

Performance pay-Health Nexus; The woeful tale of performance pay as the enhancer of workers' productivity.

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Introduction

The current practice in human resource management is the use of a broad toolkit of incentive mechanisms to encourage employees to exert elevated effort (Gibbons and Waldman, 1999). The use of such an array of instruments has been attributed to the agency problem in the employment relationship where the worker effort cannot be verified. Thus, firms design incentive contracts that seek to motivate employees to exert elevated effort in carrying out the job tasks (Mirlees, 1976)

Holmstrom, (1979) and Prendergast (1999), have pointed out that the incentive mechanisms for increasing employee effort vary widely across different organizations. Some firms may find it optimal to rely on explicit contracts that tie pay to observable measures of (individual or aggregate) performance such as piece rates, stock options, bonuses, profit sharing. Other firms prefer reward systems that rely on discretionary subjective measures of productivity. Yet, other firms may favour alternative (dynamic) strategies such as promotions, efficiency wages, deferred compensation, career development and the like, thus avoiding the use of pay-for-performance altogether.

Traditional economic theory has favoured the performance pay schemes as the most efficient of the payment schemes proposing that performance pay fosters higher productivity. As Lazear (1986, 2000), has argued, notwithstanding the variety of incentive mechanisms, they induce workers to exert extra effort on the job. This view has been supported by further studies (Gielen, Kerkhofs, van Ours, (2010) and Dohmen and Falk (2011)). Yet, the effects on performance appear to depend on the level of the pay incentive. In this respect, using field experiments Gneezy and Rustichini (2000), have concluded that *"for all positive but small enough compensations, there is a reduction in performance as compared with the zero compensation..." but once the extrinsic motivation is large enough, better performance is observed compared to a no-incentive pay regime'*. Gneezy's (2004) has augmented his view by pointing out that there is a non-monotonicity in the reaction of worker effort to both positive and negative incentives (e.g., bonuses or fines, respectively) and Pokorny (2008) has found an inverse U-shaped relationship between effort levels and incentive intensity. Furthermore, empirical evidence by Pouliakas and Theodossiou (2007), supported by economic experiments (Falk and Kosfeld, 2004;

Eriksson and Villeval, 2004), has shown that the effects of monetary incentives are likely to be compromised due to imperfect labour mobility, heterogeneous agents and varying individual psychological dispositions.

Studies have shown that workers who are paid, under explicit incentives schemes (partly or in total) enjoy mean wages that are higher compared to those who are paid according to time rates (e.g., Seiler, 1984; Brown, 1992, Booth and Frank, 1999; Parent, 1997 Lazear (2000)) after controlling for the workers self-selection to performance pay. To the extent that incentive schemes facilitate worker autonomy and enhance self-determination they would also be expected to increase job satisfaction. Indeed, Green and Heywood (2008) find that job satisfaction is higher among those paid by performance. Yet, McCausland, Pouliakas and Theodossiou (2005) have found that although this holds for higher paid workers, performance pay is correlated with lower job satisfaction for lower paid workers. In this respect the cognitive evaluation or motivation crowding-out hypothesis (Deci and Ryan, 1985; Frey and Jegen, 2001) proposes that although individuals may derive intrinsic satisfaction from their jobs, explicit rewards that are perceived as controlling devices or as indicators that the employment relationship is a pure market exchange (Kreps, 1997), are likely to reduce job satisfaction. Experimental studies show that explicit monetary incentives may decrease job satisfaction if they are perceived as a signal of employer distrust (Falk and Kosfeld, 2004) or as a signal of a deterioration of the reciprocity-based voluntary cooperation (Fehr and Gächter, 1998). Thus, extrinsic intervention may turn out to have a detrimental effect on employee performance due to crowding-out of intrinsic job satisfaction (Deci, 1971; Deci and Ryan, 1985; Lepper et al., 1973) or due to alteration in the nature of the psychological contract (Benhabou and Tirole, 2003; Kreps, 1997; Sliwka, 2003). Furthermore, performance pay systems may be detrimental to employee morale (Bewley, 1999), the perceptions of job security (Baker et al., 1988; Valetta, 1999), may undermine teamwork (Milgrom and Roberts, 1992), creativity and innovation (Kohn, 1993), and may affect job satisfaction in a negative fashion (Green and Heywood, 2008).

The collateral damage of performance pay; the performance pay – health nexus

As the above brief literature overview implies the effects of performance pay incentives on productivity and job satisfaction are ambiguous. Yet, since 1776 it has been recognised that performance pay may have important unwanted detrimental consequences on the health and well-being of the workforce though this has been largely neglected in the traditional economic theory. Indeed, Adam Smith has observed in the *Wealth of Nations*, Book VII that, “*Workmen ... when they*

are liberally paid by the piece, are very apt to overwork themselves, and to ruin their health and constitution in a few years”.

In view of Smith’s observation, one should expect that performance pay would have severe repercussions on the worker’s health and hence the productivity of the working population. If so the productivity gains of the use of performance pay should be balanced against the detrimental health repercussions for the workforce. The issue can be viewed through the lenses of what Keynes ‘Fallacy of Composition’. If few employers impose performance pay on their workforce, they would enjoy productivity gains as long as they are able to replace those of the workers who *‘ruin their health and constitution in a few years’* with healthy and productive ones. However, a widespread use of performance pay among all employers will end up decreasing the health and productivity of the whole workforce thus causing a decline of the productivity in the economy as a whole.

It is well articulated in the literature that a healthy workforce is an important condition for achieving high productivity in macroeconomic and microeconomic level. Key channels through which the health of the workforce impacts on macroeconomic performance include increase in health expenditures, reduced investment in human and physical capital formation, increased household expenditures on health services, reduction of the earnings capability and productivity losses arising from absenteeism, presenteeism, and early retirement (WHO 2009), Rasmussen, Sweeny, Sheehan (2016). Healthier employees are more productive, less likely to use vacation time due to illness and have lower presenteeism (Remes, Dewhurst, Woetzel (2020)). Finally, according to ILO, the economic costs of work-related injury and illness vary between 1.8 and 6.0% of GDP in country estimates, the average being 4%. Takala et. al. (2014).

Channels through which performance pay affect the health of the workforce.

There are several potential channels through which payment methods associated with incentive mechanisms may affect the health of the workforce which are not mutually exclusive. The key channels are outlined below.

First, as Smith has observed the incentive pay mechanisms may force the workers to work harder to the point that their physical constitution can tolerate and, if conditions allow, take excessive risks at work. This would ordinarily result in exposing the worker to a high likelihood of an injury occurring at work. This applies particularly to manual work. In such circumstances workers may endeavour to

increase productivity by overutilising physical capital or use physical capital in ways that circumvent safety. Evidence for this have been provided by Freeman and Kleiner (2005) in a case study involving the compensation insurance premiums for on job injuries of a US shoe manufacturer. It is found that the premiums or the worker's compensation insurance has decreased after the firm changed its payment method from performance pay to salaries. Furthermore, it is shown that that in the US over-the-road truckers who are paid by the hour face less chances of being involved in accidents compared to truckers who are paid by the mile (Monaco and Williams, (2000) , Rodriquez et al. (2003, 2006), Belman, Monaco, and Brooks (2004), Belman, and Monaco, (2005)). Similarly, Toupin et al. (2007) have found that Canadian loggers paid by piece rates face higher heart rates, an important market of the negative consequences for worker health and safety, compared to those paid hourly rates. This result confirms earlier studies by Sundstroem-Frisk (1984) who have also found that accident rates among Swedish loggers are lower for those paid hourly rates rather than piece rates. Similarly, Foster and Rosenweig (1994) report that subsistence farmers paid piece rates in the Philippines have lower body mass index (BMI) to other farm workers, *ceteris paribus*. It should be noted here that low BMI indicates health frailty since subsistence farmers have very low BMI. Bender, Green, and Heywood (2010) have used the European Working Conditions Survey to show that performance pay is positively correlated with workplace injury other things being equal. In a further study Bender, Green and Heywood (2012) have provided strong evidence of a positive relationship between performance pay and on the job injuries by using a large survey of over 30,000 workers in the EU. This finding is corroborated by Artz and Heywood (2015) and who have shown that the above results are robust when sorting, matching and individual heterogeneity are taken into account.

A second channel through which performance pay methods may affect the health of the workforce is that performance pay encourages the iworker to trade-off leisure or free time for additional engagement at work. Piece rate-like incentive mechanisms provide higher return to time spent in work than a salaried system. In effect the workers are encouraged to substitute time spent in leisure activities with extra time at work. Since leisure activities include time spent on healthy behaviours (such as exercising, sleep or cooking), an increase of time spent at work implies a reduction in such activities (Mullahy and Robert, 2010). The effects of this leisure for work trade off would not manifest themselves on contemporaneous health deterioration. Thus, unlike the case on the likelihood of injury, the adverse effects on health of a change from hourly rate to piece-rate would be cumulative over time. Dahl and Pierce (2020) have found the switch from fixed pay contracts to performance pay have caused an increase in the use of anti-depressants and anxiety medication by employees in Danish firms which signals a deterioration in mental health after the respective change in the payment

method. Bender and Theodossiou (2014) have found that workers on performance pay in the UK are more likely than those paid time rates to report conditions with cardiovascular, stomach/digestive problems and poorer emotional health. In addition, the researchers have found that performance pay workers are likely to work on average 1.5 hours more per week compared to those on fixed pay which, no doubt, indicates a trade-off of leisure time for additional pay. Furthermore, after controlling for individual and firm fixed effects and endogeneity Artz, Green and Heywood (2021) and Baktash, Heywood, and Jirjahn (2021) have found that performance paid workers are more likely to drink alcohol and use drugs compared to workers on a fixed salary. Bender and Theodossiou (2014) using the 18 annual waves of the British Household Panel Survey (BHPS) have shown that, during this period, the longer the time spent in jobs with performance pay, the higher the odds of having deteriorated overall health, more heart problems, stomach problems, and anxiety/depression. In addition, using the General Health Questionnaire (GHQ) they found that there is a strong correlation between time spent in performance pay jobs and self-reported stress.

The above findings suggest a third channel through which performance pay affects health which is mediated through elevated stress. In the medical literature it is well established (Jansen et al. 1995, Gozhenko et al. 2009 and Gleitman et al. 2004) that human physiology is well-adapted to and able to recover from brief episodes of stress what is known as the 'fight-or-flight' response. In response to stress the immune system redirects white blood cells to the skin, bone marrow, and lymph nodes areas where injury or infection is most likely to occur, the skin becomes cool and sweaty as blood is drawn away from it toward the heart and muscles, the heart rate increases, the spleen releases more blood cells into the circulation, which increases the blood's ability to transport oxygen, the digestive system slows down, the nonessential body systems shut down and activity in parts of the brain associated with short-term memory, concentration, and rational thinking are suppressed. However, when the cause of stress passes, the levels of stress hormones drop and the body's various organ systems return to normal, a state called 'Allostasis'. The absence or incomplete relaxation response leads to psychological and physiological damage through higher 'allostatic load'. A review by Rohleder (2014) finds that extended periods in stress, that is Chronic Stress' or 'Low Grade Stress', causes a cumulative wear and tear on the body, that eventually compromises the immune system (McEwen, 1998). Thus 'Low Grade Stress' has been implicated in aging, depression, heart disease, rheumatoid arthritis and diabetes, elevated cholesterol levels, among other illnesses.

As Smith's quotation above implies working on a performance pay contract is inherently stressful. This is an outcome of either due to overworking and putting additional effort on the job tasks or working

additional hours as suggested by Bender and Theodossiou (2014) or both. Furthermore, as the implicit contract theory (Gordon, 1974, Baily, 1974, Azariadis, 1975) has pointed out workers dislike wage variability due to their limited wealth at their disposal. The financial uncertainty of the fluctuating income stream causes anxiety. In view of the above, there should be expected a close relationship between working in performance pay and inflammatory responses to chronic low-grade stress which in turn, should be expected to cause long-term development of disease. Thus, people who work in performance pay contracts for longer should be expected to experience more persistent stress over time, and therefore be at higher risk of suffering from poor physical and mental health as a consequence of chronic stress.

Dohmen and Falk (2011) have used an experiment approach to investigate the sorting of more productive players into situations where there are performance-related payments. The subjects are required to solve calculations that are incentivised either by performance pay or by standard fixed pay contract to study the effect of job contracts on performance. As a secondary topic of interest, they also measure self-reported stress at the end of the experiment. The experimental subjects are asked to rate their stress and exhaustion at the end of the experiment. It is shown that those who are in performance pay express higher levels of stress and exhaustion at the completion of the experiment. In a similar experimental study Cadsby, Song and Tapon (2016) has investigated the effects of Performance pay on productivity. They have found that the increase in productivity due to performance pay is fully offset by the increased in self assessed stress caused by this payment scheme. Two important features of the above studies should be noticed. First, as with the large-scale surveys both studies use self-reported Likert scale for obtaining the information on stress felt by the subjects. Although self-reported stress may be suggestive of the true underlying, physiological change in stress, one cannot assume that there is a close relationship between self-assessed and objective level of stress. Second, both studies have allowed the experiment participants to self-select into payment schemes according to their own preferences. This mirrors the self-selection into the payment schemes as it mainly occurs in the actual labour market.

Self-selection and causality in the performance pay -health nexus.

Although the possible channels through which the effects of performance pay may affect health are realistic, Eriksson (2012) has pointed out that it cannot be assumed that the causality runs from performance pay to mental or physical health. One might argue that even if a correlation between working on a performance pay contract and low health status is established, this might be an outcome

of the self-selection of individuals with lowly health status to opt into performance pay contract as they might expect that they could be unable to perform satisfactorily in fixed contract. Alternatively, those who opt into a performance pay contract might consider themselves more resilient to the stress associated with this kind of working conditions. Furthermore, other unobserved innate individual characteristic might also affect the relationship. For instance, workers with a higher risk tolerance might exhibit higher tendency to opt into variable pay compared to their fixed salary counterparts (e.g. Bandiera et al., 2015; Cornelissen et al., 2011; Grund and Sliwka, 2010). A strong preference for risk then is likely to correlate with risk behaviour which in turn causes poorer health (Anderson & Mellor, 2008; Dohmen et al., 2005). Hence, workers with a high risk-tolerance may turn out to be both in performance pay and suffer from poor health.

Of course, in most of the literature reviewed above, the investigators attempt to control for self-selection, endogeneity and individual heterogeneity by using Heckman-type (1979) a statistical methodology. Yet, the ability of this methodology to control for self-selection, endogeneity and causation in the performance pay – health relationship depends crucially on the statistical properties of the identifying restrictions. The issue is that identifying restrictions are always challenged on statistical or theoretical grounds. To circumvent this issue, Bender and Theodossiou (2014) have circumvented this problem by using Prentice-Gloeckler hazard regression that allows for ‘frailty’ (individual heterogeneity) to estimating the hazard of originally healthy individuals under a performance pay contract to register failing health compared to their counterparts in fixed pay contract. Thus, by design causation is established. Nevertheless, a further issue of concern in the above studies is that they use of subjective self-reported health status or self-assessed stress status. Self-reported health is subject to biases such as social desirability, confirmation and recall bias (Paulhus and Vazire, 2007).

In view of the shortcomings of the above research Allan et al. (2021a) recently have used an incentivised experiment combined with objectively capturing the stress response using physiological measures, namely the body’s production of the cortisol hormone (Kirschbaum and Hellhammer (1989) and Nicolson (2008)). The study randomly allocates subjects to two groups to control for the self-selection bias. As in Dohmen and Falk (2011) the subjects are required solve arithmetic calculations. In one group, subjects are paid a flat rate and in the other group subjects are paid for their performance. To measure stress, the study has used a physiological health indicator, namely the stress-related hormone, cortisol, in saliva.

Under normal circumstances, cortisol (as part of the hypothalamic-pituitary-adrenal or HPA axis) helps to regulate the body's response to stress by generally suppressing reactions to stress through allostasis. This helps the body to return to a normal equilibrium (McEwen 2005). However, repeated or chronic stress can cause 'allostatic load' (McEwen 1998) which inhibits the ability of the body to return to 'normal' either by causing stress reactions such as increased blood pressure to continue beyond the direct impact of stress or by suppressing immune system responses to stress (McEwen 1998). Miller et al. (2007) has found that although the mechanisms are complex, there is a strong link between cortisol (and other HPA-axis hormones) and adverse health outcomes. In the experimental protocol the measurement of the cortisol in the saliva has followed the exposure of the experimental subjects into the pay regime. This clearly established the causation. The study has found that a brief 10-minute work task leads to higher levels of the stress when participants have been paid by performance compared to those paid a fixed payment. Interestingly, the results also have shown that although the subjective measure of self-reported stress levels move in the same direction with the objective stress measure obtained by cortisol readings, only the in the cortisol has shown statistically significant differences between the two groups. This implies that individuals tend to underestimate their stress at the end of the experiment Yet, similar with earlier literature this study does not control for possible individual heterogeneity or innate individual characteristics.

In a follow up study Allan et al. (2021b) have employed a crossover design to address the above shortcoming. Subjects are randomly assigned to either a performance pay or to a fixed pay regime in the initial session (which controls the self-selection issue) but in a follow up session a week later subjects participate in the alternative regime. In this design, a counter balanced crossover design, the same individuals can be compared in the treatment and nontreatment group, netting out individual factors such as mathematical ability (Ratkowsky, Evans, and Alldredge, 1992) and other time invariant factors that may be correlated with stress. Thus, this crossover design controls for individual and innate heterogeneity as the same person is control of him/herself. In addition, the study allows for a continuous tracking of stress via cortisol measurement four times over the duration of the experiment.

The study thus establishes the causal link of performance pay on acute physiological stress. The findings show that there is a clear causal relationship from performance pay on stress as measured by both subjective self-report and cortisol readings. Performance pay causes higher levels of stress after controlling for self-selection, endogeneity and individual heterogeneity. This relationship is robust to the inclusion of sociodemographic characteristics. Given the established link between repeated

exposure to stress and ill health in the medical literature, these results suggest a potentially significant negative attribute of PRP payment systems.

Notwithstanding the interest of the above findings, the experimental methodology has some limitations mainly the very limited time frame during which the experimental subjects are exposed to stress and the very low stakes. Of course, one can also argue that if performance pay for trivial tasks during limited time frame for a lowly financial gain has the ability to initiate physiological processes that generate significant elevation of cortisol, then real life job tasks, over significant periods of the individual's working life for substantial portions of the individuals livelihood income should be expected have profound and significant health repercussions for the individual as predicted by the 'low grade stress' medical literature explained earlier in this essay. Nevertheless, this remains a plausible supposition since to the knowledge of the author there is no real-world study that uses randomised case-control crossover design to address using psychological measure for rating stress.

In a recent paper Andelic et al (2021) have provided some further evidence on the effects of performance pay on medically assessed health. The study has used real world data, so it is subject to the usual shortcomings of self-selection and the like. The data from the UK Household Longitudinal Survey include a nurse assessment module in the 2011-2012 wave. Biomarkers of stress, namely blood pressure and inflammation markers in blood are included in the data as well as self-reported health. Under the usual caveats the study controls for some of the endogeneity that is associated with workers self-selecting into performance pay and as having poorer health. It also controls for socio-demographic characteristics. The study shows higher levels of systolic blood pressure among performance pay workers, who also have higher levels of fibrinogen which in turn is associated with chronic levels of stress as well as having poorer self-reported mental health. This is in line with the evidence provided by the experimental studies detailed above.

Concluding remarks

The literature reviewed above highlights the ambiguous impact of performance-related pay on the productivity of the individual worker and on the overall productivity of the workforce if performance pay is widely used in the labour markets.

Traditional theory has favoured the performance pay schemes as the most efficient productivity-inducing payment scheme and has proposed that performance pay fosters higher productivity. This review has shown that there are unwanted repercussions of the use of performance pay as there are

direct causal effects of its use on both the objective and subjective measures of the individual's health. In addition, there is a strong link between performance pay and physiological markers of chronic 'low grade stress' stress, which, in turn, has short and long detrimental effects on the health of workers. Yet, health is a major determinant of the productivity in both the microeconomic setting (for the individual worker) and macroeconomic setting (the health of the entire workforce). If performance pay harms the health on the individual worker and, its wide use, has detrimental effects on the health of the entire workforce then it follows that both the productivity of the individual worker and the productivity of the entire workforce will be negatively affected. Hence, while it may be that performance pay contracts are viewed as the optimal payment contract for a firm, use of performance pay in the labour market can have widespread detrimental effects on the employed population, which in turn may affect the long-term productivity of the labour force. If firms continue the use of performance pay schemes, they may need to implement policies to mitigate against its detrimental effects of health and in particular on chronic 'low grade' stress. This suggests a clear public health dimension to performance pay jobs and suggests that either their limited use, or policies should be developed to mitigate its harmful effects on the health of the workforce.

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