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The Impact of Violent Conflicts on Borrowing and Lending Behavior of Rural Households: Evidence from Northern Myanmar

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Abstract

This study analyses the impact of internal conflicts, mainly focusing on borrowing and lending decisions of rural households in Northern Myanmar. While poor households sold livestock as a coping strategy to deal with income shocks coursed by conflict, they still had to borrow money from wealthier households. Note that wealthier households suffered huge economic losses in agricultural sector and then had lower incentives to invest in this sector in the post-conflict period. Instead, they began to be active in local financial market, by lending money with interest charged to poor households. Therefore, conflicts affect households through modifying rural informal credit market from kinship-based to market-oriented. Moreover, the damage to poor rural households from conflicts results in more expensive cost of coping strategies.

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I. Introduction

When violent conflicts occur, household welfare in targeted areas will be negatively affected since conflicts change risk perceptions, impact welfare levels, disrupt educational trajectories, determine occupational choices, and affect property rights (Verwimp, 2009).

Many studies focus on the micro-economic impact of conflicts, typically the change in wealth, such as change in income and consumption levels (Bozzoli and Bruck, 2009). Meanwhile, specific studies have also explored how conflict negatively affects different household members from different perspectives, such as education and health (Alderman et al., 2006; Shemyakina, 2006), women and children (Akresh et al., 2007; Bundervoet et al., 2009), social networks, and population displacement (Engel and Ibáñez, 2007). Most of these studies have focused only on the consequences of conflicts, which are usually caused by and result in poverty.

In general, the shift of labor from farm to off-farm employment is demonstrated as an effective coping strategy of income shocks (Kochar, 1999). However, conflicts are expected to disrupt agricultural production and reduce non-farm employment opportunities significantly in the targeted areas. It is difficult for rural households in the targeted areas to find out alternative income sources for basic needs of life in the post-conflict period. Moreover, sometimes the shocks caused by conflicts involve moving to safer areas. Households must have not only sufficient funds for basic expenses during conflicts, but also transportation costs. The above-mentioned characteristics could explain why income shock caused by violent conflicts have a devastating effect on households. Under the circumstances, as Justino and Verwimp (2008) mentioned, wealthier households are expected to make use of their savings and sell their assets (e.g., livestock) to earn cash. However, poor households usually have little savings or valuable assets. Thus, the poor should have totally different coping

strategies, but this has rarely been mentioned in the literature. Thus, it is crucial for us to analyze how conflicts affect the financial behavior of households with different wealth statuses.

To conduct an empirical study of the impact of conflicts on borrowing and lending behavior, we take advantage of household-level data collection conducted in an ethnic minority region in Northern Myanmar from 2014 to 2016. Since violent conflicts between the central government and local armed forces occurred in this region in 2015, this dataset makes before and after analysis possible.

In particular, since the survey site has a shortage of official financial institutions and aid, borrowing and lending are generally limited to among households in the same areas. We collect original data not only on the amounts and interest rates of loans received and made by specific households, but also on the relationships between borrowers and lenders. Therefore, changes in financing behavior in the local credit market provide us with a new perspective for revealing the mechanism of how conflicts affect households.

To the best of our knowledge, this study is the first attempt to identify the impact of conflicts on a regional (rural) credit market. We reveal how conflicts affect rural households with different wealth statuses, through financial behavior. In particular, we found borrowing money from wealthier households tended to be an important coping strategy for poor households, to deal with the income shocks caused by conflicts. On the other hand, wealthier households tended to lend charged-interest loans to poor households. Earning income from charge-interest loans might become one of the important income sources for wealthier households in the post-conflict period.

The structure of the rest of this article is as follows. Section 2 provides a brief description of the background of the conflicts in our survey site and sampling procedure, and discusses various income sources and the transformation of income of households with different wealth statuses. Section 3 presents the empirical methodology and description of variables, and discusses estimation results. Section 4 provides some concluding remarks.

II. Survey

II.1. Background

The 2015 conflicts, known as the “2015 Kokang offensive,” involved several clashes

between the Myanmar Army and Myanmar National Democratic Alliance Army (MNDAA) that took place in Myanmar's Kokang Self-Administered Zone in Shan state (hereafter, Kokang) from February to May 2015.

Members of some households fled to safer places for a period of time. The 2015 Kokang offensive was reported to have forced 40,000–50,000 civilians to flee their homes and seek shelter on the Chinese side of the border while about 4,500 others took refuge in Lashio, Shan state (DVB Multimedia Group, 2015).

The 2015 conflicts destroyed both agricultural industry and casino industry in Kokang. In some villages, agricultural production was directly disrupted because the war resulted in the burning of crop fields. Moreover, households in Kokang, especially poor ones, depend on remittance income from their daughters who are employed in the downtown casinos. Once the 2015 conflicts reached the downtown area, casinos and other businesses had to cease operations and dismiss employees, causing the majority of migrants to return to their original families or escape to other places (with their families).

II.2. Survey site and sampling procedure

We started a series of surveys in Kokang in 2012 and continued constructing household-level surveys in 12 villages until 2017. The conflicts that occurred in 2015 interrupted our 2015 survey but also attracted our attention to this issue. As a result, we continued the surveys in post-conflict Kokang in 2015–2017, which provided valuable data for us to complete this study. Thus, a 3-year panel dataset of 95 households in three villages in flat areas, and 119 households in three villages in mountainous areas was prepared for this study.[1]

Sample households in each village were randomly selected from the lists of household heads obtained from village leaders. The household survey gathered data on households and each household member, including household income and asset levels, agricultural production, labor arrangements, income, remittances, borrowing, lending, interest rates, and other household demographics.

II.3. Income changes before and after the conflict

[1] More than 90% of Kokang's land is mountainous, and excluding the Laukkai Basin, flatlands are rare. Flat areas refer to those areas where sugarcane is planted, while mountainous areas refer to those areas not suitable for sugarcane. As sugarcane is the only profitable cash crop in Kokang, households in flat areas rely more on on-farm income (including crop and livestock income and agricultural labor income). On the other hand, households in mountainous areas rely on non-farm income (including off-farm employment income and migrant remittances).

Figure 1 shows the per capita annual income changes from 2014 to 2016. First, the upper panel shows a sharp decline of income of sample households in 2015. Second, we confirmed there was a big income gap between wealthier households and poor households (the panels in the bottom) regardless of specific years.[2] Second, we observed a sharp income decline from 2014 to 2015, regardless of the households' wealth statuses; income recovered in 2016 but was still less than income in 2014. Thus the 2015 conflict might have had a negative impact on household income in 2015 and 2016.

Figure 1: Changes in income of wealthier households and poor households

Meanwhile, it is necessary to clarify the changes in households' income sources to assess the portion of income most damaged after the violent conflicts, and to further confirm the possibility of borrowing behavior of households. Figure 2 classifies the major income sources of sample households into seven categories (crop income, livestock income, agri-labor income, non-farm income, lending income, land-rent income, and other income).[3] The two panels in Figure 2 show the average value of each category, based on their different wealth statuses, from 2014 to 2016. The upper panel present the per capita annual income (CNY) of each income category of wealthier households, and the bottom panel shows those of poor households.

Figure 2: Changes in income sources of sample households

We observed obvious declines in the per capita annual incomes from crops, agri-labors, and non-farm employment, for both wealthier households and poor households in 2015 compared to 2014. Among them, non-farm income was assumed to be the income source facing the greatest damage in 2015 and 2016.

For poor households, income from livestock increased in 2015 and 2016. As we confirmed the number of livestock of each households did not change much and the selling price of livestock declined after the conflict, we considered that the increase in livestock income of poor household was caused by reduced self-consumption. On the contrary, we found wealthier households tended to earn more income from lending in 2015 and 2016. In the following Subsection 3.5, we provide empirical analysis on

[2] Out of the 214 sample households, 67 households are regarded as "wealthier households" and 147 households are "poor households."

[3] "Other income" includes income from inheritances, gifts, dowries, and others. "Non-farm income" includes income from off-farm employment and remittances from migrant household members. We excluded "land-rent income" and "other income" in Figure 2, since they were too small.

income from lending and propose hypotheses.

IV. Empirical analysis

IV.1. Description of variables

Table 1 reports the summary statistics for certain household characteristics from 2014 to 2016. We briefly introduce each variable and explain its significance in the specific context of the survey site. "Logland" was the natural logarithm of "1 + land value score". Land value score was evaluated by one of the village leaders, since the productivity of land can be totally different; most land was in mountainous areas and there was no active land market for it. Hereafter, these households with a larger "logland" are referred to as wealthier households.

Table 1: Summary statistics: household level

The per capita annual income of sample households was 3,119 Chinese yuan (CNY) on average in 2014.[4] "Livestock value" was calculated by the market price of each livestock type in 2014, including chickens, pigs, cattle/buffalo, and goats. "Savings" refers to the total amount of savings of the households, with a maximum of 45,000 CNY in 2014, this made lending behavior possible. However, 391 households among the 641 observations had zero savings, showing that they might be easily affected by a short-term income shock.

"HH labors" refers to number of household labors. A household labor here was defined as being at least 12 years of age and not a student. This definition is because a girl over 12 years of age was able to find a job in a restaurant or casino in downtown Kokang. "% non-labor hhm" is the proportion of non-labor household members in a household. Non-labor members include the sick, those over 60 years old, and children under 12 years of age. Furthermore, "off-farm participation" and "migration participation" refer to the participation of off-farm employment and migration (where 1 = at least one member of the households participate in off-farm employment/migration, and 0 = otherwise.)

Sugarcane and maize are the two main crops produced by farm households in Kokang. We compared the production changes from 2014 to 2016 in sugarcane and maize by the number of cultivation households, land area (mu), unit yield (ton/mu, only for

[4] The CNY is in circulation in our survey villages. In December 2014, 1 CNY = 0.16 USD.

sugarcane[5]), unit gross income (CNY/mu), unit material cost (CNY/mu)[6], and unit labor cost (person*day/mu). First, we confirmed that less than half of the households (87~92 households out of 214 sample households) produced sugarcane. Since sugarcane can generally only be produced in the flat basin area, households that own flat basin lands are generally wealthier households, and have a high land value score. In contrast, almost all households (201~204 households out of 214 sample households) were producing maize.

The land area of sugarcane and maize cultivation showed little change from 2014 to 2016.[7] However, there were large declines in unit yield and income from sugarcane; yield declined from 4.0 ton/mu to 2.4 ton/mu, and income declined from 1154 CNY/mu to 532 CNY/mu. Thus, despite little change in cultivation area, the 2015 conflicts had a negative effect on sugarcane production. Moreover, we found unit labor cost declined from 12.2 person*day/mu to 7.7 person*day/mu, with a recovery from 7.7 person*day/mu to 9.3 person*day/mu from 2015 to 2016. As a result, even though the conflict was over by 2016, households who produced sugarcane possibly still had a wait-and-see attitude towards agricultural investment, possibly because they were afraid that they would be hit again by conflict. At the same time, maize production faced a similar but different situation. In post-conflict Kokang, the maize purchasing price declined by nearly 28% from 2.5 CNY/kg to 1.8 CNY/kg, indicating that lower prices likely caused the income decline.[8]

Moreover, we included schooling years of household heads ("schooling hhh") in our analysis. Schooling of household heads was expected to have effect on borrowing behavior; for example, household heads with higher schooling years may be more trusted when borrowing money, which may positively affect borrowing amounts.

"Logdistance" is the natural logarithm of value of "distance", which refer to the straight-line distance from each village to the nearest county towns (km) and constant for each village. Generally, villages closed to county towns can take use of this location

[5] We exclude the unit yield of maize, since we found that in some households, part of the maize was being used in livestock production immediately after harvest without being counted during the harvest season. The harvest lasts for at least two months, so for households who owned a lot of livestock, the yield of maize would be underestimated.

[6] Material cost includes the cost of fertilizers, chemicals, and other materials.

[7] Since sugarcane has a growth cycle of 3–5 years, in the short term, there would be no significant change in the cultivation area. On the other hand, maize is generally produced extensively, which could be confirmed by the low material cost. Thus, it was not necessary to reduce the cultivation area for reducing cost.

[8] In post-conflict Kokang, the prices of agricultural products declined by 20% to 50%, including crops (except sugarcane) and livestock. Sugarcane was cultivated under contract with a sugar producer, and therefore the purchase price was fixed during and after the 2015 conflicts.

advantage. However, the 2015 conflicts occurred in a few county towns, villages which were closed to county towns tended to be close to the conflict spots. This important variable might have affected the evacuation behavior and further the borrowing and lending behavior of the sample households.

Furthermore, "drought 2013" is a dummy variable that takes the value of 1 if the household was hit by a drought in 2013. We consider the income shock caused by the drought might have affected the borrowing and lending behavior of the sample households in the post-drought years.

"Escape 2015" is a dummy variable that takes the value of 1 if the household escaped from its village for a period during 2015. We found that over 60% of the sample households fled to other places. This behavior was likely to have affected their livelihoods. "Escape days 2015" refers to the number of days household members were gone from their home because they fled the area in 2015. On average, households stayed away for 11 days, and the longest stay was 60 days. "Escape together" is a dummy variable that takes the value of 1 if all household members escaped from their village together, and 0 if one or more household members remained in their house.

The above-mentioned evacuation behavior is expected to have had an effect on agri-production and non-farm participation. We estimate the determinants of the evacuation behavior and its effects on borrowing and lending behavior in the econometric analysis in Sections 3.

We gathered information on the borrowing and lending behavior of each sample household, including the total amount of borrowing and lending, the amount of borrowing and lending in a single year, the interest rate on loans, and who they borrowed money from (relatives or other people). It must be pointed out that there was no official financial institution or bank in Kokang, and we did not observe efficient credit or financing behavior by any agency or non-governmental organization (NGO).[9] Financial behavior was limited to between relatives (that we called "kinship-based credit"), friends, and villagers from the same or neighboring villages.

Table 2 shows the basic statistical information of variables of borrowing and lending from 2014 to 2016, and Table 3 shows the definition of each variable. We first confirmed that the number of new borrowings grew substantially in 2015, from 20% to 39%. The

[9] There were some experimental microfinance projects conducted by NGOs in Kokang, but they were quite small in number and limited to a few villages.

amount of new borrowings was 307 CNY in 2014, increasing to 524 CNY in 2015 and 315 CNY in 2016. We found that households did not stop borrowing money after the conflicts.

Table 2. Summary statistics: borrowing and lending
Table 3. Definitions of borrowing and lending variables

Second, the number of households who lent money to others did not increase that much. We consider that this is because there are a limited number of wealthier households that are able to lend money. In contrast, the amount of new lending rapidly increased from 2014 to 2015 (from 541 CNY to 1,025 CNY), and 799 CNY in 2016. Third, we found that interest rates on both borrowing and lending rose in 2015 (interest rate on lending rose in 2016 as well). Based on these results, we found that the scale of the credit market grew after the 2015 conflicts.

At the same time, we observed that some households borrowed money from their relatives and, in some of these cases, interest was not charged. In addition, land is used as pledge for borrowed money in most cases.[10] However, we found that lending between relatives declined during and after the 2015 conflict (from 69% to 47%). It is important to understand why households tended to be hesitant to lend money to their relatives in the post-conflict period, and we infer two hypotheses as reasons. The first is that wealthier households tended to tighten their financial market participation as a risk-averse risk response to the conflicts. However, the credit market expanded without external intervention, and thus, this hypothesis does not seem plausible. The second possible explanation is that wealthier households tended to lend money to as many people as possible to increase their interest income from lending. This can be also confirmed by the increasing lending income (from 12 CNY to 105 CNY) and "lending income (%)" (from 0.6% to nearly 2%) from 2014 to 2016.

Surprisingly, the maximum interest rate of lending was 50% monthly, or 600% per annum. Considering that the borrowing incurred compound interest charges, this debt burden was extremely heavy.

IV.2. Conflict evacuation

As conflict evacuation behavior is expected affected borrowing and lending behavior of

[10] There is a possibility that households that could not pay back their loans will lose their land (rights). However, we did not observe such cases during our survey.

different households. We posed the question: Do different households exhibit different evacuation behavior?, before the estimation of borrowing and lending decision. Therefore, we applied Cragg (1971)'s hurdle model to estimate what affected households' evacuation behaviors: The first decision was whether to escape; the second was how many days to remain away. Furthermore, in addition to the decision to evacuate and the length of the evacuation, we also estimate the decision to "escape together" using the Heckman probit model.

Table 4. Determinants of conflict evacuation

In Table 4, Column (1) and column (2) present the evacuation decision and the length of evacuation, respectively. Column (3) presents the second step results of the Heckman probit model, regarding the decision to "escape together." "Logland" was used for measuring the wealth statuses of sample households, and we found that wealthier households were more likely to escape (column (1)), and more likely to escape longer (column (2)), and more likely to take all family members to escape (column (3)).

There is a possibility that if a household owns a relatively large number of livestock, the household (or a few members of the household) might not escape, since the livestock would need to be taken care of. The results in column (3) tell us that household evacuation behavior was affected if they owned much livestock: they tended to leave some members behind.

We expected some households might be hesitant to escape if they had several non-labor household members. This was confirmed by the result that "% nonlabor hhm" significantly and negatively affected the decision of "escape together", which tells us that households with more non-labor members possibly had difficulties when escaping. Meanwhile, distance played a role when making the decision of how many members to escape. This is not difficult to understand. We mentioned the conflicts occurred in the county towns. When violent conflicts occurred close to a family's home, the households tended to escape and escape longer and together to ensure the safety of all family members.

Consider that if poor households had a shortage of funds for basic evacuation expenses, and they decided to escape, they might have had to borrow money for evacuation expenses. On the other hand, even if poor households did not escape, they might not be able to make a living without borrowing, since the conflict destroyed agricultural production and non-farm employment. Thus, the correlation of evacuation and decision

of borrowing will be discussed in Subsection 4.3.

On the contrary, there are also two alternatives for changes in lending behavior of wealthier households when the conflicts occurred. First, wealthier households might tighten their financial market participation, because households evacuated so that they were unable to participate in financial market. Second, the wealthier might tend to lend money to others to earn interest income, as an alternative income source to crop income. In Subsection 4.4, we verify these hypotheses.

IV.3. Conflict and borrowing

We first use multinomial probit model to estimate the determinants of the likelihood of borrowing: the dependent variable is the decision of "new borrowing", where 0 = a household did not borrow money, 1= a household borrowed money without interest, and 2 = households borrowed money with interest.

Table 5 reports the results: the upper panel shows the decision of borrowing without interest, and the bottom panel shows the decision of borrowing with interest. Columns (1) to (3) shows the decision of borrowing in 2014-2016. As "logland" is the variable used to measure the wealth status of sample households, columns (2) to (5) shows poor households tended to borrow not only without-interest loans but also with-interest loans in post-conflict 2015 and 2016. Specifically, we consider the with-interest loans only happen when there is an urgent need.

Table 5. Decision of borrowing

Moreover, we expected drought happened in 2013 might have affected the borrowing behavior of the sample households in the post-drought years, for example, households suffered from the drought had to borrow money in a long period after 2013. But it seems that there was no specific correlation between the drought and borrowing in the post-conflict 2015 and 2016. "Any old borrowing" positively affected with-interest borrowing during 2014 to 2016. That is, those who had a debt burden in the previous year were more likely to borrow loans with interest, which made the debt burden heavier.

Importantly, in columns (4) and (5), the results confirmed that evacuation behavior were not likely to affect borrowing behavior, since the coefficient of "escape 2015" were all negative. Thus we consider that evacuation behavior had a limited impact on the decision of borrowing during and after the conflicts.

Second, we verify which variables affect the amount of borrowing, using Tobit model. The results are shown in Table 6. Specifically, we use "new borrowing amount" of 2014, 2015, and 2016 as the dependent variable, respectively.

Table 6. Decision of borrowing (amount)

The results of column (1) show wealthier households tended to borrow large amounts of money in 2014. We consider that the money demand of wealthier households is much larger than the poor, since they usually borrow money for investment purposes before the conflicts. However, as columns (2) to (3), poor households tended to borrow relatively large amounts of money in 2015 and 2016. We consider this was caused by the income shock of conflicts. The results of Table 5 already told us that poor households tended to borrow money after the 2015 conflict. As a result, poor households were likely to borrow and borrow large amount of money for sudden income shock caused by conficts.

Moreover, we also verify how conflict evacuation behavior of households affected their borrowing amount. When using "escape 2015" (the decision to escape) in the estimation shown in columns (4) and (5), it seems that the decision to escape did not affect borrowing amount. As we already confirmed in Table 5, there is no correlation between evacuation behavior and the decision of borrowing, including the decision and the amounts.

IV.4. Conflict and lending

We have already revealed the determinants of borrowing behavior before and after the conflicts from the perspective of money demand in the credit market. From the opposite perspective of money supply, it is necessary to examine how lending behavior was determined before and after the conflicts. Certainly, wealthier households tend to lend money to others, since only the wealthier can do so, regardless of whether there is a conflict. However, clarifying the lending was without-interest or with-interest is with great importance.

Thus, we use multinomial probit model to estimate the determinants of the likelihood of lending: the dependent variable is the decision of new lending, where 0 = a household did not lend any loan to others, 1= a household lent without-interest loans to others, and 2 = a household lent with-interest loans to others.

The results are reported in Table 7. The upper panel shows the decision of lending without interest, and the bottom panel shows the decision of lending with interest. We found wealthier households and those who have lend money to others in the previous years were lend with-interest loans in 2015 and 2016, since "logland" and "any old lending" significantly and positively affect with-interest borrowing (columns (2) to (5)). We consider this is motivated by the growing lending interest after the 2015 conflicts.

Table 7. Decision of lending

At the same time, we also focus on the growth of lending amounts, which mentioned in Subsection 3.2. We use a Tobit model to estimate the determinants of "new lending amount", and the results are shown by years in Table 8.

Table 8. Decision of lending (amount)

We found that wealthier households and households that lent money to others in the previous year tended to lend more money in 2015 and 2016. Considering that the lending interest rate was increasing in 2015 and 2016 (Table 2), wealthier households possibly tended to supply more money in credit markets to earn more income from lending.

Additionally, columns (2) and (3) tell us that less educated household heads (that had lower "schooling hhh") tended to lend more money to others in 2015 and 2016. The possible explanation for this could be that household heads who are less educated tend to be very attracted by the increase in interest income from lending, because they have fewer income sources and employment channels (such as non-farm business that education is considered to be necessary) and investment opportunities. Furthermore, we found that the decision regarding conflict evacuation ("escape 2015") seems have had no impact on lending amount.

In order to further confirm that the reason why wealthier households supplied more money in credit markets in 2015 and 2016 is to earn more interest income, we also estimate lending income (Table 9) and the proportion of lending income in remittance-excluded annual income (Table 10), respectively, using the Tobit model. The results of Table 9 and Table 10 show that in post-conflict 2015 and 2016, wealthier households earn more income from lending interest; meanwhile, the proportion of lending income in remittance-excluded annual income tented to be larger for wealthier households.

Table 9. Determinants of lending income
Table 10. Determinants of lending income (%)

V. Conclusion

In this study, we analyzed the impact of violent conflicts, mainly focusing on borrowing and lending decisions of rural households in Northern Myanmar. First, we found that households faced a large income shock caused by the conflicts: first, both wealthier households and poor households suffered from the decline in non-farm employment. Second, wealthier households faced the failure of the harvest of sugarcane and poor households suffered from the price decline of maize, which were their most important income sources (income from crops).

Second, as a coping strategy, we found poor households reduced their self-consumption of livestock and sell them to earn income. However, the losses in income from crops, non-farm employment, and agri-labor employment were too heavy to make up by only selling livestock. As a result, poor households tended to borrow large amount of money with interest charged. On the other hand, wealthier households suffered from the failed sugarcane harvest during the conflict period; they might not only suffer huge economic losses, but also had no confidence in agricultural investment in the post-conflict period. For example, they reduced the labor input of sugarcane significantly even though the conflict was over by 2016. Instead of agricultural investment, they tended to invest in making loans (sometimes usurious loans) and earned interest income.

Thus, as long as non-farm employment and agricultural production did not recover to pre-conflict levels, poor households would continue to suffer from income shortages, owing to their reliance on non-farm employment and agri-labor employment. As a result, wealthier households continued to lend, while poor households had to keep borrowing for an extended period. These results highlight the possibility that the damage to poor rural households from conflicts results in long-term poverty.

The results of our study are specific to the local context of the surveyed areas and our sample size is rather small; thus, their external validity might be limited. However, our findings on the impact of conflicts on expansion of with-interest loans, and furthermore, on the possibility of long-term poverty, have general implications.

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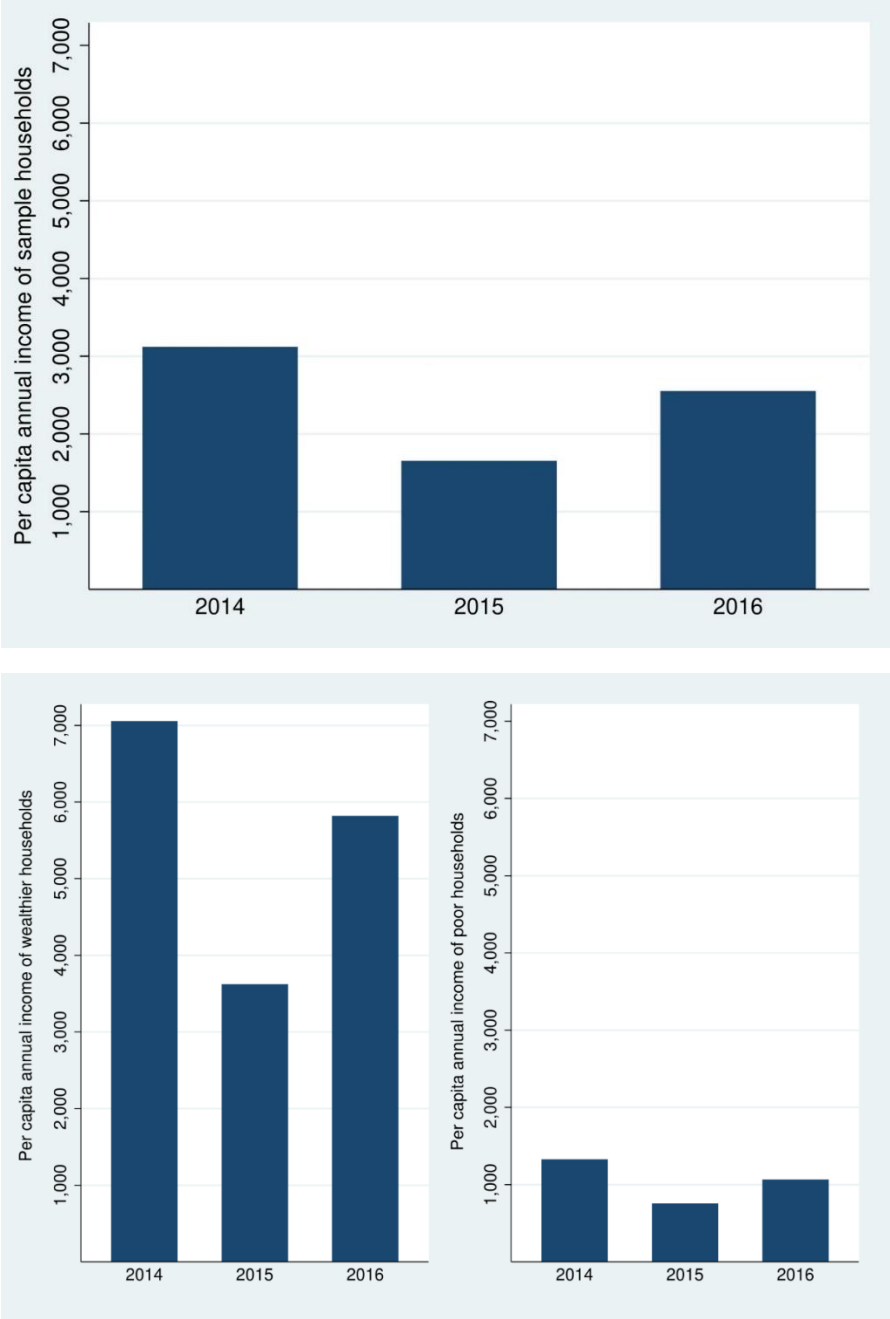
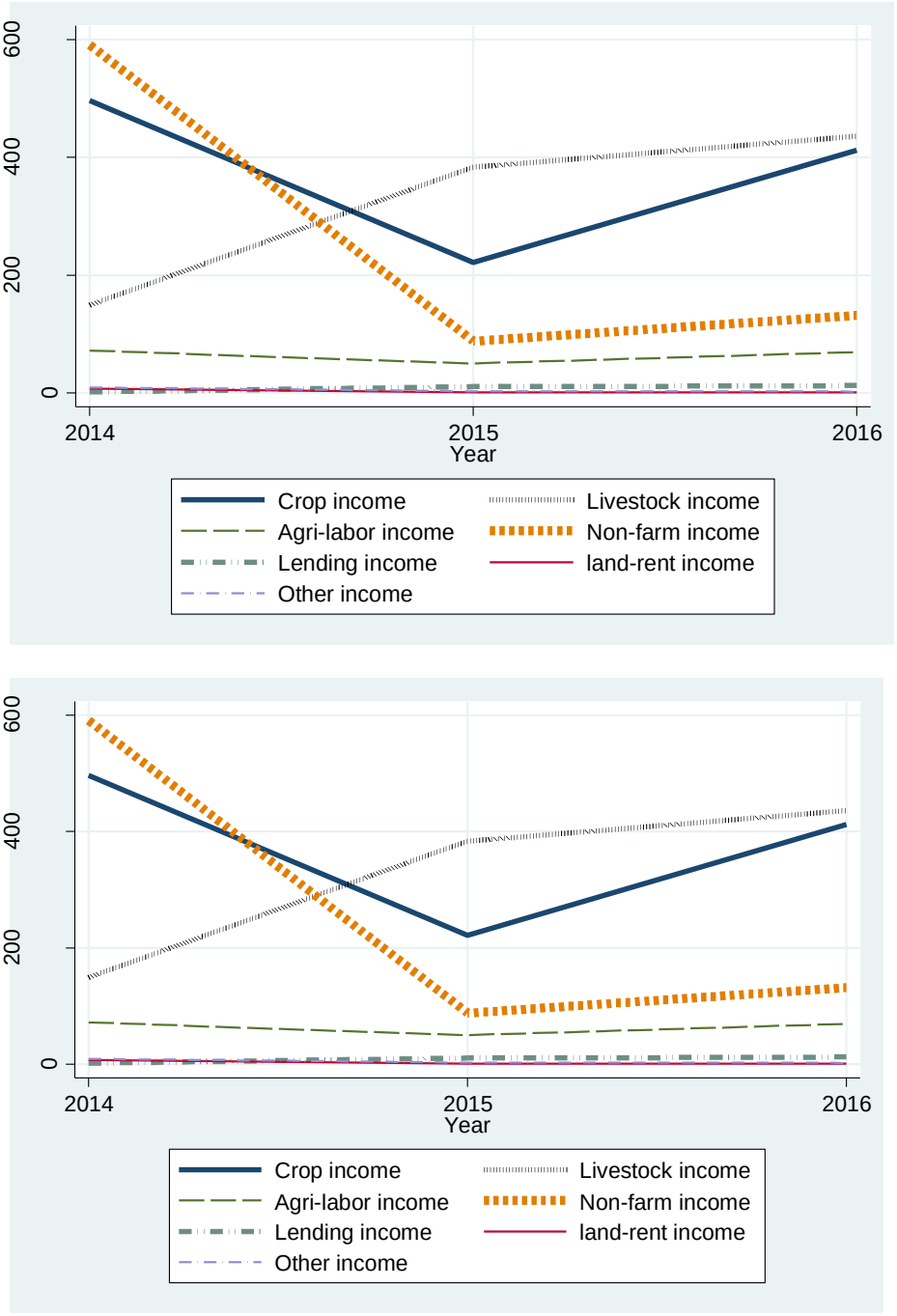
Figures and Tables

Figure 1: Changes in income of wealthier households and poor households



Note: The upper panel is the average per capita annual income (CNY) of sample households. The left panel in the bottom is the histogram of average per capita annual income (CNY) of wealthier households and the right panel in the bottom is that of poor households. We defined "wealthier households" as the households whose land value scores are equal to or greater than the mean value (>=25.750), and the rest are "poor households."

Figure 2: Changes in income sources of sample households



Note: The upper panel presents the change of per capita annual income (CNY) of five income categories of wealthier households, and the bottom panel shows those of poor households.

Table 1: Summary statistics: household level

	2014					2015					2016				
Variable	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Logland	214	2.45	1.34	0.00	5.77	214	2.45	1.34	0.00	5.77	214	2.45	1.34	0.00	5.77
Per capita annual income (thousand CNY)	214	3.12	3.70	0.01	21.12	214	1.65	2.05	0.00	11.06	214	2.55	2959.24	0.00	15.96
Livestock value (thousand CNY)	214	18.82	18.29	0.00	123.34	214	14.01	15.30	0.00	97.13	214	14.09	13.25	0.00	84.93
Savings (thousand CNY)	214	1.61	4.99	0.00	45.00	214	1.22	3.85	0.00	30.00	213	1.62	4.49	0.00	36.00
HH labors	214	3.35	1.66	0.00	11.00	214	3.47	1.70	0.00	11.00	214	3.58	1.76	0.00	11.00
% non-labor hhm	214	0.42	0.19	0.00	1.00	214	0.41	0.19	0.00	1.00	214	0.40	0.19	0.00	1.00
Off-farm participation	214	0.52	0.50	0.00	1.00	214	0.19	0.39	0.00	1.00	214	0.19	0.39	0.00	1.00
Migration participation	214	0.62	0.49	0.00	1.00	214	0.20	0.40	0.00	1.00	213	0.31	0.46	0.00	1.00
Any sugarcane	214	0.43	0.50	0.00	1.00	214	0.43	0.50	0.00	1.00	214	0.41	0.49	0.00	1.00
Land sugarcane (mu)	92	25.03	23.31	2.00	160.00	92	24.98	23.38	2.00	160.00	87	25.72	23.31	4.00	160.00
Yield sugarcane (ton/mu)	92	4.04	0.99	2.00	7.00	92	2.37	1.32	0.00	7.00	87	3.86	1.13	1.00	8.00
Gross income sugarcane (thouand CNY/mu)	92	1.15	0.44	0.24	2.49	92	0.53	0.36	0.06	1.99	87	1.11	0.37	0.24	2.44
Any maize	214	0.94	0.24	0.00	1.00	214	0.94	0.23	0.00	1.00	214	0.95	0.21	0.00	1.00
Land maize (mu)	201	6.57	6.04	1.00	40.00	202	6.36	5.40	1.00	30.00	204	6.61	5.92	1.00	40.00
Gross income maize (thousand CNY/mu)	201	0.12	0.16	0.00	0.77	202	0.09	0.13	0.00	0.61	204	0.11	0.17	0.00	0.94
Schooling hhh	214	0.91	1.84	0.00	12.00	214	0.91	1.84	0.00	12.00	214	0.91	1.84	0.00	12.00
Logdistance	214	2.32	0.26	1.95	2.77	214	2.32	0.26	1.95	2.77	214	2.32	0.26	1.95	2.77
Drought 2013	214	0.61	0.49	0.00	1.00	214	0.61	0.49	0.00	1.00	214	0.61	0.49	0.00	1.00
Escape 2015						214	0.61	0.49	0.00	1.00					
Escape days 2015						214	11.15	12.78	0.00	60.00					
Escape together						134	0.80	0.40	0.00	1.00					

Table 2. Summary statistics: borrowing and lending

	2014					2015					2016				
Variable	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max	Obs	Mean	Std. Dev.	Min	Max
Any borrowing	213	0.324	0.469	0	1	213	0.498	0.501	0	1	213	0.474	0.501	0	1
Borrowing amount (thousand CNY)	213	1.492	5.130	0	40.000	213	1.538	4.091	0	40.000	213	1.659	3.870	0	40.000
Any old borrowing	213	0.202	0.402	0	1	213	0.244	0.431	0	1	213	0.408	0.493	0	1
Any new borrowing	213	0.202	0.402	0	1	213	0.394	0.490	0	1	213	0.272	0.446	0	1
New borrowing amount (thousand CNY)	213	0.307	1.165	0	10.000	213	0.524	0.996	0	6.000	213	0.315	0.667	0	3.500
Any new borrowing with interest	44	0.182	0.390	0	1	84	0.393	0.491	0	1	67	0.493	0.504	0	1
New borrowing interest rate	44	0.003	0.007	0.000	0.030	84	0.015	0.028	0.000	0.100	67	0.024	0.035	0.000	0.100
Relative new borrowing	44	0.386	0.493	0	1	84	0.452	0.501	0	1	67	0.299	0.461	0	1
Any lending	213	0.357	0.480	0	1	214	0.416	0.494	0	1	214	0.411	0.493	0	1
Lending amount (thousand CNY)	213	0.785	2.406	0	20.000	214	1.657	4.568	0	33.000	214	2.211	6.018	0	40.000
Any old lending	213	0.131	0.339	0	1	214	0.290	0.455	0	1	214	0.369	0.484	0	1
Any new lending	213	0.254	0.436	0	1	214	0.294	0.457	0	1	214	0.257	0.438	0	1
New lending amount (thousand CNY)	213	0.541	1.748	0	15.000	214	1.025	2.842	0	20.000	214	0.799	2.252	0	16.000
Any new lending with interest	52	0.173	0.382	0	1	60	0.533	0.503	0	1	53	0.509	0.505	0	1
New lending interest rate	52	0.004	0.011	0.000	0.050	60	0.036	0.073	0.000	0.500	53	0.029	0.042	0.000	0.200
Relative new lending	52	0.692	0.466	0	1	60	0.400	0.494	0	1	53	0.472	0.504	0	1
Lending income(thousand CNY)	214	0.012	0.102	0	1.440	214	0.070	0.318	0	3.000	214	0.105	0.504	0	5.200
Lending income （%）	209	0.006	0.054	0.000	0.670	208	0.018	0.057	0.000	0.358	212	0.019	0.062	0.000	0.407

Table 3. Definitions of borrowing and lending variables

Variable	Definition
Any borrowing	A dummy variable that takes the value of 1 if a household held any debt at the end of a year, including long-term debt.
Borrowing amount	The total amount of debt of the household aggregated at the end of a year.
Any old borrowing	A dummy variable that takes the value of 1 if a household held any debt in the previous year and did not paid back them (or part of them) within the year.
Any new borrowing	A dummy variable that takes the value of 1 if a household held any borrowing in a year that it had not paid off at the end of the year.
New borrowing amount	The amount of new borrowing.
Any new borrowing with interest	A dummy variable that takes the value of 1 if new borrowing was with-interest borrowing.
New borrowing interest rate	The monthly interest rate of new borrowing amount.
Relative new borrowing	A dummy variable that takes the value of 1 if a household held debt borrowed from relatives.
Any lending	A dummy variable that takes the value of 1 if a household lent money to others, including long-term debt, at the end of a year.
Lending amount	The total amount of lending of a household aggregated at the end of a year.
Any old lending	A dummy variable that takes the value of 1 if a household lent money to others in the previous year and did not retain them (or part of them) within the year.
Any new lending	A dummy variable that takes a value of 1 if a household held any lending at the end of a year, but excluding the lending occurred before that year.
New lending amount	The amount of new lending.
Any new lending with interest	A dummy variable that takes the value of 1 if new lending was with-interest lending.
New lending interest rate	The monthly interest rate of new lending amount.
Relative new lending	A dummy variable that takes the value of 1 if a household lent money to its relatives.
Lending income	Per capita annual income from lending.
Lending income (%)	The proportion of lending income in remittance-excluded annual income.

Table 4. Decision of borrowing

	Without-interest			With-interest		
	(1)	(2)	(3)	(4)	(5)	(6)
	2014	2015	2016	2014	2015	2016
Log land	0.0529	-0.554***	-0.680***	-0.174	-0.751***	-0.598***
	(0.72)	(-5.83)	(-4.85)	(-0.70)	(-7.49)	(-4.53)
Flood 2013	0.575	-0.184	-0.565	0.356	-0.373	-0.495
	(1.87)	(-0.65)	(-1.80)	(1.39)	(-0.93)	(-1.37)
Any old borrowing	1.147	0.441	1.253*	1.846***	1.119*	1.571**
	(1.71)	(0.70)	(2.48)	(3.42)	(2.01)	(2.85)
% nonlabor hhm	-0.271	0.504	1.476	0.662	0.363	-0.0930
	(-0.30)	(1.42)	(1.56)	(0.60)	(0.58)	(-0.19)
Migration participation	-0.437	-0.214	0.128	-0.410	-0.150	-0.158
	(-0.74)	(-0.84)	(0.54)	(-0.46)	(-0.88)	(-0.45)
Distance	0.197***	0.222***	0.0985	0.191***	0.0483	-0.0109
	(6.37)	(4.01)	(1.83)	(4.45)	(1.04)	(-0.25)
Escape 2015		-0.0911	-0.477		-0.411*	-0.791**
		(-0.21)	(-1.42)		(-2.14)	(-2.72)
Constant	-3.833***	-2.081*	-1.940	-5.035**	0.0561	0.104
	(-10.26)	(-2.47)	(-1.91)	(-3.23)	(0.10)	(0.17)
N	213	210	209	213	210	209

Note: Standard errors are clustered by village and reported in parentheses.

The asterisks indicate statistical significance: * p < .10, ** p < .05, and *** p < .01.

Table 5. Decision of borrowing (amount)

	(1) 2014	(2) 2015	(3) 2016
Log land	0.532	-0.733***	-0.534***
	(1.93)	(-6.67)	(-4.30)
Flood 2013	1.576	-0.297	-0.389
	(1.64)	(-0.64)	(-1.37)
Any old borrowing	2.456***	1.104*	1.283**
	(10.57)	(2.10)	(2.76)
% nonlabor hhm	0.0593	0.746	0.0678
	(0.05)	(1.22)	(0.21)
Migration participation	-0.409	0.0409	-0.0678
	(-0.36)	(0.31)	(-0.25)
Distance	0.356**	0.0627	0.0551
	(3.18)	(0.86)	(1.48)
Escape 2015		-0.288	-0.538
		(-0.89)	(-1.93)
Constant	-9.330*	0.120	-0.526
	(-2.51)	(0.16)	(-0.93)
sigma			
Constant	3.068**	1.725***	1.431***
	(3.14)	(5.00)	(6.79)
N	213	213	212

Note: Standard errors are clustered by village and reported in parentheses.

The asterisks indicate statistical significance: * p < .10, ** p < .05, and *** p < .01.

Table 6. Decision of lending

	Without-interest			With-interest		
	(1)	(2)	(3)	(4)	(5)	(6)
	2014	2015	2016	2014	2015	2016
Log land	0.302	0.0971	0.174	0.488*	0.584	0.963***
	(1.47)	(0.78)	(1.01)	(2.30)	(1.65)	(4.20)
Flood 2013	-0.0385	-0.478**	-0.663	-0.106	0.286	0.265
	(-0.11)	(-2.79)	(-1.71)	(-0.34)	(0.80)	(0.51)
Any old lending	0.213	1.037*	1.894***	0.666	1.442***	2.162***
	(0.32)	(2.23)	(4.14)	(0.95)	(4.23)	(6.13)
% nonlabor hhm	0.213	0.621	0.525	1.741	0.880	0.0172
	(0.33)	(0.77)	(0.36)	(1.72)	(1.01)	(0.02)
Migration participation	0.447	0.503*	-0.309	1.073*	-0.0385	-0.000423
	(1.07)	(2.17)	(-1.49)	(2.06)	(-0.05)	(-0.00)
Distance	0.00725	0.134**	0.0328	-0.157*	-0.0672	-0.0779
	(0.16)	(2.80)	(0.73)	(-2.02)	(-0.77)	(-0.62)
Escape 2015		0.506	-0.767		0.417	-1.293
		(1.18)	(-1.38)		(0.73)	(-1.32)
Constant	-2.296**	-3.740***	-2.362***	-3.349**	-3.692*	-4.003*
	(-2.81)	(-4.29)	(-4.80)	(-2.80)	(-1.98)	(-2.50)
N	213	214	213	213	214	213

Note: Standard errors are clustered by village and reported in parentheses.

The asterisks indicate statistical significance: * p < .10, ** p < .05, and *** p < .01.

Table 7. Decision of lending (amount)

	(1)	(2)	(3)
	2014	2015	2016
Log land	0.409***	0.459	0.553***
	(3.59)	(1.95)	(8.53)
Flood 2013	-0.0405	-0.0202	-0.115
	(-0.13)	(-0.09)	(-0.27)
Any old lending	0.396	1.464***	2.141***
	(0.61)	(5.49)	(7.73)
% nonlabor hhm	0.662	0.639	0.232
	(1.00)	(0.94)	(0.24)
Migration participation	0.693	0.396	-0.160
	(1.73)	(1.03)	(-0.59)
Distance	-0.0261	0.0344	-0.0286
	(-0.59)	(0.54)	(-0.55)
Escape 2015		0.400	-0.980***
		(0.90)	(-4.66)
Constant	-2.464***	-3.370**	-2.353***
	(-10.67)	(-2.92)	(-5.04)
sigma			
Constant	1.554***	1.625***	1.436***
	(10.10)	(7.10)	(6.19)
N	213	214	213

Note: Standard errors are clustered by village and reported in parentheses.

The asterisks indicate statistical significance: * p < .10, ** p < .05, and *** p < .01.