

# Public sector pay and private sector wage premiums: testing alternative models of wage determination\*

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**Abstract:** The paper focuses on a labour market dominated by a public sector where the links between pay and effort are weak, as in many developing countries. This feature is incorporated in an extension of the basic Shapiro-Stiglitz model of shirking in order to explain the co-existence of high wages (in both private and public sectors) and high unemployment. Using data from panel surveys of households and of manufacturing firms, the empirical test attempts to identify why firms in the private sector do not bid down wages but offer a premium over the reservation wage of the marginal worker. The robustness of the premium is tested by controlling for the heterogeneity of workers, and the dispersion in wage offers and reservation wages of workers relative to the marginal worker. The premium appears to be driven by efficiency wage considerations rather than alternatives such as bargaining models and specific investments in workers.

**Keywords:** reservation wages, efficiency wages, matched employee-employer survey, panel data.

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## 1. Introduction

The consensus on why wage levels in urban labour markets are often high is that it reflects government wage policy, which in many countries sets urban wages at an artificially high level. In some countries and in some periods, trade unions might play a role - but the blame for “too high” wages is usually firmly assigned to public sector hiring and wage policies combined with urban bias in pricing of basic consumption goods, that inflate wages well above productivity and labour costs.

However, there is little reason to believe that government pay policies by themselves should have any direct effect on wage determination in a competitive private sector, in the absence of attempts to overtly influence private sector pay. Of course, government employment policy might crowd out particular categories of skilled labour and hence affect wage-setting for such workers. In fact, as long as labour demand in the private sector is determined by the value of marginal product, the effect of government pay policies is to affect the supply of labour to the private sector. There is no reason, however, in these circumstances, to believe that the private sector will pay a premium over the reservation wage of the marginal worker, even if the public sector does so (see Lindauer, 1991). Therefore, if the private sector is observed paying a premium over the reservation wage in the absence of trade union or overt government pressure, an alternative explanation for the payment of premiums must be offered. This paper focuses on the case of Ethiopia which has a dominant public sector offering relatively high levels of pay (Taye, 1998, 1999). The private sector in Ethiopia is still rather small in comparison, but there is little evidence that it is over-regulated or that pressure is applied to keep wages high. Nevertheless, the descriptive statistics indicate that despite rates of unemployment as high as 30% and a period of inflation, real wages in the private sector did not budge and were significantly above reported reservation wages. In the circumstances, the existence of such premiums deserve investigation.

Why might wage premiums be observed in the private sector? In the absence of regulation or union pressure on wages, there are a number of different models consistent with the existence of such premiums. First, in a standard competitive model, wage premiums are likely to be observed if workers differ in their reservation wages or in ability (observable only to the employer), thus creating dispersion in the offered wage. In any empirical analysis, introducing controls for such differences should therefore eliminate evidence of a premium. The relatively higher risk aversion of workers might also induce premiums, if firms keep wages stable despite changing labour market conditions in order to protect workers against fluctuations in income.

Alternative models of wage determination that rely on the bargaining power of workers or the threat of union formation would also predict wage premiums. The existence of specific investments and turnover costs might afford rents to continuing in employment and might be the object of a bargain between employer and employee (Malcolmson, 1999). In such circumstances, rents should only be available to those with some experience on the job - first-time workers should not receive them. (This is also likely to be true for search and matching models that assume that it is costly to search and obtain the best employer-employee match since, if matches can only be assessed after a period, first-time workers are unlikely to be rewarded in advance.)

The previous models are concerned mainly with recruitment and retention of workers. Models concerned with the motivation of workers to exert themselves on the job also predict premiums

but for different reasons. Models of efficiency wages such as that of Shapiro and Stiglitz (1984) predict that firms are likely to pay a premium over the reservation wage since they are unable to verify effort on the job without costly monitoring. Workers exert effort since if they do not and are found out, will lose that premium. The existence of wage premiums above the reservation wage of the marginal worker also implies that the labour market does not clear and the consequent unemployment acts to discipline workers. Other models of efficiency wages such as Akerlof's gift-exchange model (1982) provides a justification for wage premiums by hypothesising that a rise in relative wages results in workers reciprocating with increased effort if wage premiums engender loyalty and gratitude.

While there are many explanations for the existence of wage premiums, explaining persistently high rates of unemployment together with unyieldingly high levels of wages is more difficult. Arguably, explanations based on efficiency wage payments offer a coherent and persuasive account of why this might be so. In particular, they may matter in labour markets dominated by a large public sector<sup>2</sup>, where there is more than a suspicion that with a relatively large, rather inefficient public sector, the link between effort and pay (in wages or in other forms of rewards, such as privileges) is weak, which may affect private sector labour market functioning. Of course, while a large public sector might be unable to monitor the effort of its employees, it does not follow that the private sector must be similarly afflicted - but it is plausible that the problem of shirking might be infectious. In what follows, I lay out a standard market-clearing model of labour allocation, extended to account for a public sector where wages are set institutionally and a private sector where wage premiums are driven by the inability of employers to observe effort as in the Shapiro-Stiglitz model of shirking. This is contrasted with a simple model of rent-sharing where wages are determined by some bargain between workers and employers.

I use data on a sample of urban households in Ethiopia, surveyed twice in 1994 and 1997. The high rates of unemployment observed here<sup>3</sup> need not necessarily suggest that the private sector pays a wage premium or that unemployment is largely involuntary. In particular, the hiring policies of the public sector until 1992 might have served to increase 'wait' unemployment: hiring was largely from the ranks of the unemployed. Over 80% of the unemployed claim to be supported by their family - only 15% admit taking up an occasional job in order to support themselves. This would suggest that they are able to endure some length of time in unemployment, while queueing for work. It also sits comfortably in a world where graduates of tertiary education were guaranteed employment in the public sector and secondary-school leavers

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<sup>2</sup>The public sector remains the largest urban employer in most African countries even if its importance has diminished over the last decade: African central governments employed about 1.1% of the population in the 1990s compared with over 1.8% in the 1980s. However, less than 20% of the population is urban, so this means a larger share as a percentage of the urban labour force. The fiscal weight of the central government wage bill is one of the highest for Sub-Saharan Africa at 6.7% of GDP compared to 5.4% worldwide. When measured as a multiple of per-capita GDP, the wage is 5.7 times per-capita GDP. (see Stevenson (1992) and Schiavo-Campo et al (1997)).

<sup>3</sup>Unemployment rates have remained high over the last decade. The reforms of the economy undertaken since a new government took power in 1992 have had little effect on unemployment. Some of this persistence in unemployment might be attributed to the fact that the private sector (and self-employment) were repressed under the previous government of the Derg and the main source of employment lay in the public sector. It is unlikely that the high rates of unemployment are caused by in-migration for Ethiopia has one of the lowest rates of rural-urban migration in Africa; in part, due to the land reforms undertaken in rural areas and the fact that there are only user rights in land, so that migration would mean abandoning the claim to land.

given some assurance that work would eventually be found for them. However, this policy was dramatically changed in 1993 when the new government undertook a programme of structural adjustment - and expectations about employment ought to have changed with it. One would expect the unemployed to enter some form of informal employment (as in other developing countries) in such circumstances. However, recent evidence (both anecdotal and derived from urban surveys and the Census), suggests that petty self-employment is increasing but the unemployed do not appear to be taking this up: the new entrants into this sector are mainly students and housewives. In a country that is one of the poorest in the world and where the incentives to finding some work (even in relatively better-off households) would appear to be strong, it is odd to see such high rates of urban unemployment. It is also inconsonant with wages in the private sector being maintained at par with public sector wages - one would expect wages in the private sector to be bid down by the unemployed.

In what follows, I allow that unemployment might still be motivated by expectations of employment in the public sector, compounded by the inability (or reluctance) of the unemployed to enter informal or self-employment. Wage premiums in the private sector labour market will in part explain high unemployment without ruling out other explanations<sup>4</sup> - and in what follows I explore the reasons for the existence of such premiums. It ought to be noted immediately that the test is weighted against finding evidence of a premium: if the high urban unemployment is caused mainly by a combination of queueing for public sector work and the inability to enter informal employment, it ought to be a sufficiently stern disciplining device and there should be little reason for the private sector to pay a premium.

The empirical approach taken here differs from other empirical tests in that it focuses primarily on data on households rather than on firms. Data on firms has always seemed the more natural testing ground; however, the tests are bedevilled by the problem of distinguishing whether more profitable firms pay their employees high wages as a form of rent-sharing or whether more productive workers, who are paid to exert themselves, raise the profits of<sup>5</sup> firms. However, the test on household-level data is backed up by data using a sample of 220 private and public firms in the manufacturing sector. Firms were surveyed over the same period, 1994 and 1995 and were asked about the manner in which they attempted to encourage effort from workers. There is also evidence from a survey of workers in each firm surveyed. I deploy evidence from both firms and households in order to investigate the determinants of wage determination in the private sector.

The next section provides the theoretical framework used to organise the empirical tests followed by a summary of the data in Section 3. Section 4 sets out the econometric model and the results. Section 5 concludes the paper.

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<sup>4</sup>I assume that other factor markets clear, or more simply, abstract from problems in labour demand caused by spillovers from other factor markets. This may be a strong assumption: investment in private sector activities appears very slow and sluggish, despite recent measures to improve incentives to invest with structural adjustment. However, given non-convexities in production possibilities, private sector labour market adjustment may be too slow to absorb the increased number of unemployed in particular skill categories, resulting in high levels of involuntary unemployment.

<sup>5</sup>Manning and Thomas (1997), point out that most of the tests thus far are unpersuasive precisely because it is difficult to discriminate between efficiency wage explanations and alternatives such as rent-sharing or competitive compensating wage differential models. They also argue that there are few direct tests of efficiency wage models and most tests seem to suggest that incentives matter in wage setting but not much more.

## 2. Unemployment and job allocation

I describe a model of labour force allocation, taking into account the existence of a public sector that pegs wages at a relatively high level, while the private sector offers market wages. I model this in two stages, in order to make explicit the difference in empirical prediction of a standard market clearing model of wage determination and that in which a wage premium is offered. The model is based on that of Boadway et al (1990).

The simple model of allocation describes a world in which offers of employment are made to the unemployed and those engaged in job search while in the private sector. This is extended to account for the possibility that the private sector pays an efficiency wage to encourage workers to exert themselves on the job - and the predictions here are compared with that of a simple rent-sharing model. I assume that public sector workers do not look for other employment. As will be demonstrated in the next section where the aspirations of the unemployed are described, this is consonant with behaviour in the labour market in Ethiopia.

To model the problem at hand, I begin by describing a traditional model of job allocation, with three sectors: a private sector employing  $L_1$  workers and a public sector employing  $L_2$  workers and the remainder unemployed out of a labour force  $N$ . The workers are assumed to be identical as are the firms in the private sector. The model is set in continuous time, denoted by  $t$ . Instantaneous utility is assumed linear in income, i.e.  $u(y(t))=y(t)$ . I assume that the worker seeks to maximize the expected present value of instantaneous utility, discounted over an infinite horizon, at a rate  $r$ , i.e.

$$V = E \int_0^{\infty} y(t) \exp(-rt) dt \quad (1)$$

Income  $y$  can be derived from different sources. Individuals receive an income of  $b$  while unemployed. Job offers in each sector  $i$ , are denoted by the wage rate,  $w_i$ ,  $i = 1,2$ , where sector 1 is the private sector and sector 2 the public sector. Offers arrive with constant probability in each period<sup>6</sup>.

The model describes the situation of the unemployed in an unchanging environment. Job offers arrive at the rate of  $\Pi_1$  from the private sector and  $\Pi_2$  from the public sector while those in the private sector receive offers from the public sector at rate  $\Pi_p$ . Workers also leave work for unemployment at an exogenously given rate of  $q_1$  for private sector workers and  $q_2$  for public sector workers. To derive optimal solutions to the decision problem for being in each sector, consider the present values over a short interval of time  $[0,t]$ . Let  $V_U$ ,  $V_1$ , and  $V_2$  denote respectively, the present value of someone currently unemployed, a private sector worker and a public sector worker. Since  $\exp(-rt) \approx 1 - rt$  and since over this interval there is a probability  $q_1 t$  ( $q_2 t$ ) that private (public) sector workers would lose their jobs, it follows that:

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<sup>6</sup>Typically, further assumptions are made on the nature of offer distribution. In particular, it is usually assumed that offers are received according to a Poisson process (Devine and Kiefer, 1996). This assumption ensures that the model has a simple stationary structure.

$$V_1 = w_1 t + (1-rt)[q_1 t V_U + (1-q_1 t - \Pi_p t)V_1 + \Pi_p t V_2] \quad (2)$$

Note that (4) assumes that workers take the first job offered (as in Boadway et al. (1990)). This follows if the expected lifetime utility  $V_u$  above is larger than that gained from accepting jobs

$$V_2 = w_2 t + (1-rt)[q_2 t V_U + (1-q_2 t)V_2] \quad (3)$$

$$V_U = bt + (1-rt)[\Pi_1 t V_1 + \Pi_2 t V_2 + (1-\Pi_1 t - \Pi_2 t)V_U] \quad (4)$$

only in either the public or private sectors<sup>7</sup>. Note also that (4) assumes that only worthwhile offers are given to the unemployed (or alternatively, are used in their valuation). Taking  $V_U$  as given and taking limits as  $t \rightarrow 0$ , equations (2), (3), (4) for  $V_1$ ,  $V_2$  and  $V_U$  are solved as:

$$rV_1 = w_1 + q_1(V_U - V_1) + \Pi_p(V_2 - V_1) \quad (5)$$

$$rV_2 = w_2 + q_2(V_U - V_2) \quad (6)$$

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<sup>7</sup>The possibility of self-employment could be introduced in a simple fashion by assuming that the unemployed can always take up self-employment - and will do so if the expected lifetime utility  $V_3$  of being self-employed is higher than  $V_u$  but this will not affect the analysis here. However, given that entry into self-employment might be determined by quite different considerations from that of wage work, and that the data reveal that there is no movement between self-employment and wage-work, I confine myself to examining the behaviour of those looking for wage work.

These equations can be interpreted as asset equilibrium equations: the return from being in a particular state ('the interest rate times the asset') equals the income earned from the state in each  $t$  and the expected capital gain or loss. They must be valid for each individual.

Workers are only observed in jobs if it is worth their while and so the participation constraint has to be satisfied. This means that for someone observed working,  $V_1 \geq V_U$  (private sector) or  $V_2 \geq$

$$rV_U = b + \Pi_1(V_1 - V_U) + \Pi_2(V_2 - V_U) \quad (7)$$

$V_U$  (public sector) has to hold. I treat  $b$ , and  $w_2$  as given and assume that the private sector labour market clears. Consequently, equilibrium in the private sector labour market will imply that for the (marginal) worker  $V_1 = V_U$ . Equilibrium wages  $w_1$  can then be obtained as follows. First, solving (5), (6) and (7) for  $V_U$ , and then substituting this in (5), the following expression is easily obtained.

$$w_1 = \frac{b(r+q_2)}{r+q_2+\Pi_2} + \frac{w_2\Pi_2}{r+q_2+\Pi_2} - \frac{(w_2-b)\Pi_p}{r+q_2+\Pi_2} \quad (8)$$

In short, the equilibrium wage in the private sector must be equal to the discounted value of income while unemployed and the discounted expected value of the government's wage offer, where the discount takes into account the probability of obtaining wage offers in the government sector. If the government were to pay reservation wages, so would the private sector. The private sector's wages are distorted to the extent that the government pegs wages above the level of discounted income available to the unemployed i.e.  $b$ . The last term is the discounted value of the excess of government pay over unemployment benefit, multiplied by the probability of getting a government job offer while in the private sector. In fact, if public sector wages are pegged at very high levels and accession rates into this sector are high (so that expected returns to being in private employment are high), firms might even charge the unemployed a fee rather than pay a wage.

### *Efficiency wages in the private sector*

I now extend the model by introducing the possibility of workers in the private sector shirking on the job. Private sector workers are now assumed to be able to shirk on the job; the presence of a large public sector in which employees are well paid and in which efficiency is not of prime concern to employers may affect the motivation of workers in the private sector. Workers might choose to shirk on the job and private sector employers will wish to prevent them from doing so. I assume that monitoring by employers is imperfect so another mechanism will have to be used by employers as well. Workers can choose to shirk or not. Let superscript S (N) denote that

a worker is shirking (not-shirking). Let  $m_p$  be the probability of losing the job through monitoring of shirking by the firm. To introduce the consequences of expending effort (or not) on utility, utility is assumed to be linear in wages and effort,  $u(w,e)=w-e$ . Effort expended in the public sector by workers is the same as that of a worker who shirks in the private sector and set at zero for simplicity (i.e. their productivity is zero). The ‘asset equilibrium’ equations for a worker when shirking or not shirking in the private sector can then be written as:

$$rV_1^S = w_1 + (q_1 + m_p)(V_U - V_1^S) + \Pi_p(V_2 - V_1^S) \quad (9)$$

$$rV_1^N = (w_1 - e) + q_1(V_U - V_1^N) + \Pi_p(V_2 - V_1^N) \quad (10)$$

Given that if the worker shirks, his productivity is zero, the firm will try to ensure that non-shirking behaviour is the norm, i.e.

$$V_1^N \geq V_1^S \quad (11)$$

so that the value to the worker of not shirking is not lower than shirking. Using (9) and (10), (11) implies that:

$$w_1 \geq \frac{e(r+q_1+\Pi_p+m_p)}{m_p} + (r+\Pi_p)V_U - \Pi_p V_2 \quad (12)$$

If the non-shirking condition (12) is satisfied, workers will not shirk on the job. The ‘asset equilibrium’ equations for public sector employment and unemployment are given by (6) and (7) as before.

The non-shirking condition (12) has important consequences. In equilibrium, firms will pay wages that just induce workers never to shirk. Assuming that a worker indifferent between shirking and non-shirking chooses not to shirk, (12) can be restated using the ‘asset equilibrium’ conditions for  $V_2$  and  $V_U$  as before, to derive the optimal wage policy of firms. In the constrained private sector labour market equilibrium, wages will then satisfy:

$$w_1 = \frac{b(r+q_2)}{r+q_2+\Pi_2} + \frac{w_2\Pi_2 - \Pi_p(w_2 - b)}{r+q_2+\Pi_2} + \frac{e}{m_p} \left[ (r+q_1+\Pi_p+m_p) + \frac{\Pi_1(r+q_2+\Pi_p)}{r+q_2+\Pi_2} \right] \quad (13)$$

Comparing this solution with (8), the equilibrium wage condition without the non-shirking condition, it is now clear that the wage offered will be higher than the equivalent wage in the previous models - it exceeds it by the last term in the equation above. The premium paid will be increasing by the extra effort  $e$  needed in the private sector, the rate of public sector job offers to



workers in the private sector ( $\Pi_p$ ), the exogenous quit rate in the private sector  $q_1$  and the (exogenous) rate at which unemployed get private sector job offers ( $\Pi_1$ ); it decreases with better monitoring technology, which increases the shirking detection rate ( $m_p$ ) and with the rate of job offers for the public sector to the unemployed ( $\Pi_2$ )<sup>8</sup>.

However, while offering clear and testable predictions, the model is difficult to test, for the predictions cannot be distinguished from those of alternative models. To see this, the case of bargaining over wages by workers and employers is presented below.

#### *Wages in private sector set by bargaining between employers and workers*

Suppose, instead of the firm setting an efficient wage as above, wages and effort are determined by a bargain between employer and employee. In order to avoid being pinned to a specific model (which is unlikely to be amenable to an empirical test), the basic prediction of any such model, that  $V_1$  is above reservation utility  $V_u$  is used, (see Machin and Manning (1992)). It is assumed that

$$V_1 = \theta V_u \quad (14)$$

where  $\theta > 1$ , is assumed to be constant, (though it might well be a function of exogenous variables that determine bargaining power). If so, the following expression for private sector wages in equilibrium can be derived as before:

$$w_1 = A \left[ \frac{b(r+q_2) + \Pi_2 w_2}{r+q_2} \right] - \frac{\Pi_p w_2}{r+q_2} \quad (15)$$

$$A = \frac{r(r + \Pi_p + q_2)\theta + \Pi_p q_2(\theta - 1) + q_1(r + q_2)(\theta - 1)}{r(r + \Pi_2 + q_2) - \Pi_1(r + q_1)(\theta - 1)} \quad (16)$$

where  $A$  is larger than 1. Note that if  $\theta=1$ , (17) reduces to (8).

The contrast between (8) on the one hand and (13) and (15) on the other forms the basis of the test proposed here: if firms pay efficiency wages (or share rents), the distribution of accepted wages will be truncated below, not by the reservation wage alone (as in a standard job allocation model), but by the reservation wage plus a premium. Furthermore, in the case of the shirking model, the premium is higher, the greater the exogenous quit rate from the private sector, the higher the rate of accession into the public sector from the private sector, the worse the ability

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<sup>8</sup>The rates,  $\Pi_1$  and  $\Pi_2$ , can be related to the unemployment rate and to levels of employment  $L_1$  and  $L_2$  in a steady state equilibrium. In the steady state, flows into unemployment must equal flows into employment in the different sectors. This in turn, allows us to examine the response of the premium to the unemployment rate and it is easy to show that the premium varies inversely with the unemployment rate, rises with increased employment in the private sector and falls with rising employment in the public sector.

of the firm to monitor its workers and the higher the likelihood of the unemployed getting into the private sector. The bargaining model suggests that the premium is higher, the greater the exogenous quit rate from the private sector, the higher the rate of accession into the public sector from the private sector and the higher the likelihood of the unemployed getting into the private sector but the most important factor is the size of  $\theta$  and whether it is substantially different from 1. Hence, in the absence of specific information about monitoring technologies or the factors driving the bargain, both kinds of models offer similar predictions of a premium over the reservation wage and an empirical test that finds evidence of a premium is unlikely to be able to come out strongly in favour of the one over the other.

The challenge is therefore to discover other proximate evidence that might persuasively distinguish these theories in the empirical analysis. The next section discusses the data available to do so and possible ways in which these theories can be distinguished. In particular, a combination of data on firms and households is to be deployed in order to both offer different perspectives on the evidence in favour of the various possibilities and more important, assess the consistency of the evidence.

### 3. The empirical tests and the data

#### *Using household data on premiums*

There are two possible approaches to distinguishing between the various models of wage determination. As the previous section demonstrated, the existence of premiums alone cannot do so - but a detailed examination of the data might do better. The first step is to establish that wage premiums actually exist and are not driven by heterogeneity in the labour market. If wage premiums do not disappear once controls for worker and firm heterogeneity are introduced (by using fixed effects estimation), the next step is to ask what might cause them. The primary distinction is between efficiency wage models and models where wages are determined by insider effects. If insider effects are because of specific investments in workers which allow workers to bargain over the rents available thus, a possible test is to check whether new and first-time workers receive the wage premiums. If they do, this is inconsistent with such effects for they are generated to those continuing in work (Malcolmson, 1999). If union effects matter, comparing workers in union and non-union firms should allow the effects to be distinguished (but this is unhelpful if the threat of union formation drives the sharing of rents).

Efficiency wage models ought to generate premiums to all workers but might also generate different premiums by occupational or education group as in the shirking model discussed earlier if unemployment rates differ across groups or types of workers - and ought to be responsive to movement in unemployment rates over time. A difficulty with using data on households is the paucity of controls available for the match between employer and employee. The only data available are controls for firm-size, occupation and sector - but given such controls, if wage premiums persist and are determined primarily by worker type, the argument must be on the side of efficiency wages. However, the main prediction of this class of models is that firms offer wages above the going rate because it raises productivity and this is not readily testable using household-level data and so I turn now to a discussion of what might be achieved by examining data on the firm.

### *Using firm-level data*

An alternative approach to the problem considered above is to contrast the predictions of efficiency wage models with models of bargaining using firm-level data. Wadhvani and Wall (1991) provide an example of this approach. It begins by specifying a standard Cobb-Douglas production function, augmented by relative wages and unemployment to test the predictions of efficiency wage models. If effort, assumed to be linearly related to the log of relative wages, obtains a coefficient equal to that on (ln) employment, the Solow condition of unit effort elasticity obtains, but more generally, if wages are the subject of a bargain but efficiency wage considerations matter nevertheless, the effort-wage elasticity will be less than one (see Layard et al., 1991). The difficulty with testing this model is that a positive association between relative wages and productivity in these models may arise because of simultaneity bias, due for instance, to workers driving a bargain with employers to share rents so that high productivity raises the pressure for high wages to be paid. This is usually dealt with by suitably instrumenting for relative wages in the empirical specification and whether the argument is persuasive then depends greatly on the choice of instruments. This is also the route pursued here. While the data on wage premiums can only be suggestive about the importance of efficiency wage effects, if the firm-level evidence is also supportive, the test is on stronger ground.

### *The data*

The data are culled from two panel surveys: the first, of 1500 households, conducted in the seven largest towns in Ethiopia in November 1994<sup>9</sup>, and surveyed again in February 1997, about two years later - and the second, a survey of 220 firms in the manufacturing sector in Addis Ababa, surveyed in 1994 and 1995. The first set of tables presents summary statistics using the household survey. Table 1 presents data on activity and real wages, using the entire sample of men between 15 and 64, for 1994 and 1997<sup>10</sup>. The table describes the sectoral allocation of the sample and the labour force by public, private or self employment - or unemployment. The public sector consists of civil servants and those employed in public sector enterprises or local government. The private sector is a heterogeneous category: it includes the larger private enterprises, international organisations and a few cooperatives, as well as casual workers and domestic workers - the last category being entirely occupied by women. Own account and family workers and employers comprise the self-employed. Together with the unemployed, the four groups comprise the labour force.

Reported unemployment is high: it was about 34 percent in 1994 and 28 percent in 1997. The unemployment rate is calculated as the number of persons who reported themselves as being out of work and currently looking for work, expressed as a percentage of the labour force. The International Labour Organisation defines the unemployed as those who have not been in work in the previous week and have looked for work in that period. The figures reported here are not with reference to any period: consequently, they might be an overestimate of the current

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<sup>9</sup>Data collection was done in collaboration with the University of Goteborg and financed by SAREC (SIDA), Sweden.

<sup>10</sup>The number of observations in 1997 is slightly smaller, in part due to missing information or responses for some members of the household and in part due to attrition in the sample over time at a rate of about 5%. Households were replaced in some cases as well so that the two samples do not constitute an exact panel.

unemployment rate as usually defined. However, the 1994 Census (Central Statistical Authority (1997)) reports the unemployment rate in Addis Ababa (the capital), as 35% on average for both sexes which is in line with the figures in Table 1. Similarly, preliminary results from the Welfare Monitoring Survey of 1995/96 conducted by the Central Statistical Authority suggested male unemployment in Addis Ababa of about 28 percent<sup>11</sup>.

The second part of the table provides summary data on monthly wages for formal wage work and an estimate of earnings in self employment. Incomes, apart from wages, were collected at the household level and cannot be readily attributed to particular household members. The figures reported are therefore total household income from family business activities divided by the number of family members involved in such activities. The median income is reported to avoid the problem of outliers. All earnings are in 1990 prices, deflated by the CPI as calculated for urban Ethiopia by the Central Statistical Office. On average, monthly wages<sup>12</sup> increased over this period. Public sector pay scales were revised upwards in 1995 and men in the public sector received an average real increase in wages of 17% while men in the private sector saw their wages rise by about 7%. This conceals the substantial differences by level of education and type of employment, of which more in Table 2. Tables 2 and 3 provide the breakdown of employment and wages in each sector by education (for men). Clearly, the private sector offers higher wages on average to all groups except those with secondary education, but in the aggregate, the average wage is higher in the public sector simply because more of the secondary and tertiary educated are to be found there. Table 3 also provides the distribution of the unemployed by education and this is most revealing. The largest group, over half of the unemployed, are secondary school leavers, followed by those who have completed primary school. The table shows that 54 percent of those with completed secondary education were unemployed in 1994; a quarter of those with complete primary education were also unemployed as were a fifth of the unskilled and tertiary educated. There was some decline in these rates by 1997, although levels remained high<sup>13</sup>. It is expected therefore that the empirical tests of premiums would in turn reveal the variation by unemployment rates in each of these groups.

The descriptive statistics on some of the characteristics of the unemployed and those in work, together with information on their family background are also revealing. It is clear that the unemployed seem to come from families that are well educated on average; 45% of their mothers have had some education as compared with 15% of those who are self-employed. They also come from relatively better-off households as about 52% of them live in their own home-

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<sup>11</sup>Note that the latter survey finds a much lower overall urban unemployment rate (13 percent), but this is entirely due to the different sampling: the survey used in this paper only covered the seven largest towns, while the Central Statistical Authority's sample includes all small towns in its sampling frame, resulting in the majority of the sample coming from these smaller urban areas, where unemployment is rather low. In this survey, the sample is self-weighting so the individuals come predominantly from Addis Ababa.

<sup>12</sup>Most workers reported their wages per month and the data on hours worked was obtained separately. The data on hours is, as always, prone to errors in measurement. Furthermore, most wage workers work a standard week and there is little variation in hours. Hence, it was decided that monthly wages ought to be the measure relied on in this study.

<sup>13</sup>This surprising result is not just a consequence of the sampling. Preliminary results of the the 1995/96 Welfare Monitoring Survey of the Central Statistical Authority reveals similar results: secondary school leavers have an unemployment rate more than three times the average unemployment rate; sixty percent of the unemployed are children of a household head, living at home with the latter; another twenty percent are relatives of a head. Only 15 percent of the unemployed are household heads.

compared with 39% for those in the private sector or self employment. They are similar to those in the public sector in terms of ethnic background for over half are Amhara<sup>14</sup>. Public sector workers also come from families with relatively better educated parents (and the younger cohort of public sector workers is very similar in profile to the unemployed, particularly in terms of background). Perhaps the one distinguishing feature of the self-employed is that a larger percentage are Gurage; the Amhara are less likely to be in this sector relative to being unemployed or in wage work.

**Table 1:** Unemployment and Employment for men in urban Ethiopia: 1994-1997

	1994	1997
<b>Allocation (%)</b>		
Unemployment (% of labour force)	33.8	27.7
Public sector (% of labour force)	26.4	29.3
Private sector (% of labour force)	21.0	25.0
Self-employment (% of labour force)	18.8	18.0
Participation rate (as % of sample)	68.3	62.7
<b>Earnings (Birr)</b>		
Median revenues per family worker in self-employment (1990 prices)	258	113
Monthly wages public sector (in 1990 prices)	247	287
Monthly wages private sector (in 1990 prices)	230	246

Source: Ethiopian Urban Household Survey.

Table 3 summarises the information on the support and job expectations of the unemployed: most of them rely on parental support while unemployed - only 16 percent admit to taking up casual jobs to support themselves while unemployed. It might be argued that the self-employed are those who simply cannot afford to be unemployed for any length. However, it is unclear why those in the unemployment queue do not choose to engage in some sort of activity, however petty to support themselves<sup>15</sup>. They also reveal a preference for finding work in the public sector - about half say they are looking for work in the public sector while only 22 percent state a preference for work in the private sector. The dominance of the public sector both in the aspiration of workers and in reality is a justification for the model in Section 2 and hence

<sup>14</sup>The main ethnic groups in Ethiopia are the Amhara (who also wielded political power before 1992 and the current government), the Tigray (who form the bulk of the present government) and the Oromo.

<sup>15</sup>One explanation is that there is some cost in terms of finding formal wage employment in the future. The unemployed are also overwhelmingly the higher-skilled and this might suggest that they are attempting to signal their higher productivity to wage employers or their commitment to invest in on-the-job-skills- but since education levels are readily observable, it is unclear why such signalling would have to be undertaken while remaining unemployed. Another possible explanation might be barriers to entry in self-employment; however, it appears that the unemployed are less likely to be liquidity-constrained for instance. The barriers might take the form of social and ethnic networks to which some groups are denied entry. I attempt (without formally testing these hypotheses), to introduce proxies for these variables in the estimation of the model of allocation into sectors.

predicted reservation wages of those in private work depend in large part on wages paid in the public sector.

**Table 2:** Real monthly wages (in Birr) and distribution (in %) of the labour force across sectors by education

	Less than primary		Completed primary		Completed secondary		Completed tertiary	
	1994	1997	1994	1997	1994	1997	1994	1997
<b>Allocation (%)</b>								
Unemployed	19.1	15.5	23.1	30.7	56.6	46.4	18.4	17.3
Public Sector	16.4	18.1	28.1	24.3	23.9	30.0	59.2	58.1
Private Sector	26.3	27.4	28.8	25.6	12.0	14.0	14.6	15.1
Self employed	38.3	39.0	20.1	19.4	7.6	9.5	7.8	9.5
<b>Earnings (birr)</b>								
Reservation wages of unemployed	107		93		117		212	
Public sector wages	137	231	165	210	231	257	377	415
Private sector wages	183	209	190	204	187	291	566	513

Source: Ethiopian Urban Household Survey

**Table 3:** Source of support and type of job sought while unemployed

	Percentage of unemployed
<b>Source of support while unemployed</b>	
Parental help/relatives/spouse	80.8
Small occasional jobs	15.6
Previous savings/sale of assets	3.7
<b>Type of work sought by unemployed</b>	
Public sector	47.6
Private sector	22.3
Casual work	5.6
Any work	24.5

Source: Ethiopian Urban Household Survey

A critical issue is the examination of the premiums actually obtained by those unemployed who found work in the private sector in 1997. Only about 18% of the unemployed found work in 1997 - and about 10% found private sector work. The average premiums over the reservation

wages obtained by these men was about 83% percent in the private sector and about 54% percent in the public sector. The premiums obtained by those unemployed who found work in 1997 demonstrate that first-time workers also receive premiums. It is striking that given the preference of the unemployed for the better-paid public sector jobs and despite the high rates of unemployment observed here, the percentage premiums received by those who found work in the private sector are substantially higher than those received by public sector workers.

The final table in this section provides some summary evidence from the firm-level data about the problems faced by employers and managers and the manner in which firms attempt to motivate their workers to exert effort on the job (table 4). It demonstrates the importance attached to extracting effort on the job and that larger firms, which are less able to use personal monitoring by the owner, are more likely to use extra payments and supervision by a manger/foreman - and are more likely to suffer from problems such as absenteeism and lack of effort.. Lack of effort is mentioned as a problem by over a third of medium and large firms. The existence of clear patterns by firm size in both the manner of supervision and the kinds of problems reported means in turn that using firm size as a control in wage regressions captures such variation. The last line of the table provides the median value-added by firm size demonstrating that profitability does rise slightly with size of firm - but more convincingly, value added per worker and value added over capital is positively correlated with the size of the firm. This confirms the pattern and hence makes easier the interpretation of the controls for firm size in wage regressions that use household-level data. In order to be able to check for consistency across both household and firm-level data, the measures used of firm-size, sector occupation and education group are the same.

**Table 4:** Evidence from firm-level survey of manufacturing enterprises in 1994: Responses of managers/ owners in the private sector

	Micro firm <sup>a</sup> (0-10 empl.)	Small firm <sup>a</sup> (11-20 empl.)	Medium Firm <sup>a</sup> (21-60 empl.)	Large firm <sup>a</sup> (over 60 empl.)
<b>How is effort at work ensured?</b> (% answering yes)				
supervision by foreman	14.0	27.1	51.0	57.0
pay piece rate	49.2	29.4	39.4	57.1
other payment	14.2	21.6	24.6	42.8
cultivate trust	38.4	44.0	46.4	43.0
firing threat	8.8	14.6	11.8	20.0
<b>Problems reported</b> (% answering yes)				
absenteeism	31.5	38.2	36.4	57.0
high turnover	16.6	21.6	15.6	2.5
lack of effort	26.0	8.1	30.8	43.5
industrial action	6.0	5.8	12.0	28.0
<b>Median Value added per employee</b> (in birr)	6330	7273	5271	7977

<sup>a</sup>firm size measured in terms of employees

#### 4. The empirical model and its estimation

In order to test the theoretical model laid out in section 2, set out below are the elements of the empirical model. The observed data contain observations on the reservation wage of the unemployed in 1994 and the observed wages of those in the public and private sectors in 1994 and 1997. Furthermore, a sub-sample of those unemployed in 1994 found work in the private sector in 1997 and this important sub-sample allows both a consistency check of the models estimated as well as providing evidence on whether new and first-time employees also obtain premiums. Finally, the data on firms are used to estimate an augmented Cobb-Douglas production function to examine the effects of wages on productivity.

##### *Explaining the wage premium*

The test for whether efficiency wages are paid in the private sector turns on whether there is evidence of employers paying some amount over and above the reservation wage of the marginal worker: this amount or premium being systematically related to employee productive characteristics, group unemployment rates and local unemployment rates. This follows directly from comparing (8) to (15) and (18): if firms pay competitive wages, then private sector labour market equilibrium wages are equal to reservation wages. Note that the dominance of the public sector implies that reservation wages will reflect the going rate in the public sector and this must be accounted for. Therefore, controlling for worker heterogeneity in reservation wages and firm heterogeneity in offered wages, the observed premium should be zero, or in statistical terms, given noisy data, the premium should not be correlated to household, group or local characteristics - it should just be white noise.

The first step involves constructing an estimate of the premium and this means constructing an estimate of the reservation wage for those in work, since only the unemployed were asked for their reservation wages. In order to obtain estimates of the premium, estimates of the reservation wage of private sector workers are obtained, by using the reported reservation wages of the unemployed to construct a prediction model. Estimates of the premium are then constructed as the difference between accepted wages and estimated reservation wages.

The first step therefore is to obtain estimates of the public sector wage offer for all workers. If workers in this labour market form their expectations of wages based on the public sector's offers, this in turn determines their reservation wages. In order to construct these estimates the following model is estimated, where it is assumed that the logarithms of public sector wage offers are independent draws from the normal distribution, that differ across individuals  $j$  only in terms of their means<sup>16</sup>.

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<sup>16</sup>This regression and all the other reduced -form wage regressions that follow include corrections for selectivity bias obtained from estimates of allocation into public, private, self-employment and unemployment using a multinomial-logit specification.



$$\ln w_{pubj} = X_j' \beta + O_j' \nu + u_j \quad (17)$$

$X_j$  is a vector of the usual variables in a reduced-form regression of wages and includes education, age and its square, marital status and controls for ethnicity and town of residence.  $O_j$  represents the occupational grade assigned to the job and is used here for two critical reasons: first, for describing wage setting in the public sector and second, for identification of the effect of the public sector wage offer in predicting reservation wages. In effect, the regression attempts to identify government pay-setting rules. The use of occupational grade to serve these purposes is possible only because the occupational grade for those in work is known while the unemployed were asked specifically about the occupational grade they wished to join. Based on this regression, the mean public sector wage offer is obtained for both the unemployed and private sector workers.

The next step is obtaining estimates of the reservation wage for all private sector workers. The reservation wage regression on the sample of unemployed is estimated in an analogous way, using the predicted mean public sector wage offer.

$$\ln w_{resj} = X_j' \beta + Z_j' \delta + \ln \hat{w}_{pubj} \gamma + v_j \quad (18)$$

Observed reservation wages are regressed on a series of own characteristics and proxies for support while unemployed, the predicted mean wage offer in the public sector ( $\ln \hat{w}$ ) and a selectivity correction for being in unemployment. Note that it includes all the variables used ( $X$ ) in predicting the public sector wage offer, apart from occupational grade which makes its entry only indirectly, through the predicted public sector wage offer. To control for the quality of the match between employer and employee, proxies for how efficiently the unemployed hunt for work (whether actively looking for jobs through informal means, i.e. not just depending on the official job exchange) as is a proxy for worker heterogeneity (a variable capturing whether the worker was promoted on the first job which might distinguish relatively high productivity workers). This regression is then used to predict reservation wages for private sector workers.

Finally, estimates of the premium are obtained as the difference between observed wages in the private sector and the estimated reservation wage. This premium is regressed on levels of education, marital status, whether head of household, whether promoted on the first job, firm size, sector of employment and controls for ethnicity, town of residence and selectivity correction. In the context of a shirking (or equally, a turnover model), these variables can be supposed to capture incentives to shirk, in particular, opportunities to find a job in the public sector if unemployed or if in the private sector (linked to group-specific and local unemployment rates). The notion is that since some groups, like secondary school-leavers, have very high unemployment rates, this in turn ought to lower their premiums. Some characteristics, such as being head of a household or being married), might have good prospects in both the public sector

and elsewhere: firms may wish to retain such employees<sup>17</sup>. Local labour market conditions, such as local unemployment rates and public sector opportunities, are also likely to matter and are controlled for by town fixed effects. The variable, whether promoted on the first job, can be seen as proxying more productive workers. While reservation wages might already control for this characteristic, to the extent that it is differently valued by the firm, the suggestion is that the firm will have incentives to keep these high productivity workers, who are likely to have more opportunities to find lucrative alternatives.

### *Heterogeneity in worker quality and its effects on the premium*

One potential weakness of this exercise is the fact that the premium thus estimated may be picking up rewards to unobserved ability or quality of workers or even some firm-specific effect associated with the firm that employs them. After all, firms do interview potential workers and attempt to choose the best. In order to counter this criticism, estimates of the premium in 1997 for the same sample are obtained (and this includes only workers who stayed in the same firm over this period) and a regression on the differenced variables estimated in order to eliminate unobserved individual fixed effects from the regression<sup>18</sup>. If pay is linked to efficiency wage incentives, for instance, then by 1997 changing circumstances in the labour market (such as changed unemployment rates) would imply different coefficients for the premium regression. Therefore, the differenced regression will still include the same variables as in the level equation. The coefficients now measure the changes in the coefficients between 1994 and 1997. If the differences in coefficients in the fixed effects premium regressions are similar to those in the separate regressions, then it might be argued that unobserved ability is not the main explanation for the existence of the premiums. As a final (and perhaps the most persuasive) test of the consistency of the results, I run the regression on the actual premium earned in 1997 on a sub-sample of who were unemployed in 1994 and who found jobs in the private sector in 1997. The sample is small but the premiums obtained here are actual premiums obtained rather than estimates and if the results here are similar to those for the regression of predicted premiums in 1997, the results are undoubtedly on stronger ground. Furthermore, if it is clear that new workers do obtain premiums (recall that the average premium is 83% percent), then models of specific investments are ruled out.

### *Firm-level regression*

Finally, the firm-level data is used to examine the effects of high relative wages on productivity. A key prediction of efficiency wage theories is that wage increases pay for themselves since they act as an incentive to increased effort. If so, a higher relative wage at any firm (relative to other

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<sup>17</sup>It might also be the case that such workers have lower reservation wages since they have an incentive to leave unemployment sooner and support the household - it would be difficult to distinguish such effects.

<sup>18</sup>In doing so, I assume that the coefficients of the reservation wage regression in 1994 apply to 1997 as well. Mean wage offers in 1997 are updated, however, using the characteristics of workers in 1997. The specification used is as follows:

$\text{Premium}_{97} - \text{Premium}_{94} = (\theta_j - \theta_j) + (\alpha_{97} - \alpha_{94}) V_j + (e_{97} - e_{94})$ , where the first term vanishes, eliminating the fixed effects and the second term captures the effects of changes in coefficients over the two periods. Note that the variables used in both regressions are the same across periods since they consist of own characteristics and firm effects, which remain the same since workers in the panel used here do not change firms in this period.

firms in that industry) should make relatively more productive. The specification is similar to that of Wadhvani and Wall (1991) and Machin et al (1992). Value-added in a firm is determined by a Cobb-Douglas production function:

$$Y_{it} = A_i L_{it}^\alpha K_{it}^\beta \quad (19)$$

where  $Y_{it}$  denotes value added and the subscripts denote firm  $i$  in period  $t$ ,  $K_{it}$  is capital stock,  $L_{it}$  is employment and  $A$  denotes fixed effects that affect productivity. If efficiency wages matter, this specification should be augmented by some function that determines effort on the job. In order to do so, the simple specification where effort is allowed to affect  $L$  is used (though in practice this is easy to relax so that it might affect returns to labour,  $\beta$ ) - so that the production function uses an augmented labour input given by  $(e_i L_{it})^\beta$ . Assume that effort, denoted by  $e$ , is a function of relative wages.

Let  $e_i = b(w_i/w^*)^\gamma$  where  $w$  is the wage offered by the firm and  $w^*$  is the average wage available at other firms. Substituting the augmented labour input and taking logarithms obtains the empirical specification to be estimated.

$$\ln Y_{it} = \ln A_i + \beta \ln L_{it} + \beta\gamma \ln\left(\frac{w}{w^*}\right) + \alpha \ln K_{it} \quad (20)$$

In this simple model, if relative wages affect profit, profit maximisation requires that the elasticity of wages with respect to effort be 1 so that  $\gamma = 1$  and the coefficient on relative wages is equal to that on the labour input. However, if wages and employment are the object of a bargain between workers and employers (rather than being entirely determined by efficiency wages), the effort wage elasticity is likely to be less than one (see Layard et al., 1991).

In short, a significant effect of relative wages on value added would be evidence in favour of efficiency wages - but an elasticity less than one would not rule out bargaining over wages as well.

The main issue in the estimation of the model in Equation (22) is the possibility that high productivity actually drives wage demands so that the estimates suffer from simultaneity bias. This is an issue if insider effects actually determine wages- and hence testing the model is fraught because all appearance of such bias must be eliminated in order to persuade one of the importance of efficiency wages in wage determination. Therefore, it is vital to check whether relative wages are endogenous and if so, to find suitable instruments to obtain consistent estimates of the parameters. Since data on two years (1994 and 1995) were available, the value-added in 1995 was regressed on relative wages, capital stock and employment in 1995 and lagged values of all these variables used as instruments.

The instruments used for the measure of relative wages include the dummy variables measuring whether firms used different kinds of supervision, whether they use a firing threat and whether they thought that instilling trust in workers was important and whether employees were found through relatives and friends. Other instruments include the value of investment undertaken over the previous five years and the age of the firm. (These were also used as direct regressors but

proved to have little effect). Note that one difficulty with this procedure is that firm-specific fixed effects have not been eliminated and in order to control for this to some degree, dummies for sector were used<sup>19</sup>. None of the firms report any union threat or indeed that any fraction of the firms' labour force was unionised.

## 5. Results

A multinomial-logit model of allocation into wage work, self-employment and unemployment was estimated and the selectivity corrections retained to correct the estimated equations (19) and (20), as well as the reduced form regressions on the estimated premiums in the private sector<sup>20</sup>.

In order to obtain estimates of the private sector premium, it was necessary to predict both the wages in the public sector and the reservation wages (itself a function of the predicted public sector wage), for private sector workers. Table 5 presents the wage regression for the public sector in 1994. The regressors include occupational grade (professional, clerk or skilled - the base group being the unskilled), in order to describe public sector wage-setting rules. It also serves to identify the public sector wage in the regression of reservation wages since occupational grade cannot be thought to affect reservation wages directly. Occupational grades are strongly significant in determining wages, even after controlling for education, age and other characteristics. Returns to education are large, particularly for those with tertiary education - and the fit of the regression is good with an adjusted  $R^2$  of 0.57.

Table 5 also provides the estimated reservation wage regression on the sample of unemployed. This regression contains all the variables included in the allocation function but also includes, three others: the predicted public sector wage offer, the manner of job search and whether the person was promoted on the first job. The predicted wage offer dominates the regression with

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<sup>19</sup>Unfortunately, a regression in first differences does not allow testing the hypothesis proposed here since data relative wages changed little between the two years. Note that eliminating unobserved firm-level effects such as unobserved quality of workers also helps eliminate another contender in explaining why high relative wages might raise the productivity of a firm - which cannot be done here. However, assuming that relative wages have changed little between years and examining the regression in first differences obtains similar coefficients.

<sup>20</sup>For the unemployed, it is clear that it is high reservation wages that determine allocation. Living with parents and receiving support in the form of remittances are positively related to being unemployed. Self-employment is mainly associated with ethnicity (being Gurage), a larger family size and lower skill levels on average. Education seems to have a substantial effect on allocation. Secondary and tertiary education have large and significant effects on entry into the public sector. Those with secondary education also have a high probability of being unemployed: having secondary education increases the marginal probability of being unemployed by about 19%. Tertiary education is associated with a lower probability of being unemployed in 1994 - but by 1997, this is reversed, which is consistent with the removal of guarantees of employment in the public sector for this group. The educated are less likely to be in the private sector and self-employment. Primary and secondary education reduces the probability of being in the private sector by 9 to 22 percentage points in this period; similar percentages apply for self-employment. The association of unemployment with secondary school education may well be a recent phenomenon, linked to the reforms. A previous paper, focusing on the young between 1990 to 1997 sheds some light on this. Reforms since 1991 do not appear to have resulted in an increased absorption of skilled workers into the private sector or self-employment. The retrenchment since 1990 and the reduced recruitment of the secondary- and tertiary- educated by the public sector has resulted in a substantial rise in unemployment among the educated (Krishnan, Tesfayi and Dercon (1997)).

a large and significant coefficient of 0.70. It also drowns out the effect of most of the other variables in the regression apart from mother's education and the town of residence. The last set of variables might be thought to suggest that, controlling for education, those in the capital Addis Ababa, have higher reservation wages on average.

The predicted reservation wage is used to estimate the premiums paid in the private sector and to ask whether such premiums if observed are systematically related to the likelihood of shirking on the job. But before doing so, it might be useful to ask precisely how meaningful the predicted reservation wages might be; for instance, do they have a relationship with observed wages that is consistent with standard models of job allocation? If yes, observed wages and reservation wages ought to be positively correlated. Reservation wages were included in a standard regression of private sector wages and have a coefficient of .92 (not significantly different from 1) which is reassuring.

### *The behaviour of the wage premium*

Table 6 presents estimates of the regression of the premium paid in 1994. The average premium (as a percentage of actual wages) is about 0.26 and the distribution is slightly positively skewed. The regression includes the regressors, whether head of the household, education, whether promoted on first job, ethnicity and town of residence. If the characteristics adequately reflect the likelihood of shirking for these groups (for instance, shirking might be higher where local unemployment rates are low for the particular educational or skill category), and they are significant in determining the size of the premiums, one might have evidence in support of an efficiency wage model.

But before taking that leap in interpreting the coefficients, there are a number of concerns that must be addressed. Perhaps the most important is whether the premiums merely reflect some aspect of the match between employer and employee that cannot be accounted for by employee characteristics alone. One obvious candidate is the size of the firm and the sector to which it belongs. As the evidence at the firm level indicates, profitability and techniques for disciplining workers vary with the size of the firm and therefore, using both firm size and sector of employment captures the value of the match sensibly enough. As it turns out, sectoral dummies and in some cases firm size are significant in determining the premium, but they have little impact on the size and significance of the other variables.

Yet another concern is that the firm pays the marginal worker his reservation wage - but other workers may well receive wages in excess of their reservation wages. Put another way, if reservation wages differ at the margin, perhaps because of differences in assets or support, the observed premiums may simply reflect this dispersion in reservation wages. Again, in order to control for this, proxies for assets are included. (Controls such as being head of household are an attempt to pick up such an effect - however, it is difficult to distinguish between their role in measuring commitment on the job for instance, that might raise the offered wage and their effect reservation wages) The regression demonstrates the impact of including the variable, whether living with parents. Other variables (such as whether the household owns their home and the quality of housing) were also used - and other possibilities such as total value of assets owned were also included. They have little effect on the premiums. The key point here is the effect of education on the premiums. Since different educational groups face very different rates of

unemployment as demonstrated in Table 2, and secondary school leavers face particularly high unemployment rates, one would expect that this group would also see the lowest premiums.

**Table 5:** Prediction of public sector wage offer and reservation wages

Variables	Ln (public sector wages)		Ln (reported reservation wage)	
	Coefficient	p value	Coefficient	p value
Age	0.08	0.01	0.02	0.46
Age squared	-0.00	0.04	-0.00	0.35
Primary	0.21	0.03	-0.17	0.32
Secondary	0.62	0.00	-0.29	0.25
Tertiary	1.03	0.00	-0.12	0.60
Whether head	0.16	0.06	0.28	0.38
Professional	0.40	0.00		
Clerical	0.08	0.47		
Skilled	0.37	0.00		
Household size			-0.16	0.15
Number of children			0.00	0.95
Ln (BMI)			0.47	0.20
Live at home			0.01	0.90
Size of house			0.07	0.02
Father's education			-0.07	0.69
Mother's education			0.11	0.13
Whether promoted on first job			-0.04	0.84
Look for job through friends			-0.07	0.14
Predicted wage offer			0.68	0.00
Sample size	354		414	
Adjusted R <sup>2</sup>	0.57		0.33	

Regression include controls for ethnicity, town of residence and selection

The regression of the premium was re-estimated on the sample in 1997 (using the coefficients from the reservation wage regression for 1994 but updating all the variables, including the mean wage offer from the public sector). This regression suggests that the effects of the characteristics had changed - and the premiums received by primary school leavers in particular, have fallen. Furthermore, there is a shift in the fortunes of the Amhara (the dominant political group until 1992), in favour of the Tigray - so that their premiums have fallen. These effects are displayed in Table 6. This table also compares these results with that of the sub-sample of unemployed in 1994 who entered work in 1997. Finally, as a test of robustness of the change in coefficients between 1994 and 1997 (and to examine the effects of omitted heterogeneity), the panel estimates of the changes in coefficients is presented.

**Table 6:** Regression on premiums obtained in 1994 and 1997

	premium in 1994		premium in 1997		premium in 1997 for sub-sample of new entrants		change in premium (1997-1994) = $(\theta_j - \theta_j) + (\alpha_{97} - \alpha_{94}) V_j + (e_{97} - e_{94})$ Controls for omitted fixed effects	
	coefficient	p-value	coefficient	p-value	coefficient	p-value	coefficient	P-value
Constant	-0.51	0.02	-0.19	0.56	-0.82	0.21	-0.93	0.17
Head	-0.29	0.01	-0.07	0.61	-0.38	0.14	0.38	0.10
Live at home	-0.04	0.74	-0.09	0.46	-0.09	0.60	-0.57	0.01
Age	0.01	0.03	0.00	0.27			0.00	0.98
Primary	0.18	0.09	-0.22	0.05	-0.49	0.04	-0.52	0.00
Secondary	-0.01	0.93	-0.19	0.29	-0.38	0.29	-0.33	0.22
Tertiary	0.15	0.30	-0.11	0.60	-0.40	0.33	-0.02	0.95
Amhara	0.18	0.02	-0.13	0.18	-0.20	0.14	0.03	0.85
Tigray	-0.06	0.69	0.15	0.38			0.62	0.00
Promoted on first job	0.12	0.13	0.16	0.19			0.06	0.71
Micro firm	-0.12	0.19	0.03	0.80	0.36	0.03	0.25	0.09
Small firm	-0.09	0.39	0.01	0.94	0.31	0.19	0.58	0.00
Medium firm	-0.09	0.48	0.13	0.30	0.39	0.06	0.25	0.24
Service sector	0.04	0.71	-0.20	0.08	-0.42	0.03	-0.01	0.96
Construction	-0.16	0.13	-0.02	0.89	0.31	0.11	0.01	0.97
Transport	0.08	0.43	0.34	0.02	0.42	0.04	0.09	0.64
sample size	232		202		48		100	
adjusted R <sup>2</sup>	0.56		0.16		0.12		0.31	

Regressions include controls for town, and selectivity correction. Omitted sector is manufacturing.

### *The heterogeneity in reservation wages and quality of workers*

A critical issue is that the dispersion in wages is due to omitted worker heterogeneity, not measured in either predicted reservation wages or in the regression of the premium. The final check was to use the panel of observations with complete information on all the variables (a sample of 100 workers) and run a regression on the differences in predicted premiums, retaining the same variables as regressors. The purpose of the exercise was to ask whether the changes in coefficients observed in the differenced regression were similar to the differences obtained when comparing the regressions in 1994 and 1997 (see Table 6). This does appear to be the case, suggesting that omitted heterogeneity is not a factor. Note that, in particular, the fall in returns to workers with primary education and to the Amhara is of a similar order of magnitude as in the two separate regressions for 1994 and 1997.

As in firm-level tests for efficiency wages, the possibility that rent-sharing drives the results remains an issue. The regression on differences also offers estimates of the differences in premiums between 1994 and 1997, for workers who remained in the same firm over the two years. This obviously removes any fixed effects specific to the firm and worker - which in turn should eliminate any effect that captures the unobserved bargain. If firm-specific effects (and by extension, rents) are not important, the coefficients should be similar to those obtained by differencing the coefficients in the regressions between 1994 and 1997. Therefore, the robustness of the regressions to omitted fixed effects (whether firm-level or worker) is certainly support of both the existence of non-competitive premiums and reasons other than rent-sharing in obtaining the premiums.

The argument could be made that the reason premiums are observed is that the unemployed seem to place a lower value on their endowments than do employers. For instance, in the case of the variable, whether promoted on the first job, the coefficient is insignificant (and negative) in the reservation wage regression but strongly positive and significant (if weakly) in the regression of the premium. This suggests that if a worker was in employment and then languishes in unemployment for some length of time, he may well mark down his expected wage. It might also indicate that the unemployed are very different from those in employment and the employed are able to strike up a better bargain than the unemployed could hope for - so that reservation wages for those in work are actually higher than that predicted here. In short, the concern is that the premiums observed owe a great deal to the manner of their construction - or alternatively, that the employed are insiders driving an advantageous wage bargain.

To address this concern, the predicted and actual premiums paid to a small group of the unemployed<sup>21</sup> who found work in the private sector in 1997 were examined - the results are also presented in Table 6. They demonstrate that, for this sample at least, the regression estimates of actual and predicted premiums are very similar in sign and significance<sup>22</sup>. It is striking that the

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<sup>21</sup>Sixty one of those unemployed in 1994 found employment in the private sector in 1997. However, about 13 had missing information on either reservation wages or actual wages; a further 11 did not provide information on the size of the firm in which they found employment. The equation was specified with fewer regressors since the degrees of freedom are small and some of the variables (like the dummies for Bahr Dar and Dessie, two of the towns) had no variation.

<sup>22</sup>Some of the variables like whether Tigray and whether promoted on the first job (none of the sample had been previously employed) had little variation in such a small sample and could not be used.



results using actual premiums are so similar to that obtained using the prediction model and the estimated premiums in 1997. (The average premium predicted for this sample is actually smaller than that actually obtained.) I conclude from this, that the unemployed are not radically different from the employed in the pattern of remuneration: the fact that average premiums are smaller for this sample (whether predicted or actual), than that predicted for the full sample is more a reflection of slack labour markets for this cohort. Again, the similarity in sign and effect of the premiums obtained by workers with primary and secondary education and the Amhara is important.

### *Who obtains premiums?*

In table 7, the actual percentage premiums over and above the reservation wage for a worker with otherwise mean characteristics are presented for different specific characteristics. It reveals that the premiums are lower on average for secondary school leavers - who also comprise the largest group amongst the sample of unemployed. Primary school leavers obtain the highest premiums in 1994, as do those with tertiary education. Both groups have relatively lower unemployment rates and the latter have a high chance of obtaining offers from the public sector. The premiums are higher for those who live in the capital Addis Ababa (relative to the provincial towns), who are Amhara and were promoted in their first job. (The last variable must be treated circumspectly for while it might well reflect better workers who can readily obtain offers elsewhere, it might be best seen as a control for worker heterogeneity). It is tempting to treat firm size as a proxy for the ability of a firm to monitor its workers: small firms presumably can do so more readily than big firms, where perhaps premiums are paid to persuade workers to exert effort. However, firm size is a veil for a variety of sins and it might be prudent to regard it as a control for the match between worker and firm. More reassuring is the fact that the effects of worker characteristics are robust to its inclusion.

The regression of premiums in 1997 is also related to worker characteristics but the relationship seems to have changed with the changing labour market. Primary school leavers now bear the brunt of lower premiums relative to other groups and the Amhara have lost their advantage but Addis Ababa retains hers relative to the other towns.

Finally, I turn again to the estimated premiums for the sample of 48 men who found employment in 1997 (table 7). This is a younger cohort that has spent longer in unemployment (for an average of 25 months) compared with the average private sector worker (10 months). The educated have lower premiums on average than those with less than primary education. Again the Amharas have lower premiums than the other ethnic groups - but consistent with the previous evidence, those in the capital Addis Ababa, have an advantage. Even so, it is striking that the regression of actual premiums behaves very much like that of the predicted premiums and adds weight to the notion that the premiums exist and have not been conjured up. In particular, it suggests that the evidence for rent-sharing derived from specific investments is weak since new workers also obtain premiums.

**Table 7:** Percentage premium over the reservation wage

Variable	Premium in 1994 (sample - 208 workers in private sector)	Premium in 1997 (sample - 222 workers in private sector)	Premium in 1997 (sample - 48 unemployed who found work in 1997)
(Predicted) Average premium	28.6	19.8	3.2
<i>Education</i>			
Unskilled	14.5	37.8*	38.0*
Primary school	51.1*	-8.1*	-15.0*
Secondary school	11.0	13.6	-5.0
Tertiary	43.9*	23.4	13.8
<i>Ethnicity</i>			
Amhara	53.3*	10.7	-14.1*
Tigray	4.5	46.9*	-
<i>Worker quality</i>			
Promoted on first job	49*	19.8*	-
<i>Firm size</i>			
Micro	18.6	19.4	2.3
Small	21.4	17.5	6.8
Medium	21.8	32.9	10.2
<i>Town of residence</i>			
Addis Ababa	36.1*	30.3*	12.0*

(Obtained as marginal returns to particular characteristics, keeping other values at the mean of the sample)

### *Firm-level evidence*

Finally, the examination of the regressions using data on the firm seem to back up the evidence above since the relative wages of primary workers have a positive and significant effect on value added while those of secondary school leavers do not. The regressions are presented in Table 8 below. Relative wages of workers with primary education have a positive and significant effect on value-added while the relative wages of secondary school leavers have no effect. This is in consonance with the evidence from the household survey in 1994, where primary school leavers obtained the highest premiums. Furthermore, the null hypothesis that the effort wage elasticity is one cannot be rejected. As a check, the unaugmented production function was also estimated and the coefficients on employment and capital stock remained much the same, consistent with a simple Cobb-Douglas specification.

**Table 8 :** Instrumented variable regression of value added using data on firms  
Dependent variable: ln(value added in 1995)

	Coefficient	p value
ln (capital stock )*	0.11	0.14
ln (employment )*	0.82	0.00
ln (relative wage for primary educated ) *	0.77	0.08
ln(relative wage of secondary school educated ) *	-0.17	0.41
Adjusted R <sup>2</sup> for (non IV) OLS regression 0.57		
Hausman test: $\chi^2 = 28.3$ with df=5 (0.04)		

Regressions include controls for sectors, age of firm and investment over the previous five years. Instruments used in first stage regressions include controls for kind of supervision, whether piece rates used, lagged employment and capital stock.. \* denotes variables treated as endogenous.

First-stage regressions for relative wages

Variables	Ln relative primary wage		ln relative secondary wage	
	Coefficient	p-value	Coefficient	p-value
Ln Employment in 91	-0.35	0.13	0.18	0.76
Ln Employment in 91(squared)	0.09	0.03	-0.06	0.61
Pay piece rates	0.30	0.04	0.03	0.94
Use assembly-line supervision	-0.31	0.02	0.14	0.69
Supervised personally	- 0.02	0.72	0.21	0.65
Threat of being fired	0.16	0.37	0.73	0.12
Found employee through friend/relative	0.23	0.14	0.29	0.48

Adjusted R<sup>2</sup> for first stage regressions: ln(rel prim wage) : 0.16 (Note: includes other exogenous variables)

Adjusted R<sup>2</sup> for first stage regressions: (ln (rel wage secondary) : 0.06.

## 6. Conclusions

In this paper, I have taken a less than usual route to discovering whether firms pay efficiency wages. It is unusual because it relies on a survey of households rather than that of firms - though the evidence is backed up by data on firms. In doing so, it cannot avoid the problems that have bedevilled the tests of efficiency wages, particularly the thorny issue of whether more profitable firms pay their employees high wages as a form of rent-sharing or whether more productive workers, who are paid to exert themselves raise the profits of firms - but it does offer evidence that can allow different perspectives on the workings of the labour market. However, the fact that results at the level of the firm and the evidence on wage premiums reveal a consistent pattern, not readily explained by insider effects, is suggestive.

Using a sample of workers in the labour force, the test uses predicted reservation wages to construct estimates of premiums for those in employment. I find a significant and meaningful relationship between the premiums paid and a series of worker characteristics including education and town of residence, controlling for firm size and heterogeneity in worker quality. In particular, those with primary education appear to receive the highest premiums in 1994. Furthermore, using firm level data for the same year, relative wages of workers with primary education seem to positively affect value-added.

The key issue is whether, in the presence of a large public sector which pays high wages, wage premiums in the private sector are paid as an incentive for workers to exert effort on the job. Firms report that absenteeism and lack of effort by workers are important problems that they face. The premiums observed here vary with the rates of unemployment faced by groups with different education: primary school leavers (in 1994) and the unskilled (in 1997) receive the highest premiums<sup>23</sup> and faced relatively lower rates of unemployment. The Amhara in 1994 (the dominant political group in 1994, replaced by the Tigray in 1997), those with tertiary education and those in the capital Addis Ababa also receive relatively higher premiums, consistent with their higher chances of finding work in the public sector.

Is this positive evidence of efficiency wages? It is certainly suggestive - and a number of rival explanations such as dispersion caused by differences in size of the firm or the dispersion in reservation wages relative to the marginal worker, or employed insiders being able to effect advantageous wage bargains do not seem consonant with the evidence. The firm-level data suggest that union pressure is not accounted important by managers in the private sector and none of the firms have workers in unions, so there is little evidence of the existence of insider effects. It is possible that the dispersion in reservation wages relative to a marginal worker causes premiums - and while various controls were tried to little effect, there may well be better measures of assets unavailable here to proxy this variation. However, the similarity of results in both the fixed-effects regression and the level regressions for 1994 and 1997 - coupled with the fact that the actual premiums are paid to those who found employment in 1997 seems to be evidence against it. (It is also evidence against the importance of turnover costs and specific investments in wage determination). Unobserved variation in ability is also a possible explanation but again, this received little support when tested against the regression in first differences using the panel data. In sum, there does appear to be evidence of efficiency wages being paid in the private sector of this labour market. And while the larger question of whether this is the most important reason for high and persistent unemployment remains open, it is striking that unemployment rates well over 25% seem necessary before wage premiums fall. Clearly, the difficulties inherent in motivating workers are critical to wage-setting in this labour market.

Finally, it is worth drawing attention to the difficulty of taking theory to data in the context of the standard labour market information being collected in developing countries. As is clear from this analysis, the usual data collected on workers and the unemployed does not allow an analyst to distinguish between the alternatives in a straightforward way. In particular, the concentration on firms (and their workers) might be less useful in a world where the relatively more stable unit of organisation is the household. It is clear that more can be learned by expanding the household

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<sup>23</sup>As Shapiro and Stiglitz (1984) remark at the end of their paper, their model is most likely to apply to the determination of wages for unskilled workers.

survey to gather more information on the firms where members of the household are employed. This might also allow a clear comparison between the unemployed and those in work. The lesson from this exercise is that starting from the household as the unit of analysis to analyse the functioning of the labour market might well be more illuminating than concentrating on the behaviour of firms alone.

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