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How does a debt
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precautionary
savings? Evidence
from a policy
experiment



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Abstract

Using official national-level survey data, we investigate the impact of a large debt waiver program in India on beneficiaries' savings and consumption. We detect a one-time increase in spending on basic food, minor durables, and intoxicants. In addition, plausibly anticipating higher credit constraints in the post-waiver period, the beneficiaries *increase* precautionary savings as represented by increased investment in jewelry. The arbitrary program eligibility cut-off, defined in terms of landholdings, allows us to employ a regression discontinuity(RD) design. We perform several placebo and robustness tests in order to rule out alternative explanations.

Key Words: Consumption and Savings, Governmental Policy and Regulation, Banks, Bankruptcy, Political Economy

JEL Classification: E21, G18, G20, G33, P26, G21, G28, G30, G38, L51, M52.

I Introduction

How does a large-scale and unanticipated debt relief program impact a beneficiary household’s savings and consumption behavior is a question that has not been clearly answered in the extant literature.¹ If a debt waiver bails out borrowers who are distressed for reasons beyond their control and hence completes incomplete contracts (Bolton and Rosenthal (2002)), then we expect the impact to be positive. In such a situation, households may experience a permanent increase in income (Agarwal and Qian (2014)) and, as a result, increase consumption permanently. If, on the other hand, a debt waiver negatively impacts the functioning of the credit markets ex-ante, due to the possibility of increased moral hazard (Bolton and Rosenthal (2002)), and leads to increased credit constraints (Kanz (2016); Cohen-Cole, Duygan-Bump, and Montoriol-Garriga (2009); Jagtiani and Li (2013); De and Tantri (2014)), then the positive effects may be offset. In fact, Kanz (2016) finds that the beneficiaries of this program indeed anticipate higher credit constraints. Therefore, anticipating difficult times, the beneficiaries may resort to precautionary savings. Any increase in consumption, in such a scenario, is likely to be short-lived. Increased credit constraints after the waiver could reduce investments (Kanz (2016)) and hence, the increase in consumption in the short term is unlikely to sustain in the medium and long term. What actually transpires, therefore, is an empirical question.

We study the impact of—one of the world’s largest debt relief schemes—the Indian Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS, henceforth) of 2008, on the savings and consumption behavior of the beneficiary households. In particular, we examine the impact of the debt waiver program on disaggregated consumption and precautionary savings behavior of beneficiaries. Using two official national level surveys—one of which was conducted immediately after the waiver and the other close to 4 years after the waiver—and a sharp regression discontinuity design that exploits a program feature, we detect a one time increase in the consumption of basic food, minor durables and intoxicants. In addition, spending on jewelry, plausibly a form of precautionary savings for the savings constrained poor (Rosenzweig and Wolpin (1993)) also increases sharply. However, all these increases tend to be short-lived: consumption levels revert to their

¹In the context of bankruptcy, many important studies have examined the implications of debt relief on real outcomes, such as employment and earnings (Dobbie and Song (2014)), wealth accumulation (Han and Li (2011)), access to credit (Cohen-Cole, Duygan-Bump, and Montoriol-Garriga (2009); Livshits, MacGee, and Tertilt (2007); Musto (2004); Jagtiani and Li (2013)), and earnings sensitivity to consumption (Filer and Fisher (2007)). However, it has been noted that the decision to file for bankruptcy could be influenced by borrower circumstances (Dobbie and Song (2014)) and credit market conditions (Dick and Lehnert (2010)), and both of these factors could influence ex-post outcomes. Studies that examine the implications of debt relief granted by governments worldwide overcome the above endogeneity problem (Gine and Kanz (2014); Kroszner (1998)). Such studies have focused mostly on ex-post credit market outcomes such as debt renegotiations and foreclosures (Agarwal, Amromin, Ben-David, Chomsisengphet, Piskorski, and Seru (2012); Mayer, Morrison, Piskorski, and Gupta (2011); Alston (1984)), loan repayment behavior (Gine and Kanz (2014)), and other outcomes such as investment and productivity (Kanz (2016)).

estimated counterfactual levels in the medium term.

Note that (Kanz (2016)) examine the impact of ADWDRS on various real outcomes including consumption and savings at the beneficiary level. As we explain in detail in Section II, our study differs from theirs on a number of critical dimensions. Using a proprietary survey, Kanz (2016) examine the impact of the ADWDRS on the short term aggregate consumption and savings of waiver beneficiaries drawn from four districts belonging to one state of India and find no significant change in the aggregate consumption and savings. We, on the other hand, examine the impact of the event on both short term and long term disaggregated consumption and precautionary savings using two official national level sample surveys. Although our findings differ from those of Kanz (2016) with respect to consumption and savings but, as we explain in Section II, could potentially explain their findings relating to decline in investment and productivity. It is also important to note that while Kanz (2016) identify waiver beneficiaries directly, we use indirect proxies and hence estimate only the intention-to-treat effect as the national surveys were not done keeping waiver in mind and hence do not have explicit waiver identifiers. While lack of direct identification may impact the precision of our estimates, it has an important advantage over surveys which are explicitly designed to measure the impact of the waiver: the interviewees, at the time of the survey, were not aware that the findings may be used to evaluate the impact of the waiver program. Such a knowledge could potentially influence responses or participation in a program specific survey. Finally, as noted before, our findings answer a critical question—what do the beneficiaries do with the windfall arising from waiver? Kanz (2016) do not answer this question.

Some more details about ADWDRS are in order here. All delinquent agricultural loans as of a cut off date were eligible for debt relief. The extent of relief depended on the size of the farmers' landholding. Close to 36.92 million farmers availed the benefit of waiver. In total, 30%² of the households that depended on agriculture benefited from the program. The exchequer had to ultimately spend USD 14.4 billion for this program. This amount is equivalent to approximately 1.2% of India's GDP and 7.6% of total tax receipts at that time,³ making this one of the largest debt relief programs in history. The debt waiver scheme was indeed a large positive income shock to the beneficiary households. According to De and Tantri (2014), the average amount of debt waiver awarded was INR 23,618. This amount works out to be more than 4 times the regular monthly expenditure of an average household. It is also important to note that, as we describe in detail in Section III, the waiver was largely un-anticipated.

As per the debt waiver scheme, defaulting agricultural borrowers with a landholding of less than or equal to 2 hectares were eligible for a full waiver. Other defaulting borrowers

²This calculation has been done assuming a family size of 5.

³Source: Indiabudget.nic.in

were eligible only for a partial waiver of 25% of the outstanding loan. It is noteworthy that landholding is reckoned based on the quantity of land pledged at the time of borrowing. The crop loans have a tenure of one year and the waiver was extended to only defaulting farmers. Additionally, although the waiver was announced on February 29 2008, eligibility was based on loan status as of December 31st 2007 (De and Tantri (2014)). Thus, eligible loans should have been borrowed on or before December 30, 2006, a good 14 months before the waiver announcement. Therefore, it is difficult to build a case for self-selection of landholding based on anticipation of the waiver. More importantly, land is not an infinitely divisible item. It may be difficult for someone with 2.1 hectares of land to sell off 0.2 hectares or pledge only 1.9 hectares as the whole field is pledged.

Thus, the nature of this experiment lends itself nicely to an RD design. We use this feature of the debt relief program to divide our sample into “control” and “treatment” groups. A caveat is in order at this stage: not all households in the treatment group would have been waiver beneficiaries because the waiver was extended to only defaulting farmers. However, as we explain in Section 4, 30% of households dependent on agriculture received a waiver. Thus, a large fraction of our treatment group is likely to have received full debt relief. By design, none of the households in the control group received a full waiver. Therefore, our regression estimates measure the intention-to-treat (ITT) effect rather than the treatment effect itself (Karlan and Zinman (2009)).

We obtain consumption data from the Ministry of Statistics and Program Implementation, Government of India. The National Sample Survey Organisation (NSSO), which is a part of the same Ministry, conducts regular national consumption surveys. We use data from the 64th, 66th, and 68th round of NSSO surveys. These surveys were a part of regular government exercise. Incidentally, the 64th round was conducted just before the waiver, the 66th round was conducted within 12 to 24 months after the waiver, and the 68th round was conducted within 36 to 48 months after the waiver. In these surveys, randomly selected households are asked about the amount of money spent on items of day to day consumption as well as on one time purchases such as jewelry. The survey also records data about land owned by the household as well as the principal occupation of the members of the household.

We estimate the RD specification on households primarily dependent on agriculture using the survey conducted immediately after the waiver. We first classify household expenditure into seven categories: basic food, rich food, minor durables, major durables, jewelry, intoxicants,⁴ and others. Our results show that the debt relief leads to a 9.2% increase in investment in jewelry. In addition, spending on basic food increases by 4.2%, spending on minor durables increases by 7.6%, and the consumption of locally made intoxicants increases by 11.4%. All the above increases are short lived. None of the above increases manifest in the 68th round of NSSO survey conducted approximately

⁴This includes tobacco, toddy and locally made alcohol

four years after the program. Our results indicate that the waiver beneficiaries are likely to direct the extra cash flow from the waiver towards investment in jewelry and for one time extra consumption.

We next focus on the possible mechanism at work. It is well known that poor farmers use assets to smooth consumption when faced with transitory income shocks (Rosenzweig and Wolpin (1993); Paxson (1992)). However, the shock that we examine is permanent and unanticipated, and hence, should have led to a permanent increase in consumption. This contradiction can be explained by the expectation of increased post-waiver credit constraints. It has been shown that debt relief leads to an increased expectation of credit constraints (Kanz (2016); Athreya (2002, 2004); Chatterjee, Corbae, Nakajima, and Ríos-Rull (2007)). In such a scenario, the waiver beneficiaries may see the need to build a buffer stock and resort to precautionary savings (Jappelli and Pistaferri (2010)). Realization of credit constraints is likely to curtail future investments as well (Kanz (2016)). Therefore, any increase in consumption is likely to be short lived. In our discussion of the theoretical background, we dwell further on the possible reasons for increased credit constraints.

We claim that the waiver beneficiaries anticipate credit constraints and hence build buffer stock in response. They also increase consumption in the short term. In fact, Kanz (2016) who study the same program, find that the full waiver beneficiaries care less about the reputational consequences of a default in the post-waiver period and default strategically. They show that the moral hazard is higher among full waiver beneficiaries compared to comparable partial-waiver beneficiaries. Building on the above finding, we conjecture that the waiver beneficiaries are more likely to resort to precautionary savings as they anticipate higher credit constraints. This explains waiver beneficiaries' and non-beneficiaries' asymmetric responses, although both groups have access to the same information set. Using a separate bank loan level dataset used by De and Tantri (2014), we replicate their results relating to increased credit constraints faced by waiver beneficiaries in the post waiver period. Using this data set, we find that the treatment group comprising full waiver beneficiaries is 9.8% less likely to have a loan in the post-waiver period compared to the control group comprising partial waiver beneficiaries. This, along with findings recorded in Kanz (2016), suggests that the waiver beneficiary households indeed anticipate credit constraints in the post-waiver period.

We perform several robustness tests to establish the sanctity of our results. First, we estimate the above RD using households which are not primarily dependent on agriculture. Such households are less likely to be waiver beneficiaries. We do not find any discontinuity in annual or monthly purchases in this sample. Second, using a sample of large farmers, we perform false limit tests. Third, we use data from a survey conducted just before the waiver and test if the discontinuity at the cut-off shows up even before the waiver. We do not detect any discontinuity in this case. Fourth, we vary the bandwidths used in the RD tests and find that the results become stronger as the bandwidth becomes

narrower. Finally, although self selection is less of a concern given the nature of running variable as well the event design, we perform the test suggested by (McCrary (2008)) and do not find any bunching to the left of the discontinuity.

We then test if consumption increases in the long run. For this, we use the 68th round survey conducted nearly 4 years after the waiver. We do not find any significant discontinuity near the cut-off with respect to any item of expenditure. It is likely that in the long run, the negative impact of credit constraints completely offsets the gains from the waiver. This justifies the need for precautionary savings immediately after the waiver. A large fraction of waiver beneficiaries may be forced to borrow from informal lending channels (Kanz (2016)). Given that informal loans are more expensive compared with bank loans (De and Singh (2011a)), cash outflow towards loan repayment may increase in the long run and hence the need to build buffer stock ex-ante may increase.

One important concern with our study is that unlike De and Tantri (2014) and Kanz (2016), we do not have data pertaining to borrowing and waiver status at the household level and hence there could be a question regarding the channel that we point out. Admittedly, therefore, our regression discontinuity coefficients reflect the ITT effect rather than the treatment effect itself. To establish that our results are indeed caused by the waiver, we use two indirect but exogenous proxies:

- a. Rainfall situation in the district.
- b. Density of agricultural loan accounts in the district.

It is reasonable to assume that a drought in the year preceding the waiver is exogenous to the economic circumstances of a district, but at the same time, increases the number of waiver beneficiaries significantly. Note that the waiver was awarded to defaulters as of December 31st 2007. We find that, among the households residing in drought affected areas, those having landholding just below two hectares spend close to 12% more on jewelry when compared to those with landholding just above two hectares. No such discontinuity is detected in areas not affected by drought. Note that according to the usual consumption smoothing in the face of transitory shocks argument (Paxson (1992); Rosenzweig and Wolpin (1993)), farmers in drought-affected areas are expected to sell assets and not buy them. The fact that we find that such farmers invest in precautionary savings strongly points out to that the waiver channel is at work here. In addition, we also find a 14.8% increase in consumption of basic food and a 9.9% increase in consumption of intoxicants. However, the consumption of rich foods falls by 3.3%. It seems like in drought affected areas, waiver beneficiaries substitute rich food by basic food.

Second, the proportion of waiver beneficiaries is likely to be higher in regions with more agricultural loan accounts when the waiver was announced. A waiver beneficiary needs to have a farm loan to start with and should have defaulted on the same. Therefore, the number of agricultural loan accounts in a district works as a good proxy for the intensity of the waiver. Admittedly, the number of agricultural loan accounts outstanding in

a district could be endogenous to the district’s economic circumstances. However, we cannot think of any confounding factor that affects farmers just below 2 hectares, but does not affect comparable farmers just above the 2 hectare threshold, and at the same time is correlated with agricultural loan penetration. We find that the effects pointed out in this study manifest only in regions that have high agricultural loan density.

This paper contributes to the literature on the ex-post real impact of debt relief programs, especially in emerging markets (Mukherjee, Subramanian, and Tantri (2014)); Gine and Kanz (2014)). Extant studies on this program such as Kanz (2016) and Gine and Kanz (2014), which are based on either district-level aggregate data or local survey data, found no impact of the program on real outcomes such as production, agricultural investments, consumption, and loan repayment behavior. We, on the other hand, show that debt relief leads to a one time jump in investment in precautionary savings, reflecting an anticipation of either a decrease in earnings or increased volatility in earnings. We also detect a one time increase in the consumption of certain items. We use an event that is clearly exogenous and large. We also use data from three nation-wide consumption surveys conducted by a government agency. Using exogenous proxies such as drought and farm loan penetration, we attempt to establish that the results are indeed driven by the waiver. These aspects of our study significantly strengthen our identification and make our results generalizable to similar settings.

II Related Literature

This paper contributes to three strands of literature. First, as described in the Introduction, it is directly related to the literature on the ex-post consequences of a debt waiver in emerging economies (Mukherjee, Subramanian, and Tantri (2014) and Gine and Kanz (2014)). The program that we study is typical of a debt waiver in an emerging economy. To the best of our knowledge, this is the first paper to examine disaggregated expenditure at the household level and document an increase in precautionary savings after a waiver. Our study significantly differs from Kanz (2016) in a number of ways. First, Kanz (2016) looks at aggregate consumption immediately after the waiver and finds that consumption levels do not change as a result of a waiver. We look at disaggregated consumption data and investment in jewelry separately. We detect significant changes in individual items and most importantly, an increase in the amount invested in jewelry. We also detect an increase in spending on basic food, minor durables, and locally made intoxicants. In line with Kanz (2016), consumption of most other items remains unchanged.

Second, in Kanz (2016), it is not clear how investment in jewelry is classified. We have data about investment in jewelry at the household level. We classify investment in jewelry as a part of precautionary savings. It is well known that the poor in emerging markets face savings constraints and hence save using commodities and physical assets

(Deaton (2016)). Third, the proprietary survey data used in Kanz (2016) covers four districts of one state in India. We, on the other hand, use data from the NSSO’s biennial survey, which is the standard national survey of the country. Most importantly, our subjects were not interviewed specifically with the waiver in mind. The advantage of this design is that the selection into the sample is unlikely to have an impact on the response. A cost that we pay is that the questions are not tailor-made from the point of view of the waiver. Finally, Kanz (2016) do not answer the question—what do waiver beneficiaries do with the windfall. We explain the source of windfall due to waiver in detail in Section IX. Kanz (2016) do not find any increase even in the short term consumption and savings. Our findings answer the above question. At the same time, our findings support the main findings of Kanz (2016) that agricultural investment and productivity declined after the waiver. Our findings suggest that the waiver beneficiaries spend the windfall on consumption of specific items and also increase precautionary savings. It is possible that the increase in precautionary savings might have come at the expense of agricultural investments. However, we cannot test this hypothesis.

Our paper is also related to the literature that deals with the treatment of windfall gains by the recipients (Paxson (1992); Agarwal and Qian (2014)). Our findings support the view that under certain circumstances, a part of the windfall gains could be invested in precautionary savings (Jappelli and Pistaferri (2010)). Finally, we also contribute to the large literature that deals with political intervention in private markets in emerging economies (Cole, Healy, and Werker (2012); Cole, Gine, Tobacman, Townsend, Topalova, and Vickery (2013); Gine and Kanz (2014); Burgess, Pande, and Wong (2005); Banerjee and Duflo (2014)). In line with the received work, we show that such interventions may have significant unintended consequences. Clearly, increasing investments in jewelry was not the objective of the Indian debt waiver program.

III Indian Agriculture

A majority of the Indian working population depends on agriculture for its livelihood. As per the 2001 census of India, 59.9% of the Indian population was dependent on agriculture. In Panel A of Table 1, we present a summary of Indian agriculture. The average household landholding in India is significantly small (Bardhan (1973); Bhagwati and Chakravarty (1969)). A recent estimate by the National Bank For Agriculture and Rural Development (NABARD) states that the average household landholding in India is around 1.33 hectares. Foster and Rosenzweig (2011) show that tiny landholding adversely affects per-capita productivity. Not surprisingly, agricultural growth during the 10 years preceding the waiver stood at 1.6% compared to the general GDP growth of approximately 6%. Despite big leaps in agricultural technology, Indian agriculture to this day significantly depends on favorable weather. Even the use of crop insurance is very

limited. More than 75% of Indian farmers are not covered by any kind of crop insurance (Clarke, Mahul, Rao, and Verma (2012); Cole, Giné, Tobacman, Townsend, Topalova, and Vickery (2013)). This makes them extremely vulnerable to weather shocks. Deschênes and Greenstone (2012) show that a drought results in a significant increase in mortality rates in India.

The description of Indian agriculture is informative in underscoring the fact that the setting we analyze in this study differs significantly from those in the existing literature on the ex-post consequences of debt relief under bankruptcy (Dobbie and Song (2014)). Our setting also significantly differs from financial and economic crisis settings in which a government initiated interventions in private debt contracts have been studied (Alston (1984); Bolton and Rosenthal (2002); Agarwal, Amromin, Ben-David, Chomsisengphet, Piskorski, and Seru (2012)). It is representative of a typical emerging economy with a large fraction of its population still dependent on agriculture. In such an economy, the urge to intervene in agricultural credit markets is very high given the dismal situation in which farmers find themselves. This study focuses on the ex-post impact of one such intervention on consumption expenditure in the post-waiver period.

IV Agricultural Debt Waiver and Debt Relief Scheme (ADWDRS) 2008

In this section, we describe the debt relief program in detail.

IV.A Background

As noted in Section 3, the economic condition of Indian farmers is significantly worse than that of the rest of the population. Farmers in several regions of the country, such as the Vidharbha region of the state of Maharashtra, face extreme distress and are often driven to extreme steps such as suicide.⁵ Lack of access to credit from the formal sector and extreme indebtedness to the informal sector are often cited as reasons for farmer suicides (Vadivel and Ponnarasu (2013); Shiva and Jalees (2005))

To suggest measures to address the issue of rural indebtedness, the Indian government set up an expert committee under the chairmanship of Dr. Radhakrishna of the Indira Gandhi Institute For Research and Development (IGIDR), Mumbai. The committee's mandate was "to look into the problems of agricultural indebtedness in its totality and to suggest measures to provide relief to farmers across the country." The committee

⁵Several media articles describe the situation in the Vidharbha region. Source: <http://www.ndtv.com/india-news/12-farmers-in-vidharbha-commit-suicide-in-72-hours-719199>, <http://www.dnaindia.com/analysis/standpoint-how-many-vidarbh-farmers-need-to-die-before-the-government-wakes-up-2049214>

recommended, among other things, setting up a fund to provide long-term financing for agriculture and providing special relief packages to 100 districts identified as low land productivity areas. It is important to note that the committee did not recommend a waiver. The committee submitted its report during July 2007.

The waiver program was largely unanticipated. First, granting of debt relief depended on the status of loans two months prior to the date of waiver announcement. Second, a newspaper search near the event date did not indicate any widespread expectation of an impending debt waiver. Third, as noted above, Dr. Radhakrishna committee did not recommend a waiver. Finally, even the weather conditions and agricultural production just before waiver were normal (Mukherjee, Subramanian, and Tantri (2014)). Thus, there was no widespread agricultural distress that could have created anticipation of some kind of government intervention in agricultural credit markets. Moreover, there was no threat that the government would increase taxes on the beneficiaries in the future as agricultural income is exempt from income tax in India (Bhowal, Subramanian, and Tantri (2013)). Therefore, the shock cannot be considered as transitory in nature.

IV.B The Relief Program

The then finance minister, in his budget speech delivered on February 29th, 2008, announced a nation-wide debt waiver program. To qualify for debt relief, a loan had to be overdue or restructured as of December 31, 2007 and continue to be so as of February 29th, 2008. The amount of relief depended on the size of the landholding the farmer possessed. “Small and marginal farmers” defined for the purpose of the program as farmers with landholdings of 2 hectares or less, were eligible for a full (100%) waiver, while “other farmers” defined as those with more than 2 hectares, qualified for partial (25%) loan relief conditional on repayment of the remaining 75%. The implementation of the program began on June 30, 2008, with full waivers granted immediately. However, partial waivers could not be implemented immediately because farmers found it difficult to arrange 75% of the outstanding balance at one go. The deadline for partial waiver farmers to remit 75% was extended several times. The banks were reimbursed in full by the government.

In Panel B of Table 1, we provide summary details of the waiver. In total, 36.92 million households benefited from the waiver; 30.15 million households received a full waiver and the remaining 6.77 million households received a partial waiver. If we assume a family of five, then the waiver program affected 184.6 million people in the country. This represents approximately 17.95% of the Indian population and 30% of the population that is dependent on agriculture. The total amount waived turned out to be 1% of Indian GDP and 7.6% of the government’s total tax revenues. Thus, the waiver program represented a massive transfer of resources from tax payers to the farming community.

V Data, Variable Definitions, and Summary Statistics

We obtain consumption data from the National Sample Surveys conducted by the National Sample Survey Organisation (NSSO). NSSO works under the jurisdiction of the Ministry of Statistics and Program Implementation. We use data from the 64th, 66th, and 68th round of the NSSO. The 64th round was conducted just before the waiver (July 2007 to June 2008), the 66th round was conducted immediately after the waiver (July 2009 to June 2010), and the 68th round was conducted 36 to 48 months after the waiver (July 2011 to June 2012). We do not consider the 65th and 67th surveys because they focused on categories outside the purview of the waiver.⁶ The 65th round focused on urban slum dwellers. Moreover, the 65th round started within one month of the waiver award, leaving very little time for real effects to play out. The 67th round of the survey focused on unincorporated business. The debt relief was extended only to agricultural loans. Therefore, we exclude both of these rounds. We restrict our sample to small- and medium-sized farmers.⁷

The NSSO interviewers ask households about the amount of money spent on various items. The NSSO surveys cover 167 items, including items of day today consumption as well as infrequent purchases. Table 2 provides the data relating to various consumption expenditures just before the waiver. For most items of expenditure, the surveyors record the amount spent in the last 30 days. For some infrequently purchased items such as consumer durables, they record the amount spent in the last 365 days. For comparability, we divide the non-recurring expenditures by twelve and report the monthly equivalents.

We create the following variables based on the above distinction:

- a. Jewelry: This represents the total expenditure on jewelry and other such valuables.
- b. Basic Food: This represents expenditures made on basic food items such as cereals, pulses, vegetables, edible oil and milk.
- c. Rich Food: This represents spending on beverages, spices, dry fruits, egg, fish and meat. These items are significantly more expensive when compared to items listed as basic food.
- d. Minor Durables: This represents the amount spent on minor durable goods, furniture, bedding, crockery and others.
- e. Major Durables: This represents the amount spent on major durable goods, therapeutic appliances, cooking appliances and recreation goods.
- f. Intoxicants: This represents the amount spent on intoxicating items which are locally available. The items covered include toddy, country liquor, pan, tobacco, bidi,

⁶Source: Ministry of Planning and Implementation

⁷As per the RBI definition, farmers with a landholding of less than or equal to 5 hectares are considered small and medium sized farmers.

ganja and other intoxicants.

g. Other Household consumption: This represents the sum of households' expenditure on items such as transportation, personal goods, building maintenance and other day-to-day expenses.

It is important to note that these are pre-existing distinctions by the NSSO based on Indian consumption patterns.

We obtain data pertaining to farm loan accounts from the Reserve Bank of India (RBI), the Indian Central Bank.

We provide summary statistics of household expenditures before the waiver in Table 2.

VI Empirical Strategy and Results

The objective of this study is to analyze the impact of a large debt relief program on the savings and consumption behavior of the beneficiary households. We noted in Section 4 that the debt waiver was given only to defaulting farmers. The NSSO data, unfortunately, does not provide any information about farmers' indebtedness and their loan repayment status. Therefore, we cannot make a straightforward comparison between beneficiary households and comparable non-beneficiaries, as done by other studies on the same program (Mukherjee, Subramanian, and Tantri (2014)).

We use another salient feature of the debt waiver program to devise an identification strategy. As we described in Section 4, the quantum of debt relief depended on the size of the landholding. Defaulting farmers with landholdings of 2 hectares or less received a full waiver, whereas other defaulting farmers received only partial relief, which was restricted to 25% of the outstanding loan. While the full waiver was given immediately,⁸ a partial waiver was made conditional on a farmer putting up 75% of the outstanding amount. Initially, a one year window was provided for fulfilling the above condition for partial waiver beneficiaries.

As we noted in Section 6, the NSSO surveys record the exact landholding details of the beneficiary households. This is over and above the land occupied by their dwelling unit. Given that we do not have records pertaining to households' indebtedness or their loan repayment track records, our tests can only capture the ITT effect. We analyze only those households that have at least some landholding over and above their dwelling units. We described in Section 4 that nearly 30% of the farmers in India benefited from the waiver. Given the above finding, the actual treatment effect is likely to be 3 times that of the ITT impact that we find in our tests.

⁸All full waivers were made on June 30th 2008, within 3 months of the announcements. The banks wrote off the entire outstanding loan, and in turn, were reimbursed by the government exchequer.

The NSSO survey is not restricted to households engaged in agriculture. This raises a question about our identification strategy. Fortunately, the NSSO collects information about the principal occupation of the household also. We restrict our main sample to households which are primarily engaged in agriculture. In India, as we show in Table 1, 59.9% of the population is dependent on agriculture. In rural areas, the proportion is likely to be higher. More importantly, from Table 1, we show that nearly 30% of households that depend on agriculture did receive waiver benefits. Given this, it is not unreasonable to expect that a large portion of households in our sample were indeed affected by the treatment, that is, the debt waiver. As per the RBI definition, farmers with landholdings of more than 5 hectares are considered large farmers. We do not include such farmers in our main tests.

VI.A Regression Discontinuity

The Indian debt relief program, with its arbitrary cut-off of 2 hectares for waiver benefits, lends itself very well to a RD design. The exogenous nature of the event and the nature of the running variable, that is, land, makes self-selection difficult. One of the basic requirements of RD is that the discontinuity should not be a result of a correlated movement of a variable correlated with the running variable (Lee and Lemieux (2010)). As noted in the Introduction, the wide coverage of our data allows us to control for the impact of other economic variables that may vary at the district level. We perform the test prescribed by McCrary (2008). Our results are similar to those reported in Kanz (2016). We do not find any significant bunching just before the cut-off. We present this result in Figure 3.

We then proceed to perform the RD test. Specifically, we estimate the following regression equation.

$$Y_{ij} = \beta_0 + \beta_1 * Waiver + \beta_2 * Norm_Land + \beta_3 * Waiver * Norm_Land + \delta_j + \gamma X_t + \varepsilon_{ij}, \quad (1)$$

Here the dependent variable is the natural logarithm of the monthly amount spent on the item under consideration. *Waiver* is a dummy variable that takes the value of 1 if the household under consideration owns less than or equal to 2 hectares in landholding. *Norm_Land* represents the distance of a household's landholding from 2 hectares. δ_j represent district level fixed effects. X_t represents a vector of district level control variables such as district level agricultural GDP and average rainfall.

We use the log form of the variables of interest because, as depicted in Figures 1(a) and 1(b), the main expenditure variable of interest, jewelry, seems to be log-normally distributed. Figures 1(a) and 1(b) plot the normal probability plot for level and log forms, respectively. From the figures, it is clear that the log form is closer to normal.

A clarification regarding the arrangement of data is in order here. Note that the waiver was awarded to farmers with a landholding of 2 hectares or less. Therefore, a farmer with a landholding of 2 hectares is a waiver beneficiary. To incorporate this aspect, we first center the landholding values around 2 hectares and shift the treatment group to the right side of the cut-off point. This ensures that a farmer with exactly 2 hectares of landholding is considered a part of the treatment group. Thus, a landholding of 5 (1) gets a normalized score of -3 (1). This way of centering ensures that landholdings equal to and below 2 hectares are assigned a positive number, and landholdings above 2 hectares are assigned a negative number; hence, waiver beneficiaries, that is, the treatment group, are represented on the right side of the cut-off point. Therefore, a positive coefficient in the RD test implies that the waiver beneficiaries spend more on that particular item of interest than comparable non-beneficiaries do.

VI.B Main Result: Impact of Waiver on Savings and Consumption

We start by examining households which are primarily dependent on agriculture. We use data from the 66th round of the NSSO survey conducted anywhere between 12 to 24 months from the date of waiver. Given the time interval, even once in a year type expenditures are likely to have occurred after the waiver. The results of our RD estimates are reported in Table 3 and Figure 2. In Figures 2(a), 2(b), 2(c) and, 2(d) it is possible to detect a clear discontinuity in the investments in jewelry, basic food, minor durables and intoxicants respectively. We use the log form of Rupee value of investment under these heads as the dependent variable given the results presented in Figures 1(a) and 1(b). We do the same in our subsequent analysis.

This result implies that the jewelry, basic food, minor durables and intoxicants expenditures is higher for households with landholdings just below 2 hectares compared to households just above 2 hectares. This discontinuity is not visible for other items depicted in Figure 2.

VI.B.1 Main Result: Impact of Waiver on Jewelry Investment and Other Consumption

We start our RD analysis by classifying the total expenditure into investment in jewelry and other six categories mentioned in Section V. The formal results are presented in Table 3. If indeed the waiver beneficiaries resort to precautionary savings, then we expect to find a sharp increase in investment in jewelry at the cut-off. The sample is restricted to the 66th round, which was done immediately after the waiver. We use the natural logarithm of the value of expenditure incurred by a household as the dependent variable.

As shown in the first column of Table 3, we detect a sharp increase in jewelry investment at the cut-off. The discontinuity is to the tune of 9.2%. It is well known that poor households in India, who do not have access to formal banking, use jewelry as a means of saving for a rainy day (Ghosh and Pain (2005); Kannan and Dhal (2008)). Therefore, the above result is consistent with the precautionary savings hypothesis.

VI.B.2 Impact Of the Waiver on Disaggregated Consumption

As a logical next step, we next examine the impact of the waiver on consumption of items other than jewelry. We disaggregate consumption expenditure into six categories as specified in Section V. Using the monthly expenditure on these sub-categories as dependent variables, we conduct several RD tests. We report the results in columns 2 to 7 of Table 3. We use the natural logarithm of expenditures on basic food, rich food, minor consumer durables, major consumer durables, intoxicants, and other residual items in columns 1 to 7, respectively. We include district fixed effects in all specifications.

As can be seen from the Table 3, we find that the waiver beneficiaries spend 4.2% more on basic food, 7.6% more on minor durables and 11.4% more on intoxicants. All the above estimates are statistically significant at conventional levels. Please note that the group of households with landholding just above 2 hectares is the comparison group here. We do not detect a significant difference with respect to spending on major durables and other residual items. As noted before, NSSO covers poor households (Deaton (2016)). Most of such households generally struggle to meet their basic needs such as food. Therefore, it is not surprising that households spend the windfall on basic food and minor durables and avoid spending on rich food such as egg, fish and meat. However, we also notice an increase in spending on locally made intoxicants. This shows that the windfall gain could have negative effects as well. Investigating the consequences of this increase in consumption is beyond the scope of this paper. We later investigate if this increase in consumption sustains or is short lived.

We note that NSSO surveys report missing observations and we treat them as such and not as zeroes. We address this change in number of observations by limiting the sample to households for which we have information on jewelry and present the results in Table A.1 in the Appendix.

VI.C Robustness Tests

We perform several placebo tests to rule out alternative explanations.

VI.C.1 False Sample Test

We estimate RD coefficients for households that are not dependent on agriculture. Given that the waiver was given for agricultural borrowers, one does not expect to see

any discontinuity at 2 hectare-levels for such borrowers. It is possible that some non-agricultural households engage in agriculture. However, the proportion of such families is likely to be significantly lower. Given that households not engaged in agriculture did not receive waiver benefits, we do not expect them to increase precautionary savings in response to the debt waiver program.

We report the results in columns 1 to 7 of Table 4. The sample is restricted to households whose primary occupation is not agriculture. The arrangement of rows and columns mimics the arrangement made in Table 3. The dependent variable is the natural logarithm of the total amount spent on a particular item of consumption. As in Table 3, we include district fixed effects. We do not find any discontinuity with respect to investment in jewelry and other items of consumption at the cut-off for such households. The discontinuity coefficients are statistically indistinguishable from zero. Therefore, from this result, it is reasonable to conclude that the one-time increase in precautionary savings and other consumption detected in Table 3, is restricted to households that are primarily dependent on agriculture. The above result further strengthens our hypothesis that the discontinuities in consumption detected in Table 3 are indeed caused by the debt waiver.

VI.C.2 False Limit Test

We estimate RD using false limits for households engaged in agriculture. Arguably, we do not expect to find any discontinuity around such false cut-offs as there was no discontinuous treatment for such farmers. We repeat the exercise with several false cut-offs. We report the results using a false cut-off of 1 hectare and 3 hectares in Panels A and B of Table 5 respectively. It is noteworthy that we do not observe a significant discontinuity with respect to any item including jewelry. This further strengthens our view that the discontinuities observed in Table 3 are due to the waiver.

VI.C.3 False Year Test

We perform a false year test to rule out the possibility that farmers just below the cut-off may be systematically different compared to farmers just above the cut-off. We use data from the 64th round of the NSSO survey, which was done before the waiver. We cannot estimate an RD design here as landholdings are given in terms of broad intervals such as 1.5 to 2, 2 to 2.5, and so on. We compare the annual and monthly expenditures of farmers with a landholding anywhere between 2 and 2.5 hectares to those with a landholding anywhere between 1.5 and 2 hectares. Although we run a normal OLS regression, we maintain the spirit of RD by selecting a close bandwidth. Here, we are unable to reject the hypothesis that the investment in jewelry and consumption levels are no different between treatment and control groups. This shows than the one-time

increase in jewelry investment and increase in consumption of some items after the waiver are not a mere continuation of a pre-existing trend. For brevity, we do not report the results.

VI.C.4 Robustness with Respect to Selection of Bandwidth

As noted before, we use 2 hectares to the left and 3 hectares to the right of the cut-off in landholding as our preferred bandwidth to cover small and medium farmers. To ensure that our results are not confined to a particular bandwidth selected, we estimate our main result using different bandwidths. We start with a bandwidth of 2 hectare around the cut-off of 2 hectares and decrease the bandwidth progressively. We report the results in Panels A to G of Table 6. Each panel deals with a particular item of consumption. The arrangement of rows and columns is similar in all panels of the Table 6. The sample is restricted to households engaged in agriculture.

In Panel A, we consider investment in jewelry. In column 1, we start with a bandwidth of 2 hectares⁹ and progressively decrease the bandwidth in each subsequent columns reaching to 0.01 hectare in column 7. The range here is extremely tight and hence the households on both sides of the cut-off are likely to be similar. Expectedly, the number of observations decreases as the bandwidth becomes narrower. As shown in Panel A of Table 6, statistically significant discontinuity is found in all 6 out of 7 bandwidths. The discontinuity is economically meaningful in all columns.

In Panels B, C, and D, we examine the impact on consumption of basic food, minor durables and intoxicants using different bandwidths. We find the discontinuities to be statistically significant in 6 out of 7 cases with respect to basic food and 7 out of 7 cases with respect to minor durables and 6 out of 7 cases with respect to intoxicants. Importantly, the discontinuity is always significant when extremely tight ranges of less than 0.1 hectares or less on both sides of the cut-off are used in the last four columns.

In Panels E, F and G, we consider rich food, major durables and other residual items. We do not observe a significant discontinuity in most cases. In some cases related to rich food and major durables, we find discontinuity with an opposite sign. In other words, the consumption of these items is lower for waiver beneficiaries when compared to non-beneficiaries. However, these discontinuities disappear when the bandwidth is changed. Given the above results, it is reasonable to infer that the results presented in Table 3 are robust to change in bandwidth.

VI.D Long Term Impact

Given the nature of our data, we are uniquely situated to examine the long term impact of the waiver on savings and consumption levels. In addition, the detailed breakdown

⁹Here households having landholding of up to 4 hectares are considered.

of consumption provided by the NSSO allows us to examine the impact on consumption patterns as well. If the waiver results in increased agricultural production, then we expect that the consumption expenditure of the beneficiary households to be higher than that for non-beneficiaries, at least in the long run. In other words, we expect the increase in consumption detected in Table 3 to sustain. On the other hand, if the waiver increases credit constraints for the beneficiary households, then the gains from the waiver are likely to be off-set by the increased cost of borrowing or non-availability of bank credit. In such a case the consumption gains reported in Table 3, are unlikely to sustain.

We use data from the 68th round of the NSSO survey to measure the long-term impact. The survey was completed between 36 and 48 months from the date of waiver. We estimate a specification similar to the one used in Table 3 and report the results in Table 7, using the same arrangement of rows and columns. It is clear from Table 7 that there is no statistically significant difference in either the investment in jewelry or other consumption expenditures incurred by the treatment and control groups.

These results show that the gains in consumption are transitory in nature. Over the medium and long term, the waiver beneficiaries are back to the level of consumption that is comparable to non-beneficiaries. This could be plausibly driven by an increase in credit constraints. We discuss this aspect next.

VII Evidence Suggesting Credit Constraints

We hypothesize that waiver beneficiaries anticipate credit constraints in the future and hence use the windfall from a waiver to build precautionary savings. [Guerrieri and Lorenzoni \(2017\)](#) argue that when facing anticipated credit constraints, households indeed build precautionary savings. In the Introduction, we discussed the possibility of loan officers tightening credit after the waiver. The anticipation of moral hazard on the part of the beneficiaries could lead to credit rationing ([De and Tantri \(2013\)](#)). However, this raises the question of why only waiver beneficiaries should develop moral hazard. Given that the 2008 waiver was common knowledge, it is possible that both beneficiaries and the non-beneficiaries alike developed moral hazard, and hence, credit constraints, if any, should apply to both categories.

Note that the waiver was applied to only small farmers, and the 2008 waiver defined a small farmer as the one with less than or equal to two hectares of landholding. It is reasonable to expect that even the anticipated future waivers may favor small farmers, and the two hectares definition may stick. Therefore, there is reason to believe that the level of moral hazard is likely to be higher among small farmers compared to large farmers. It is possible that some of the large farmers became small farmers after the waiver by under reporting their landholdings or selling part of their land. Underreporting of land size after the waiver is unlikely to be widespread, as the banks can easily verify this using

pre-waiver records and switching banks is not easy given the low banking penetration. In addition, selling a very small portion of land, say 0.1 hectares, from a large paddy field to fall into the 2 hectares category, is likely to be infeasible. Therefore, there is reason to believe that credit constraints could be more binding on waiver beneficiaries compared to non-beneficiaries.

We verify the above using a proprietary loan level data. This data has been used in [De and Tantri \(2013\)](#), who study the impact of the debt waiver on the borrowing culture. This dataset contains information about borrowers' landholdings. The data spans a period of 3 years before and 3 years after the waiver. This allows us to check if the borrower has a loan in the post-waiver period. We also know the status of a borrower with respect to the waiver.

We use the same empirical strategy used in [De and Tantri \(2013\)](#) for this test. They use a robust RD design suggested by [Calonico, Cattaneo, and Titiunik \(2014\)](#). Employing the RD robust design, we examine if the waiver beneficiaries have a lower chance of having a loan in the post-waiver period compared to comparable non-beneficiaries. Specifically, our dependent variable is a dummy variable that takes the value of one if a borrower does not have a loan in the post-waiver period and zero otherwise. The borrowers' level of landholding is the running variable. As before, we use 2 hectares as the cut-off.

We report the results in Table 8. In column 1, we limit the sample to one year after the waiver, that is, February 28th, 2009. In column 2, we limit the sample to March 31st, 2009, which is the last day of the Indian financial year. In column 3, we limit the sample to June 30th, 2009, which marks the end of one year from the date of the actual waiver grant. Finally, in column 4, we limit the sample to December 31st, 2009. As shown in the Table 8, the waiver beneficiaries are between 8.70% to 9.80% less likely to have a loan compared to non-beneficiaries.

Note that the outcome is an equilibrium outcome and hence it is important to separate demand from supply. The institutional features are handy in this regard. The interest rate applicable to crop loans is fixed at 7% ([Mukherjee, Subramanian, and Tantri \(2014\)](#)), which is lower than even the risk free rate by about 150 basis points, and by about 250 basis points compared to bank deposit rates. More importantly, the lending rates in informal credit markets are several times higher ([De and Singh \(2011b\)](#)). Therefore, it is unlikely that farmers switch from banks to informal credit markets voluntarily. Increased borrowing from the informal sector after the waiver noted by [Kanz \(2016\)](#) is likely to be due to a tightening of supply. This result provides evidence for the credit rationing hypothesis.

VIII The Debt Waiver Channel

As we acknowledged in the Introduction, we do not have data relating to farmers' indebtedness. This may raise a question about the validity of our inferences. A large portion of farmers with a landholding of less than or equal to 2 hectares are likely to be waiver beneficiaries. However, lacking loan level data, we cannot precisely identify the loan waiver beneficiaries.

To assuage such concerns, we use exogenous proxies to identify waiver beneficiaries. We rely on the fact that in order to obtain waiver benefits, a farmer should have availed bank loans and also must have defaulted on the loan. We consider these factors and devise the following proxies:

- a. Drought in the year immediately preceding the waiver
- b. Farm loan penetration at the district level.

VIII.A Drought Affected Areas

As we noted in Section 4, debt relief was extended only to defaulting farmers. It is well recognized in the political economy literature that adverse weather in the form of a drought can exogenously increase defaults ([Bolton and Rosenthal \(2002\)](#)). Therefore, it is reasonable to assume that the proportion of waiver beneficiaries is likely to be higher in districts affected by drought just before waiver. Also, such a higher proportion of waiver beneficiaries in drought affected districts is exogenous to the economic conditions prevailing in the district.

We classify districts based on weather in 2007-08. We estimate our main RD tests separately for drought-affected and non-drought-affected districts. We define drought as defined by the Indian Meteorological Department, the principal government agency in all matters relating to meteorology and allied subjects.

We report the results in Table 9. In Panel A, we report the results for drought-affected districts, and in Panel B, we cover the non-affected districts.

We first consider drought-affected districts. In line with the results in Table 3, investment in jewelry is higher by 12.0%, expenditure on basic food is higher by 14.8%, and expenditure on intoxicants is higher by 9.9% for households just below the 2 hectare cut-off compared to households just above the cut-off. The discontinuity in minor durables narrowly misses the conventional significance level. As well, we detect a minor reduction (close to 3.3%) in the consumption of rich food. It is possible that in drought affected areas waiver beneficiaries substitute rich food with basic food. As before, there is no significant increase in other forms of expenditure. It is reasonable to conclude that these results are largely in line with results presented in Table 3. Given that the increase in the proportion of waiver beneficiaries is exogenous, this result strengthens our claim that

the increased investment in jewelry and other consumption detected in Table 3 is indeed due to debt relief.

We then estimate the RD by considering only those households that live in districts that did not face a drought in 2007-08. The proportion of waiver beneficiaries in such districts is likely to be lower, and hence the ITT effect is unlikely to be strong. We report the results in Panel B of Table 9.

Here, we do not find any increase in the savings and consumption levels of farmers just below and above the cut-off. The fact that the observed effects manifest only in drought-affected districts and not in districts that did not face drought indicates that the waiver channel is at work.

VIII.B Bank Agricultural Loan Penetration

We collect data regarding the number of agricultural loans by banks in a district as at the end of 2007. The data is published by the Reserve Bank of India (RBI), the Indian central bank. We classify districts in the national top tercile in terms of the number of agricultural loan accounts as districts with high agricultural loan density, and those in the lower tercile as districts with low agricultural loan density. All other factors remain the same. The impact of the waiver is likely to be higher in districts with high farm loan penetration compared to low farm loan penetration districts. This is because the chances of a farmer using farm bank loans are higher in regions with high farm bank loan concentration.

It is important to note that unlike drought, bank loan penetration is not exogenous to economic conditions prevailing in a district. However, this is not a major concern in our setting as we are looking at discontinuity at an exogenously determined cut-off point of two hectares. We cannot think of any endogenous variable that is correlated with bank farm loan penetration that affects comparable households just below two hectares and those just above two hectares differently.

We estimate the model used to generate results shown in Table 3 by limiting the sample to districts with high and low agricultural loan density. The results for high agricultural loan account density districts reported in Panel A of Table 10 are in line with the results in Table 3. Here, the investment in jewelry is higher, by 29.3%, expenditures on basic food and intoxicants are respectively higher by 19.7% and 19%, for the treatment group in high agricultural loan concentration districts. As in Panel A of Table 9, there is a slight fall in expenditure on rich food indicating possible substitution. There is no significant difference in the other expenditure items.

We then estimate the RD results considering only those households that live in districts with low farm loan density. The results are reported in Panel B of Table 10. Here, we do not find any significant increase in jewelry and other expenditure between farmers

just below and above the cut-off. The fact that the observed effects manifest in districts with high agricultural bank loan penetration and not in districts with low agricultural bank loan penetration points to the bank lending channel at work.

It is conceivable that higher access to banking may also have an opposite effect with respect to jewelry investment. The waiver beneficiaries could also invest in bank deposits for savings. However, India suffers from persistent high inflation¹⁰. Therefore, jewelry may work as a better store of value compared to bank deposits.

This evidence further strengthens our hypothesis regarding the debt waiver as the channel that leads to increased precautionary savings.

IX Sources of Additional Income

Given that the waiver benefits were given only to delinquent borrowers, there may be a question about the source of immediate extra income arising from the waiver. Please note that the waiver beneficiaries were those who failed to repay their loans on the due date. Loan officers in India do not provide new loans unless all outstanding loans are repaid (Bhowal, Subramanian, and Tantri (2013)). Therefore, it is very common to find farmers in India repaying their loans well after the due date. It is also important to note that there is no system of maintaining formal credit scores for farmers. In fact, using loan-level data from a public sector bank (Bhowal, Subramanian, and Tantri (2013)), we find that 78% of defaulting farmers indeed repay their loans after the due date. Such farmers are left with surplus funds if a waiver is announced after the default but before the date of intended repayment. Secondly, a debt waiver frees up collateral locked with the bank. Therefore, the farmer is now able to borrow from either formal or informal sources using freed land as collateral. Thus, savings on plausible delayed debt repayment and the renewed ability to borrow from freed collateral are likely to be the source of funds for increased precautionary savings.

X Conclusion

This study examines the impact of a large-scale and unanticipated government intervention in the form of debt relief on beneficiary households' savings and consumption expenditures in a large emerging economy. Full debt relief was extended to defaulting small farmers with a landholding of less than or below 2 hectares. Those with a higher landholding were given partial relief. This feature allows us to effectively employ an RD design. We use a national consumption survey conducted by the NSSO, a statistical agency under the Government of India. The survey includes data regarding household

¹⁰Source: RBI

level landholding along with consumption expenditures. We use data from 3 rounds conducted before and after the waiver.

We find that debt relief leads to a substantial increase in precautionary savings in the form of increased investments in jewelry and a one time increase in the consumption of basic food, minor durables and intoxicants. However, the increase in consumption fails to sustain in the medium term. We establish the robustness of our findings using several placebo tests. Our results indicate that the positive income and wealth shock from the waiver is likely to be completely offset by increased credit constraints.

Lacking bank borrowing data, we use exogenous proxies to establish the debt waiver channel. We use a sub-sample of households that belong to districts facing a weather shock in the form of drought and see an exogenous increase in the proportion of waiver beneficiaries among farmers with less than 2 hectares of landholdings. As a second proxy, we create a sub-sample of households that belong to districts with high bank farm loan penetration. The effects hypothesized in this paper manifest strongly in the above two sub-samples.

These findings have a significant policy implication. We show that a large-scale, unconditional debt waiver given to defaulting small borrowers may not lead to sustained material improvement in the lifestyle of the targeted beneficiaries, while significantly draining the exchequer. Rationally anticipating increased credit constraints, beneficiary households are likely to increase precautionary savings. Any increase in consumption is likely to be short-lived. The increased financial constraints that banks impose may offset any gains from the income or the wealth effect. It is possible that over a very long period, the negative impact of the financial constraints may exceed the positive impact of the waiver. The waiver beneficiaries, in such a situation, may end up worse off than before.

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XI Institutional Background- Additional Details

XI.1 Rules Governing Agricultural Lending

All Indian banks operating in India are subject to priority sector guidelines, which require them to allocate a certain proportion of their total credit to sectors designated as priority sectors (Burgess and Pande (2004); Cole (2009a)). Under these rules, 18% of total credit is required to be allocated to agriculture and allied activities. Any shortfall in priority sector lending has to be invested in low yielding government securities. In fact, until 1991, a bank had to open at least 4 branches in an unbanked location to get permission to open a branch in a banked location (Burgess, Pande, and Wong (2005)). These rules were relaxed after 1991, when India embarked on a path of financial and economic liberalization. Thus, bank branch bank concentration in a region in India is significantly influenced by legacy factors that are completely orthogonal to the debt waiver scheme that we study.

XI.A Political Motive

As we noted in the Introduction, although farmers in India are economically distressed in general, the years running up to the waiver were not particularly bad. Mukherjee, Subramanian, and Tantri (2014) note that weather conditions just before the waiver were normal and there was not even an adverse production shock. On the other hand, the year was politically important. National elections were just one year away and this was the last opportunity for the government to announce populist measures. Thus, the announcement of the waiver program is also consistent with the idea of the political capture of public resources (Cole (2009b); Akhmedov and Zhuravskaya (2004); Khwaja and Mian (2005)).

XII Increase In Credit Constraints: Discussion

Banerjee and Duflo (2014) show that loan officers tend to bail out borrowers in difficulty by extending further loans with the hope that the entire loan will be repaid once the borrower comes out of the negative shock. However, if a debt waiver induces strategic behavior, then the informal restructuring mechanism is likely to collapse as the loan officer may find it more profitable to recognize a loss immediately rather than having to recognize a bigger loss later. As we pointed out in Section 2, loan officers at Indian government owned banks face higher downside incentives rather than upside incentives

(Banerjee, Cole, and Duflo (2006); Sarkar, Tantri, and Subramanian (2013)). They face penalties for loan defaults as well as for not achieving priority sector lending targets.

In the presence of strategic defaults induced by future waiver expectations, loan officers may find it unprofitable to extend loans to defaulters as a part of informal restructuring. Consequently, defaulting farmers may be left with less resources immediately after a waiver compared to the counterfactual situation of a default and no debt relief. As shown by Kanz (2016), borrowers may be drawn towards more expensive informal credit. Since it takes time and effort to find new sources of credit (Cunat (2007); Angelini, Di Salvo, and Ferri (1998)), the waiver beneficiaries are likely to expect a negative income shock in the post-waiver period. In fact, Kanz (2016) finds that waiver beneficiaries expect increased credit constraints in the post-waiver period. Therefore, a debt waiver is likely to increase precautionary savings.

Table 1: SUMMARY STATISTICS

In this table, we present summary statistics pertaining to Indian Agriculture and the Debt Waiver Scheme of 2008.

Panel A: Indian Agriculture	
Indian Population (Millions)	1028
Percentage of Population Dependent on Agriculture (%)	59.9
Average Land Holdings in India (Hectors)	1.33
Average Agricultural Growth Rate in India (%)	1.6
Total Food Production in India (Million Tonnes)	196.8
Average Agricultural NPAs to the proportion of total Farm Loans (%)	17.5
Panel B: Indian Debt Waiver	
Amount of Debt Waiver (Million Rupees)	525,200
Debt waiver as a proportion of GDP (%)	0.99
Debt Waiver as proportion of Agricultural Credit (%)	23.31
Number of full waiver beneficiaries (Million Farmers)	30.15
Number of Partial waiver beneficiaries (Million Farmers)	6.77
Source: Census of India	

Table 2: SUMMARY OF THE EXPENDITURES OF HOUSEHOLDS BEFORE THE DEBT WAIVER

In this table, we present summary statistics of households before the debt waiver scheme in 2008. We provide data relating to number of households (HH). We also provide summary data relating to average total expenditure per household as well as a detailed breakdown of expenditure for households. We separately report results for all households surveyed and those that report the primary occupation as self-employed in agriculture (if rural).

Particulars	Type of HH	
	All HH	Agricultural HH
Number of Households	46658	13800
Number of Households having less than or equal to 2 Hectares of Land	40444	8795
Number of Households having land between 2 and 5 Hectares	6214	5005
Number of Districts	569	563
Number of Districts with rural population greater than 75 %	381	379
Number of Districts with Above median Agricultural Credit Ratio	301	299
Average (Median) Total Expenditure per household (INR '000)	5.43	5.09
Average (Median) Expenditure on Jewellery per household (INR '000)	0.40	0.34
Average (Median) Expenditure on Basic Food per household (INR '000)	1.42	1.61
Average (Median) Expenditure on Rich Food per household (INR '000)	0.97	1.03
Average (Median) Expenditure on Low cost durables per household (INR '000)	0.07	0.07
Average (Median) Expenditure on High cost durables per household (INR '000)	0.33	0.31
Average (Median) Expenditure on Low cost toxic items per household (INR '000)	0.02	0.02
Average (Median) Expenditure on Other items per household (INR '000)	0.26	0.23

Table 3: EFFECT ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households. We employ a bandwidth of 2 hectares to the left and 3 hectares to the right of the cut-off to cover all agricultural households belonging to the small and medium farmers definition. We first calculate the deviation of each household's landholding from 2 hectares. We use this deviation as the running variable with zero, which denotes 2 hectares, as the cut-off. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. We use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						
Waiver dummy	0.092** (0.044)	0.042** (0.021)	0.017 (0.023)	0.076* (0.045)	-0.032 (0.050)	0.114** (0.056)	0.0108 (0.029)
No. of observations	6341	13964	13969	10427	12005	9710	13849
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.152	0.099	0.213	0.102	0.0727	0.171	0.109
	Major durables						
	Intoxicants						
	Other HH consumption						

Table 4: EFFECT ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS DEPENDENT ON OTHER OCCUPATIONS USING THE 66TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households which have other occupations different from self-employment in agriculture. We employ a bandwidth of 2 hectares to the left and 3 hectares to the right of the cut-off to cover all agricultural households belonging to the small and medium farmers definition. We first calculate the deviation of each household's landholding from 2 hectares. We use this deviation as the running variable with zero, which denotes 2 hectares, as the cut-off. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. We use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry Basic food Rich food Minor durables Major durables Intoxicants Other HH consumption						
Waiver dummy	0.068 (0.048)	0.029 (0.179)	0.138 (0.275)	0.018 (0.034)	0.049 (0.039)	0.057 (0.421)	0.046 (0.030)
No. of observations	25038	64722	65007	44981	53579	38620	64781
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.149	0.099	0.332	0.102	0.072	0.171	0.132

Table 5: EFFECT ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY FOR FALSE LIMITS

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households for false cut-off values. We first calculate the deviation of each household's landholding from 1 hectare which is the false cut-off value. We use this deviation as the running variable with zero, which denotes 1 hectares, as the cut-off. The same procedure is repeated for the assumed cut-off value of 3 hectares in Panel B. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. In Panel A, we report the results with the cut-off value of 1 hectare. In Panel B, we report the same for the cut-off value of 3 hectares. In both these cases, we use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

A. Cut-off at 1 hectare							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						Other HH consumption
Waiver dummy	0.013 (0.066)	0.045 (0.057)	-0.017 (0.045)	-0.066* (0.040)	-0.043 (0.076)	-0.017 (0.037)	0.036 (0.056)
No. of observations	6341	13964	13969	10427	12005	9710	13911
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.151	0.115	0.366	0.119	0.116	0.186	0.167
B. Cut-off at 3 hectare							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						Other HH consumption
Waiver dummy	0.002 (0.061)	0.000 (0.086)	-0.036 (0.051)	0.006 (0.063)	0.069 (0.208)	-0.033 (0.067)	0.054 (0.077)
No. of observations	6341	13964	13969	10427	12005	9710	13911
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.150	0.115	0.365	0.118	0.115	0.186	0.169

Table 6: EFFECT OF CHOICE OF BANDWIDTH ON VARIOUS HEADS OF CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households whose primary occupation is self-employed in agriculture. We first calculate the deviation of each household's landholding from 2 hectares. We use the deviation so obtained as the running variable with zero, which denotes 2 hectares, as the cut-off. A bandwidth of 2 hectares implies that the sample is restricted to all the households that are having landholding from 0 to 4 hectares. Each column uses a different bandwidth which reduces progressively. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We use the natural logarithm of the Rupee value of the expenditure on jewelry as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

A. Robustness to bandwidth choice - Jewelry

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.025	0.01
Waiver dummy	0.114** (0.047)	0.140*** (0.053)	0.104 (0.064)	0.015* (0.159)	0.036* (0.190)	0.082* (0.236)	0.738** (0.301)
Observations	5,911	4,263	2,617	436	342	190	128
R-squared	0.155	0.134	0.116	0.129	0.132	0.243	0.399
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.150	0.127	0.105	0.0694	0.0603	0.127	0.252

B. Robustness to bandwidth choice - Basic food

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.025	0.01
Waiver dummy	0.032** (0.016)	0.028* (0.018)	0.006 (0.021)	0.133* (0.068)	0.171** (0.084)	0.264** (0.117)	0.374* (0.192)
Observations	13,125	9,354	5,627	936	768	456	293
R-squared	0.258	0.281	0.315	0.527	0.556	0.671	0.670
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.224	0.235	0.240	0.218	0.231	0.358	0.348

Table 6 contd: EFFECT OF BANDWIDTH ON VARIOUS HEADS OF CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

C. Robustness to bandwidth choice - Minor durables							
	(1)	(2)	(3)	(4)	(5)	(7)	
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.01	
Waiver dummy	0.085* (0.048)	0.081* (0.054)	0.018* (0.066)	0.106* (0.219)	0.053* (0.267)	0.728** (0.340)	1.038* (0.588)
Observations	9,745	7,094	4,366	753	614	382	
R-squared	0.237	0.268	0.317	0.559	0.567	0.668	
District FE	Yes	Yes	Yes	Yes	Yes	Yes	
Adjusted R-squared	0.190	0.205	0.218	0.212	0.188	0.341	
						0.346	

D. Robustness to bandwidth choice - Intoxicants							
	(1)	(2)	(3)	(4)	(5)	(7)	
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.01	
Waiver dummy	0.125 (0.042)	0.123* (0.048)	0.136* (0.059)	0.407* (0.204)	0.337* (0.265)	0.508* (0.397)	0.819** (0.795)
Observations	5671	4857	3,959	657	534	340	
R-squared	0.336	0.360	0.411	0.611	0.639	0.693	
District FE	Yes	Yes	Yes	Yes	Yes	Yes	
Adjusted R-squared	0.292	0.301	0.320	0.260	0.279	0.336	
						0.386	

Table 6 contd: EFFECT OF CHOICE OF BANDWIDTH ON VARIOUS HEADS OF CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

E. Robustness to bandwidth choice - Rich food

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.025	0.01
Waiver dummy	-0.072 (0.021)	-0.05 (0.024)	-0.028 (0.028)	-0.073 (0.089)	-0.121 (0.104)	-0.331** (0.146)	-0.447* (0.234)
Observations	13,130	9,354	5,625	936	768	456	293
R-squared	0.485	0.521	0.553	0.725	0.747	0.805	0.817
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.462	0.490	0.504	0.545	0.562	0.618	0.640

F. Robustness to bandwidth choice - Major durables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.025	0.01
Waiver dummy	0.038 (0.053)	0.017 (0.059)	-0.021 (0.073)	-0.715*** (0.233)	-0.581** (0.291)	-1.168*** (0.390)	-0.629** (0.703)
Observations	11,244	8,116	4,938	828	671	385	241
R-squared	0.245	0.269	0.286	0.611	0.627	0.685	0.710
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.205	0.215	0.196	0.321	0.317	0.336	0.389

Table 6 contd: EFFECT OF BANDWIDTH ON VARIOUS HEADS OF CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
G. Robustness to bandwidth choice - Other HH consumption							
Bandwidth	2.00	1.50	1.00	0.10	0.05	0.025	0.01
Waiver dummy	0.079*** (0.030)	0.051 (0.034)	0.040 (0.043)	0.113 (0.138)	0.037 (0.162)	0.283 (0.245)	0.105 (0.374)
Observations	13,077	9,317	5,602	934	766	454	291
R-squared	0.255	0.277	0.287	0.523	0.570	0.630	0.686
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.221	0.230	0.208	0.210	0.254	0.275	0.376

Table 7: EFFECT ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 68TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households whose primary occupation is self-employed in agriculture during the 68th round of NSSO survey. We employ a bandwidth of 2 hectares to the left and 3 hectares to the right of the cut-off to cover all agricultural households belonging to the small and medium farmers definition. We first calculate the deviation of each household's landholding from 2 hectares. We use this deviation as the running variable with zero, which denotes 2 hectares, as the cut-off. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. We use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						
Waiver dummy	0.013 (0.067)	0.016 (0.022)	0.050 (0.062)	0.007 (0.043)	0.072 (0.053)	0.011 (0.017)	0.014 (0.040)
No. of observations	3521	14153	14143	11588	12611	9710	14111
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.276	0.124	0.413	0.126	0.110	0.199	0.197
	Intoxicants						
	Major durables						
	Other HH consumption						

Table 8: EVIDENCE SUGGESTING CREDIT RATIONING IN THE POST-WAIVER PERIOD

These tables report the robust RD results (Calonico, Cattaneo, and Titiunik (2014)) for the impact of the debt waiver program on the availability of bank loans in the post-waiver period. The data is organized at the borrower level. The dependent variable, 'No loan', is a dummy variable that takes the value of 1 if the borrower does not have a loan in the post-waiver period and zero otherwise. Individual landholding serves as the running variable, with 2 hectares (as specified by the ADWDRS in 2008) as the cut-off. We report robust, conventional, and bias-corrected estimates for Y . Standard errors are reported in parentheses. ***, **, and * represents statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable	No Loan			
Robust	0.093** [-2.164]	0.092** [-2.117]	0.087* [-1.925]	0.098* [-1.957]
Conventional	0.089** [-2.347]	0.089** [-2.311]	0.085** [-2.083]	0.075* [-1.945]
Bias-corrected	0.093** [-2.462]	0.092** [-2.412]	0.087** [-2.113]	0.098** [-2.538]
Observations	3,317	3,300	2,529	2,698

Table 9: DIFFERENCE IN IMPACT BASED ON DROUGHT ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households in drought affected and non-drought affected districts. We employ a bandwidth of 2 hectares to the left and 3 hectares to the right of the cut-off to cover all agricultural households belonging to the small and medium farmers definition. We first calculate the deviation of each household's landholding from 2 hectares. We use this deviation as the running variable with zero, which denotes 2 hectares, as the cut-off. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. In Panel A, we cover households located drought-affected districts in 2007. Other households that are not affected by drought are covered in Panel B. We use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

A. Districts affected by drought, 66th round							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						Other HH consumption
Waiver dummy	0.120*	0.148***	-0.033***	0.081	0.087	0.099***	-0.056
	(0.068)	(0.019)	(0.008)	(0.074)	(0.080)	(0.027)	(0.121)
No. of observations	2413	4815	4817	3653	6478	3422	5818
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.167	0.107	0.387	0.0886	0.112	0.168	0.174
B. Districts not affected by drought, 66th round							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						Other HH consumption
Waiver dummy	-0.048	0.002	0.017	0.089	0.000	0.010	0.247
	(0.039)	(0.021)	(0.015)	(0.214)	(0.070)	(0.051)	(0.307)
No. of observations	3226	7756	7762	5654	6478	5308	5713
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.152	0.121	0.333	0.129	0.135	0.189	0.177

Table 10: DIFFERENCE IN IMPACT BASED ON AGRICULTURAL LOAN DENSITY ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households in high agricultural loan density and low agricultural loan density districts. We employ a bandwidth of 2 hectares to the left and 3 hectares to the right of the cut-off to cover all agricultural households belonging to the small and medium farmers definition. We first calculate the deviation of each household's landholding from 2 hectares. We use this deviation as the running variable with zero, which denotes 2 hectares, as the cut-off. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. In Panel A, we cover households located districts that were in the top tercile in terms of agricultural loan density in 2007. Other households that are in the bottom tercile districts in terms of the same are covered in Panel B. We use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

A. Districts with the top tercile agricultural loan accounts, 66th round

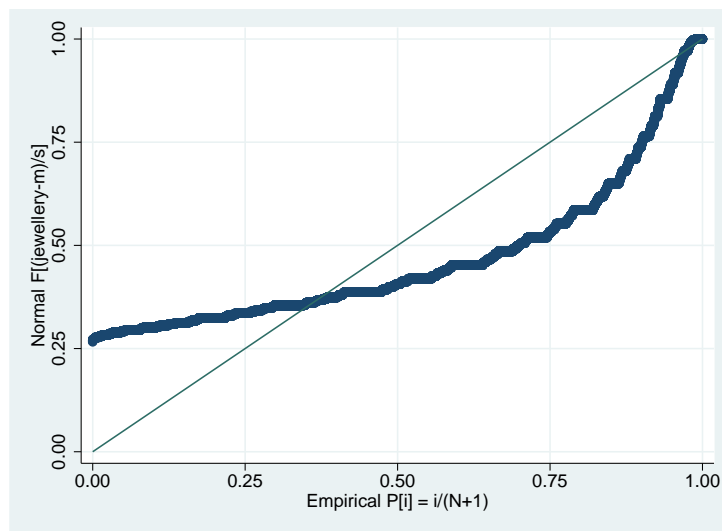
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						
Waiver dummy	0.293*** (0.101)	0.197*** (0.047)	-0.060*** (0.021)	-0.001 (0.097)	0.035 (0.107)	0.190*** (0.079)	0.070 (0.052)
No. of observations	1483	3814	3816	2508	3219	2148	3815
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.108	0.0845	0.201	0.0472	0.124	0.155	0.142

B. Districts with the bottom tercile agricultural loan accounts, 66th round

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry						
Waiver dummy	-0.014 (0.072)	0.031 (0.061)	0.046 (0.046)	0.309 (0.227)	0.116 (0.716)	-0.032 (0.036)	0.067 (0.087)
No. of observations	2306	4866	4867	3926	3890	3819	4821
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.244	0.162	0.339	0.175	0.109	0.236	0.131

Figure 1: NORMAL PROBABILITY PLOTS FOR JEWELRY EXPENDITURE FOR HOUSEHOLDS IN THE 66TH ROUND OF THE NSSO SURVEY

(a) Jewelry - level



(b) Jewelry - log

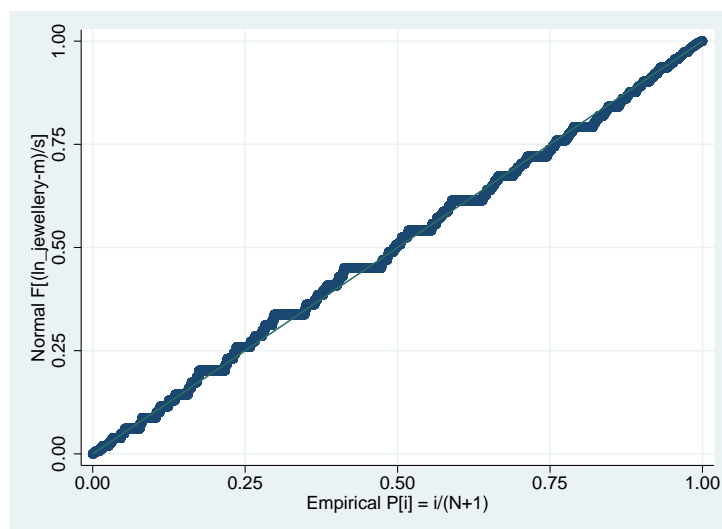
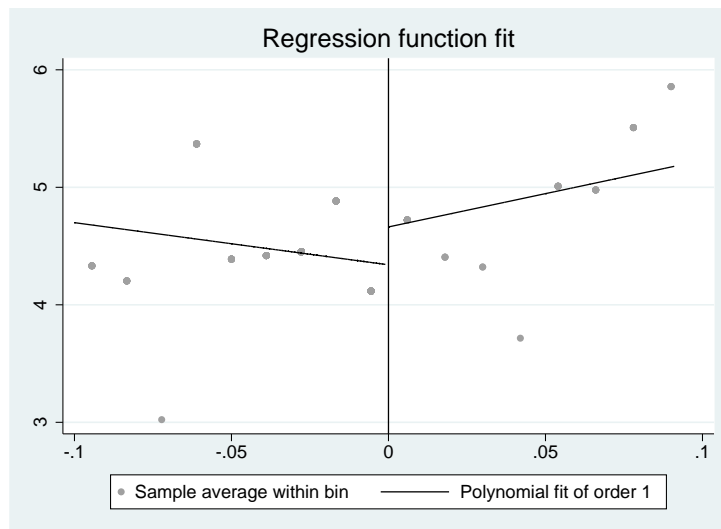


Figure 2: RD PLOTS FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

The figures below depict the RD plots using the default technique of Mimicking variance evenly spaced using spacing estimators. Evenly spaced here implies evenly spaced bins for the construction of the partitioning scheme underlying the RD plots. Mimicking variance selects the number of bins that generates local sample means with an asymptotic variability mimicking the overall variability of the data. For further details on the methodology and spacing estimators, please refer to (Calonico, Cattaneo, and Titiunik (2014)). We have obtained the best fit curve using a first order polynomial.

(a) Jewelry Expenditure



(b) Basic food expenditure

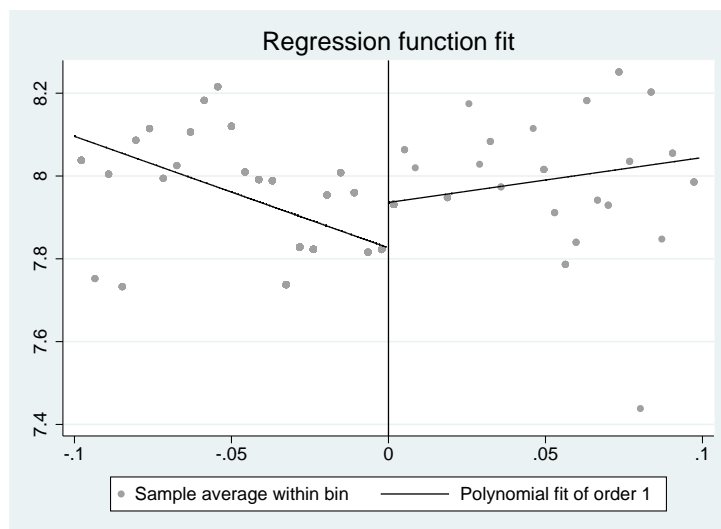
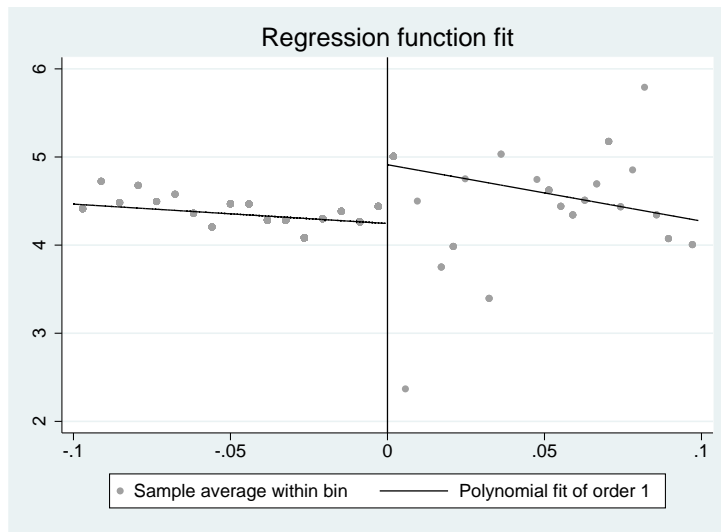


Figure 2 (contd.): RD PLOTS FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

(c) Minor durables



(d) Intoxicants

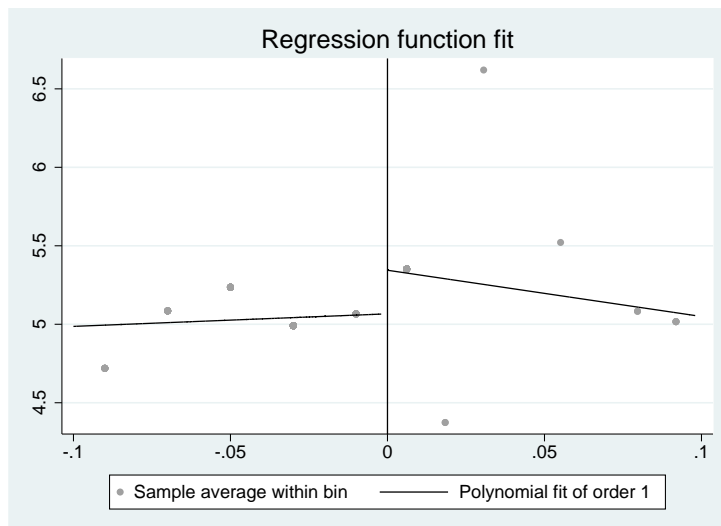
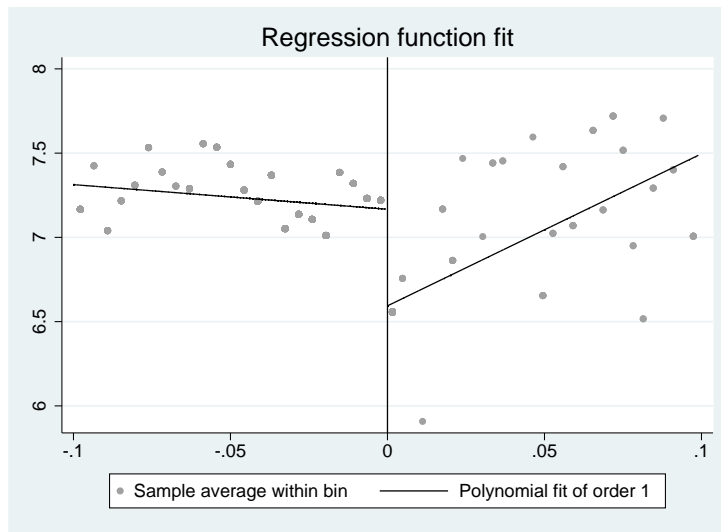


Figure 2 (contd.): RD PLOTS FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

(e) Rich food



(f) Major durables

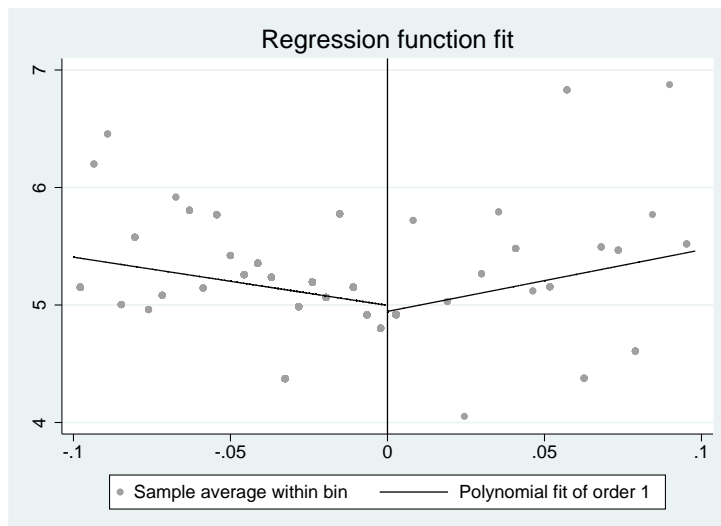


Figure 2 (contd.): RD PLOTS FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

(g) Other Household expenditure

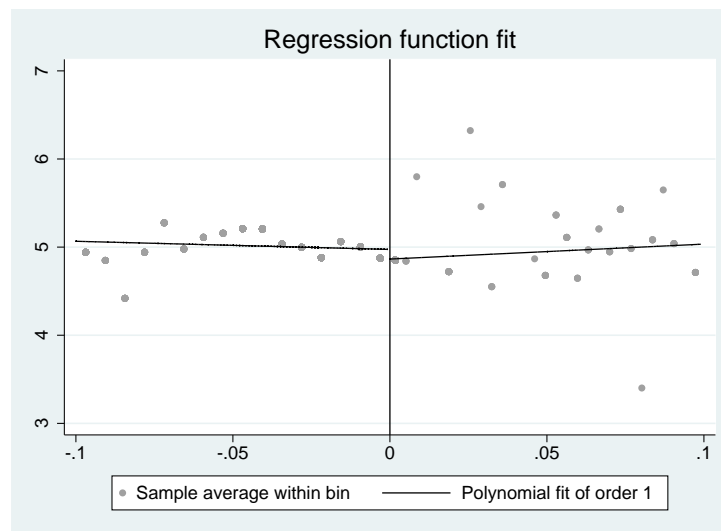
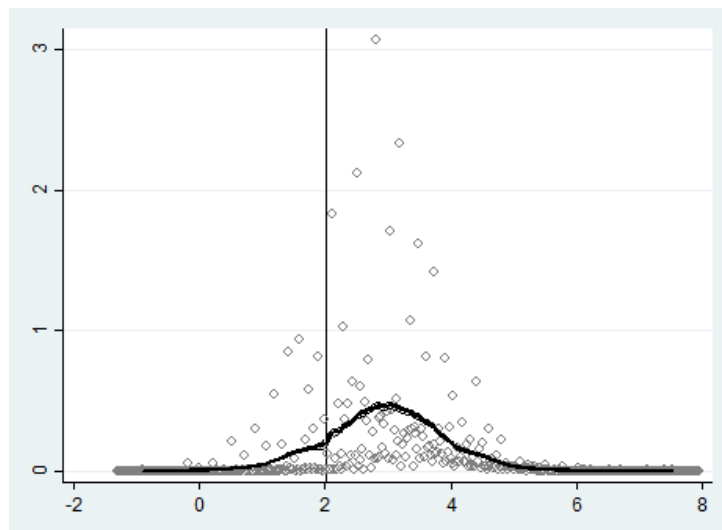


Figure 3: McCrARY TEST FOR DISCONTINUITY AT CUT-OFF POINT FOR HOUSEHOLDS WITH PRIMARY OCCUPATION AS SELF EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

The figure below depicts the McCrary test results for the households with agriculture as their primary occupation during the 66th round of the NSSO survey. The sample includes households with land holdings between 0-5 hectares. We do not observe bunching around 2 hectares either to the right or left of the cut-off point, thus confirming that there was no self-selection by households to avail the waiver benefit. We use the default bin size for our estimation. Our results remain robust on decreasing the bandwidth size to half its default levels. We report the coefficient and standard error estimates below. However, owing to the non-parametric nature of the test, we do not report a t-statistic.



Summary Statistics	
Log diff in height at 2 hectares	-0.032
Standard error	0.14
Default bin size	0.023

Appendix

Table A.1: EFFECT ON DISAGGREGATED CONSUMPTION FOR HOUSEHOLDS WITH NON-MISSING JEWELRY EXPENDITURE OBSERVATIONS AND WITH PRIMARY OCCUPATION AS SELF-EMPLOYED IN AGRICULTURE (IF RURAL) IN THE 66TH ROUND OF THE NSSO SURVEY

This table reports the RD results for the difference in various heads of consumption expenditure between beneficiary and non-beneficiary households with non-missing jewelry expenditure values. We employ a bandwidth of 2 hectares to the left and 3 hectares to the right of the cut-off to cover all agricultural households belonging to the small and medium farmers definition. We first calculate the deviation of each household's landholding from 2 hectares. We use this deviation as the running variable with zero, which denotes 2 hectares, as the cut-off. The RD specification estimates the significance of $E[Y_i(1) - Y_i(0)|X_i = \bar{x}]$. We show the results for jewelry and various expenditures in columns 1 to 7. We use the natural logarithm of the rupee value of the expenditure on a particular item as the dependent variable. We employ district fixed effects. ***, **, and * represent statistical significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Jewelry Basic food Rich food Minor durables Major durables Intoxicants Other HH consumption						
Waiver dummy	0.092** (0.044)	0.031* (0.043)	-0.015 (0.023)	0.032* (0.012)	-0.023 (0.094)	0.091* (0.077)	0.010* (0.012)
No. of observations	6341	6341	6340	5338	6341	2389	6317
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R-squared	0.308	0.214	0.525	0.231	0.248	0.439	0.237

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