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## **How Much Does Having a Bank Account Help The Poor? An Investigation With Instrumental Variables**

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### **Abstract**

Having a bank account is widely regarded as the first step towards financial inclusion of the poor, as funds deposited in a bank account is expected to lead to higher savings. However, the existing literature on the savings potential of new bank accounts for the poor usually stops short of investigating whether the savings are productively used. In this paper we attempt to fill in this gap. Moreover, having a bank account to the poor is not synonymous to using it. Therefore, we measure the impact of being paid at bank on the investment in human capital of the households. Our empirical approach differs from most existing studies which have used field experiments with a limited sample size and a one-time payment to subjects of the experiments. In order to ensure generalizability of our findings, we use a large nationally representative sample and repeated wage payments to the poor. Our empirical tests exploiting special features of the National Rural Employment Guarantee Scheme (NREGS) of India indicate that the beneficiary households (recipients of NREGS wage payments through bank accounts) spend significantly less than their counterparts (cash payment recipients) on education, arguably the most important human capital development investment for the poor. The results are consistent between standard OLS and instrumental variable estimates designed to correct for omitted variable bias in OLS tests. Our tests for other discretionary and non-discretionary expenses provide corroborating evidence.

Keywords: bank account, education, Instrumental variable

JEL codes: D10, D14, I20

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## **How much does having a bank account help the poor?**

### **An investigation with instrumental variables**

*“This Mission (Pradhan Mantri Jan-Dhan Yojana or PMJDY) would enable all households, urban and rural, to gain easy and universal access to financial services. Exclusion from the banking system excludes people from all benefits that come from a modern financial system. In this Mission, households will not only have bank accounts with indigenous RuPay Debit cards but will also gain access to credit for economic activity and to insurance and pension services for their social security.”- Narendra Modi, Prime Minister of India, 22<sup>nd</sup> August 2014<sup>i</sup>.*

### **1. Introduction and Motivation**

The existing economic literature on poverty reduction and welfare of the poor has been

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concerned with savings by the poor. Karlan et al (2014) provide an incisive survey of this part of the literature. In this connection, it has been observed that money deposited in a bank account leads to higher savings than a similar amount held in cash (Chin, Karkoviata and Wilcox, 2011; Mullainathan and Shafir, 2009), simply because cash in hand is more readily available for spending.

In underscoring the importance of savings by and for the poor, Karlan et al (2014, p. 36) observe that “savings help households smooth consumption and finance productive investments in human and business capital.” However, the existing literature on the savings potential of new bank accounts for the poor usually stops short of investigating whether the savings are productively used. At present we have precious little knowledge whether bank account payments induce more desirable use of the deposited funds than other

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modes of payment, including especially cash payment.

In this paper we attempt to fill this gap in the current state of knowledge. As we have noted above, the existing literature tells us that bank account payment leads to more savings. We investigate the further and ultimately more important question whether the additional savings are channeled into value-additive investments. Arguably, educational expenditure is the most important human capital development expenditure for the poor households, because it carries the potential of lifting them out of poverty. Also, this expenditure is by and large discretionary for the very poor, since it competes for their limited budget with more pressing subsistence-related expenses. In other words, educational expenditure implies a conscious choice. We investigate whether expenditure on education by poor households differs significantly if they use money in their bank

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accounts as opposed to cash, after controlling for other relevant factors. The other major candidate for human capital development expenditure, namely expenditure on preventive health care, presents a challenge for empirical research in the Indian setting. The organized data sources, such as the National Sample Survey Organization (NSSO) of the Government of India, does not separate the information on preventive health care, which represents conscious investment in health, from other types of health care including emergency health care due to injuries, illnesses etc.

Further, to conduct our investigations we adopt an empirical strategy which is fundamentally different from almost all existing studies on savings and investment decisions of the poor. They typically use field experiments at single locations with a limited sample size and a one-time payment to the subjects in the experiment. By contrast, in order to ensure generalizability of our findings, we

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elect to use a large nationally representative sample and repeated wage payments to those included in our sample.

To obtain appropriate samples of bank account payment and cash payment recipients, we turn to the National Rural Employment Guarantee Schemes (NREGS) of India. NREGS is an important and ambitious nationwide government scheme for employment and income generation for the ultra-poor. It guarantees 100 days of unskilled work to at least one member of each rural household in the country who are willing to work at the minimum wage rate. Although NREGS work is available to any rural household, the nature of the work, mostly unskilled manual work, is such that only the poorest strata self-select themselves into this scheme. Importantly for our purpose, NREGS also seeks to promote higher usage of bank accounts. As an important component of the overall scheme, NREGS aims to deposit the wage payments

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of the beneficiary households directly in their bank accounts. The implementation of this part of the scheme has been proceeding district by district since 2006, and was supposed to be completed by 2008. However, as of 2009-10, there were many districts that were not fully covered, and many household in those districts were still getting paid in cash. As a result, NREGS presents a unique opportunity to research the economics of cash versus bank account payment for the poor, given that the ‘treated’ households (recipients of NREGS payments through bank accounts) and the households in the ‘control’ group (cash payment recipients) have very similar socio-economic characteristics, as both groups belong to the lowest economic strata. Further, the size of both groups is large, ensuring robust empirical test results. Importantly, variation in district-level implementation of the bank account payment scheme can be suitably exploited for identification.

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Our test results uniformly indicate that the households that receive NREGS wages in cash spend more on education than similar households that receive them in their bank accounts. The results are consistent between standard OLS and instrumental variable regressions, but stronger in the case of the latter. The households that receive cash payment appear to spend on an average Rs 1,066 more on education annually than the treated households. The amount is statistically significant (at 5 percent level) as well as economically significant (2.1 percent of total annual expenses). In other words, the bank account payment option may lead to more savings, as other papers have found, but less human capital investments.

Our findings will appear counterintuitive, possibly even shocking to many academics and policy-makers interested in financial inclusion of the poor. After all, creating bank accounts for the unbanked poor is a major policy initiative in India



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and other developing countries. It is, therefore, important to find a plausible explanation for our findings. For a given household, the preference ordering between future and current consumption should not be different from money in cash to money in a bank account. If, therefore, payment of wages in the bank account appears to lead to less expenditure on education, it must be due to additional constraints on accessing a bank account. Lacking direct data, we test this proposition indirectly. We argue that any such constraints are likely to affect discretionary expenditures more than expenditures on essential items, such as food, which the households cannot do without. For the very poor, as we have argued above, educational expenditure is by and large discretionary, since it competes for their limited budget with more pressing subsistence-related expenses. If, therefore, expenditure on other clearly identified discretionary items are also found to be less in the case of the treated group, while the expenditures on necessary

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items are similar for the two groups, we would consider the evidence supportive of our proposition. The tests conducted on other discretionary expenses including entertainment, toiletries, and personal care find that the treated households spend significantly less on these items as well. Additional test results indicate that the two groups of households are similar in terms of expenditure on food and other necessities as well as total annual expenditure.

Can we identify the nature of the constraints that have resulted in the findings that we observe? It is an important question for policy-making. It has been observed that five types of constraints hinder the poor from effectively using financial products and institutions (Karlan et al, 2014); financial illiteracy and knowledge gaps including fear of banking born of unfamiliarity with banking practices (Adhikari and Bhatia, 2010; Anderson et al, 2013; Drèze and Khera 2008), transactions costs

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including non-pecuniary costs such as physical distance from the bank branch in rural areas, lack of trust and regulatory barriers, social constraints, and behavioral biases. Pecuniary transactions costs are unlikely to be a serious constraint in the present case. Since 2005-6 various State Level Bankers' Committees (SLBCs) in India at the behest of the Reserve Bank of India, and more recently the Government of India, have launched initiatives to open "no-frills" accounts with almost no financial eligibility conditions. Lack of trust and regulatory barriers, social constraints, and behavioral biases are more likely to hinder opening a bank account than using an existing one. In the present case the households in the treated group already had bank accounts with funds in them. So in the final analysis we are left with financial illiteracy and unfamiliarity with banking practices and non-pecuniary transaction costs, mainly physical distance to the nearest bank branch, as main candidates for constraints in the present case. The fact that a

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significant proportion of the very poor in developing countries are not literate must accentuate the problem of financial illiteracy and knowledge gap. In our sample, 38 percent of the heads of the treated households are not literate. The corresponding number is 31 percent for the control group households.

In our empirical work we use data from several distinct databases. For our purpose the most important data source is the nationally representative household survey conducted by the NSSO in the year 2009-10 as part of its 66th employment and unemployment round. In this round the surveyed households were asked about the mode of payment of NREGS wages. Since implementation of NREGA wage payment through bank accounts started in 2006, and was supposed to be completed by 2008, the data from this particular NSSO survey round are most suitable for our purpose. As of the date of writing this paper, it

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remains the only round where the surveyed households were asked about the mode of NREGS wage payment. Apart from the mode of payment information which is used in constructing the independent variable of interest in our tests, the data also include important demographic information on the surveyed households including educational and other categories of household expenditure, employment status and educational status of the household members etc. The information is useful for constructing the dependent variables (educational and other expenditures of households in a district) and suitable control variables in our empirical tests.

Our tests also control for district level educational infrastructure, district level banking infrastructure, and district level implementation of bank account payment of NREGS wages. The data sources for the control variables are, respectively, District Infrastructure on School Education (DISE)

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corresponding to the year 2009, Basic Statistical Returns (BSR) compiled by the Reserve Bank of India which include information on bank credit supply and number of bank accounts in each district per year, and a database maintained by the NREGS administration which includes district-level information on the status of the implementation of its wage payment through bank account scheme. After combining the data from all sources, we obtain a sample of 8077 households who received NREGA wage payment through a bank or in cash. The sample is almost evenly divided between the treated and control groups: 4114 treated and 3963 control.

Our main regression model includes education expenditures of households as the dependent variable, a dummy indicating the mode of payment of NREGS wages as the independent variable of interest, and a battery of variables to control for the possible dissimilarities between the

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treated and the control groups. However, the standard OLS test results may be subject to omitted variable bias. The omitted variables may be of two types. First, the households that have bank accounts (and were therefore able to receive NREGS wages in their bank accounts), may have a different preference ordering between future and present consumption and therefore may invest in human capital differently, from the households that do not. As a proxy for the omitted variable capturing this household level preference ordering, we include a dummy variable in our test models indicating the households who also have post office savings accounts. Those households have a demonstrably higher preference for savings than the others. Second, our test model includes both household-level and district-level variables. There may be an unobserved district-level variable correlated with both educational expenditure of the households in a district and the extent of bank account payment of NREGS wages in the district. As a result of

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historical developments and social conditions, the households in some districts in our sample may have, on an average, higher academic aspirations as well as higher preference for bank accounts than the corresponding households in the other districts, making the mode of payment of NREGS wages dummy in our model endogenous. In the interest of clean identification and to ensure causality of our findings, in addition to OLS regressions we estimate instrumental variable regressions where we instrument the endogenous variable with district-level implementation of bank account payment of NREGS wages scheme. We subject the instrument to a battery of tests for validity. It passes all of them very satisfactorily.

Our findings contribute to several distinct strands of the literature. First, ours is the first study to investigate the human capital development implications of cash payment versus bank account payment. Our findings suggest a negative



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implication of the savings potential of new bank accounts for the poor. If money is deposited into a bank account, there is a possibility that a part of this is saved but, as our findings indicate, at the cost of lower investment in human capital development and reduced future earnings. Second, our study offers insights into the observed gap between take-up and usage of new accounts for the poor in many parts of the world. In several field experiments in Kenya, Dupas et al (2012) and Dupas and Robinson (2013a) found vast gaps between take-up and usage rates of new accounts even when usage is very leniently defined, such as only two transactions per year. India's experience with "no-frills" accounts especially created for the unbanked poor with almost no financial eligibility condition is similar. The no-frills accounts in India have largely remained dormant (Ramji, 2008). Our findings suggest that financial illiteracy is a likely explanation for the gap. Third, there are several different strands of economic literature where

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education of the poor plays a central role. Our finding that how the funds to pay for education are received significantly influences investment in education by the poor adds a new dimension to those literatures. In the literature on the effects of financial development on economic inequality, education has been observed to serve as a beneficial channel (De et al, 2011). This paper extends this literature by showing that how the funds are received should affect economic inequality

Finally, our findings also inform policy initiatives in India and other countries to open new bank accounts for the poor with a view to transferring benefits directly into the accounts. *Pradhan Mantri Jan-Dhan Yojana* (PMJDY) initiative in India is a recent example. The initiative has a target of 75 million new accounts; 60 million of them in rural areas and the rest in urban areas. The benefits include access to social security services, such as insurance and pension schemes,

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which are more efficiently provided to those who hold formal bank accounts than to those who do not. The quotation at the beginning of this section from a speech by the Indian Prime Minister publicizing the initiative is an eloquent exposition of such benefits. Our findings suggest that the benefits may not be utilized effectively.

The rest of this paper is organized as follows. Section 2 discusses the hypotheses and methodology of the present work. Section 3 discusses the data and the variables used in the present work. Section 4 presents the summary statistics and the results. Section 5 concludes with discussion and policy recommendations.

## **2. Methodology**

In order to estimate the impact of bank payment of NREGS wages on the educational expenditures of households, we do an OLS estimation of the following model among a cross-

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section of households who have NREGS work and are paid either by cash or bank deposits.

$$Ed_{hd} = \beta_0 + \beta_1.(BP_{hd}) + \delta_0.Exp_{hd} + \delta_1.X_{hd} + \delta_2D_d + \varepsilon_{hd} \dots\dots\dots (1)$$

where  $Ed_{hd}$  is per capita annual expenditure on education of household  $h$ , in district  $d$ .  $BP_{hd}$  is the indicator for the household being treated, that is the NREGS wage being paid through a bank account (=1). This category is used as a comparison group in the above regression.  $Exp_{hd}$  is the vector of dummies created from the annual household expenditure per capita, which is used as a proxy for household living standards.  $X_{hd}$  is the vector of other observable household level covariates.  $D_d$  is the vector of district level covariates, as explained below.  $\varepsilon_{hd}$  is the error term.

To control for differences in family situations which could influence intra-household resource allocation, we include dummies for primary occupation of the household head. As parental education is found to be highly correlated

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with children's participation in higher education (Basant and Sen 2014), we use the educational level of household head as a proxy for parental education, because the latter is not reported in the data. We also control for the number of school –going children (between the age 7 to 18), as it is supposed to affect educational expenditures. As female-headed households are found to spend differently on education of their children, we control for sex of the head of household.

Since supply of educational infrastructure in one's own district may affect the household's investment in education, we use district level variables to control for it. The variables are percentage of schools with girls' toilet, percentage of schools with single class room, percentage of schools with no female teacher, percentage of schools with a good classroom, and percentage of schools having no school building.

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As we have argued above, educational expenditures for the very poor in a developing economy is discretionary in nature. The primary components of educational expenditures in NSS data are two: (1) fees for schools/colleges and private tuition, and (2) expenses for books and stationaries. Since, by default, the NREGS program, and therefore our sample, include households living at the margin, any change in regular cash flow compels them to reduce discretionary expenditures. While the vast majority of the children in the poorest strata attend government schools, where the expenses towards school fees are minimal, there are other costs associated with education, particularly for books and stationaries. Further, most parents in these households are not educated enough to help their children with studies, so they end up spending significantly on private tuition (ASER, 2013; Wadhwa, 2013)<sup>ii</sup>. These expenses are mostly small out-of-pocket frequently recurring expenses. The rural poor may face constraints in the form of

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unfamiliarity with banking practices and physical distance to a bank branch in making regular need-based withdrawals (Rajan, 2007; Thyagarajan and Venkatesan, 2008). Therefore, for the rural poor, we expect the immediate impact of wages paid in bank accounts on educational expenditure to be negative; that is,  $\beta_1 < 0$ . However, the OLS regression model may be unable to identify the causal impact of access to bank account on human capital expenditure.

### **2.1 Selectivity bias adjustment and identification**

The treatment variable of interest is the dummy indicator capturing the mode of payment of NREGS wage. However, this variable may be endogenous due to few reasons. First problem may arise, when households are able to choose from different modes of payments. Certain households may have a general preference for future consumption over present consumption, and hence may decide to spend more on human capital

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development of their children and also decide to save more through their bank accounts. In this case, the estimates of the average treatment effect from the OLS model will be biased upward against our hypothesis. As a proxy for the omitted variable in this case, we use an indicator variable for the households having savings account in post office. This variable is expected to control for the households' preference for future consumption.

However, under the NREGS implementation scheme during the period under study, the districts have more authority on the mode of payment mechanism than the households (GoI, 2009b; Adhikari and Bhatia, 2010). It is possible that due to some unobserved factor, some districts that have households that care more about future consumption and hence investment more in human development also have better implementation mechanism in place for the NREGS wage payment in bank account scheme than the other districts in our sample. This



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will make the mode of payment dummy in the OLS model endogenous. We try to correct for this omitted variable bias using instrumental variable (IV) estimation. We use a district level measure capturing the status of implementation of NREGS payment through bank account scheme as an instrument for the endogenous variable in the first stage regression of our IV estimation. This instrument corrects for the omitted variable bias due to district level implementation, generating non-random treatment assignment to the districts. In the second stage regression, our dependent variable is the expected educational expenditures of the households from the first-stage regressions, and the independent variable of interest is, as before, receiving NREGS payments through bank account (=1), and receiving through other methods including cash payment (=0).

Let  $Z_d$  be the amount of NREGS payment through bank account per NREGS worker in district

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d. Using the distribution of  $Z_d$ , we create three dummies for  $Z_d$ , that are used as IVs. One dummy variable indicates the group of districts where average payment per worker through bank is more than Rs 161 and less than or equal to Rs 1140. The second dummy indicates the district group where average bank payment is more than Rs 1140 and less than or equal to Rs 4025. The Third group consists of all district with average payment above Rs 4025. The omitted group is the group of districts with average bank payment less than or equal to Rs 161. These cut-off points are not arbitrary. They represent the 25<sup>th</sup>, 50<sup>th</sup>, and 95<sup>th</sup> percentile distribution of  $Z_d$ . This gives us three interdependent IVs.

We conduct 2SLS-IV estimation, where the first stage regression is:

$$\begin{aligned} BP_{hd} &= \rho_0 + \rho_1 Z_d + \rho_2 Exp_{hd} + \rho_3 X_{hd} \\ &+ \rho_4 D_d + \epsilon_{hds} \dots \dots \dots (2) \end{aligned}$$

The second stage regression is the same as in (1).

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### **3. Data and Variables**

#### **3.1 Data**

We use data from four different sources. Our primary source of data is the nationally representative household survey collected by the National Sample Survey Organization (NSSO) of the Government of India (GoI) in the year 2009-10. We use the quinquennial, unemployment-employment round of the National Survey Data (NSS), which was collected from a cross-section of a total of 1,00,957 households. Since NREGS started in the year 2006, and implementation was supposed to be completed by the year 2008, this data seems to be the most suitable to capture the immediate impact. Moreover, during the course of our study, this was the only available nationally representative survey data in India that captures the details on status of NREGS work and modes of wage payments. There is no other nationally

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representative survey data collected in India on direct benefit transfer to the bank account of the recipients. . Apart from that, the data also collects several other demographic details of household, details of individuals on employment status, educational status, and different broad heads of household expenditures.

For our district level control of educational infrastructures, we use the data from District Infrastructure on School Education (DISE) corresponding to the year 2009<sup>iii</sup>. This is a government of India initiative, where all schools across India volunteer to submit the detailed information on school infrastructure. This is the only nationwide database on school infrastructure in India. This captures information on school buildings, classroom, and availability of different type of toilets, availability of teachers, their qualifications, enrolment rates, grants received, and such related indicators.

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Data on variables to construct the IV is collected from the Ministry of Rural Development (MoRD), Government of India, who maintains a regular database capturing several indicators of implementation of the NREGS at the district level<sup>iv</sup>. We extract district level data on the wages paid through different modes, and the number of total NREGS workers in each district. In order to calculate a measure for implementation level in district, we divide the total amount of wage paid at bank in each district by the number of NREGS worker in the district, to reach to a per capita level of  $Z_d$ , for district  $d$ . However, the closest and most relevant year for which, the amounts paid through different modes were available is 2010-11. Since there is just one year gap between the periods of household level data collection of NSS (2009-10) and the above NREGS data (2010-11), we assume that the implementation indicators of the districts follow similar trend for at least about a year. Since our IV is a categorical variable, the categories of

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districts according to the level of implementations are not supposed to go through any major change within a year.

Finally, since implementation of payments through bank may also depend on the district level infrastructure of banking facilities, we also use the data on Basic Statistical Returns (BSR) of the Reserve Bank of India (RBI) of the year 2009, which captures number of credit accounts, and amount of credit per district. We calculate the amount per capita of the both the above indicators for each district, by dividing with corresponding district population of census 2001<sup>v</sup>.

After merging the household level data from the NSS, with three other district level data sets as mentioned above, number of sample households working in NREGS reduces from 13,238 to 12,194. However, our final sample consists of the households only who got paid at bank or as cash.

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This reduces the number of sample households to 8,077<sup>vi</sup>.

### **3.2 Variables**

The dependent variable in our main regression model is total expenditures of households on education, measured in Indian Rupees<sup>vii</sup>. This includes tuition and other fees such private tutor, school college fees, expenses for school books and other educational articles. In a few specifications for robustness and placebo tests, we also use other discretionary expenditures and necessary expenditures of the households as dependent variables. We have four different specifications of discretionary expenditures. In one of them we include entertainment items only, such as, expenses for movies, picnic, sports, club fees, video cassettes, cable charges etc. In the next category of

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discretionary expenditures, we include expenses on toiletries, such as, toothpaste, hair oil, shaving blades. In third head under discretionary items, we include expenses for the above two, plus items for personal care, such as, spectacles, torch, umbrella, lighter etc. In the fourth specification, under the same discretionary category, we include all the above expenses plus expenses for consumer services, such as, domestic servants, tailoring, grinding charges, telephone, legal expenses, and expenses for pet animals (excluding conveyance).

For placebo tests, we have two different specifications of necessary items. The first one includes expenses for food items only. The second one includes all food items plus expenses on rents, consumer taxes, fuel, light; sundry articles, such as, glassware, bucket, washing soap; and non-institutional medical expenses.

The primary independent variable of interest is constructed from the question asked to the



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households about the mode of payment. The categories of responses are payment at bank, payment at post office, payment in Gram Sabha (village) meeting, payment by field assistant, by SHG (Self help group) member, through smart card, other unexplained categories of payment and not yet been paid. The households getting paid in post office are not part of our sample, as our treatment is bank payment versus cash payment. Also, people who are not paid are excluded from the study. All payment modes, other than payment through bank are assumed to be cash payment in our final sample of 8,077 households. As we can see from the appendix table 1 that the majority of people are paid through bank in the original NSS data (35 percent), and in our final sample (51 percent). Once we combine all other payment modes to a single category of 'cash payment,' our final sample has almost equal share in both treatment and control groups.

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The total expenditure of households is used as proxy for living standards. We create few categories of that variable based on rural poverty line in India and few multiples of that amounts. We use the household head's education level as a proxy for parent's education, as the latter is not available. As number of children in household matters in decision on educational expenditures, we create a dummy for the households which have children aged 7-18 years<sup>viii</sup>. We get the occupation categories from the household level question.

The DISE data gives us information on school infrastructure at districts, as we choose few of them based on their expected association with our outcome variable. District level number of schools without female teacher, number of schools with girls' toilet, number of single class room schools, and number of schools without any building are divided by their respective district level

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numbers of total schools, to generate district level covariate for school infrastructure.

To create per capita credit amount at district level that captures financial infrastructure of the district, we sum up the total credit given to people of all different occupation categories and divide that by total district level population in the year 2001. We also use the per capita number of bank accounts in the district created in the same manner.

The NREGS data given at the district level, as mentioned earlier, helps us generate our instrumental variable. We also use the total number of NREGS workers in each district as additional control to remove the bias happening due to the district specific unobserved conditions that may lead to more NREGS worker opting to work in certain districts. Else, higher number of workers in certain districts could inflate  $Z_d$ , and would wrongfully indicate higher bank pay implementation.

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#### **4. Results**

Table 1 presents the summary statistics and results from t-test of difference in group means of total household expenditures, and all outcome variables used in different specifications. Difference in group means indicate that on average the treated households have less expenditures on education and other discretionary items. However, the groups appear to be similar in terms of total household expenditure as well as expenditure on food and other necessary items. Table 2 presents summary statistics and results from test of difference in means for all the covariates of the model. The difference in means of some of the covariates indicates that it is important to control for those household level or district level observables.

The OLS estimates from the first column of table 3 appear to indicate that annual educational expenditures for the treated households are less than

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the control households. However, this effect is not statistically significant. Moreover, for the identification of the model, the suspected endogeneity of the bank payment dummy discussed earlier needs to be addressed. The second stage results of the IV estimation presented in column 4 provide stronger support of a negative relationship (statistically significant at 5% level) between NREGS payment through bank and the annual educational expenditures of the household. The educational expenditure is less by as much as Rs 1,066 on average for the households receiving payment through bank, as compared to the households receiving payment through cash. This difference is about 2.1 percent of the average annual consumption expenditure of the former group.

All other household level covariates have expected signs. Compared to the richest group of households, the poorer households spend less on children's educational needs in OLS as well as IV

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estimations. Households with heads having some educational qualifications spend more on children's education compared to households with non-literate heads. Households primarily serving as agricultural labor have less educational expenses for their children compared to most other types of households.

#### **4.1 Instrument validity results**

All our estimates are robust to heteroskedasticity and clustering at the district level. The endogeneity test gives a p-value as low as 0.01, which strongly suggests that our primary variable of interest is endogenous and recommends the instrumental variable estimates instead of the OLS estimate. The fact that IV estimation yields stronger negative results indicate that the OLS estimates are biased upward. The upward bias in OLS estimates may arise from a district level omitted variable suggesting that the households in certain districts are systematically different than the

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other districts in our sample. They care more for their future consumption than present consumption, and therefore may prefer payment through bank, as well as invest more in their children's education. Although expenditure decisions are made at the household level, once we control for all observed heterogeneity across households and when households effectively do not have choice of the mode of payment, the only omitted variable that makes the treatment endogenous in nature arise from district level implementation. As we clearly see from table 2 that as much as 64 percent of the households in the control group reside in districts with average wage disbursement through bank being in the bottom group (less than Rs 161<sup>ix</sup>). Once we are able to correct for this omitted variable capturing the difference in preference across districts, the IV estimates become strongly negative.

All the dummy variable instruments in column 2 of Table 3 in our reduced form regression

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have non-zero coefficient and are statistically significant. The first stage of 2SLS-IV regression as presented in column 3 reports statistically significant coefficients with desired signs. The households in districts with a high level of implementation NREGS payments being disbursed through bank are expected to have higher chances of receiving NREGS payment through bank.

The first stage of the 2SLS-IV regression gives Shea's partial correlation of 0.21, which indicates a strong correlation between the district level implementation dummies and the household level indicator of payment through bank. The F-statistics from the first stage is 31.74, with a p-value close to zero. The positive signs of the coefficients for all three dummies along with the above statistical estimates satisfy the instrument's relevant condition.



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The first stage Kleibergen-Paap rk LM statistic gives Chi-square value of 61.3, with p-value of zero; and the Kleibergen-Paap rk Wald statistic gives Chi-square value of 95.7, with the same p-value. It indicates that the instruments are adequate to identify the equation.

The test of joint significance of endogenous regressors from the first stage producing Anderson-Rubin Wald test F-statistics and Anderson-Rubin Wald test Chi-square statistics indicate that the endogenous regressors are relevant too<sup>x</sup>.

The over-identification test estimating Hansen-J statistics has a p-value of 0.95, which indicates that instruments are valid instruments, uncorrelated with error term; and excluded instruments are correctly excluded from the estimated equation.

#### **4.2 Robustness checks and placebo tests**

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To check for the robustness of the results, we estimate the OLS and 2SLS-IV models under different specifications capturing household composition, district fixed effects<sup>xi</sup>, and controls for educational and banking infrastructure in the district. Our finding of negative impact of bank account payment on educational expenditures of the households does not seem to be sensitive to model specifications, as shown in columns 1-7 of table 4. All coefficients remain negative and statistically significant at 95% level.

For further robustness checks, we consider the impact of bank account payment on other discretionary expenditures, such as entertainment, toiletries, and personal care. We also test for the impact of all of them together. The results are presented in table 5. As in the case of educational expenditures, the results for both OLS and IV regressions are negative and statistically significant in all specifications. The results confirm our

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prediction that payments through bank have negative effects on discretionary expenditures.

We also perform two placebo tests by changing the dependent variable to two non-discretionary items of expenditures. In the first test, presented in table 6, we use the components of the total consumption expenditures spent on durable goods including fan, air-conditioner, sewing machine, washing machine, pressure cooker and such; plus jewelry, and ornaments. Columns 1 and 2 of Table 6 are OLS and IV results repeated from Table 3 before. Columns 3 and 4 show that durable goods expenditure is higher for the treated group of households. The coefficients are positive and significant in all cases. Since decisions about big ticket purchases are usually longer-term decisions rather than monthly decisions, payment through bank may help the households plan better for those purchases over cash payment. We should note here that the question in the NSS survey about durable

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goods expenditure sought the annual amount spent in the last year, whereas all other questions about expenses on education, food (necessary items in our case), items for personal care (discretionary items) sought the amount spent in the last month. In our tests, we convert the monthly amounts into annual amounts to make them comparable with other annual amounts..

In the second placebo test, presented in table 7, our dependent variables are components of expenditures on necessary items, including expenditures on food (in columns 1-2), and other necessities, such as sundry articles, conveyance, rent, and medical expenses (in columns 3-4). The treated group does not seem to spend differently from the control group in any specifications. This strengthens our finding further that payment through bank leads to lower expenditure on education and other discretionary items only.

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To complete our investigations, we investigate the impact of payment of NREGS wages through a post-office account, which is the third common mode of payment (see Appendix table 1). Doing the same exercise as for the bank payment option, the OLS and IV estimates are negative and statistically significant for the post-office payment option at 90 percent level. Though less negative than the bank payment option (significant at 95% level), the results still indicate that having cash in hand rather than being paid in a post office account is more convenient for the rural poor in terms of spending on their children's short-term educational needs.

## **7. Concluding observations**

The primary object of our study has been investigation whether the mode of payment of NREGA wages, bank account payment as opposed to cash payment, leads to an observed difference in expenditure on education between the treated

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households and the control households and, if so, which of the two groups spends more. As we have noted above, the existing literature tells us that bank account payment leads to more savings. In this paper we have investigated the further and ultimately more important question whether the additional savings are channeled into value-additive investments.

There are two key insights from our study. First, the mode of payment of wages matters for expenditure decisions of the poor. Our test results have consistently shown that payment through bank accounts leads to less investment in education, the one human capital investment that has the potential of lifting them out of poverty. IV regressions have established the causality of our findings. We have argued that our findings indicate that the poor face constraints in accessing their bank accounts as and when they need. The constraints arise from non-pecuniary transactions costs such as physical

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distance from a bank branch and financial illiteracy resulting in avoidance of banking transactions. The second key insight from the paper is that such constraints hinder discretionary expenditures more than necessary expenditures, such as expenditures on food and other necessities that are not possible to live without. For the very poor, expenditure on education is by and large discretionary, as it competes with other subsistence- related expenses for their limited budget. Our tests on other discretionary items as well as necessary items have yielded supporting evidence.

Though the existing literature on the subject is sparse, there is some indirect support for our findings. Proximity to bank branches has been found to be a significant contributor to the demand for bank accounts in India (Prina, 2015). It has been observed that the delays in processing the bank transfers in the case of NREGS payments, coupled with distance to banks, dampen the expected

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benefits of bank payment. (Adhikari, 2010; Drèze and Khera, 2008; Khera, 2010).

We conclude with a note of caution. NREGS earnings provide supplementary income to rural households to the tune of Rs 4,000 per annum on an average. This amounts to about 8% of the total annual expenditure of the poor households in our sample. A supplementary income perhaps impacts discretionary expenditure more than other types of expenditure. Therefore, we cannot confidently predict what the impact would be if the funds for the entire consumption budget of the households are received through their bank accounts. However, it is safe to suggest that the poor will continue to face challenges in accessing their bank accounts until the banking infrastructure becomes more wide-spread and financial education programs substantially mitigate fear of financial products and institutions.



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*EconWorld2016@Barcelona*  
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*Preliminary draft: Comments welcome*

Table 1: Summary statistics of outcome variables, total household expenditure and the test of difference in group means

Variables: all expenditures are measured in Annual Indian Rs.	Controlled Households			Treated Households			Full sample Households			Difference in Means between Controlled and Treated
	N	Mean	SD	N	Mean	SD	N	Mean	SD	
Total Edu Exp	3963	2118.3	4964.2	4114	1676.9	3707.9	8077	1893.5	4375	441.4***
Total Exp	3963	51268	27653.5	4114	50293	29676.4	8077	50771.2	28704	975.4
Share in Edu Exp	3963	0.03	0.05	4114	0.03	0.04	8077	0.03	0.05	0.00432***
Discretionary: a)Entertainment	3963	683.3	1086.1	4114	286.7	763.3	8077	481.3	956.4	396.6***
Discretionary: b)Toiletries	3963	1204.2	820.5	4114	1002.8	674.2	8077	1101.7	756.3	201.4***
Discretionary: c) =a + b + personal care	3963	2172.5	1909.1	4114	1448.9	1354.7	8077	1803.9	1689.2	723.5***
Discretionary: d) =a + b + personal care + consumer services	3963	4198.4	3995.3	4114	3342.1	2887.5	8077	3762.2	3501.5	856.3***
Durable	3963	1821.3	4134.6	4114	2023.3	8963.4	8077	1924.1	7022.4	-202.0
Necessary: a) Food	3963	27812	13599.4	4114	27911	13720.7	8077	27862.2	13660.5	-99.09
Necessary: b) Food & other (clothing foot wear not included)	3963	9372.9	6580.5	4114	9516.5	9205.7	8077	9446	8025.5	-143.6

\*\*\*Significance at 99%, Controlled=cash payment, Treated = Bank payment



Table 2. Summary Statistics and test of difference in group means of covariates and other variables of interest

Variable	Controlled Households			Treated Households			Full sample Households			Difference in group means: t-test
	N	Mean	SD	N	Mean	SD	N	Mean	SD	
Very poor	3963	0.07	0.25	4114	0.08	0.3	8077	0.07	0.3	-0.01
Vulnerable	3963	0.25	0.44	4114	0.31	0.5	8077	0.28	0.5	-0.06
Middle Class	3963	0.57	0.50	4114	0.54	0.5	8077	0.55	0.5	0.03**
No of child 7-18	3963	1.27	1.29	4114	1.44	1.4	8077	1.35	1.3	-0.17
Female head	3963	0.09	0.29	4114	0.08	0.3	8077	0.09	0.3	0.01
Head: < Secondary	3962	0.60	0.49	4114	0.58	0.5	8076	0.59	0.5	0.02*
Head: HS	3962	0.05	0.21	4114	0.03	0.2	8076	0.04	0.2	0.02***
Head: Grad	3962	0.04	0.18	4114	0.01	0.1	8076	0.02	0.2	0.02***
Self emp non-ag	3959	0.21	0.41	4113	0.20	0.4	8072	0.21	0.4	0.01
Agri Lab Hh	3959	0.19	0.39	4113	0.15	0.4	8072	0.17	0.4	0.04***
Other Lab Hh	3959	0.18	0.39	4113	0.30	0.5	8072	0.24	0.4	-0.12
Self emp agri	3959	0.28	0.45	4113	0.28	0.5	8072	0.28	0.5	-0.001
Other Hh	3959	0.13	0.34	4113	0.06	0.2	8072	0.09	0.3	0.07***
PO Savings Account	3963	0.18	0.39	4114	0.25	0.4	8077	0.21	0.4	-0.06
NREG bank pay	3963	0.00	0.00	4114	1.00	0.0	8077	0.51	0.5	
NREG cash pay	3963	1.00	0.00	4114	0.00	0.0	8077	0.49	0.5	
District level NREGS amount per worker disbursed - by mode of payment: extracted from MoRD Data										
At (Bank + PO)	3963	1601.51	2469.30	4114	3007.41	1606.9	8077	2317.60	2191.0	-1405.9***
At Bank	3963	727.71	1380.80	4114	2270.99	1510.2	8077	1513.78	1640.8	-1543.3***
At PO	3963	873.80	1889.26	4114	736.42	752.6	8077	803.83	1429.8	137.4***
Total worker in Dist	3963	215057.70	229765.6	4114	208306.6	190687.8	8077	211619	210782.6	6751.1
District level NREGS bank payment implementation categories created from per worker payment at bank: data from MoRD										
0<= amount <=161	3963	0.64	0.48	4114	0.07	0.3	8077	0.35	0.5	0.57***
161<amount<=1140	3963	0.13	0.34	4114	0.18	0.4	8077	0.16	0.4	-0.05

1140<amount<=4025	3963	0.19	0.39	4114	0.62	0.5	8077	0.41	0.5	-0.44
amount>4025	3963	0.04	0.20	4114	0.12	0.3	8077	0.08	0.3	-0.08
Ratio Girl toilet	3963	0.03	0.19	4114	0.00	0.0	8077	0.02	0.1	0.03***
Ratio single room scl	3963	5.92	8.64	4114	3.77	5.0	8077	4.82	7.1	2.15***
Ratio no fem teach scl	3963	19.45	12.23	4114	28.07	12.8	8077	23.84	13.3	-8.62
Ratio good class rm scl	3963	52.14	27.94	4114	68.62	16.8	8077	60.53	24.4	-16.48***
Ratio no buldg scl	3963	11.70	19.14	4114	9.78	12.9	8077	10.72	16.3	1.92***

\*\*\*Significance at 99%, \*\*at 95%, \*at 90%. Controlled=cash payment, Treated = Bank payment





Table 3: Impact of payment through bank account on total annual educational expenditures of household

Dependent Var in each column	Single eqn (OLS) (1) Annual Edu exp	Reduced form (OLS) (2) Annual Edu exp	2SLS-1 <sup>st</sup> stage (3) Pay at bank	2SLS (IV) 2 <sup>nd</sup> stage (4) Annual Edu exp
Pay at Bank (=1) Dist. Bank Pay Implem	-116.5			-1066.6**
Impl 25-50 pcentil		-464.12*	0.38***	
Impl 50-95 pcentil		-595.71**	0.54***	
Impl > 95pcentil		-610.06*	0.61***	
No of Child 7-18	870.01***	871.18***	0.003	874.61***
<u>Hh living standards</u>				
Very poor	-5043.97***	-5058.2***	-0.04	-5113.25***
Vulnerable	-4468.53***	-4476.36***	0.01	-4468.7***
Middle Class	-3315.28***	-3348.25***	0.03	-3319.9***
Po savings Ac	361.19**	329.95**	0.13***	465.25**
<u>Head's Education</u>				
Secondary & Less	385.89***	392.47***	0.03**	429.9***
HS	2110.91***	2070.38***	0.06**	2132.4***
Grad & above	1735.43***	1718.7***	-0.01	1704.75***
<u>Hh Occupation</u>				
Self emp non-agri	191.43	196.09	0.03	228.74
Other Lab	-97.46	-72.1	0.05***	-13.46
Self emp agri	379.38**	360.81**	0.05***	417.46**
Other hh	734.54**	701.31**	-0.01	692.69**
Female head	-400.88**	-388.98**	0.04***	-343.74**
Number NREG worker Dist.	Yes	Yes	Yes	Yes
Dist. Banking facility	Yes	Yes	Yes	Yes
School facility	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.18	0.18	0.43	0.17
N	8071	8071	8071	8071

- Household expenditures have been used as proxy for households' living standards. The households in the richest group, with non-literate heads, categorized as agricultural labor, having no post office savings accounts, and staying in districts with implementation of NREGA payment through bank account in the district being less than 25<sup>th</sup> percentile, are used as comparison groups in respective categories of variables.
- Independent variable of interest is: Household getting NREGA payment through bank (=1) in comparison to households receiving cash payment (=0).
- All outcome variables are measured in annual amounts.
- \* p<0.1; \*\* p<0.05; \*\*\* p<0.01. Heteroscedastic robust standard errors, clustered at district level.

Table 4: Impact of payment through bank account on total annual educational expenditures of household: Check for Robustness

Dependent Var:	Results of Robustness checks from 2nd Stage of IV-2SLS estimation: Covariates are different across columns						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Annual Edu exp							
Pay at Bank (=1)	-1593.8***	-1139.61***	-1187.46***	-1125.64***	-1121.28***	-1065.82**	-1066.58**
<u>Hh living standards</u>							
Very poor		-4870.05***	-5226.43***	-5081.71***	-5060.59***	-5098.76***	-5113.25***
Vulnerable		-4302.06***	-4537.83***	-4426.27***	-4405.1***	-4454.48***	-4468.7***
Middle class		-3308.7***	-3356.41***	-3301.49***	-3285.21***	-3313.4***	-3319.9***
No of Child 7-18			880.86***	867.87***	863.12***	876.09***	874.61***
<u>Head's Education</u>							
Secondary & less			393.41***	361.97***	360.34***	425.7***	429.89***
HS			2143.45***	2012.53***	1997.14***	2130.79***	2132.39***
Graduate & above			1864.5***	1652.32***	1601.24***	1702.91***	1704.74***
Female head Hh			-313.50*	-314.45*	-315.16*	-347.17**	-343.74**
Hh occupation				Yes	Yes	Yes	Yes
PO Savings Ac					Yes	Yes	Yes
Dist.School facility						Yes	Yes
Number NREG						Yes	Yes
worker							Yes
Dist Bank Facility							Yes
R <sup>2</sup>	-0.01	0.07	0.16	0.16	0.16	0.17	0.17
N	8077	8077	8076	8071	8071	8071	8071

- Household expenditures have been used as proxy for households' living standards. The households in the richest group, with non-iterate heads, categorized as agricultural labor, and having no Post office savings account, are used as comparison groups in respective categories of variables.
- All outcome variables are measured in annual amounts.
- Independent variable of interest is: Household getting NREGA payment through bank (=1) in comparison to households receiving cash payment (=0)
- \* p<0.1; \*\* p<0.05; \*\*\* p<0.01. Heteroscedastic robust standard errors, clustered at district level.
- Numbers of observations are different across columns as we lose some observations during district matching of household level NSS data, and different district level databases from different sources.

Table 5: Robustness Test: Dependent variables are different components of annual discretionary expenditures

	(1) OLS	(2) IV	(3) OLS	(4) IV	(5) OLS	(6) IV	(7) OLS	(8) IV
Pay at Bank (=1)	-137.1***	-329.6***	-119.1**	-519.8***	-311.1***	-1,039.3***	-348.7**	-1,392.2***
<u>Living stands.</u>								
Very poor	-883.8***	-897.9***	-984.4***	-1,013.6***	-2,111.9***	-2,164.9***	-5,792.0***	-5,868.1***
Vulnerable	-836.4***	-836.4***	-740.3***	-740.4***	-1,772.0***	-1,772.2***	-4,923.3***	-4,923.5***
Middle class	-649.2***	-650.1***	-485.1***	-487.0***	-1,278.6***	-1,282.2***	-3,641.0***	-3,646.1***
No of child7 -18	51.77***	52.7***	106.7***	108.6***	186.7***	190.2***	432.9***	437.9***
Head's Educ								
Second or less	30.12	39.04*	45.31**	63.9***	88.6**	122.3***	52.7	101.0
HS	150.56**	154.9**	76.7	85.8	291.0***	307.5***	689.5***	713.1***
Grad +	639.16***	632.9***	388.19***	375.2***	1,162.3***	1,138.8***	2,705.7***	2,672.0***
PO savings Ac	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Hh Occup	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Female Head	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Bank Facility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
NREG worker in Dist	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R2	0.22	0.22	0.25	0.20	0.3	0.27	0.35	0.34
N	8,071	8,071	8,071	8,071	8,071	8,071	8,071	8,071

- The outcome variables in columns 5-6 include items on column 1-4, and items for personal care like spectacle, torch, umbrella, lighter etc. Outcome variables in columns 7-8 include all items in column 5-6, and consumer services like domestic servant, tailoring, grinding charges, telephone, legal expenses etc. All outcome variables are measured in annual expenditure amounts (in Indian Rs).
- Household expenditures have been used as proxy for households' living standards. The households in the richest group, with non-literate heads, categorized as agricultural labor, and having no Post office savings account, are used as comparison groups in respective categories of variables.
- Independent variable of interest is: Household getting NREGA payment through bank (=1) in comparison to households receiving cash payment (=0)
- \* p<0.1; \*\* p<0.05; \*\*\* p<0.01. Heteroscedastic robust standard errors, clustered at district level.

Table 6: Placebo test 1 - Impact of payment through bank account on different expenditure components of households

	Annual Edu Expenditure		Annual Durable Expenditure	
	(1) OLS	(2) IV	(3) OLS	(4) IV
Pay at Bank (=1)	-116.5	-1,066.6**	564.58*	1,678.73**
<u>Hh living standards</u>				
Very poor	-5,043.9***	-5,113.3***	-6,583.87***	-6,502.6***
Vulnerable	-4,468.5***	-4,468.7***	-6,292.53***	-6,292.3***
Middle class	-3,315.3***	-3,319.9***	-5,491.3***	-5,485.8***
Child7-18	870.0***	874.61***	233.96***	228.57***
<u>Head's Education</u>				
Secondary & less	385.9***	429.89***	43.95	54.49
HS	2,110.9***	2,132.4***	353.8	278.16
Graduate & above	1,735.4***	1,704.7***	739.05	683.14
Female head	Yes	Yes	Yes	Yes
Hh Occupation	Yes	Yes	Yes	Yes
School facility	Yes	Yes	Yes	Yes
Bank Facility	Yes	Yes	Yes	Yes
NREG worker in Dist	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.18	0.17	0.07	0.06
N	8,071	8,071	8,071	8,071

1. Outcome variables in columns 3-4 include all durable goods. All outcome variables are measured in annual amounts.
2. Household expenditures have been used as proxy for households' living standards. The households in the richest group, with non-literate heads, categorized as agricultural labor, and having no post office savings accounts, are used as comparison groups in respective categories of variables.
3. Independent variable of interest is: Household getting NREGA payment through bank (=1) in comparison to households receiving cash payment (=0).
4. \* p<0.1; \*\* p<0.05; \*\*\* p<0.01. Heteroscedastic robust standard errors, clustered at district level.

Table 7: Placebo test 2- Impact of payment through bank account on Necessary expenditure components of households

	Necessary Food expenses		Necessary Other expenses	
	OLS (1)	IV (2)	OLS (3)	IV (4)
Pay at Bank (=1)	258.7	-225.87	546.7	-1,007.1
<u>Living standards</u>				
Very poor	-23,257.1***	-23,292.4***	-12,983.1***	-13,096.4***
Vulnerable	-15,970.3***	-15,970.4***	-10,923.9***	-10,924.2***
Middle class	-9,685.6***	-9,687.9***	-7,662.8***	-7,670.4***
No of child7 -18	3,880.9***	3,883.3***	1,093.7***	1,101.2***
<u>Head's Education</u>				
Secondary or less	-715.1**	-692.6**	-36.42	35.5
HS	478.52	489.5	2,636.2***	2,671.3***
Graduate & above	3,045.2**	3,029.6**	2,572.3***	2,522.1***
Hh Occupation	Yes	Yes	Yes	Yes
Female Head	Yes	Yes	Yes	Yes
School facility	Yes	Yes	Yes	Yes
Bank Facility	Yes	Yes	Yes	Yes
NREG worker in Dist	Yes	Yes	Yes	Yes
R <sup>2</sup>	0.41	0.41	0.23	0.22
N	8,071	8,071	8,071	8,071

1. Outcome variables in column 1-2 include necessary food expenditures; column 3-4 include all other necessary expenditures such as sundry articles, conveyance, rent, medical expenses, and consumer taxes; All outcome variables are measured in annual amounts.
2. Household expenditures have been used as proxy for households' living standards. The households in the richest group, with non-literate heads, categorized as agricultural labor, and having no post office savings accounts, are used as comparison groups in respective categories of variables.

3. Independent variable of interest is: Household getting NREGA payment through bank (=1) in comparison to households receiving cash payment (=0)
4. \*  $p < 0.1$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ . Heteroscedastic robust standard errors, clustered at district level.

Appendix Table 1:

Modes of NREGS payment to households: from NSS data	Total NREGS working households as available in NSS data		Sample of NREGS working Households after merging with other 3 district level databases		Final sample of people getting paid at bank or cash (any mode other than post office) after merging with all four district databases	
	N	Percent	N	Percent	N	Percent
PO	3902	29.48	3734	30.62	0	0
Bank	4620	34.9	4114	33.74	4114	50.93
gram sabha	1084	8.19	981	8.04	981	12.15
field assistant	1980	14.96	1862	15.27	1862	23.05
SHG member	159	1.2	157	1.29	157	1.94
smart card	67	0.51	65	0.53	65	0.8
not paid	413	3.12	383	3.14	0	0
other	1013	7.65	898	7.36	898	11.12
Total households	13,238	100	12,194	100	8,077	100

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<sup>i</sup> GoI. 2014.

<sup>ii</sup> Wadhwa (2013) shows that about one-fourth of students from grade one to eight spend money for private tutors. The incidence is as high as 72 percent in low-private school state such as West Bengal.

<sup>iii</sup> See <http://www.dise.in/> , accessed on 7<sup>th</sup> July, 2015.

<sup>iv</sup> See <http://www.nrega.nic.in/netnrega/home.aspx> , accessed on 7<sup>th</sup> July, 2015.

<sup>v</sup> We do not use these as our IV to correct for the omitted variable bias arising at the district level. Although the financial infrastructure of the district may be strongly related to NREGS implementation, but districts with better financial infrastructure may also have a direct positive impact on demand for education. However, actual district level implementation of mode of payment of NREGS wage depends on other district level exogenous factors conditional on financial infrastructure. So, the financial infrastructure enters in our model as a district level covariate only.

<sup>vi</sup> See Appendix table 1 for details on sample attrition.

<sup>vii</sup> Since some of the households have zero expenditure on education, we could not use natural logarithm of expenditures.

<sup>viii</sup> In few specifications, not presented here, we also use household size and dependent ratio of the household as covariates. The latter has been constructed from the sum of number of children below 17 years and number of adults above 60 years in the household, divided by the household size. The signs of these covariates are same as expected. Our findings do not change.

<sup>ix</sup> 33 percent of the total 8,077 sample households reside in districts with zero disbursement through bank, as reported in MoRD database. NSS data reveals that nine percent of households in same districts report to have received the NREGS payment through bank. The NSS data being collected a year earlier, it is difficult to assume that households got paid at bank in one year, and there is zero disbursement through bank in the same districts in the following. This indicates that there is a possibility of reporting error in MoRD database (as that reports amount in Rs, whereas, the NSS variable on mode of payment is a categorical variable). However, 91 percent households of the zero bank disbursement districts still report of not being paid at bank. So, our results are not driven by this data discrepancy. Our estimation, after removing these nine percent households still gives strong negative results, supporting our findings. The latter results are available with authors upon request.

<sup>x</sup> Anderson-Rubin Wald test F-statistics:  $F(3,466)=1.89$  with  $P\text{-val}=0.1301$ , and Anderson-Rubin Wald test Chi-square:  $\text{Chi-sq}(3)=5.70$  with  $P\text{-val}=0.1269$ .

<sup>xi</sup> We also control for state fixed effects in different specification, which does not change our findings.