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Body Mass Index, participation, duration of work and earnings under the National Rural Employment Guarantee Scheme: Evidence from Rajasthan☆

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ABSTRACT

Despite its evident importance relatively little is known about links between Body Mass Index (BMI) and participation in workfare programs, particularly in India. Using a unique data set for the Indian state of Rajasthan for 2009–10, this paper attempts to fill this void and examines the association between BMI and participation in, duration of employment in and earnings from employment in NREGS. Thus we go beyond the scope of the extant literature and model these links for both male and female workers with varied social and economic backgrounds. Further, we permit non-linearities in some impacts and allow for mutual endogenity, say, between BMI and earnings. The policy implications of a mix of piece and daily wage rates under NREGS, a combination of NREGS and food subsidy, and the mix of food subsidised are elaborated.

1. Introduction and motivation

It has long been recognized that a worker's health and nutritional status are, ceteris paribus, fundamental determinants of their labour market performance. This includes extent of participation in labour markets and wages earned.

The effect of nutritional intake on labour productivity and wage rates has been an important area of research for health economists and nutritionists for some time. This found initial expression in the form of the efficiency wage hypothesis developed by Leibenstein (1957) and Mazumdar (1959), and formalized and extended by Mirrlees (1975), Dasgupta and Ray (1986, 1987), and Dasgupta (1993, 1997, 2009), among others. Early surveys include Bliss and Stern (1978a, 1978b) and Binswanger and Rosenzweig (1984). The efficiency wage hypothesis postulated that in developing countries, particularly at low levels of nutrition, workers are physically incapable of doing hard manual labour. Hence their productivity is low which

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then implies that they get low wages, have low purchasing power and, therefore, low levels of nutrition, completing a vicious cycle of deprivation. These workers are unable to save very much so their assets — both physical and human — are minimal. This reduces their chances of escaping the poverty-nutrition trap (henceforth PNT).

Dasgupta (1997) distinguishes between current and past nutritional status. Generally, height (weight) is used as an index of past (current) nutritional status. However, an entire range of body weights and compositions (associated with physical activities) can be consistent with good health. Moreover, weight is not a useful index unless it is normalized by height. Hence a widely used measure is the Body Mass Index (BMI), defined as the ratio of a person's weight (w) to the square of his height (h), or, in other words (w/h^2). In adults, BMI has been found to be an index of both the principal stores of energy (i.e., fats) and the active tissue mass. As an approximation, BMI is independent of height. This renders it a good measure of adult nutritional status and, more generally, of health.[1]

Empirical literature has investigated the links between current nutritional status and productivity. Strong effects of weight-for-height on both productivity and wages were reported among agricultural workers in South India by Deolalikar (1988). The elasticity of farm output with respect to weight-for-height was approximately 2, and the elasticity of wages in the range 0.3–0.7, the lower value reflecting the effect in peak seasons, and the higher value reflecting the effect in slack seasons, given the different tasks. Thomas and Strauss (1997) found that BMI is positively correlated with wages in the case of Brazilian workers.[2]

Dasgupta (1997) draws attention to two major limitations of empirical investigations of the links between current nutritional status and productivity. One is failure to address causality: it could be that higher wages enable workers to eat more and thus have higher BMI. Secondly, none explores 'non-market' work; for example, the effects of undernutrition on women's productivity inside the home are not analysed. Dasgupta and Ray (1986, 1987) and Dasgupta (1993, 1997, 2009) offer insights into undernutrition determining employment and wages. See also Jha, Gaiha, and Sharma (2009). The present paper also establishes the links between BMI and participation in a national public works program, National Rural Employment Guarantee Scheme (henceforth NREGS), duration of participation and wages earned, based mostly on a piece-rate system.

Baland, Dreze, and Leruth (1999) advance three reasons for the co-existence of piece-rate contracts and daily wage contracts. First, piece-rate contracts are superior to daily-wage contracts, because they are mutually beneficial as workers are freed to choose their own pace of work which obviates the need for supervision. Second, piece-rate contracts are 'supplementary contracts', which exist with daily-wage contracts because the former may involve a cost to the employer in terms of task quality. Third, piece-rate contracts are 'substitute contracts', when wages are rigid and there is involuntary unemployment of daily-wage labour. So they are a second-best employment option for workers who are unable to find work on a daily-wage basis.

Baland et al. (1999) observe that when daily-wage and piece-rate contracts are simultaneously offered, the set of workers who work for daily wages is generally convex in the space of abilities, i.e., those who work on piece-rate contracts consist of those workers who are more able than all daily-wageworkers, or less able than all daily-wage workers. The former prefer piece-rate contracts because these enable them to work and earn more, i.e., the piece-rate contracts give them an opportunity to take full advantage of their high working ability. Low-ability workers prefer piece-rate contracts because they find the pace of work on daily-wage contracts too stressful. Among workers working on piece-rate contracts, the number of tasks performed increases monotonically with working ability. So, if higher earnings lead to better nutrition which then translates into higher productivity, it is arguable that piece-rate wages conform to efficiency wages.

This paper is the first to address the critical issues of the role of BMI in influencing participation in NREGS programs, determination of hours worked and wages earned. We use a unique household data set collected by us for the Indian state of Rajasthan, The paper is organized as follows. Section 2 discusses salient features of the NREGS. Section 3 discusses methodology. Section 4 discusses sample design, data collected, and key descriptive statistics. Section 5 comments on the principal results. Section 6 concludes from a broad policy perspective.

2. Salient features of NREGS program

India has a long history of direct and targeted interventions to fight poverty through workfare schemes, subsidised food, farm-input and credit scheme subsidies. The National Rural Employment Guarantee ACT (NREGA) of 2005 is the most recent

[1] A World Health Organization expert consultation in 2002 (WHO, 2004) addressed the debate about interpretation of recommended body-mass index (BMI) cut-off points for determining overweight and obesity in Asian populations, and considered whether population-specific cut-off points for BMI are necessary. They agreed that Asian populations have different associations between BMI, percentage of body fat, and health risks than do European populations. However, available data do not necessarily indicate a clear BMI cut-off point for all Asians for overweight or obesity. No attempt was made, therefore, to redefine cut-off points for each population separately. The consultation also agreed that the WHO BMI cut-off points should be retained as international classifications (The Lancet, 2004). Another study (Burkhauser and Cawley, 2008) is, however, emphatic that BMI is seriously flawed as it does not distinguish fat from fat-free mass such as muscle and bone. They find that many important patterns, such as who is classified as obese, group rates of obesity, and correlations of obesity with various outcomes, are all sensitive to measures of fatness and obesity used. So, although ranges of BMI differ slightly for classification of populations into underweight, overweight and obese, as reported in the WHO consultation, the conventional ranges continues to be widely used.

[2] Other important contributions focusing on the links between BMI and wages include Black, Devereux, and Salvanes (2007), Han, Norton, and Stearns (2009), Greve (2007) and Cawley (2000).