Employment Guarantee, Financial Inclusion and Payment Delay

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Work in progress

June 27, 2015

¹Subhasish Dey is gratefully acknowledged for processing the data. Leslie Reinhorn and Anurag Banerjee are acknowledged for helpful discussion. The usual disclaimer applies.
Abstract

The flagship programme of employment guarantee in India known as Mahatma Gandhi National Rural Employment Guarantee Scheme (NREGA) guarantees a maximum of 100 days of work for the rural poor at a government stipulated wage in a public works scheme. Although the very intent of this programme is to benefit the poor, it was criticized for its formidable payment delay. A surprising stylized fact is that such a payment lag raises the participation of poor in the programme instead of lowering it. In this paper, we argue that a payment delay could seriously hurt the poor that may not be seen from the usual success indicator of the programme, i.e. participation. Asset-poor households may participate more in response to such a payment lag. This happens because a payment delay makes labour a credit good. The household discounts its future labour income at a higher rate due to a longer payment lag. This depresses the annuity value of the labour income flow creating an adverse wealth effect. Since leisure is a normal good, households consume less leisure and work harder in response to a longer payment delay. If poor is financially excluded, this perverse wealth effect working though the interest rate is not at work. Poor would participate less in NREGA and look for other outside option. A programme of financial inclusion is likely to make the poor worse off when an employment guarantee programme is in place with a formidable payment delay.

Keywords: MGNREGS, Employment Guarantee, Credit Good, Financialization.
1 Introduction

Since 2006 the Government of India has implemented a flagship programme called the Mahatma Gandhi National Rural Employment Guarantee Scheme (NREGA hereafter). The programme guarantees a maximum of 100 days of work at a government stipulated wage in a public works scheme for the rural poor. This programme has uneven success across the country. Figure 1 plots the kernel density of NREGA participation of 498 districts from 15 states in India spanning the period 2012-14.

A key institutional bottleneck has been the significant delay by the government in processing timely payment of wages of rural household workers. In principle, workers were promised a payment of NREGA wages through nominated bank accounts or post office accounts within 14 days of completion of the public works project (Government of India, 2013). In practice, workers face delays in payment of wages upwards ranging from 30 to over 90 days.

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1. The MGNREGS is the world’s largest workfare programme and the Indian government’s largest anti-poverty intervention, with an annual cost of USD 7 billion which is 1% of India’s GDP (Government of India 2013).

2. The sample of districts are chosen to match the districts where financial inclusion data are available which we discuss later. All the data were compiled from the Government of India website: www.nrega.nic.in.
Figure 2 plots the probability of delayed payments based on the same sample of districts. The median probability of delay (more than 15 days) of all the payments based on district level estimation is about 50%.

Figure 2: Probability of Payment Delay for 15 states in India, 2012-14.

How does the payment delay affect the NREGA participation? Table 1 reports a preliminary fixed effect regression of NREGA participation of our sample of districts on the payment delay. The dependent Variable is the proportion of households demanding NREGA participation in total registered households. The unit of analysis is the district. The coefficient of

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3 The delay in the payment of wages is particularly evident in the poorer states of India, due to a weak institutional environment in these states. For example, in Bihar, during the financial year 2013-14, 24% of payment transactions were delayed over 90 days and 50% were delayed by more than 14 days (calculated by the authors from the data available on www.mgnrega.nic.in). This delay occurs due to (i) the complex auditing process at different levels of the local government, and (ii) inefficiencies in the banking system where the majority of banks that operate in rural areas are government owned.

4 Controls include measures of demand at the district level. These are measures of social backwardness (proportion of households who are dalits and adivasis, and marginal workers as proportion of total workers which constitute the poorest in India, where the demand for MGNREGS is the highest), average rainfall in monsoon months (semi-arid districts with low rainfall are likely to have higher MGNREGS demand), proportion of villages with drinking water, electricity, on a bus route, with paved roads, and a post
payment delay is found to be positive and significant at a 5 percent level. Curiously rural poor tend to participate more in the NREGA programme when payment delay is higher. This positive relationship is the focal point of our present paper.

Table 1: Payment Delay and MGNREGS Participation in India

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>1.43**</td>
</tr>
<tr>
<td></td>
<td>(0.69)</td>
</tr>
<tr>
<td>Average days of delayed payment</td>
<td>0.01**</td>
</tr>
<tr>
<td></td>
<td>(0.0001)</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.66</td>
</tr>
<tr>
<td>Number of observations</td>
<td>453</td>
</tr>
</tbody>
</table>

Note: Std errors are in parentheses. ** means significant at 5% level

In addition to the NREGA, the Government of India has almost simultaneously launched another major programme of financial inclusion of the poor. The aim is to provide the rural poor the access to a wide range of financial services including savings and deposits at a minimal cost. Various measures were undertaken by the Reserve Bank of India to lower the transaction and administrative costs for the poor to open savings accounts which effectively boosts the real rate of return on saving providing incentive to the poor to save more. Figure 3 plots the official index of financial inclusion (known as CRISIL index) and NREGA participation for the same 498 districts. Greater financial inclusion is associated with higher participation. The correlation coefficient is 0.29 that is significant at a 1% level.

and telegraph office (households in villages with better infrastructure and access are more likely to work in the private labour market rather than the MGNREGS), and state level fixed effects (to control for state-level differences in MGNREGS implementation).
This financial inclusion programme is also closely connected to the vigorous privately induced micro credit campaigns. Studies show during the same period, rural households’ indebtedness and default also increased. Greater default led to a rise in borrowing cost of the households giving rise to a vicious circle of poverty and indebtedness. The most recent survey of agricultural households by the National Sample Survey Office (NSSO) shows that over half of agricultural households are considered to fall in the indebted category (51.9 per cent) (Sangwan 2015). One cause of increasing indebtedness identified in the literature has been increasing loan pushing by microfinance organisations to poor rural farmers and the high real interest rates being charged on these loans (Hulme and Maitrot 2014).

The purpose of this paper is to demonstrate in terms of a stylized life cycle model that when there is a formidable institutional bottleneck in the form of a payment delay in NREGA, poor effectively participate more in the NREGA programme. This happens because a payment delay makes labour a credit good. A longer payment lag lowers the present value of labour income flows because it lowers the discount factor. The household has to make a credible promise to the lender to work harder to pay off his debt. This
raises his participation in the NREGA programme. Although poor participate more in the programme because of their inability to take recourse to alternative mode of smoothing consumption, we show that it lowers their steady state welfare via the disutility of work. Thus NREGA with a long payment delay certainly disadvantages the poor. If rural households are saddled with higher debt and interest cost consequent on this financialization, it will accentuate the adverse wealth effect. If payment delay increases, his human asset net worth goes down creating an adverse wealth effect which makes the household agent work harder.

If the household worker is financially excluded meaning that he is liquidity constrained without any access to financial market to smooth his consumption, a longer payment delay does not entail any such adverse *wealth effect of reducing the capitalized value of his labour income flows. If the household has outside income option besides NREGA, he will switch to it by participating less in the employment guarantee scheme. In both cases the household suffers welfare loss due to payment delay but the loss of welfare is greater in a scenario of financial inclusion.

Our model explains the empirical regularity that rural worker participate more in NREGA when there is greater payment delay and also greater financial inclusion. This does not necessarily indicate the success of the employment guarantee programme but rather signals deeper problems of lower well being of the poor given that the employment guarantee programme is subject a formidable payment delay.

2 The Model

Consider an economy where the rural household receives a stationary endowment (nonlabour income), $y^i$ each period which is the outside option of not working. The household has a choice either to work for NREGA at a fixed contract wage $w$ or not to work and consume the endowment every period. The labour supply is thus indivisible (say $h_0$). As in Hansen (1985), the household chooses the probability of working ($l^i_t$) for the NREGA.\(^5\) We

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\(^5\) The practical analogue of this probability is the proportion of members of the household working for NREGA. We choose this indivisible labour specification because in the
call $l_i^t$ the NREGA participation. Let the instantaneous utility function be logarithmic, $\ln(c_i^t - \bar{c}) + B \ln(1 - h_i^t)$ where $c_i^t =$consumption at date $t$, $\bar{c} =$ subsistence consumption which is assumed to be higher than nonlabour income $y^i$, $h_i^t =$fraction of hours worked and $B$ is the work disutility parameter. Given the indivisible labour specification, this instantaneous utility function of the household reduces to $\ln(c_i^t - \bar{c}) - Al_i^t$ where $A = B \ln(1 - h_0^t)$. The utility function is thus linear in NREGA participation. There is a $k$-period delay in the wage payment for the NREGA service that the household renders at date $t$ where $k = 1$ means no delay. Household’s labour supply is thus a credit good.

### 2.1 Baseline case of financial exclusion

Consider first a polar extreme case where households live in a state of financial autarky without any access to financial market. Besides NREGA work, the household member’s option to survive is to consume the endowment $y^i$ every period where we assume $y^i > \bar{c}$. Since there is no borrowing-lending, the household is liquidity constrained. The only option of consumption smoothing is to supply labour as a credit good which pays later. Such an autarkic household solves the following optimization problem:

$$Max \sum_{t=0}^{\infty} \beta^t [\ln(c_i^t - \bar{c}) - Al_i^t]$$

s.t.

$$c_i^t \leq y^i + wh_0 l_{i-k+1}^t$$

and

$$0 \leq l_i^t \leq 1$$

Assuming an interior solution, the stationary labour supply and consumption functions are as follows:

$$c^i(k) = \frac{wh_0 \beta^{k-1}}{A} + \bar{c}$$

Data labour force participation is measured in terms of extensive margin. In the appendix, we work out a scenario where households supply labour at an intensive margin.
\[ \hat{v}(k) = \frac{\beta^{k-1}}{A} + \frac{\bar{c} - y^i}{wh_0} \]  

(5)

The adult consumes above his subsistence level by an amount proportional to the present value of delayed wage. A longer payment delay (higher \(k\)) unambiguously lowers labour supply and consumption in this case.\(^6\) The proportionality factor is inversely related to the disutility factor from work. An inordinate increase in \(k\) reduces consumption to the subsistence level \(\bar{c}\). For practical purposes, we assume hereafter that the payment delay \(k\) is bounded above.

### 2.2 Financial Inclusion

Consider now the scenario where households have an access to the credit market to borrow at a riskfree interest rate \(r\). The household maximizes (1) subject to the following constraint:

\[ c^i_t + b^i_t(1 + r) = y^i + wh^i_{t-k+1} + b^i_{t+1} \]  

(6)

and (3). Note that \(b^i_{t+1}\) is the new loans of the household at date \(t\), \(r\) is the interest rate which is assumed to be the same as \((1/\beta) - 1\).\(^7\) Let \(b^i_0\) be initial indebtedness of the household.

The first order condition with respect to labour supply yields the same stationary consumption as (4):

\[ c^i(k) = \left[ \bar{c} + A^{-1}\beta^{k-1}wh^i_0 \right] \]  

(7)

The steady labour supply function is, however, different. we have the foll-

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\(^6\)The invariance of the household’s consumption to its income and asset position reflects the full insurance feature of indivisible labour model with lottery as in Hansen (1985) and Rogerson (1988). The present model has no uncertainty but one can easily add income risk in the model and replicate this full insurance feature. In the context of rural India, this full insurance result may be empirically questionable. One can think of informal risk sharing arrangement among households as a means of such full consumption insurance. The exact mechanism of such risk sharing is beyond the scope of this paper. In the appendix we work out an alternative model with divisible labour which does not have this full consumption insurance feature.

\(^7\)To ensure a steady state, hereafter we assume that the rate of time preference is the same as the rate of interest.
Lemma 1 The steady state labour supply depends on the payment lag and the initial level of indebtedness of the household (and is characterized as:

$$l^i(k) = \frac{(\bar{c} - y^i)}{(1 - \beta)} \frac{\beta(\beta^{-k} - 1)}{wh_0} + \frac{1 - \beta^k}{(1 - \beta)A} + b_0^i \frac{(1 - \beta^k)}{\beta^kwh_0}$$  \(8\)

Proof: Using the flow budget constraint recursively forward from date 0 and using the optimal stationary consumption function (7), one gets (assuming no-Ponzi game condition):

$$-b_0^i\beta^{-1} + \frac{y^i}{1-\beta} + \beta^{k-1}wl(i)h_0 \left[ 1 + \beta^k + \beta^{2k} + \beta^{3k} + .... \infty \right]$$

$$= \left[ \frac{-c + \beta^{k-1}wh_0}{A} \right] \frac{1}{1-\beta}$$

which solves for (8). //

It is straightforward to verify from (8) that as long as \(y^i < \bar{c}\) and \(b_0^i > 0\), the following proposition holds.

Proposition 2 Rural poor participate more in the NREGA programme in response to a longer payment delay.

To see the intuition behind this result first note that the present value of labour income given that there is a payment lag \(k\) is given by:

$$\frac{wl^i(k)h_0}{(1+r)^{k-1}} \left[ 1 + \frac{1}{(1+r)^k} + \frac{1}{(1+r)^{2k}} + \frac{1}{(1+r)^{3k}} + .... \infty \right]$$

A longer payment lag \((k)\) means that the present value of this wage income flows is lower. If leisure is a normal good, the household would wish to cut

\(^8\)Alternative paths of labour supply can also be equilibrium. However, we only focus on a steady state path of \(l^i\).
back leisure time. Since labour supply is indivisible, this basically means that the household would attach higher probability (\(l(k)\)) to work. This explains why labour supply rises.

The key result that households supply more labour in response to a longer payment delay is robust when the household chooses labour at an intensive margin. The appendix works out the case of a divisible labour supply economy.

### 2.3 Welfare effects of an increase in payment lag

We now show that in both financial scenarios (exclusion and inclusion) the steady state welfare is lower in response to a longer payment delay. In case of financial exclusion, the steady state welfare as a function of payment lag (denoted as \(W^a(k)\)) is given by:

\[
W^{i,a}(k) = \frac{1}{1 - \beta}([(k-1) \ln \beta - \beta^k - 1] + \frac{1}{1 - \beta} [\ln (wh_0 A^{-1}) - A(\bar{c} - y^i)(wh_0)^{-1}]),
\]

which implies that

\[
W^{i,a}(k) = \frac{\ln \beta}{1 - \beta} [1 - \beta^k - 1]
\]

which is unambiguously negative.

In a state of financial inclusion, similar calculation yields the steady state welfare:

\[
W^{i,a}(k) = \frac{\ln \beta}{1 - \beta} [1 - \beta^k - 1]
\]

In this case the household does not suffer this adverse wealth effect because household does not capitalize labour income.

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9 It is straightforward to work out the solution of no payment delay when \(k = 1\) which are as follows:

\[
\begin{align*}
\bar{c}^i &= \bar{c} + A^{-1} wh_0 \\
\bar{t}^i &= \frac{\bar{c} - y^i}{wh_0} + \frac{1}{A} + \frac{r b_i}{wh_0}
\end{align*}
\]

In this case the household does not suffer this adverse wealth effect because household does not capitalize labour income.

10 Similar reasoning applies to understand why households with low income \((y^i)\) participate more in NREGS.

11 To get (9) plug consumption and labour supply functions, (4) and (5) into the expected utility function (1).
welfare as a function of payment lag \( k \) which we call \( W^i(k) \) as follows\(^{12}\):

\[
W^i(k) = \frac{1}{1 - \beta} \left[ \ln(A^{-1}wh_0) + (k - 1) \ln \beta - A\tilde{l}^i(k) \right]
\]  

(10)

The comparative statics effect of a change in \( k \) on the lifetime welfare of the household is:

\[
W_{i}^\tau(k) = \frac{1}{1 - \beta} \left[ \ln \beta - A\tilde{l}^{\tau}(k) \right]
\]

Since \( l^{\tau}(k) > 0 \) for the poor with a below subsistence income (from proposition 2), \( W_{i}^{\tau}(k) \) is unambiguously negative. The payment delay thus unambiguously lowers welfare in both states of financial inclusion and exclusion. However, the decline in welfare is sharper in case of financial inclusion as seen in Figure 4 which compares the steady state welfare of the poor in these two financial states. In order to have the same yardstick of comparison, we set \( b_0 = 0 \) for both financially included and excluded households. In a state of financial inclusion, the sharp decline in welfare due to longer payment lag happens primarily because labour as a credit good falls in its net worth when the payment delay is longer and the household has to compensate this by working significantly harder. On the other hand, no such negative wealth effect works in a state of financial autarky. The household cuts labour supply which partly compensates the welfare loss but the net welfare still goes down due to a greater reduction in consumption.\(^{13}\)

\(^{12}\)To obtain (10), plugging (7) and (8) into (1).

\(^{13}\)We set the parameters as follows: \( \beta = 0.93, w=1000, \bar{c} = 1, y = 1.2, A=100, h_0 = 0.5 \). These parameters are fixed to get an interior solution for the labour supply within the \((0,1)\) interval. The direction of comparative statics reported in Figures 4 through 7 are robust to alternative choices of parameter values.
To sum up: our model predicts that in a state of financial inclusion the household supplies more labour in response to a longer payment delay as opposed to a state of financial exclusion. In both financial states they suffer welfare loss due to a longer payment lag while the loss is far greater in a state of financial inclusion. The upshot is that the two flagship programmes of development, financialization and employment guarantee schemes together could increase the hardship of the rural poor if the formidable friction of a payment delay exists.

2.4 Debt, NREGA participation and welfare

Given that the a programme of financial inclusion is in place, how does a higher initial debt and interest burden affect the rural poor? Figure 4 plots the relationship between payment delay and the NREGA participation for alternative debt levels. Faced with higher debt, households progressively participate more in NREGA. Figure 5 plots the corresponding steady state welfare which shows that households with greater debt suffer a steeper decline in welfare due to a longer payment delay.
Figures 6 and 7 plot the same relationships for two different interest rates. Higher interest rate by raising the adult’s debt retirement cost raises the labour supply and lowers his steady state welfare. This happens progressively more for longer payment lag because the annuity value of wage payment goes down more sharply as the payment lag increases. Thus a financialization that increases the debt and interest cost of the rural poor
promotes NREGA participation, but hurts the poor if payment lags are longer. No such adverse effect arises if payment lag is eliminated ($k = 1$).

The upshot is that in a state of financial inclusion, a higher debt and higher interest burden could make the poor participate even more in the
employment guarantee programme in response to a payment delay. Poor would suffer an accelerated welfare loss as payment delay rises.

3 Conclusion

The payment delay is deemed to be a serious bottleneck for the success of the flagship employment guarantee programme (NREGA) in India. We find that the NREGA participation actually responds positively to such a payment lag. This may misleadingly suggest that payment lag is not posing a threat to the efficacy of the work guarantee programme in India. We demonstrate in terms of a stylized life cycle model that even if asset poor households work harder in response to such a payment delay, it defeats the very objective of the NREGA programme. The rural poor are worse off in terms of welfare because they work harder to mitigate the adverse wealth effect that a payment lag inflicts on them. A programme of financial inclusion when a payment delay in the NREGA programme is present makes the lot of the rural poor even worse by compounding the adverse wealth effect. The policy recommendation is the immediate reduction of the payment lag before implementing the financialization programme.

4 Appendix

4.1 Case of a divisible labour economy

The household solves the following maximization problem.

\[
Max \sum_{t=0}^{\infty} \beta^t [\ln(c^t_i - \bar{c}) + B \ln(1 - h^t_i)]
\]  \hspace{1cm} (11)

s.t.

\[
c^t_i + b^t_i (1 + r) = y^t_i + wh^t_{i-k+1} + b^t_{i+1}
\]  \hspace{1cm} (12)

where \( h^t_i \) is labour hours which is a choice variable because the household now makes a choice of labour at the intensive margin.

Given the steady state assumption that \( \beta(1 + r) = 1 \), it is easy to ver-
ify from the Euler equation that the steady state consumption and labour supply depend only on the payment lag $k$ and is subject to the following restriction:

$$c^i(k) = \bar{c} + \beta^{k-1}B^{-1}w(1 - h^i(k))$$

(13)

which upon substitution in the lifetime budget constraint of the household with no-Ponzi game condition yields:

$$h^i(k) = \frac{(\bar{c} - y^i + \beta^0) + w}{w[1 + (1 - \beta)\{\frac{1}{1-\beta}\}] - \beta^k}$$

(14)

By inspection of (14) it is easy to verify that if $\bar{c} - y^i > 0$ and $b^0_0 > 0$, the numerator is rising in $k$. The denominator is falling in $k$. Thus $h^i(k)$ is unambiguously increasing in $k$ for poor indebted households. Thus greater payment delay increases labour supply.

Substitution of (13) in (14) yields the optimal consumption policy. Unlike the indivisible labour supply model, the consumption is not invariant to income. Since $h^i(k)$ is increasing in $k$, $c^i(k)$ is decreasing in $k$. Thus the steady state welfare is decreasing in $k$.

References


