Featherbedding and labour market reforms

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Abstract

When labour unions are able to use first-best price discrimination, they can extract a wage above the marginal product of labour. In other words, employment is above the firm's own optimum – this is *featherbedding* or *overmanning*. This effect can capture the importance that unions put on maximizing employment. While labour market reforms are usually beneficial in the long run, they can be detrimental in the short run if investment does not pick up quickly enough.

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JEL codes: E02, E32, J08

1 Introduction

Labour market reforms in Europe have long been debated, but the topic has gained large prominence since the 2008 Crisis. Despite a consensus on the long term gains of such policies, there is strong disagreement on their short run impact, and their soundness during downturns.

Many DSGE macro models with labour market rigidities use the reduced form interpretation that these rigidities increase the wage markup. This is the analog of monopolistic competition in the goods market: a producer has monopoly power over his own variety, and charges a uniform price in an anonymous market. Since consumers choose quantities freely, the demand curve is unaffected, while the price markup shifts the supply curve inwards.

Transposed to the labour market, the labour supply curve is shifted inwards by a wage markup, while the demand curve is unaffected. It is sensible to assume linear pricing in many goods market: firms cannot observe individual consumers to conduct *first-best* price discrimination. However, this assumption can be less sensible for the labour market. Labour isn't hired by

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anonymous firms. Workers or unions have more information about the company in which they work, hence I argue that first-best price discrimination – or *featherbedding* can be a more adequate model in some labour markets.

A worker is able to extract all the surplus that he generates, and not just his marginal product. The wage is equal to the average product of labour, above the marginal product. This shifts the labour demand curve out, and leads to over-employment. Featherbedding has two opposite effects on the labour market. Setting the wage above the worker's marginal rate of substitution lowers employment. But having the wage above the marginal product of labour increases employment. The two effects can cancel each other or not. It provides a more realistic model of unions: they try to maximize wages, but not necessarily at the cost of employment. The effect of reforms on employment depends on which curve shifts most. In a depression, *increasing* featherbedding forces firms to hire more in the short run: this is a possible justification of some of the New Deal anticompetitive policies.

Related literature

Following Blanchard and Giavazzi (2003), the literature on structural reforms has studied the best strategies to implement these policies. Krause and Uhlig (2012) analyse the German Hartz reforms in a DSGE macro model. Using a calibrated multi-country DSGE model, Bayoumi et al. (2004) as well as Everaert and Schule (2006) look at the spillovers of such reforms and emphasize the importance of coordinating reforms across the Eurozone. More recently, Cacciatore et al. (2016) find that the timing of product and labour market reforms relative to the business cycle greatly matters in the short-run. Eggertsson et al. (2014) caution against deflationary structural reforms at the zero lower bound in a New Keynesian DSGE model.

This paper is also related to the labour economics literature on collective bargaining. The model of a union as a monopolist wage setter – the firm being free to choose employment – dates back to Dunlop (1944), and was generalised by Nickell and Andrews (1983) as the *right-to-manage* model. In contrast, McDonald and Solow (1981) and Manning (1987) developed models where unions bargain over both wages and employment. If the union is able to enforce a level of employment above the firm's own labour demand, this leads to over-employment, also referred to as *featherbedding*. This can however be efficient by offsetting the negative employment effect of the wage markup. Finally, this paper has links with the literature on the degree of centralisation of collective bargaining (see Calmfors and Drifill 1988, or Layard et al. 1991).

2 The model

This paper will compare the *right-to-manage* and *featherbedding* models. In the first the union sets a wage, subject to a labour demand curve. In the second, the union sets both the wage and the level of employment.

2.1 Featherbedding: labour demand

I model the wage bargaining between a worker and a firm as a principal-agent problem. There are N workers (or worker types), indexed by i. The representative firm has a production function $F(L)$. The aggregate labour supply L is an aggregate of the labour supplied by each worker i, defined by:

$$g(L) = \frac{1}{N}\sum_{i=1}^{N} g(L_i)$$

Both $F(\cdot)$ and $g(\cdot)$ are increasing, concave function with $F(0) = g(0) = 0$. Concavity of production requires that $F(g^{-1}(\cdot))$ is also concave – a stronger condition.[1] If the firm observes a wage W_i and is free to choose the amount of labour L_i, it equalizes the marginal surplus $MS(L_i)$ with the wage.

$$MS(L_i) = \frac{\partial F}{\partial L_i} = \frac{1}{N}\frac{g'(L_i)}{g'(L)}F'(L) = \frac{1}{N}\frac{g'(L_i)}{g'(L)}MPL \tag{1}$$

On the other hand, if the worker/union of type i is able to choose the wage and employment together, there is a participation constraint: the firm must be better off accepting W_i and L_i than not employing type i at all. Denote $F(L_i, L_{k\neq i}) = F(L_1, ., L_i, ., L_N) = F\left[g^{-1}\left(\frac{1}{N}\sum_{k=1}^{N} g(L_k)\right)\right]$ and similarly $F(0, L_{k\neq i}) = F\left[g^{-1}\left(\frac{1}{N}\sum_{k\neq i} g(L_k)\right)\right]$. The participation constraint is

$$TS(L_i) = F(L_i, L_{k\neq i}) - F(0, L_{k\neq i}) \geq W_i L_i$$

When N is large, the *binding* participation constraint can be approximated:

$$TS(L_i) = \frac{1}{N}\frac{g(L_i)}{g'(L)}F'(L) = \frac{1}{N}\frac{g(L_i)}{g'(L)}MPL = W_i L_i$$

Hence, the wage is the *average surplus* product of labour.

[1] For constant elasticities in the production function and labour aggregate, $F(L) = L^{1-\alpha}$ and $L = \left(\frac{1}{N}\sum_{i=1}^{N} L_i^{\frac{\epsilon-1}{\epsilon}}\right)^{\frac{\epsilon}{\epsilon-1}}$, these conditions imply $1/\epsilon < \alpha < 1$

Property 1 *(1) Under perfect competition and linear pricing, the firm observes the wages (W_i) and chooses its labour demands (L_i) to maximize its profits. The marginal surplus product of worker i is equal to the wage.*

$$W_i = MS(L_i) = \frac{1}{N}\frac{g'(L_i)}{g'(L)}MPL \qquad \frac{\partial \ln W_i}{\partial \ln L_i} = \frac{g''(L_i)L_i}{g'(L_i)}$$

(2) Under price discrimination, the worker of type i is able to capture all of the total surplus that he generates for the firm, $W_iL_i = TS(L_i)$, or

$$W_i = AS(L_i) = \frac{1}{N}\frac{g(L_i)}{g'(L)L_i}MPL \qquad \frac{\partial \ln W_i}{\partial \ln L_i} = \frac{g'(L_i)L_i}{g(L_i)} - 1$$

(3) From the concavity of $g(\cdot)$, $\frac{g(L_i)}{g'(L_i)L_i} > 1$ hence $AS(L_i) > MS(L_i)$
The demand elasticity, $\epsilon = -\frac{\partial \ln L_i}{\partial \ln W_i}$ is equal under (1) and (2) if $g(\cdot)$ is CES.

Under the featherbedding case, the wage is higher for every level of employment. Or equivalently, the labor demand is higher for every level of wage.

2.2 Labour supply

The household of type i maximize the representative utility function[2]

$$\max \mathrm{E}_0 \sum_{t=0}^{+\infty} \beta^t \left[u(N.C_t(i)) - v(L_t(i))\right]$$

subject to a budget constraint $C_t(i) + Q_tB_t(i) = B_{t-1}(i) + W_t(i)L_t(i) + \frac{D_t}{N}$
The agent receives a dividend D_t from a diversified equity portfolio, and a wage compensation $W_t(i)L_t(i)$. New bonds B_t can be exchanged at price Q_t.

Property 2 *(1) Under perfect competition, the wage is equal to the marginal rate of substitution, $W_i = \frac{MRS_i}{N} = \frac{1}{N}\frac{v'(L_i)}{u'(C)}$*

(2) Under both linear pricing and price discrimination, the wage is a markup over the MRS, with the elasticity $\epsilon = -\frac{\partial \ln L_i}{\partial \ln W_i}$ defined in property (1)

$$W_i = \frac{1}{N}\frac{\epsilon}{\epsilon - 1}MRS_i = \frac{1}{N}\frac{\epsilon}{\epsilon - 1}\frac{v'(L_i)}{u'(C)}$$

[2]The factor N is simply introduced for scaling reasons as in the labour aggregate previously. With N symmetric agents, each consumes $1/N$ of the available total consumption, $C_t(i) = C_t/N$ but the MRS will feature the marginal utility of *aggregate* consumption

Both the competitive and featherbedding cases have efficient employment, since MPL and MRS are equal. With linear pricing, employment is inefficiently low.

I now assume a continuum of workers/unions, to get rid of the factor N:

Theorem 1 *In the symmetric equilibrium*
(1) Under perfect competition $W = MPL = MRS$
(2) Under linear pricing $W = MPL = \frac{\epsilon}{\epsilon-1} MRS$ *with* $\epsilon = -\frac{g'(L)}{g''(L)L}$
(3) Under featherbedding $MPL = MRS = \frac{\epsilon-1}{\epsilon} W$ *with* $\epsilon = \frac{1}{1-\frac{g'(L)L}{g(L)}}$

Labour market rigidities are usually modeled as an employment tax, as it creates a wedge between demand and supply of labour. But here, these rigidities are acting instead as a capital income tax: featherbedding creates a wedge between the marginal product of capital and the returns to capital, and can be thought of as a tax on profits:

$$D = Y - WL = F(L) - \frac{\epsilon}{\epsilon - 1} MPL.L < F(L) - MPL.L$$

2.3 Capital intensity

Let me now introduce capital. The production function is homogeneous in capital and labour, $Y = F(K, L)$ and capital accumulation writes

$$K_{t+1} = Y_t - C_t + (1 - \delta)K_t$$

δ is the rate of depreciation. Firm owners earn the residual profits:

$$RK = F(K, L) - WL$$

If workers are paid their MPL, capital will be paid its MPK since F is homogeneous. But if the wage is higher, the returns to capital will be lower.[3]

Lemma 1 *(1) Under perfect competition and linear pricing, the firm chooses labour ($W = MPL$), and the rate of return is the marginal product of capital.*

$$R = \frac{\partial F}{\partial K}$$

[3]It is important to note that wages are only bargained *after* capital has been installed, so that it leads to a hold up problem of firms by unions. This problem could in theory be avoided through ex-ante commitment (see Grout, 1984). But here, atomistic workers/unions have an incentive to renege since their individual actions do not affect the overall level of investments.

(2) Under price discrimination, the wage is above the MPL, hence returns are lower. There is wedge between the MPK and the returns to capital

$$R = \frac{Y}{K} - \frac{\epsilon}{\epsilon - 1}\frac{L}{K}\frac{\partial F}{\partial L} = \frac{\partial F}{\partial K} - \frac{1}{\epsilon - 1}\left(\frac{Y}{K} - \frac{\partial F}{\partial K}\right)$$

In steady state, the interest rate, net of depreciation, is equal to the rate of time preference: $R = \rho + \delta$ with $\rho = 1/\beta - 1$. Using lemmas 1–2 as well as $C = Y - \delta K$ in steady state, I can solve the equilibrium L, C and K.

Theorem 2 (proof in appendix) *(1) Under linear pricing, L, C and K are lower than under perfect competition, due to the markup*

(2) Under featherbedding, C and K are lower than under perfect competition. The effect on employment L is ambiguous

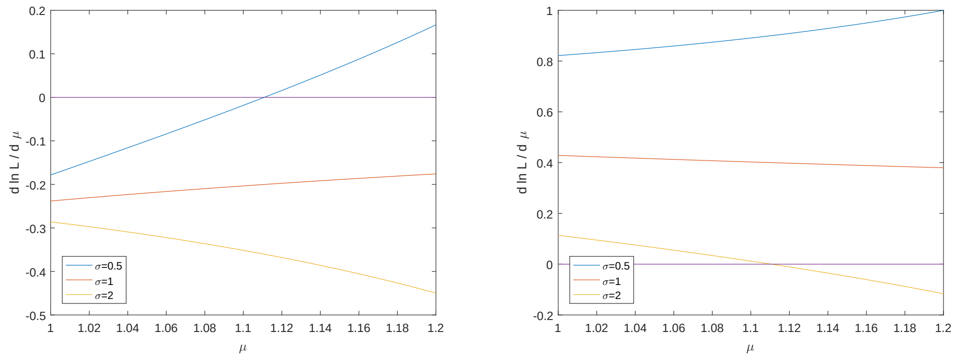
(3) C and K are higher under linear pricing than under featherbedding. The comparative impact on employment L is ambiguous

The intuition is as follows. With linear pricing, the MRS markup reduces labour supply and consumption. This reduced labour supply lowers returns to capital hence capital itself, which further reduces labour supply and consumption. Under featherbedding, the abnormally low returns to capital greatly reduce capital and hence output and consumption. For labour, there is a negative substitution effect (low wages due to low capital) and a positive income effect (due to the lower consumption). A high elasticity of consumption in the utility function makes the income effect bigger. Hence, when the consumption elasticity σ is very low, there is little or no income effect, so that the substitution effect of lower capital and lower wages brings the featherbedding employment below the competitive and linear pricing outcome. For very high values of σ, the high income effect dominates and there is more work than under the two alternatives. For intermediate values of σ, people work more under featherbedding than linear pricing, but less than under perfect competition.

2.4 Application: labour market reforms

This framework is useful to analyse structural labour market reforms. I assume that the economy starts from a featherbedding situation, with a markup both on the MPL and MRS side. The structural reform can lower either the MPL markup alone, or both markups together. These two cases can be interpreted as two different kinds of reforms, that either preserve insider/outsider dynamics, or are more inclusive. Allowing the MPL or both markups to fall has immediate consequences on employment, but it also leads to higher investment driven by higher expected profits. Hence in the long run capital increases, which improves the efficiency of the economy. This improved efficiency has two effects on employment: the higher capital increases the real wage while increased consumption will lower the labour supply. For a very high relative risk aversion, the income effect can be stronger then the substitution effect.

As an illustration, I use an isoelastic production function $Y = K^{\alpha}L^{1-\alpha}$ and an isoelastic, separable utility function $u(C) - v(L) = \frac{C^{1-\sigma}}{1-\sigma} - \lambda\frac{L^{1+\phi}}{1+\phi}$.[4] Figure 1 shows the long run percentage change in employment caused by a marginal reduction in one or two of the markups. Not surprisingly, an inclusive reform is better at reducing unemployment. In fact, reducing only the MPL markup will often lead to a fall in employment in the long run. This fall in employment is not welfare deteriorating, especially since consumption does increase in the long run hence households consume more and work less. But this does illustrate that not all structural reforms are beneficial to employment in the long run.



(a) MPL markup only

(b) Both markups

Figure 1: Marginal (long term) percentage increase in labour with a reduction in one or two of the markups, depending on the relative risk aversion σ

How these reforms affect employment in the short run depends on investment. The level of capital does not reach its new long term value immediately, hence labour remains relatively unproductive in the short run, implying a lower demand than in the long run. This would make employment fall by more (or increase by less) in the short run than in the long run. On the other

[4] I assume a wage markup $\mu = 1.1$. I assume a capital elasticity $\alpha = 0.4$, so that the labour share, including featherbedding, is $\mu(1-\alpha) = 0.66$. I set the Frisch elasticity $\phi = 2$ – but it is not crucial. The income effect is crucial, and I look at different values for the intertemporal elasticity of substitution, between 0.5 and 2.

hand, capital accumulation also increases labour demand. Hence a positive (or moderately negative) short run employment effect requires a strong response of investment. This makes well-functioning capital markets all the more essential.

3 Conclusion

In this paper I have built a model of featherbedding in the labour market, and I have argued that it can be a good description of some sectors or industries where labour unions are relatively strong. I have shown that with featherbedding, the wage is a markup over workers' marginal rate of substitution (MRS), but the wage is also a markup over firms' marginal product of labour. If these two markups are equal, the MPL and MRS are equalised. However, since the wage is above the MPL, firms' profits are abnormally low – featherbedding rigidities act as a tax on capital and not on labour. When capital is introduced, capital is inefficiently low, with ambiguous effects on employment. If structural reforms only allow firms to choose employment more freely without reducing the monopoly markup of unions, welfare improves, but the long term effects on employment are small or negative. In the short run, these reforms will be detrimental if sluggish investment does not raise labour demand quickly enough.

Using this framework in larger DSGE models is an obvious possibility of future research, to allow a more quantitative assessment, and to look at the potential role of monetary policy or gradual firm entry. While featherbedding is likely more prevalent in the labour market, some similar can exist in the market for goods and services. In sectors with very little competition, it is not uncommon that consumers have little choice about the amount of goods or services that they can buy, and are forced to buy more than what they would wish. The framework of this paper could hence also be used in the goods market.

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Appendix: Proof of theorem 2

(1) write (K, L, C) as a function of the markup μ

$$\begin{aligned} MPL(K,L) - \mu MRS(C,L) &= 0 \\ MPK(K,L) - (\rho + \delta) &= 0 \\ F(K,L) - \delta K - C &= 0 \end{aligned}$$

Differentiating this system with a Jacobian,

$$\begin{pmatrix} \frac{KF_{KL}}{F_L} & \frac{LF_{LL}}{F_L} - \frac{Lv''(L)}{v'(L)} & \frac{u''(C)}{u'(C)}C \\ KF_{KK} & LF_{KL} & 0 \\ KF_K - K\delta & LF_L & -C \end{pmatrix} \begin{pmatrix} \frac{\partial \ln K}{\partial \ln \mu} \\ \frac{\partial \ln L}{\partial \ln \mu} \\ \frac{\partial \ln C}{\partial \ln \mu} \end{pmatrix} = \begin{matrix} 1 \\ 0 \\ 0 \end{matrix}$$

As MPL and MPK are homogeneous of degree 0 in (K, L), one can show that

$$\frac{\partial \ln K}{\partial \ln \mu} = \frac{\partial \ln L}{\partial \ln \mu} = \frac{\partial \ln C}{\partial \ln \mu} = \frac{-1}{\sigma + \phi}$$

with σ and ϕ the (possibly local) elasticities of consumption and work.

(2) write (K, L, C) as a function of the markup μ

$$\begin{aligned} MPL(K, L) - MRS(C, L) &= 0 \\ F(K, L) - \mu LMPL(K, L) - (\rho + \delta)K &= 0 \\ F(K, L) - \delta K - C &= 0 \end{aligned}$$

A similar differentiation brings

$$\begin{pmatrix} \frac{KF_{KL}}{F_L} & \frac{LF_{LL}}{F_L} - \frac{Lv''(L)}{v'(L)} & \frac{u''(C)}{u'(C)}C \\ (\mu - 1) - \mu\frac{KF_{KL}}{F_L} & (1 - \mu) - \mu\frac{LF_{LL}}{F_L} & 0 \\ KF_K - K\delta & LF_L & -C \end{pmatrix} \begin{pmatrix} \frac{\partial \ln K}{\partial \ln \mu} \\ \frac{\partial \ln L}{\partial \ln \mu} \\ \frac{\partial \ln C}{\partial \ln \mu} \end{pmatrix} = \begin{matrix} 0 \\ \mu \\ 0 \end{matrix}$$

Using the (possibly local) elasticities (α, σ, ϕ), I get

$$\begin{aligned} \frac{\partial \ln K}{\partial \ln \mu} &= \left(\frac{\alpha + \phi + \sigma\frac{LF_L}{C}}{\alpha - \frac{(\mu - 1)}{\mu}} \right) \frac{-1}{\phi + \sigma} < \frac{-1}{\phi + \sigma} \\ \frac{\partial \ln C}{\partial \ln \mu} &= \frac{\left[\alpha + \phi\frac{(KF_K - K\delta)}{C} \right]}{\alpha - \frac{(\mu - 1)}{\mu}} \frac{-1}{\phi + \sigma} < \frac{-1}{\phi + \sigma} \\ \frac{\partial \ln L}{\partial \ln \mu} &= \left(\frac{\alpha - \sigma\frac{(\mu - 1)\delta(1 - \alpha) + \rho\alpha}{\mu\delta(1 - \alpha) + \rho}}{\alpha - \frac{(\mu - 1)}{\mu}} \right) \frac{-1}{\phi + \sigma} \gtrless 0 \end{aligned}$$

(3) Comparing the cases (1) and (2) above, one simply needs to look at

$$\frac{\partial \ln K}{\partial \ln \mu}|_{(2)} < \frac{\partial \ln K}{\partial \ln \mu}|_{(1)} \qquad \frac{\partial \ln C}{\partial \ln \mu}|_{(2)} < \frac{\partial \ln C}{\partial \ln \mu}|_{(1)} \qquad \frac{\partial \ln L}{\partial \ln \mu}|_{(2)} \gtrless \frac{\partial \ln L}{\partial \ln \mu}|_{(1)}$$