Do Governments Pay Efficiency Wages? Evidence from a Selection of Countries.

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Jeanette Taylor and Ranald Taylor

Abstract

The issue of how much to pay government employees without risking a drop in their public service motivation (PSM) levels is a complex one. On one hand, it is argued that government employees are generally less motivated by high wages than their private sector counterparts. Governments too are constrained in their ability to offer high wages to their employees. There is also the proposition that high wages, particularly performance-based wages, can reduce or ‘crowd out’ intrinsic motivation. On the other hand, it is common knowledge that most people do not seek employment without expecting some sort of remuneration for their effort. Wages can satisfy both lower-order and higher-order needs, and can be used to indicate achievement and recognition for one’s effort. This paper argues for the significance of ‘PSM-adjusted wage’, the level which ensures high effort without undermining PSM levels in the public sector. It draws upon the efficiency wage theory and the PSM literature to construct a model for PSM-adjusted wage, which is then piloted on the 2005 ISSP dataset of fifteen countries that include USA, Great Britain, and Australia.
Introduction

The issue of how much to pay government employees in order to ensure maximum effort levels and without risking a drop in their public service motivation (PSM) levels is a complex one. Efficiency wage theory dictates that paying employees above the market clearing rate or a wage premium guarantees maximum effort (Solow 1979). The literature of PSM presents a different perspective. It states that employees with high PSM levels are more motivated by a desire to serve the public interest than by obscenely large sums of monies (Perry and Hondeghem 2008; Perry and Wise 1990). But the fact that these high performing employees are strongly driven to pursue the common good should not be taken to imply that employers can get away with paying them extremely low or minimum wages. After all, most people choose to work because of their desire and/or need to earn an income (Latham and Locke 1992). In short, wages can satisfy both lower-order and higher-order needs (Pinder 1984; Rainey 1991).

This paper’s exploration of the complex relationships between effort, wages and PSM in the public sector will address four specific questions. First, are governments in selected countries paying their public sector workforce efficiency wages? Second, what is the relationship between efficiency wages and effort? How much do these governments need to pay in order to raise the effort levels of their public sector workforce according to the efficiency wage specification? Third, what is the association between PSM and effort? How much change in PSM is associated with effort change? In combination, the second and third questions allow us to find out which of these two factors – wages or PSM – accounts for a larger change in the public sector workforce’s effort levels. Fourth, what is the relationship between ‘PSM-adjusted wages’ and effort? How much change in wages is related to a change in effort when PSM is taken into account? This article makes a distinction between efficiency wages and ‘PSM-adjusted wages’. An efficiency wage is the level of wage that is higher than the prevailing market rate, which elicits maximum effort. A ‘PSM-adjusted wage’, on the other
hand, is defined as the amount that is associated with a high effort level without undermining the PSM level.

We will begin this article by reviewing the literature on the significance of wages as a way to raise employees’ effort in the public sector. Two perspectives will be presented: Solow’s (1979) efficiency wage model, and the PSM literature. A simple framework will then be formulated to explain the relationships between effort, wages and PSM. We will pilot this model with the 2005 ISSP dataset. Fifteen countries in the dataset are selected for the analysis. They include USA, Canada, Great Britain, Australia, New Zealand, several countries in Europe (e.g., Denmark and France) and Asia (Japan and Taiwan), Israel, and Russia.

An efficiency wage perspective on wages and effort

The central argument in Solow’s (1979) efficiency wage model is that unless employers offer wages higher than the prevailing market rate, or efficiency wages, employees will engage in unproductive activities, such as shirking, and ultimately switch jobs. A low wage relative to the prevailing market wage can contribute to dissatisfaction, and other negative attitudes amongst employees (e.g., outrage and a desire for revenge), thereby leading to an increase in shirking or sabotage activities (Akerlof and Yellen 1986). In a Walrasian labor market, employees are indifferent to their jobs because there are similar paying jobs available in the labor market. As a result of this indifference to jobs, employees are less likely to exert high effort and are more likely to shirk. In the worst case scenario, if they are fired from their jobs for substandard performance or shirking activities, this will have a minimum impact on them because they can always find another job in a Walrasian labor market (Wood 1993).

Shirking occurs because of asymmetric information. Unlike employees, employers do not have complete information about their employees’ work habits and practices, and how much effort the
employees have put forth to achieve the organization’s goals. The fact that a typical employment contract can specify the number of hours that employees need to work per day means that an organization can buy employees’ time, but not employees’ effort. The fact that labor quality cannot be observed by employers prior to employment, as alluded to by moral hazard and adverse selection problems, suggests that it pays to offer higher relative wages in order to minimize the risk of taking on less productive employees.

Organizations which pay more than the market-clearing wage or a wage premium can raise the costs to workers of shirking (Shapiro and Stiglitz 1984). Employees who are paid wages that are higher than their peers in comparable jobs may place more value on their jobs than those in less-paid positions. These employees perceive that they will have more to lose if they are caught shirking and consequently lose their jobs. Even if there is a chance that they will not be caught if they engage in shirking, they may still wish to minimize or avoid shirking and instead choose to exert higher effort levels because of the heightened importance placed on their efficiency wages. In addition, the ‘gift exchange’ analysis undertaken by Akerlof (1982) and Kaufman (1984) explains that high relative wages can increase employees’ identification with their organization. High relative wages, it is argued raise employees’ general willingness to cooperate and reciprocate in the employment relationship in that ‘My employer treats me well so I will return the favor’.2

If one takes the view that the quality of a workforce affects the effort of the workforce, then high relative wages may arguably ensure a high quality workforce through recruitment and retention (Stiglitz 1996, 1974; Weiss 1980). Efficiency wage theory explains why most organizations believe that they can fill their vacancies more quickly with high quality workers if they raise their relative wages. Cable and Judge (1994) suggested that wage is a signalling device for recruits. Wage premiums also affect retention. They reduce turnover and the disruption caused by turnover (Stiglitz 1974). Henry Ford was perhaps the first modern employer to use efficiency wages to reduce workers’ turnover during the production of the Model T. By paying $5 above the market prevailing
wage, labor turnover was reduced significantly, resulting in a large increase in the production of the Ford Model T, making it the highest selling automobile during the early 1900s (Raff and Summers 1987). Efficiency wage theory clearly points to a significant association between high relative wages and effort. The next section will present an alternative perspective on this relationship.

A PSM perspective on wages and effort

The importance of PSM on effort, or more specifically, performance, has been raised in the literature: ‘High performance is central to the theory of PSM’ (Brewer and Selden 1998, p. 425). Past research has demonstrated that employees’ PSM is related to how well they perform their jobs (Alonso and Lewis 2001; Brewer and Selden 1998; Bright 2000; Naff and Crum 1999). Drawing from job design research findings, Perry and Wise (1990) propose that job characteristics can have a motivating impact on effort. Attributes in the public service that are likely to appeal to those with high PSM levels include those that provide opportunities to address questions of social equity, pursue social programs, advocate a valued special interest, and express loyalty to country. Wright (2004) clarifies that if government employees, who are motivated to make a worthwhile contribution to society, perceive that their work is important to accomplishing organizational goals that benefit society, then they will exert higher effort levels.

In contrast to effort, wages are reported to be not significantly related to PSM (Crewson 1997; Houston 2000; Perry and Wise 1990). Most public-private sector studies maintain that public sector employees are less motivated by the extrinsic aspects of their work, and more motivated by the intrinsic features, particularly an opportunity to help others (Lawler 1971; Rainey 1982, 1991; cf. Gabris and Simo 1995). Similarly, various studies show that students who aspire to enter this sector have less interest in monetary rewards than their counterparts who intend to join the private sector (Chetkovich 2003; Taylor 2005). According to Frey and associates (Frey 1997; Frey and Jegen 2001), high amounts of extrinsic rewards, such as high wages, can have a ‘crowding-out’ effect on
employees’ intrinsic motivation. For example, when employees perceive the wages to be controlling, their self-determination and self-esteem can suffer, and they can respond by lowering their intrinsic motivation.

But these findings do not deny the relevance of offering wages to government employees in order to raise their effort levels. People can have different motives for serving the public interest, and they include rational motives (Rainey 1982; Perry and Wise 1990). In her study of Australian government employees, Taylor (2007) found the rational motives in the PSM construct to be significantly associated with organizational commitment. Although wage did not occupy the top five positions of employees’ preferences, it was found to be an important factor for recruitment and retention in a government-commissioned survey of graduate employees in the Australian federal government (Management Advisory Committee 2003). Taylor’s (2005) survey of university graduates found that whilst the respondents who favored the private sector were more motivated by a high wage than their counterparts who were attracted to the public sector, the latter group was more concerned about a comparable wage than the former group. Frey (1997) stated that wages which are perceived as fair will support work morale, and have a ‘crowding-in’ effect on employees’ intrinsic motivation. This implies that the public sector should aim to achieve a balance between providing adequate economic rewards without undercutting the service needs of government employees (Crewson 1997; Le Grand 2003). In particular, consideration should be given to paying employees wages at a level that encourages them to put forth greater effort without risking a drop in PSM. This level is proposed as the ‘PSM-adjusted wage’.

**The research framework**

This research framework is divided into two parts. We begin our analysis with the efficiency wage model, followed by the PSM-adjusted wage model. Under the efficiency wage model, effort ($E$) per employee ($i$) is a function of the employee’s wage inside the organization ($W_n$) relative to the
expected prevailing wage outside the organization ($W_o$). Employees will work harder if they are convinced that they are being treated relatively well (Akerlof 1983; Akerlof and Yellen 1990; Shapiro and Stiglitz 1984). This relationship between effort and wages can be summarized in the equation below.

\[ E_i = e \left( \frac{W_n}{W_e} \right) \quad e_1, e_2 > 0 \text{ and } e_{11}, e_{22} < 0 \quad (1) \]

where $e$ is the elasticity of effort, and $e_1$ and $e_2$ are the first derivatives, and $e_{11}$ and $e_{22}$ are the second derivatives of equation (1).

The second derivatives in equation (1) suggest that wages are subject to diminishing returns. The relationship between wages and effort follows an inverted U-shaped curve. Figure 1 indicates that at point A, the wage paid is $W_0$ and effort is $E_0$. An increase in wages raises the effort level of employees. This will continue until point B which represents the optimal level of effort $E_n^*$. At this point, the wage is at $W_n^*$, which is the efficiency wage. Beyond point B, subsequent increases in wages will cause effort to fall. An increase in wages from $W_n^*$ to $W_n$ will result in a decline in effort from $E_n^*$ to $E_n$.

Figure 1: The relationship between effort and wage
Two possible reasons are presented to explain why an increase in wage beyond $W_n^*$ will lead to a reduction in effort. The first is derived from the backward bending labor supply curve (Gravelle and Rees 2004). Orthodox labor supply models tend to predict a positive labor supply reaction to increases in wages. Employees would substitute labor with leisure, and vice versa. They would supply more labor when wages are high, and consume more leisure when wages are low (Lucas and Rapping 1969). Although this prediction is straightforward, it is difficult to verify and not universally accepted. For instance, Camerer et al. (1997) found negative elasticities on the labor supply of New York cabdrivers, which suggests the existence of a backward labor supply curve in the New York cab industry. Once cabdrivers met their daily income target, they quit working. This implies a particular work/leisure preference function where the negative income effect outweighs the substitution effect of a wage rise. This is always an empirical question for a particular type of labor supplied. Similarly, in his writing on happiness, Frey (2008) stated that although a higher income can make people happy, the higher utility derived from material goods will wear off as people adapt to the higher income level. He reasoned that satisfaction comes from change, and disappears with continued consumption.

The second reason for the drop in effort with an increase in wages beyond the optimum point can be drawn from the body of literature on the negative impact of high levels of extrinsic rewards on intrinsic motivation, as mentioned earlier in the PSM literature. High levels of wages have been reported to undermine or ‘crowd-out’ intrinsic motivation (Deci 1971, 1972; Frey 1997). They are argued to undercut employees’ PSM levels (Crewson 1997; Le Grand 2003), which can drive down their effort levels.

The relationship between effort and PSM can be described as

\[ ef = \frac{PSM}{E_i} \quad ef_1, ef_2 > 0, \text{ and } ef_11, ef_22 > 0 \]  \hspace{1cm} (2)
where \( ef = \) the elasticity of effort with respect to PSM, and \( E_i = W_n/W_e \). High PSM raises effort (Alonso and Lewis 2001; Brewer and Selden 1998; Bright 2000), and reduces the dependence of wages on effort based on the argument that high wages can undermine PSM (Crewson 1997; Frey 1997; Le Grand 2003).

To find the optimum efficiency wage \( (e) \) and PSM-adjusted wage \( (ee) \), the equation below is utilized.

\[
e = E_i/W_n = 1, \quad \text{and} \quad ee = PSM/W_n = 1
\]

(3)

Operationalizing equation (3) is done by taking logarithms of the variables \( \partial \log W_n/\partial \log E_i \) and \( \partial \log PSM/\partial \log W_n \). The relationship between PSM and effort is captured by the elasticity of PSM with respect to effort \( (ef = \partial \log PSM/\partial \log E_i) \).

**Method**

**Sample**

This study utilizes the 2005 *International Social Survey Programme (ISSP): Work Orientations* dataset in fifteen countries. They consist of USA, Canada, Great Britain, Denmark, France, Germany, Spain, Bulgaria, Slovenia, Russia, Israel, Japan, Taiwan, Australia, and New Zealand. Only respondents who participated full-time in the labor market, and those working in the public sector and private sector are taken into account. The private sector respondents include self-employed individuals. The sectoral division permits relative wage to be determined. The total number of respondents was 9,742. The mean age of the respondents was 41.7 years. A majority of them were males (57%), and married (63%), held higher than secondary school qualifications (26%), and worked an average of 40 hours per week (32%) in the private sector (70%).

**Measures**
The ISSP dataset provides two measures:

1. Wages. This is derived from the respondents’ annual income (expressed in the country’s currency). A mean wage is then calculated for each country by sector.

2. PSM index. This is estimated from two items: ‘A job that allows someone to help other people’; and ‘A job that is useful to society’. On a 5-point Likert scale, ranging from ‘not at all important’ (1) to ‘very important’ (5), the respondents indicated the importance they personally placed on the existence of each item in a job. An average score of the two items is calculated for each respondent. Factor analysis (principal component, varimax rotation) of the two items measuring the PSM index revealed a single construct. Cronbach’s alpha = 0.79

The above data are used to estimate efficiency wage ratio (government wages/private sector wages), the elasticity of effort with respect to wages (e), the elasticity of PSM with respect to effort (ef), and ‘PSM-adjusted wages’ (ee), as specified in equation (3).

**Findings**

The findings are presented in Table 1. The first column in the table shows an average efficiency wage ratio above unity, which conforms to the efficiency wage specification. The value of 1.03 implies that most governments in the 15 countries, such as Australia and New Zealand, were paying their public sector employees slightly above the market rate or efficiency wages at that time. The exceptions were USA, Denmark, France, Bulgaria and Russia. Public sector employees in these countries were paid below the prevailing market wages.

<table>
<thead>
<tr>
<th>Countries</th>
<th>Efficiency wage ratio</th>
<th>e</th>
<th>ef</th>
<th>PSM-adjusted wage (ee)</th>
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<tbody>
<tr>
<td>Australia</td>
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<td>New Zealand</td>
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<td>USA</td>
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<td>Denmark</td>
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<td>Bulgaria</td>
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<td>Russia</td>
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<tr>
<td>Other countries</td>
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</tbody>
</table>
USA (N = 841)  0.62  0.20  0.68  0.15  
Canada (N = 471)  1.07  0.21  0.62  0.13  
Great Britain (N = 330)  1.09  0.23  0.61  0.14  
Denmark (N = 960)  0.83  0.18  0.62  0.11  
France (N = 842)  0.88  0.30  0.59  0.18  
Germany (N = 660)  1.20  0.31  0.60  0.18  
Spain (N = 493)  1.22  0.33  0.63  0.20  
Bulgaria (N = 428)  0.85  0.40  0.65  0.27  
Slovenia (N = 496)  1.15  0.18  0.60  0.11  
Russia (N = 873)  0.78  0.26  0.61  0.16  
Israel (N = 415)  1.14  0.27  0.64  0.17  
Japan (N = 379)  1.26  0.28  0.58  0.16  
Taiwan (N = 1120)  1.17  0.22  0.61  0.13  
Australia (N = 832)  1.08  0.21  0.61  0.13  
New Zealand (N = 612)  1.03  0.21  0.61  0.13  
Average  1.03  0.25  0.62  0.16  

e = elasticity of effort  
en = elasticity of PSM  
N = number of respondents.

On average, the elasticity of effort with respect to wages, e, was estimated to be 0.25. This implies that governments in the selected countries which wish to increase their employees’ effort by 1 per cent will need to increase their public sector wages by 0.25 per cent. The comparatively high e value in some countries, such as that in Bulgaria and Spain, implies that these governments will need to pay higher wages in order to bring about a similar rise in effort of 1 per cent amongst their public sector workforce. The smaller the value of e, the smaller the governments will need to pay their public sector workforce to raise their effort. Countries which show relatively small e values are Denmark and USA.

The third column in Table 1 shows a mean elasticity of PSM with respect to effort, ef, of 0.62. This implies that, for every one percent increase in the effort level of the public sector workforce in the 15 countries, PSM contributed 0.62 per cent to that one per cent. A higher ef value suggests the greater importance placed on PSM to bring about a change in effort. For instance, on average, a 0.68
per cent increase in PSM levels amongst the American public sector workforce contributed to a 1 per cent rise in their effort level. In comparison, a similar rise in effort level amongst the Japanese counterparts is derived from a 0.58 per cent increase in their PSM levels. The finding also points to the significance of PSM amongst the public sector workforce in the 15 countries in bringing forth a rise in effort relative to wages, as evident by the higher \( ef \) values compared to the \( e \) values for every country.

The last column in Table 1 reports on the ‘PSM-adjusted wage’ \( (ee) \). It demonstrates that when PSM is taken into account, government employers require a smaller increase in wages to bring about a rise in effort. On average, a 1 per cent change in effort is associated with 0.25 per cent change in efficiency wages, relative to 0.16 per cent change in PSM-adjusted wages. This trend of lower PSM-adjusted wages than efficiency wages to bring about a similar rise in effort applies to all 15 countries, even in those that show an inclination for a higher than average PSM-adjusted wage increase, such as Spain and Bulgaria.

Discussion

This paper attempts to develop a model to explain the complex relationships between wages, PSM and effort amongst the public sector workforce. The model, which was piloted on 15 countries, presents four prominent findings. First, many governments are found to be paying their public sector workforce efficiency wages. Countries that failed to meet the efficiency wage specification in the public sector are USA, Denmark, France, Bulgaria and Russia. According to wage efficiency theory, employees who receive wages that are higher than the prevailing market wages are likely to be exerting an optimum level of effort. If this is true, then one could expect the public sector employees in most of the countries studied to put forth high levels of effort in their work.
Second, the elasticity of PSM with respect to effort, \( ef \), is estimated to be greater than the elasticity of effort with respect to wages, \( e \). This would suggest that a more cost-effective way to raise government employees’ effort is through their PSM levels. The findings confirm the significance of PSM in shaping effort (Alonso and Lewis 2001; Brewer and Selden 1998; Bright 2000; Naff and Crum 1999).

Third, the PSM-adjusted wage (\( ee \)) is found to be lower than \( e \) for all 15 countries. On average, a 1 per cent change in effort is associated with 0.25 per cent change in efficiency wages, relative to 0.16 per cent change in PSM-adjusted wages. In short, when the employees’ PSM is considered, one would require a smaller increase in wages, or one that is lower than the amount proposed by efficiency wage theory, to bring about a rise in effort. The finding downplays the significance of wages in driving effort amongst government employees with high PSM levels, and is supported by earlier research (Perry and Hondeghem 2008; Perry and Wise 1990).

Fourth, there are some countries which registered unique characteristics. The fact that the Spanish public sector paid their employees one of the highest wage premiums (1.22) amongst the 15 countries, but registered one of the highest \( e \) value (0.33) might suggest that the public sector wage level in this country has risen beyond the level required to achieve an optimum effort level, as discussed earlier in Figure 1. Despite being paid a large wage premium, Spanish government employees required higher than average increase in their efficiency wages to bring about a rise in effort similar to those of their international counterparts. Their PSM-adjusted wage is much smaller than their efficiency wage at 0.20, though it is still above average. It is likely that these employees placed a greater importance on wages than their international counterparts. The variance in the values of \( e \) and \( ee \) across the 15 countries highlights the differing emphasis placed on the importance of wages across different countries. Government employees in Spain and France, for example, required greater changes in efficiency and PSM-adjusted wages than those in Denmark and USA in order to change their effort by a similar amount.
The results for American government employees are worthy of special mention. Although they received wages that were lower than those of their private sector counterparts, they required a comparatively smaller change in wages than that of their foreign counterparts in order to raise their effort by 1 percent. Although PSM is one of the contributing factors, this article does not discount the possibility of other factors at play in affecting effort levels. Further research should consider other factors in the analysis, such as the work environment (Moynihan and Pandey 2007; Perry 2000), and job attributes (Grant 2007, 2008; Taylor 2008).

This study is subject to a few caveats. The first relates to the small sample size. This model was piloted on a small group of full-time public sector employees. The second involves the use of cross-sectional data, which cannot be subjected to time series analysis. The third pertains to the reliance on pre-existing survey research data. This implies that the findings are constrained by the items used to determine PSM. Future research should be conducted with a larger sample size, across time, and with stronger and established measures of PSM, notably Perry’s PSM instrument (Coursey and Pandey 2007; Perry 1996, 1997; Vandenabeele 2008). Nevertheless, the findings in this small pilot study support the descriptive literature and empirical studies containing assertions on the significance of PSM in the workplace. In particular, it suggests that PSM not only reduces the reliance on wages to raise effort, but it also accounts for a larger change in effort than wages.
References


1 The significance of considering relative wages in affecting outcomes is supported by other scholars. Duesenberry (1949) formulated and econometrically tested the relative income hypothesis which proposed an asymmetric structure of externalities. Frey (2008) similarly noted that individuals today are faced with extended possibilities for social comparisons, which can affect their perceptions
of the value of income: ‘It is not the absolute level of income that matters most, but rather one’s position relative to other people’ (Frey and Stutzer 2002, p.85). Equity theory also raises the idea of social comparability, which can be applied to wages. It proposes that individuals evaluate the ratio of their inputs to outcomes for a given task in relation to a comparative referent (Adams 1965; Harder 1992; Walster et al. 1978). The optimal point exists when the individuals perceive the ratio as a balanced one, i.e., equal to one. At this point, they can focus their energies on achieving the organization’s goals as this will in turn satisfy their personal goals. On the other hand, employees who perceive that they are undercompensated or treated unfairly can resort to negative actions, such as theft, reduced output quality, and turnover (Cowherd and Levine 1992; Greenberg 1990; Summers and Hendrix 1991). In his study of professional basketball and baseball players, Harder (1992) found that under-rewarded players behaved less cooperatively and more selfishly.

This norm of reciprocity in an exchange relationship, such as that of employment, has also been raised in the psychological contract literature (Coyle-Shapiro and Kessler 2003; Rousseau and McLean Parks 1993).