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Efficiency Wage Models and Different Policy Implications

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Abstract:
Studies related to efficiency wage consideration justifies the need for high real wage in order to increase workers' productivity; this in turn results in persistent involuntary unemployment. The present paper attempts to make an extensive survey on efficiency wage literature. The novelty of the present paper lies in the inclusion of several recent extensions (both theoretical and empirical) besides the pioneering research papers. I also investigate a number of studies related to different fiscal and monetary policy implications in the efficiency wage set up. To my knowledge the treatment of the survey in the paper is unique.

Keywords: *Efficiency wage, involuntary unemployment, fiscal policy, monetary policy*

1. Introduction

The soul conjectures of the models of the New Keynesian explanation of real wage rigidity based on efficiency wage theory is that, it is not in a firm's interest to lower real wages because the productivity (effort or efficiency) of workers is not independent of the wage, rather real wages and workers' effort are interdependent.

Marshall (1920), observed that 'highly paid labour is generally efficient. Much later, the efficiency wage idea reappeared in the literature relating to developing economics (Leibenstein (1957)). Higher real wages improve labour efficiency in developing countries by reducing malnourishment and providing higher nutrition.

Solow (1979) provides the basic structure of efficiency wage models. In Solow's model, it is employer's interest to keep wage downward rigid, because lowering wage would lower productivity and raise cost. The representative firm seeks to maximize its real profits where the firm's output depends on the number of workers it employs and their effort. The effort is assumed to be an increasing function of real wage. The optimum efficient wage is determined at the point where elasticity of effort with respect to wage is unity that is marginal cost is at its minimum. The firm accordingly hire labour up to the point where its marginal product is equal to the minimum marginal cost. Efficiency wages can give rise to involuntary unemployment as real wage is determined only on the basis of effort function and does not depend either on the level of employment or shifts in aggregate demand.

Though, higher wages reducing the malnourishment of the currently unemployed, may lead to a rise in aggregate output in the underdeveloped economy (Dasgupta and Ray (1986), Bardhan (1993)), but in the developed countries where most workers have adequate nutrition, a different reasoning for efficiency wage is needed. Hence the concept of wage stickiness is extended by a number of modern efficiency wage models related to the issues of selection and incentives.

Whatever be the rationale, the firm's optimum decision to set efficiency wage above the market clearing level certainly leads to persistent involuntary unemployment. Hence the role of different policy implications in this efficiency wage structure needs to be analysed. A number of studies have been carried out investigating the impact of fiscal policies related to labour taxation, corporate tax, commodity tax etc. Moreover efficiency wage theory is the source of New Keynesian explanation of non neutrality of money owing to real wage rigidity. Hence a number of literatures have also dealt with the impact of real effects of money in this particular structure.

As Dickens, Katz and Lang (1985) pointed out that efficiency wages cannot be rejected on a priory theoretical ground and evidence is needed. The validity of efficiency wages can only be resolved empirically; side by side an enormous literature has been developed to test empirical validity of efficiency wage hypothesis.

There are a number of studies which present excellent surveys of work on efficiency wage models like Stiglitz (1984), Akerlof and Yellen (1984), Calvo (1979), Yellen (1984),Katz (1986) etc. this particular paper differs from earlier surveys as it discusses not only the development in recent theoretical and empirical studies on efficiency wage theory but also focuses more explicitly on the studies carried out on different policy (fiscal and monetary) incidences in the efficiency wage set up.

This paper has been structured in a way that, section 2 explains different theoretical efficiency wage models which includes both pioneering studies as well as some extensions, in section 3 a number of studies regarding the impact of different fiscal policies are surveyed, further section 4 reviews models dealing with the affect of monetary policy in efficiency wage framework, section 5 surveys empirical studies related to different aspects of efficiency wage, finally concluding remarks are made in section 6.

2. Theoretical Formulation of Efficiency Wage Models

In this section a number of theoretical models considering efficiency wage relationship have been reviewed. Initially the pioneering studies on efficiency wage hypothesis and then some extended studies based on these pioneering studies has been considered.

2.1. Pioneering Studies

A number of studies in efficiency wage model can be considered as the pioneering in this field which can be classified into three broad categories.

2.1.1. Nutritional Based Models

The conventional nutritional based models are given by Leibenstein (1957), Mirrlees (1976), Stiglitz (1976), and Bliss and Stern (1978).

Leibenstein (1957), in the literature relating to developing economies refers that higher wages increase the physical well-being of workers through higher nutrition, and by reducing malnourishment. Leibenstein is the first person to explore the theoretical implication of productivity – consumption link.

In this context thorough investigations had been made by Mirrlees (1976) and Stiglitz (1976).Based on productivity consumption link on wages, Stiglitz (1976) was concerned with the consequences of the efficiency wage hypothesis for the distribution of income in the rural sector and considered the effect of increase in rural population on rural output and inequality. The broad conclusions drawn by him are,

"i) there are important conflicts between equality and efficiency, ii) complete equality is not feasible for sufficiently poor firms, iii) maximisation of family welfare may entail some degree of inequality, iv) the social marginal product of an individual is negative in the egalitarian and utilitarian farms, v) In the plantation economy, working individuals have a positive marginal product, and receive a wage equal to that marginal pro- duct; but there may be considerable unemployment"

Bliss and Stern (1978) further extended the theoretical implications of Mirrlees (1976) and Stiglitz (1976) and also tried to provide the empirical implications of some findings in their later version and concentrated the study only on agricultural labour. According to them, there is an efficiency wage which will always be paid to the landless marginal labourers regardless any other wage determining factors. Further since productivity - consumption link is stronger in the long run than in the short run, wages in the long term contract would be higher and hence advantageous than the short term contracts. Moreover theoretical solution implies the fact that at the optimum, landless labours receive more wage than the labourers with land.

In the above models, workers are paid wage higher than their reservation level which would s increases their consumption and maximise their productivity.

2.1.2. Modern Efficiency Wage Models

Apart from nutritional based efficiency wage models ,the modern efficiency wage models can be identified into four categories i) the labour turnover model, ii) the adverse selection model, iii), the fairness model, and iv) the shirking model.

2.1.2.1. The Labour Turnover Model

A reason why firms may offer an efficiency wage in excess of market – clearing wage is to reduce costly labour turnover. Such an idea is based on the pioneering work of Phelps (1968) and Phelps et al. (1970) on natural rate of unemployment and search behaviour. Stiglitz (1974) presented the labour turnover model as an explanation of the gaps between wages and unemployment of rural and urban areas. The concept, that the workers' willingness to quit a job will be significantly reduced if a firm pays above existing wage rate, was established by Salop (1979).In his model, labour market equilibrium ensures involuntary unemployment as all firms try to raise workers' wage in order to avoid the idea of quitting. If unemployment increases the wage premium necessary to avoid labour turnover will fall.

2.1.2.2. The Adverse Selection Model

In the labour market, asymmetric information is predominant. Firms have imperfect information about the productivity level of the workers, whereas workers have more information about their abilities. The firm may hire low productive labour and need to fire them when revealed but before that the firm may have already invested considerable resources in training these unproductive employees. Thus, to avoid this problem, the firm offers high wage so that higher wage attracts productive applicants. Based on this concept, Weiss (1980) presented a model where the wage offered by a firm influences both the number and quality of job seekers.

2.1.2.3. The Fairness Model

In a series of papers, Akerlof (1982) and Akerlof and Yellen (1985, 1986, 1990) tried to establish the fact that in order to maintain feeling of equity and fairness within the labour market, the firm restrain themselves to offer too low wages. Gift exchange models of Akerlof (1982, 84) is based on "a fair day's work for a fair day's pay" as effort is a positive function of workers' moral. Akerlof and Yellen (1990) formulated a "fair wage – effort hypothesis" where firms face a fair wage constraint; here optimum fair wage exceeds market clearing wage level and involuntary unemployment is ensured.

2.1.2.4. The Shirking Model

It has been thought that it is costly for the firm to collect information about workers productivity and also to monitor them .Hence the firm pay efficiency wage above the market clearing level with an idea that this may deter the workers to shirk. In the Shapiro-Stiglitz (1984) model a no shirking constraint (NSC) is considered which shows the minimum wage level corresponding to each level of employment below which shirking will take place. In case of imperfect monitoring, the optimum outcome ensures involuntary unemployment.

2.1.3. Relative Wage Theory

Summers (1988)suggests relative wage theory in efficiency wage set up in which workers productivity depends primarily on their relative wage which provides the best available apparatus for understanding actual unemployment and its fluctuation. According to this study productivity depends on the relative attractiveness of opportunities inside and outside the firm.By laying at this simple relative wage model this paper firstly describes the determination of equilibrium unemployment, where the level of employment is determined on the basis of efficiency (productivity), and workers' outside opportunities which depend positively on the utility of leisure, the value of unemployment benefits and negatively on the duration of unemployment. Secondly this paper explains why unemployment outcomes are sensitive to small amounts of insider power and shows how efficiency wage models can be extended to account for cyclical unemployment fluctuations once the role of relative wages in influencing worker productivityis recognized. Finally this paper provides the explanation why firm choose to adjust wages slowly and fire workers when adverse shocks come, with the help of misperception idea.

2.2. Extensions of Pioneering Studies

Based on the different pioneering studies on efficiency wage model, as stated in Section 2.1, a number of extensions have been formulated adding some important propositions to the literature.

Rodgers (1975) argued that since nutrition affects productivity with lag, one should expect to see long term contracts .He even found that nutritionally determined wage is also insensitive to demand.

Dasgupta and Ray (1986) have examined the nutrition based efficiency wage model in a general equilibrium setting. In such a model with different amount of wealth, wealthier workers have an advantage in the labour market. This is because for any given wage they consume more nutrients and are more productive.

Carmichael (1990), made a survey on efficiency wage literature and concluded that efficiency wage models fail to explain wage rigidity or persistent involuntary unemployment.

Kimball (1993), analysed equilibrium dynamics in the Shapiro and Stiglitz model.

Lin and Lai (1994) set out an intertemporal optimizing model embodying the efficiency wage hypothesis and examined whether the Solow condition is valid or not and has shown that, unless the turnover costs are absent and the voluntary quitting rate is independent from wage offer, the effort-wage elasticity is less than unity.

Based on the study of Lin and Lai (1994), Faria (2000) also examined Solow condition in an intertemporal model that combines efficiency wages involving shirking and turnover models with managerial supervision. It is shown that the Solow condition does not hold when shirking and turnover costs are considered. The Solow condition can be a possible outcome when managerial productivity offsets shirking and turnover costs.

Rebitzer and Taylor (1995) extended the Shapiro-Stiglitz model (1984) by considering the probability of detecting a shirker to be inversely related to the size of the workforce (in the Shapiro - Stiglitz model the probability of detecting a shirker follows a Poisson process) but assume that supervisory capacity is fixed.

Eric Toulemonde (2003) developed a simple model based on insider –outsider theory which explains why labour turnover costs cause the insiders to earn high wages than outsiders. Following efficiency wage theory, higher wages increases insiders' productivity which raises the cost of replacing insiders by low productive outsiders. This in turn increases insiders' wage further. Thus the link between effort and wages reinforces the effects of labour turnover costs on wages.

By using an extension of efficiency wage model Skott (2005) in this paper explains the existence and persistence of over education .He calibrated to fit the amount of over education found in empirical studies. The result indicates that there exists inverse relationship between the relative wage and relative employment rate of high skilled workers with aggregate economic activity. Due to rise in relative supply of high skill labour, low skill unemployment rises where aggregate employment is kept constant.

Based on the rules of Shapiro-Stiglitz's (1984) shirking model, Guerrazzi (2008) provided a general equilibrium efficiency wage model. In this framework effort decisions undertaken by the individual worker are endogenised in a continuous manner which resolves the indeterminacy in a model with exogenous effort. This model also shows that higher (lower) unemployment rates results in higher (lower) effort levels.

3. Impact of Fiscal Policies

Considering different variations in efficiency wage structures, involuntary unemployment being an obvious outcome due to persistent imbalance in the labour market, studies regarding different policy instruments have been evolved. Moreover in most countries, pay roll wage and employment tax are used to finance Social Security, Medicare and Unemployment Insurance expenditure. Both pay roll ad valorem or wage tax and specific or employment tax are imposed to the firms on the basis of the wage bill of their employees and their employment level respectively. This increases labour cost and the firm lowers wage to pass on the share of the tax to the employee. The extent of sharing however depends on the elasticities of labour demand and supply schedule that is on the nature of the

labour market. The process also affects the optimum employment level of the firm. Since efficiency wage creates imperfection in the labour market; there are a wide range of studies that tested the impact of such pay roll tax on wage and employment. The results however differ based on distinct assumptions regarding the properties of effort function in each model. Some efficiency wage literature has also studied the impact of tax policy on employment in a two sector general equilibrium framework. However, few more literatures evolved actually in connection with optimum tax policy in efficiency wage theory. In Section 3.1 and 3.2 some pioneering and extended studies regarding fiscal policy in efficiency wage models are surveyed respectively.

3.1. Fiscal Policies in Pioneering Models

In Yellen's (1984) rudimentary efficiency wage model, effort function is expressed only as a function of real wage and as the optimum real wage rate is determined solely by the nature of the effort function, after tax real wage remains unchanged due to imposition of ad valorem tax. Thus, the firm lowers employment at the optimum solution for profit maximisation where the higher level of marginal productivity of effective employment now equals higher marginal cost arising due to incidence of ad valorem tax. The effect of employment tax or specific tax however leads to an increase in after tax wage but will definitely put a negative effect on employment.

In the moral hazard model of Shapiro - Stiglitz (1984), the effect of the two taxes would produce exactly the same impact, a decrease in the after tax wage at a lesser degree and a decrease in employment.

Johnson and Layard (1986) used a moral hazard or shirking model and show that incidence of ad valorem tax keeps employment unaffected but reduces after tax wage. The tax burden will entirely borne by the workers. While incidence of specific tax may either lower or raise the after tax wage but definitely lowers employment. This is a completely reverse case of rudimentary efficiency wage model by Yellen (1984).

In the paper 'The Effect of Taxes on Labour in Efficiency Wage Models' due to Pisauro (1990), the effect of labour taxation on wage and employment in a moral hazard efficiency wage model has been tested, where effort is a continuous variable and workers are risk averse. This paper identifies that the specification of utility i.e. i) additive separability between effort and consumption, ii) linearity in effort, iii) concavity in income, enables to obtain an explicit solution for the effort function. The assumption about attitude toward risk i.e. linearity or concavity in consumption determines the choices of the firm. It has been observed that if workers are not risk neutral in consumption under reasonable assumptions, specific taxwill cause an increase in net - of – taxreal wage, which is just an opposite result related to ad valorem tax where net real wage falls. However employment would fall with the imposition of both ad valorem and specific tax.

3.2. Impact of Fiscal Policies in the Extending Version of Pioneering Models

Other than the impact of pay roll taxes, some extended studies have also been evolved related to various tax systems in the efficiency wage framework. In this section, a brief over view of such studies are offered.

In Wilson (1990), the purpose of the study is to explore the optimal system of taxes and subsidies on capital for an open economy efficiency wage model. In this model different wages are paid to the similar workers. A positive marginal tax on capital investment in the high – wage sector is being justified where there are informational asymmetries between government and private firms.

- Agell and Lundborg (1992) considered a two sector model on the basis of fair wage hypothesis and therefore allowing involuntary unemployment. Following the gift exchange model developed by Akerlof (1982), they examined the effects of various policy instruments, such as taxation and unemployment benefits on income distribution, resource allocation and unemployment. Agell and Lundborg (1995) with the general equilibrium cum fair wage model identifies the fact that when workers' effort depends on the relative remuneration of capital and labour , reduction in equilibrium unemployment is achieved by any tax policy that increases the wage rental rate and thus unambiguously lowers the rate of unemployment.
- Ching – Hueii Chang (1995) however took up the welfare aspect and stated that wage tax affects adversely after tax wage and employment while commodity tax should not have such harmful effects and thus proposed a tax policy that government must reduce the rate of tax on labour and rise revenue primarily from taxes on commodities.
- Christopher A. Pissarides (1997) modelled and simulated the effects of employment tax cuts on unemployment and wages in four equilibrium models: competitive, union bargaining, search and efficiency wages. He found that if the ratio of unemployment compensation to wages is fixed, the effect of the tax cut is mainly on wages. But if income out of work is fixed in real terms, there are substantial employment effects. When wages are determined by bargaining, revenue neutral reforms that make the tax more progressive also reduce unemployment. Thus, policy towards unemployment compensation and tax structure are key influences on the effect of taxes on unemployment.
- Delipalla and Sanfey (1998) identified that there are different versions of efficiency wage models which examined the relative effects of ad valorem and specific labour taxes on wage and employment study related to different commodity taxes on the labour market .is missing. Hence they examined the effects of two types of commodity taxation, specific and ad valorem, on wages and profits using two types of models one with efficiency wage setting and one with bargaining between a union and a firm. In the efficiency wage model revenue-neutral shift from specific to ad valorem taxation leads to an increase in both employment and wages, and a reduction in profitability. However in bargaining case the effect on wages and profits may be reversed: predominantly ad valorem taxation raises employment but lowers wages, and under certain circumstances, the net effect can lead to an increase in profits.
- Burnside, Martin and Fisher (2000) focused on the exogenous fiscal shock that leads to persistent movements in government purchases and average marginal tax rates. They analyzed the ability of a particular general equilibrium efficiency wage model

in order to test the actual responses of hours worked and real wages to a fiscal policy shock. Their key finding is that the model does not work without the assumption of constant marginal tax rates.

- Gupta and Gupta (2001) had made a dynamic analysis of the effects of various tax policies on the unemployment of an economy with a labour efficiency function which shifts overtime. Efficiency of the workers varies positively with the stock of knowledge in addition to wage and unemployment. The comparative steady state effects on unemployment with respect to change in various tax rates are analyzed assuming that the production of public good (educational output) is financed by the tax revenue.
- Lang (2003) considered that in a standard competitive model, a tax change will affect a group of workers which has high inelastic supply and their earnings will fall by the entire nominal employer share of the tax increase. Under market clearing assumption the range of possible outcomes broadens .However if there exists excess labour in equilibrium as in efficiency wage models, supply of labour is perfectly elastic and earnings increases more than the worker's nominal share.
- V.T. Rapanos (2006) assuming identical effort functions across two sectors of a simple general equilibrium model examined the effects of corporate and consumption tax on income distribution, prices, and unemployment .Effort function depends on unemployment, a corporate income tax may lead to a reduction of unemployment depending on the labour intensity of taxed sector and the level of unemployment. On the other hand consumption tax lowers unemployment as long as it is imposed on the capital intensive commodity.

However efficiency wage models are often considered as a source of non neutrality of money, the next section deals with different models related to real effects of money.

4. Impact of Monetary Policy

In the New classical models developed by Lucas, Sargent and Barro during 1970s, it has been observed that any anticipated monetary disturbance will cause an immediate jump of nominal wages and prices to their new equilibrium keeping output and employment unaffected. Hence the assumption of continuous market clearing, in these models explains neutrality of money. But in contrast, new Keynesian models (Akerlof and Yellen (1985a), Mankiw (1985), Parkin (1986), Rotemberg (1987) suggest prices and wages to be rigid rather than flexible due to the persistence of market imperfections and hence under similar new classical theoretical framework money becomes non – neutral.

In New Keynesian system of non neutrality of money, i.e. money supply effecting real variables of the economy, arises because of either nominal rigidities (of money wage or price) or real rigidities (of real wage). Fischer (1977) had considered temporary nominal wage rigidityin the form of long term wage contracts with flexible prices to explain short run non – neutrality of money. Mankiw (1985) explained nominal price rigidity, where a monopolistically competitive firm facing menu cost has little incentive to adjust price with any fluctuation in aggregate demand causing a large fluctuation in output.

4.1. Impact of Monetary Policy in the Pioneering Model

Since efficiency wages cause rigidities and since non neutrality of money arises due to rigidity, efficiency wage models are used to explain real effects of money. This fact was first identified by Akerlof and Yellen (1985a) who demonstrated that, when imperfect competition inthe product market is combined with efficiency wages in the labour market , aggregate demand disturbances those caused by monetary shocks will have real effects on production and employment.

4.2. Extensions Regarding the Impact of Monetary Policy

After Akerlof and Yellen (1985a), a number of efficiency wage models have come up to explain money's real effects. Stiglitz (1986), Summers (1988), Ball and Romer (1990), Gottfries and Westermark (1998) by using efficiency wage models presented the fact that monetary shocks raise output and employment.

In Stiglitz (1984) output falls with increase in employment if real wages are held constant i.e. cost of labour rises leading to a fall in output. If effort is being more sensitive to employment output is sure to fall otherwise output rises very little relative to employment. Moreover with nominal wage rigidity both output and employment increases with any positive monetary shock, (Stiglitz (1986)).In Summers (1988), incentive for adjustment to nominal wage with certain monetary shock is very small and hence the firm has no incentive to adjust price with unchanged cost. Moreover less the workers put weight on unemployment, incentive to adjust wages is smaller, thus positive monetary shock has positive impact on output and employment.

Since rigidities in real prices are not sufficient to create rigidities in nominal prices and real effects of nominal shocks. Ball and Romer (1990) considered that substantial nominal rigidity can arise from a combination of real rigidities and small nominal frictions. They have shown the connection between real and nominal rigidity given the presence of nominal frictions both where two sources of real rigidity one arising from goods market imperfection and the other from labour market imperfections.

Gottfries and Westermark (1998) explained the fact that aggregate demand shocks have large effects on output and employment because prices and wages adjust slowly to the shocks. Thus skilful policy activism can be used where government can react to information that was not known when wages were set. Moreover slow price adjustment on the macroeconomic level is a reflection of persistence. The more persistence there is, the slower price adjusts after permanent change in the money supply.

Lin and Lai (1998), with partial wage rigidity considering flexible component as lump sum tax, in an efficiency wage model explained non- neutrality of money. The model compares the situation of Solow (1979) and Yellen (1984) considering real wage rigidity with no impact of economy employment on productivity, where money has no real effects on real wage and employment.

The question that was thrown by Carter (2005) in this regard was whether output rise or fall with money in efficiency wage models. According to him in the basic efficiency wage models with nominal wage rigidities dealing with real effects of money like Stiglitz (1986), Summers (1988), Ball and Romer (1990), Gottfries and Westermark (1998), the impact of employment on the efficiency of the workers is absent or in some cases negligible. Carter specified using published empirical results that in the presence of strong negative impact of employment on efficiency, output may fall when monetary shocks cause employment to rise

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5. Empirical Studies Based on Efficiency Wage Model

As already mentioned there are a large number of empirical studies which validates different aspects of efficiency wage, this particular section tries to survey some of the traditional as well as recent empirical studies in this field.

Rodgers (1975) argued that since nutrition affects productivity with lag one should expect to see long term contracts .He even found that nutritionally determined wage is also insensitive to demand.

Krueger and Summers (1985) examined differences in pay for equally skilled workers in different industries. The major finding is that there is substantial dispersion in wages across industries, even after allowing for measured and unmeasured labour quality, working conditions, fringe benefits, transitory demand shocks, threat of unionization, union bargaining power, firm size and other factors. Some direct evidence in favour of efficiency wage theories is presented. The evidence suggests that industry wage differentials are successful in eliciting better performance through reduced turnover and increased effort.

Raff and Summers (1987) conducted a case study on Henry Ford's introduction of the five dollars a day in 1914.Their conclusion is that the Ford experience supports efficiency wage interpretations. According to the study, Ford's new wage strategy made significant increase in productivity and profit. There are evidences that other firms too followed Ford's policy and benefitted extremely (wages in the automobile industry 40% higher than in the rest of manufacturing (Rae 1965, quoted in Raff and Summers).

Krueger and Summers (1988) examined differences in pay for equally skilled workers in different industries. The evidence supports the labour turnover model of efficiency wage which suggests that industry wage differentials are successful in eliciting better performance through reduced turnover and increased effort.

Deolalikar (1988) and Behrman and Deolalikar (1989) estimated strongest impact of calorie intake on productivity.

On making a study on Fast Food Industry Krueger (1991) explored the notion that monitoring and wages are substitutes in a framework with identical products, different ownership structures. He found that supervision is less adequate in company jobs. Shirking could be even more important in managerial jobs where there is more opportunity to exercise discretion and shirking is easier to detect in line jobs.

Capelli and Chauvin (1991) tested the shirking model of efficiency wage by examining the relationship between rates of employee discipline and relative wage premiums. The results suggest that greater wage is associated with lower levels of shirking as measured by disciplinary dismissals. Shirking and discipline are also lower where conditions in the labour market raise the costs associated with shirking by making it more difficult to find alternative employment.

Wadhwani and Wall (1991), by using the basic data from published accounts of 219UK manufacturing companies over the period 1972 – 82, tested the efficiency wage model by examining some of its predictions for the determinants of a firm's productivity. If workers are homogeneous, then differences in relative wages should not, affect the firm's output. However, in an efficiency wage model, a high relative wage in this firm will make it more productive than its counterparts. They have presented the evidence in favour of both of these predictions of the efficiency wage model.

Levine (1992) in his efficiency wage theories predicted that companies that pay high wages will have higher productivity from high work effort, low turnover, and other efficiency-enhancing effects. His paper used the PIMS line-of-business data set to test whether high wage businesses are more productive. Relative wages were measured by managers' assessments of their relative compensation, holding worker quality constant. A positive relation was found between changes in relative wages and changes in total factor productivity. The elasticity of output with respect to wages was of the magnitude predicted by efficiency wage theories.

Based on shirking efficiency wage models, a compensating differentials model and a union –firm bargaining model, Machin and Manning (1992) derived three dynamic models. In these three models, short run dynamics differ but have similar long run comparative statics. These models were tested using panel data on 486 UK companies. The evidence shows that shirking model in firms with low level of unionization but bargaining model in highly unionized industries.

Rebitzer and Taylor (1995) established the Empirical findings of a non-negative minimum wage employment elasticity, to account for endogenously determined supervision.

An interview survey was designed by Agell and Lundberg (1995) to explore how personnel managers and senior wage negotiators respond to popular models of the labor market. Nominal wage rigidity can be explained on the basis of relative wages and notions of fairness Authors find evidence of efficiency wage mechanisms and theories based on rent-sharing. Indications of adverse selection problems can also be observed.

Huang (1996) used two-digit manufacturing industry-level production functions to test efficiency wage propositions. Results demonstrate that unexplained industry wage premia and higher unemployment rates raise productivity. Wage premium and the human capital wage component cannot be aggregated into a single human capital index. 88% of the productivity effect associated with industry wages can be tied to observable human capital in the industry, where as only 12% is associated with the wage premium.

Campbell and Kamlani (1997) conducted a survey of 184 firms to find out the reasons for wage rigidity. Explanations on adverse selection in quits and the effect of wages on effort are found to show strongest support. Wage rigidity for white-collar workers is associated with reduction in turnover where as implicit contracts are prevalent in other workers. Workers are more responsive to wage decrease than to wage increase, moreover wage decrease affects the effort of low-skilled workers than of high-skilled workers.

Bose (1997) used a dynamic model of nutritional efficiency wages in order to investigate the effect of policy changes on nutritional status. The nutritional status of self-employed workers is determined by per-capita resources in that sector. He found that the nutritional status which an employer chooses for employed workers varies inversely with the nutritional status of the unemployed population. Nutritional supplements provided to unemployed workers leads to an increase in formal employment and a reduction in nutritional inequality (by the Lorenz criterion).

Fleisher and Wang (2001) examined incentive-wage effects for production and for managerial/technical workers in both urban and rural Chinese non-agricultural enterprises. They found strong evidence that the enterprises in all ownership categories show wage behaviour which is based on increasing productivity and firms in which efficiency wage is higher, employees shirking is less. There is weak evidence that joint ventures are closer to profit-maximizing behaviour at this intensive margin of wage/employment behaviour than do collectives or state-owned enterprises.

Lang (2003) empirically tested his theoretical formulation; his empirical test is based on the 1968, 1974 and 1979 increase in the taxable earnings base for FICA. It has been observed that tax increase affects only those workers having significantly more earnings than with median earnings for male full-time/year-round workers. These results support the models in which the motivational effects of wages are important.

A paper by Dalgaard and Holger (2010) constructed a nutrition-based efficiency wage model where worker body size can influence productivity. They empirically established that taller workers earn higher wages and at the same time are less likely to remain unemployed in less developed economics.

A paper by Rana, Baten and Kamil (2010) tested the validity of wage efficiency hypothesis in developing country .They have measured the technical efficiency of food manufacturing industry using unbalanced panel data set over the period 1988- 1989 to 1999 – 2000.The result in this paper states that wage efficiency policy was not valid for developing country like Bangladesh.

Samimi and Ghaderi (2011) tested the efficiency wage hypothesis for Iran's manufacturing industries at the 4-digit aggregation level of ISIC classification, during 2001-2006. According to the efficiency wage hypothesis, it is logical for some firms to pay wages that are above the market wage. If workers are paid more, they become more productive. By using panel data technique they examined the positive relationship between wages and productivity. However, the result obtained in Iran's manufacturing industries contradicts the efficiency wage hypothesis.

Wang (2014) analysed equilibrium unemployment in a model that combines efficiency wages with search and matching frictions in the labour market. They expressed equilibrium unemployment as the sum of a pure efficiency wage component and that reflects search frictions. Using standard values of calibrated parameters, they found that over 85% of equilibrium unemployment is due to efficiency wage effects.

Although, there are a vast number of empirical studies of efficiency wages, many do not accept it as convincing (Manning and Thomas, (1997)). The major problem lies with identification that is generated from efficiency wages. Moreover for the econometricians it becomes to observe workers productivity under situations of asymmetric information. This is the basic criticism of the empirical studies based on observational data. Hence in order to produce evidence by laboratory experiments which provide efficiency wage relationship, a number of studies (Fehr, Gachter and Kirchsteiger, 1993, Fehr and Falk, (1999) has been evolved in particular to the "gift-exchange" model.

The results of these experiments have been criticized by some current evidences (Gneezy and List (2006)).These do not support the "fair wage-effort" hypothesis in the long-run and hence created doubt whether the behaviour of laboratory subjects can be considered as good indication to judge actual behaviour in labour markets.

6. Conclusion

This paper makes an attempt to survey the standard efficiency wage literature as well as the recent extensions (both theoretical and empirical) in this field. Though there exist an extensive survey literature related to standard efficiency wage theory, novelties of this paper lies in the fact that i) here an attempt has been made to include more recent studies related to efficiency wage along with the pioneering models in this field, and ii) unlike the existing survey papers, the present paper tries to explore the literature related to the impact of both fiscal and monetary policies in the efficiency wage set up.

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