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Can public works increase equilibrium wages? Evidence from India's National Rural Employment Guarantee

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ABSTRACT

We estimate the impact of the world's largest public works program, India's National Rural Employment Guarantee Scheme (NREGS), on agricultural wages. NREGS was rolled out across India in three distinct phases, and this phased introduction is used to identify difference-in-difference estimates of the program effect. Using monthly data on wage rates from the period 2000–2011 in 209 districts across 18 Indian states, we include district-specific fixed effects and trends to control for differences in wage rates in the absence of the program. We find that, on average, the program boosted the growth rate of real daily agricultural wages by 4.3% per year. The effect of the scheme is more consistent with an increase in the growth rate of wages than with a discontinuous jump in wages. The effect was concentrated in some states and in the agricultural peak season, appears to have been gender-neutral and was biased towards unskilled labor. Since many of the world's poorest depend on casual agricultural labor for their livelihood, while at the same time minimum-wage legislation is unlikely to be effective in many developing countries, we argue that rural public employment programs constitute a potentially important anti-poverty policy tool.

1. Introduction

Seventy per cent of the world's 1.4 billion extremely poor live in rural areas (International Fund for Agricultural Development, 2011). Some of them till their own land, but at the bottom of the pyramid are landless laborers who subsist on casual agricultural wage labor (International Labour Organization, 1996). Direct transfers aside, policies that can put upward pressure on agricultural day wages are therefore likely to be one of the most effective ways of improving the welfare of the poorest people on the planet.[1]

Implementing minimum wage legislation is unrealistic in most developing countries, but public employment programs can be a useful tool for increasing labor demand. It has long been hypothesized that this increase in demand for labor may, if large enough, push wages up through a general equilibrium effect. If so, the welfare effects of public employment schemes could reach well beyond the people who are directly employed by them.[2]

This paper looks at a large-scale public employment program—the Indian government's National Rural Employment Guarantee S cheme (NREGS)—and analyses its impact on agricultural wages. Using a decade's worth (2000–2011) of monthly data on agricultural wages for a panel of over 200 Indian districts, we find that, on average, NREGS boosted the real daily agricultural wage rate in India by 4.3% per year. A key contribution of the paper is the use of monthly observations of wages, allowing us to undertake analysis that would not be possible with less frequent observations. The key findings suggest that the introduction of NREGS in an average district caused an increase in the growth rate of wages in the district, as opposed to a one-off step increase — a gradual increase rather than a jump. This is consistent with the notion that the program gradually increased in intensity once launched. While the impact on the growth rate of agricultural wages is unlikely to

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[1] A large literature confirms the negative association between agricultural wages and poverty rates (Deaton & Drèze, 2002; Eswaran, Kotwal, Ramaswami, & Wadhwa, 2009; Kijima & Lanjouw, 2005; Lanjouw & Murgai, 2009).

[2] However, this would not be a Pareto improvement: increases in wage rates correspond to higher input prices for employers. But given that agricultural employers are almost invariably better off than the landless, and also fewer in number, this may be an acceptable trade-off.

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continue indefinitely, we do not find evidence that it had diminished by the end of our time series, three years after its introduction in all of India's rural districts.

The idea of tying welfare benefits to work requirements goes back at least as far as pre-revolutionary France, where the poor could receive alms in return for work at 'charity workshops'. The English Poor Law of 1834 required the poor to live in 'workhouses' in order to receive welfare (Himmelfarb, 1984). British colonial administrators in India frequently used public works to deliver famine relief (Drèze, 1990). Katz (1996) discusses work requirements to access welfare in the United States in the 19th and early 20th century. In Germany, public works were used in the 1930s to alleviate unemployment and build inter-city highways—many of which are still in use today. The term 'workfare' was coined in the United States in the late 1960s to describe the idea of social benefits tied to work requirements. Public works have diminished in importance in rich countries, but they are still widespread in the developing world. Subbarao (2003) provides an overview of contemporary public employment programs in Asia and Africa.

Despite the long history of public employment programs, academics and policymakers continue to debate their effect on the poor and on wider society. Theory suggests[3] that public works have three potential effects on welfare: a *direct effect* on those employed in the works; a *labor market effect* related to the shift in labor demand; and a *productivity effect* related to the investment in public goods produced under the scheme. The labor market effect would include, but need not be limited to, an increase in wages.[4] It is also conceivable that the public goods created under the scheme could have a direct effect on welfare in addition to the possible increase in labor productivity.

Note that with our data, we are unable to distinguish empirically between the *labor market* and *productivity* mechanisms, but our general impression of the reality of NREGS aligns with that of the World Bank (2011), who write that 'the objective of asset creation runs a very distant second to the primary objective of employment generation.'[5]

India and NREGS provide a good context in which to study the impact of public employment programs on wages. First, NREGS is an enormous program by any standard and is therefore of considerable interest in itself. In the financial year 2010–11, it generated 2.6 *billion* person-days of employment. Evaluations of pilot schemes are often criticized on the basis that the observed effects may not be scalable. That critique certainly does not apply here, and any lessons learnt should be of broad interest. Second, empirical studies of the wage effects of public works programs are rare in part because of a scarcity of reliable wage data. The availability of good wage data at a disaggregated regional and temporal level is a great advantage of studying the Indian context. Third, the scheme was introduced in 2006 and extended to all of India (except disputed and wholly urban areas) in 2008 in three distinct phases. The phased rollout allows us to use difference-in-difference estimation as our identification strategy. In other words, the districts in which NREGS was already present, or not yet present, provide information on contemporaneous non-NREGS wage increases, so that the estimated effect attributed to NREGS is net of other trends. Fourth, India is a large and diverse country. The federal structure provides ample empirical variation, while also making internal validity easier to defend than for cross-country studies.

The paper makes two key contributions. First, it estimates the effect of a large employment program on wages in a developing country. There are several theoretical studies analyzing these issues, but empirical tests of these theories in a developing country context are still rare. Second, our dataset allows us to test for heterogeneous effects across regions, seasons, skill category and gender, while allowing for district-specific trends in wage rates to address endogeneity concerns.

Our main findings are as follows: NREGS increased the growth rate of agricultural wages by 4.3% per year in the average district in the first few years after its introduction. The effect does not appear to have diminished by mid-2011. The effect is strongest in states that are traditionally strong in the implementation of social programs and in states that have previously been identified as 'star performers' in NREGS implementation. The effect appears to be concentrated in the main agricultural season in India, that is, in the second half of the calendar year, when agricultural labor is relatively scarce. The scheme mainly affects wages for unskilled as opposed to skilled labor. There is no discernible difference in the effect on men's and women's wages. The effect is positive and significant across districts in all three phases of implementation.

Our paper relates to the theoretical literature on rural public works, targeting and workfare. The theoretical contributions of Akerlof (1978) and Nichols and Zeckhauser (1982) highlight the targeting benefits of attaching work requirements to welfare.[6] Besley and Coate (1992) emphasize the screening benefits of workfare in both developed and developing countries.[7] They argue that work requirements make it easier for the government to screen individuals and assess their circumstances on a case-by-case basis. The situation is, however, more complex in developing countries, as it is often difficult to judge the earning potential of welfare applicants. Besley and Coate present the optimal workfare program for screening purposes and derive a sufficient condition for this to be cheaper than cash benefits. More recently, Basu et al. (2009) and Basu (2013) show theoretically that workfare programs can benefit the poor through efficiency gains in an agricultural labor market characterized by distortions such as labor tying and employer monopsony.

The empirical literature on public works and agricultural wages is growing. Ravallion, Datt, and Chaudhuri (1993) and Gaiha (1997) study the Maharashtra Employment Guarantee (MEG) which was operational in the Indian state of Maharashtra from 1970 until it was superseded by NREGS. They authors study the impact of an official wage increase in 1988 on MEG employment and conclude that there is 'little sign in these data of anything more than a slight impact of changes in the [MEG] wage on agricultural wages in either the short run or the long run.' Gaiha (1997) examines the impact of MEG on agricultural wages using monthly data. He finds a positive effect of MEG on agricultural wages in Maharashtra. Our study differs from these in that we look at a nationwide program and use monthly and district level data from 18 states. Our identification strategy also differs in that we exploit the phased rollout of NREGS to compute a difference-in-difference type estimator.

There are now a number of studies that relate specifically to NREGS. Mann and Pande (2012) provide an overview of published and unpublished work up to 2012. Drèze and Oldiges (2011) examine the implementation of NREGS using administrative data. Using household data from three Indian states, Jha, Bhattacharyya, and Gaiha (2011) analyze the nutritional impact of NREGS wage, non-NREGS income, and Public Distribution System (PDS) participation. Dutta, Murgai, Ravallion, and van de Walle (2012) use 2009–10 NSS data to show that there is much unmet demand for NREGS

[3] See Ravallion (1990) for a theoretical discussion on the effects of public works on welfare.

[4] NREGS can benefit the poor through efficiency gains in an agricultural labour market characterised by distortions such as monopsony power of the employers (Basu, Chau, & Kanbur, 2009) or labour-tying (Basu, 2013).

[5] However, Ranaware, Das, Kulkarni, and Narayanan (2015) find in a survey that 90% of users of works produced under NREGS consider them useful.

[6] van de Walle (1998) presents a review of the literature on targeting. Besley and Kanbur (1993) also discuss the merits of targeting in welfare projects.

[7] They also emphasise the deterrence argument, whereby workfare might encourage poverty-reducing investment by the poor.