***	-0.14***	-0.01	-0.01	-0.08	-0.07
	(0.02)	(0.02)	(0.04)	(0.04)	(0.04)	(0.04)	(0.13)	(0.11)
Main controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other controls	No	Yes	No	Yes	No	Yes	No	Yes
F-value							39	40
Observations	16362	16362	16362	16362	3421	3421	3421	3421

Note: The regression function is equation (9) while the dependent variables is the log of rural net income per capita from 1991 to 2000.

* indicates significance at 10% level, ** indicates significance at 5% level, *** indicates significance at 1% level.