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How Elastic is the Demand for Labour in Belgian Enterprises ? Results from Firm Level Accounts Data, 1986-1994

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Abstract:
This paper analyzes wage elasticities using a panel dataset of more than 3000 large Belgian firms over the period 1986-94. We explore various functional forms and find that the short run wage elasticiy is unity, while the long run is -1.25. These results are striking for they are much larger than those reported in previous studies using macro economic time series data. Due to the micro economic nature of the data it is possible to take a number of important factors into account which is not possible if one uses macro data. In particular, we explicitly model firm heterogeneity and we treat the wage as endogenous. The results reported in this paper can have an important impact on economic policy and wage negotiations between the social partners in Belgium.

I. Introduction

Recently, there exists an increasing concern among politicians, economists and business men over high labour costs and inflexible labour markets as one of the main causes of the high unemployment rate in the European Union. This concern is fed by the institutional structure of many European labour markets and the increased competition from low wage countries in South East Asia and Central and Eastern Europe. While the OECD in its recent job study blames inflexible labour markets, high minimum wages and institutional factors typical for European countries for the high and persisting unemployment problem in Europe, others search for causes which are in general not related to labour costs for explaining high unemployment (Freeman, 1995). The facts are that the European unemployment rate is much higher than in North America, labour markets are more rigid, reflected in lower gross job turnover (i.e. the sum of gross job creation and destruction) and labour costs and taxes are much higher.

In this paper we investigate the effect of labour costs on the demand for labour by using a unique micro level dataset of more than 3000 Belgian companies. Economists concerned with economic policy to stimulate employment have a particular interest in the estimates of wage elasticities. Thus to predict the impact of tax changes, wage subsidies, etc. it is important to have an idea of the underlying parameter estimates. Although, Belgium is by no means a representative country for the European Union, it is one of the more interesting economies to analyze given its high and persistent unemployment rate putting Belgium in the class of countries of high unemployment in the European Union (just like Spain and Ireland). Moreover, Belgium is a small open economy and therefore it is subject to competitive pressure in international markets. Economic policy makers concerned with international competition can view Belgium as a good test case given its export oriented market.

The approach in this paper is fairly basic, yet fundamental to the problem. We are interested in the elasticity of the demand for labour. Although this is a basic question there has been relatively little work on estimating demand functions for labour as stressed by Hamermesh (1993). Most of the literature has used macro economic time series data to estimate long and short run wage elasticities, yielding relatively low values[1]. Estimates for Belgium using macro economic time series usually reveal a short run wage elasticity of about -0.15 and a long run of about -0.40 depending on the underlying economic model and time period used (Sneesens and Drèze, 1986; Sneessens and Mehta, 1990). Reviewing the literature Hamermesh (1993) concluded that a good guess for the long run elasticity is about -0.45. Those low elasticities can be explained in various ways, they might be the result of a specific model specifcation, the lack of variation in a number of variables, the lack of a sufficient number of observations, the impossibility to control for firm idiosyncracies or other non-aggregate effects or they might truely reflect low elasticities. If the latter is the case then we should not pay that much attention to the role of wages in employment determination, but perhaps focus on other factors like demand shocks or technological progress (Mortensen and Pissarides, 1995, Bean, 1995). However, before exploring those issues it is necessary to obtain some idea about the impact of wage costs on labour demand in firms.

In the following sections we will investigate labour demand elasiticities taking into account institutional aspects and firm specific technology in an implicit way. To this end we use a unique panel dataset of more than 3,000 Belgium firms over the period 1986-94. The advantages of using micro economic data rather than macro economic are numerous. Firstly, due to the combination of large cross-sections being followed over time the degrees of freedom in statistical inferences increase dramatically which increases the reliability of the results. Secondly, due to the nature of firm level panel data it is possible to take into account firm heterogeneity. Recent research pays increasingly more attention to the impact of firm heterogeneity in economic analysis, in particular when analysing firm level employment behaviour. For instance Davis and Haltiwanger (1992) for the US and Konings (1995) for the UK show that at all phases of the business cycle and even within narrowly defined sectors and regions firms simultaneously create and destroy jobs. If only macro economic data are used it is not possible to take into account those enterprise level idiosyncracies. A third reason why the use of micro panel data is

[1] See Hamermesh (1993) for a survey of the literature.

advisable is the easy availability of appropriate instruments for endogenous exlanatory variables which we will discuss in more detail below (Arellano and Bond, 1991).

In the second section we give a general theoretical background. The third section describes the basic characteristics of the data, the econometric model and methodology. We discuss the results in the fourth section and conclude the paper in section five.

II. Theoretical Background

The standard, static theory of (long run) labour demand can be derived from a cost minimization problem under the constraint of a given production plan yielding a conditional demand for labour as a function of relative factor prices and planned output. Variations in the form of the labour demand functions can be tracked back to the assumptions made about production, i.e. Cobb-Douglas, CES, translog, generalized Leontief (see also Hamermesh, 1986). In case of a two factor (labour and capital) approach the Cobb-Douglas production function is often used which yields the following static (long run) demand for labour,

$$L^* = \alpha_0 + \alpha_1 w + \alpha_2 r + \alpha_3 y \qquad (1)$$

where L^* stands for the log of desired employment, w is the log of the unit cost of labour, r is the log of the unit cost of capital and y is the log of output. The coefficient on output gives an idea about scale economies, while the coefficient on labour costs equals the negative of the coefficient on the cost of capital. This last constraint derives from the homogeneity assumption of production.

Equation (1), however, ignores any dynamic aspect of employment. Apart from the traditional costs of labour (wages) a firm incurs other transactions costs when it hires or fires workers. Those costs ensure that a firm's demand for labour does not only depend on current exogenous factors, but also on past employment levels and on expectations about the future level of such factors[2]. If the firm adjusts with a lag to changes in output or relative prices, differences between the current labour input and the long run demand may arise. The simplest way to incorporate this process in equation (1) is by assuming that labour adjusts according to (2), where λ is an exogenously given adjustment parameter.

(2) $$\Delta L_t = L_t - L_{t-1} = \lambda(L_t^* - L_{t-1})$$

Substituting (1) in (2) yields

(3) $$L_t = \beta_0 + \beta_1 L_{t-1} + \beta_2 w_t + \beta_3 r_t + \beta_4 y_t$$

Note that β_1 gives a direct estimate of the adjustment parameter for $\beta_1 = 1 - \lambda$. A constraint in (3) is that the explanatory variables have the same lag structure and that all adjustment is via employment. This is a consequence of assuming static expectations. If this assumption is dropped many different alternative formulations of (3) are possible, depending on the way expectations are formed (e.g. rational expectations, adaptive expectations, etc.). Clark and Freeman (1986), Hamermesh (1993) among others investigated and reviewed those issues. Several approaches are possible here. One approach shown by Machin, Manning and Meghir (1992) is to start from an intertemporal optimisation problem, incorporating a hiring function, trade union preferences over wages and employment and to derive the Euler equations. This approach aims at testing one specific model about firm and union behaviour. Another approach would be to take a fairly general starting point without putting any a priori restrictions on the dynamic structure of the model or coefficients. This approach aims at "matching" the data in the best possible way without necessarily testing a specific theoretical model. If the aim is to obtain some idea of the wage elasticity of labour demand the second approach is probably

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[2] Nickell (1986) gives a comprehensive overview of dynamic models of labour demand.

not a bad one. It is the latter which we will follow in this paper. A general formulation would result in an unrestricted labour demand equation of the following form,

$$L_t = cons + \sum_{i=0}^{n_1} \alpha_i L_{t-i} + \sum_{i=0}^{n_2} \beta_i w_{t-i} + \sum_{i=0}^{n_3} \gamma_i r_{t-i} + \sum_{i=0}^{n_4} \delta_i y_{t-i} \quad (4)$$

Equation (4) encompasses several assumptions about expectations. For instance rational expectations would boil down to (4) but with exclusion of L_{t-2}, L_{t-3}, etc. and with specific restrictions on the other coefficients (e.g. Hamermesh,1993, p 251 for more details). The advantage of using (4) is that it allows one to infer the dynamics of lagged adjustment in a general way. What is not possible to infer from equation (4) is the asymmetry of adjustment costs. For instance, as shown by Pfann and Palm (1993) asymmetric adjustment costs play an important role in the explanation of unbalanced labour demand between booms and recessions.

In the above specifications it is assumed that factor costs are exogenously given. This is not a bad assumption if the supply of labour is perfectly elastic. However if this is not the case then wages will depend on employment as well. Moreover there are many alternative ways possible in which wages can be determined endogenously. For instance in the case of trade unions, bargaining over wages and employment will lead to a particular wage which is different from the market clearing wage level. In this case wages will also depend on the employment levels. Similarly, firms might consider paying efficiency wages which will result in a higher wage than the market clearing wage. The payment of efficiency wages might depend on the number of employees in a firm. The larger the firm the harder it is to monitor workers and the more incentive the firm has to pay efficiency wages. These condierations can be modelled in various ways by making assumptions about union preferences and/or the way in which efficiency wages are paid. We will take this into account when we estimate our labour demand functions.

Another objection of the above description is that firms are assumed to be price takers. An alternative modelling strategy would take into account a price setting firm as in Layard and Nickell (1986). For instance, a price setting firm facing a constant elasticity of demand curve would choose employment as a follows,

$$N^{*}=F(w,K,\sigma^{e}) \tag{5}$$

where N^* stands for desired level of employment (rather than log employment), w is the unit labour cost, K is the capital stock and σ^e is a measure of expected demand for the firm's product relative to potential output (as in Arellano and Bond, 1991). Again, equation (5) can be rewritten taking into account costly adjustment of labour. For instance, log linearizing (5) and assuming quadratic adjustment costs of the form $(1/2)(N_{it} - N_{it-1})^2$, where N_{it} stands for the level of employment, then a log-linear approximation to the Euler equation for a profit maximising firm i at time t amounts to a version of equation (4) with capital instead of the cost of capital entering as one of the explanatory variables.

In this section we briefly reviewed the main theoretical approaches to estimate employment equations, without really deriving the various theories. Since the main purposes of this paper is to obtain an idea about the short and long run wage elasiticity without imposing any theoretical restrictions we do not develop this any further but refer to Layard, Nickell and Jackman (1991), Lockwood and Manning (1989), Konings and Walsh (1994) and Nickell, Vaniomaki and Wadhwani (1995) for a discussion and analysis of some of the theoretical points mentioned. In our empirical methodology, however, we implicitly take those considerations into account by appropriatly instrumenting the wage and other variables.

III. Data, Econometric Model and Methodology

The dataset we have at our disposal is a unique firm level panel data set covering all firms which have to submit full company accounts to the Central Accounts Administration in Belgium. This means that all companies with more than 100 employees are automatically included in the sample. Other firms are selected if two of the following three criteria are met: number of employees, total assets and sales exceed respectively 50, 85 million Belgian francs and 170 million Belgian francs. The dataset covers manufacturing as well as service industries except banks, insurance companies and hospitals. The sample is restricted to firms which have at least four consecutive time observations. This gives us a panel dataset of more than 3000 large Belgian firms over the period 1986-94.

All key variables are taken from the published annual accounts of the companies considered. Value added is used as a measure for output. We prefer to use this measure because it eliminates the problem of comparing companies with different vertical integration structures. Employment is given by the mean number of employees in a given year and consists of managing directors, white and blue collar workers. Unit labour costs are total labour costs (taxes and social charges included) divided by the number of employees. Capital is proxied by the capital stock (the summed book values of the different fixed assets components) at the end of the year.

Table 1 shows the summary statistics for some key variables in 1994. Average employment in 1994 amounts to 320. In 1994, the unit labour cost in the average firm is 1,048,000 BF and the unit employer contribution is 401,900 BF. Thus the employer's contribution to social security accounts for 40% of the total unit labour cost in the average firm in our sample in 1991. In figure 1 we show the distribution of the unit labour cost in 1994. From figure 1 we can see that there is substantial inter-firm wage dispersion. In figure 2 and 3 we show some general macro trends related to our data. Figure 2 shows the evolution of the unit labour cost, employer contribution and employment in the median firm in our sample in each year. While median employment stayed relatively constant, the unit labour costs and employer contributions increased with the former raising more, especially in the late 90's. This is also clear in figure 3 where the corresponding growth rates are plotted. It seems that employment growth adjusts with a time lag to changes in costs. Finally, there is substantial heterogeneity between firms concerning employment behaviour present in the data. Table 2 shows that on average there are 4.3% new jobs created each year, while 4.4% of the existing jobs are destroyed. Thus the gross job reallocation rate amounts to 8.8%. Subtracting the absolute value of the net employment growth gives a measure of job turbulence which is independend of aggregate movements in employment. In other words it gives an indication of firm heterorgeneity. We call it, consistent with the literature, the excess job reallocation rate and is is 7.3%. In other words, at all times, irrespective of the business cycle firms simultaneously create and destroy jobs. Figure 4 shows the evolution of those gross job flows over time.

Since we follow a large cross-section of firms over time it is useful to have some idea of the structure of the panel. What matters in this respect is the number of continuous time periods we observe one particular firm. In our estimation we required that firms had to have at least four consecutive time periods. Table 3 shows the basic structure of the panel. Table 3 shows that the panel is unbalanced and that most firms are observed for at least 7 continuing years.

The econometric model we shall estimate is derived from the previous section. A static model of long run demand for labour adjusted to allow for firm heterogeneity would give the following testable equation,

$$L_{it}=fix_i+\gamma_0+\gamma_1 w_{it}+\gamma_2 K_{it}+\gamma_3 y_{it}+\epsilon_{it} \qquad (6)$$

All variables are in natural logarithm and subscript i denotes firm i while subscript t denotes year, fix_i stands for an unobservable firm specific effect. This fixed effect represents firm heterogeneity. It could reflect different technologies for different firms, it could reflect different managerial skills or it still could reflect some other unobservable fixed firm specific characteristic. The ϵ_{it} are assumed to have finite moments and in particular $E(\epsilon_{it}) = E(\epsilon_{it}\epsilon_{is}) = 0$ for $t \neq s$. Since we do not observe the unit cost of capital we proxy this with the capital stock in firm i at time t. The output variable, y_{it}, is proxied by value added.

We do not observe the firm fixed effect, yet it is potentially correlated with the other explanatory variables - not taking it into account would yield inconsistent estimates of the other parameters. One way to control for this is to estimate (6) in first difference form, yielding

(7) $$\Delta L_{it} = \gamma_1 \Delta w_{it} + \gamma_2 \Delta K_{it} + \gamma_3 \Delta y_{it} + \Delta \epsilon_{it}$$

In the estimation we consider the wage as endogenous and we also experimented with assuming capital and value added as endogenous. The above formulations are static. Taking into account the theoretical background of the previous section we will also estimate a general dynamic model as in equation (4).

The estimation technique we used is the General Methods of Moments technique as developed by Arellano and Bond (1991). The advantage of using this method over other commonly used panel data estimation techniques lies in its efficient use of the number of instruments generated for endogenous explanatory variables. For instance, in a first differenced model valid instruments for the differenced labour cost in (7) in year 1990 is the level of the labour cost in 1988 since this is not correlated with the diffenced error term in 1990. Table 4 shows in a schematic way of how the number of instruments increases as the panel progresses. In order to test the validity of the instruments a Sargan test of over-identifying restrictions is computed and is asymptotically χ^2 distributed. Because we will estimate the model in first differenced form equation (7) will show first order serial correlation. However, what matters in a first differenced model is the absence of second order serial correlation if the error term in the levels equation (6) is white noise. Therefore, a test of second-order serial correlation is reported and is asymptotically N(0,1) distributed. In the estimation of (7) we also included time dummies and eight regional dummies, refering to the provinces in Belgium. The time dummies capture common aggregate effects, like the state of the business cycle, while the regional dummies capture the various development stages in the provinces in Belgium. We also experimented with including industry variables, but they turned out to be insignificant.

IV. Results

Table 5 shows the results of estimating a static model and a partial adjustment model as in equation (3). Because we estimated the model in first differences and because of the nature in which instruments are generated the estimation refers to the period 1989-94. We started in the first column with a static long run labour demand function. The wage is treated as an endogenous explanatory variable and the instruments used are all available moment restrictions on the wage from t-2 backwards. The second order serial correlation test does not perform badly, yet it is significant at the 10% critical level suggesting that some dynamics is not taking into account. We therefore continued with estimating the simplest dynamic model possible in column (2) and (3). Since the lagged dependend variable is included and it is a first differenced model we need to instrument it appropriately. Also the wage is again treated as endogenous. As instruments we included all available moment restrictions on employment and labour cost from t-2 backwards. Both the second order serial correlation test and the Sargan test of instrument validity accept the model specification. In column (3) we also included industry dummies and the estimated coefficients seem to be robust to common industry effects.

From column (2) and (3) it shows that the short run wage elasticity is unitiy in absolute value. This is quite high when we compare short run wage elasticities (about -0.15) for Belgium based on macro economic time series. This is also true for the long run wage elasticity. The long run elasticity is -1.23, which is again much higher than previous estimates (about -0.50) (see Sneessens and Drèze, 1986; Sneessens and Mehta, 1990). The output elasticity is about 0.50 suggesting increasing returns to scale in production. This makes sense given that the data cover all large firms in Belgium (employing more than 50 employees). Note also that the adjustment of employment takes place rapidly, the adjustment parameter on employment, refering to equation (2), the estimated adjustment parameter is 0.80. In the last column of table 5 we test for robustness of the coefficients over time. In particular we are interested in different employment responses in booms vs. recessions as suggested by Goubert, Heylen and Omey (1995). We therefore interacted the variables with a dummy equal to 1 if the year of the observation refers to 1991,92,93 and 94, the recession years. First, none of the coefficients for the recession sub period seem to be significantly different from zero, except capital. While in booms there is a positive relationship between capital and employment, in recessions this relationship is reversed and becomes negative. This is not surprising if in recessions employment is reduced, while the capital stock remains fixed. Thus in recessions firms become more capital intensive, presumably because it is more costly to adjust capital. Although for the other variables there does not seem to be a significant difference between recessions and booms it is worth noting that the estimated short run wage elasticity in the boom is -0.87 which is lower than the overall estimate of -1.0 and given a t-statistic in the recessionary years of about 1 it suggests that in booms the wage elasticity is smaller in absolute value than in recessions. This is a hypothesis worth further exploring if more data are available in the time dimension.

We next go one step further and estimate a more general dynamic model, as suggested by equation (4) and treating the other explanatory variables as endogenous as well. In table (6) we report in the first column a general dynamic employment equation, which could be derived from a model in which firms set prices, facing quadratic adjustment costs of labour and rational expectations. Similar Euler equations are reported in Arellano and Bond (1991). In the first column only the wage and employment are treated as endogenous variables. The short run wage elasticity is again -1.0 and the long run wage elasticity is -1.25, very similar as the results reported in table 5. It is interesting to note the dynamic structure of the employment equation. We can see that most adjustment occurs after one year. In the second column we treated the other explanatory variables as endogenous as well. However, the second order serial correlation test rejects the model in this case, suggesting a misspecification. In this case, the short run wage elasticity is a little above unity, while the long run approaches 2. Yet, given the bad performance of the second order serial correlation test we prefer to work with the assumptions of the first column.

The reported short run wage elasticity of -1 and the long run wage elasticity of -1.25 are drastically higher than initially was believed for the Belgium economy. Thus a reduction of the unit labour cost of 10% would increase employment by 10% or about 30 new jobs in the average firm. This means that for our sample about 90,000 new jobs could be created by reducing the labour cost in by 10%. The reasons why these results are different are most likely related to the better use of available data and the nature of micro econometric panel data. In this study we are able to take into account firm heterogeneity. This is crucial given that recent research shows how important firm heterogeneity is in the behaviour of job creation and destruction and more generally in analysing firm growth. Firm heterogeneity might be the consequence of various aspects, it could reflect underlying efficiency differences between firms, it could reflect unmeasurable management skills which are fairly fixed over time, it could also be a consequence of the strategic interactions between firms. Another advantage of the current approach lies in the way in which labour costs are treated. We explicitly took into account the endogenous nature of wage determination. Especially in large firms in Belgium this will be important because large firms either will have unions bargaining over wages and employment and/or pay efficiency wages. By using micro economic data we are able to separate out common aggregate effects, common regional effects and idiosyncratic effects on the demand for labour. Finally, we did not impose any restrictions on the coefficients which could have been done if one wanted to test a particular model. This was not the purpose of the present paper, instead we obtained an estimate for the labour cost elasticity free of any particular restrictions (see also Clark and Freeman, 1980).

The results in this paper are probably not typical for the Belgian economy, but are most likely the same for similar economies where labour costs are high due to high employer contributions and where bargaining is an important part of the wage determination process. Konings and Vandenbussche (1995) report for the UK a long run elasticity of -0.82 using a panel data set of large firms over the period 1982-89. Similar estimates using micro studies are also reported for other countries (see Hamermesh, 1993 for an overview).

The reported estimates could have important consequences for economic policy. The fact that labour demand is more responsive to changes in the cost of labour than initially was believed suggests that particular policy measures like employment tax credits, reducing employer's contribution, etc. will have a proportional positive impact on the demand for labour in Belgium in the short run and a more than proportional positive impact in the long run. It is clear from the results reported here that substantial net employment creation can be established by reducing labour costs via reducing employer contributions. If the net wage the worker receives is not affected there will be no increase in wage inequality, demand will not be affected while at the same time employment in firms will be increased. The reported estimates suggest that basic market mechanisms could be applied to generate employment.

V. Conclusion

In this paper we used firm level panel data to estimate wage elasticities in Belgium. The results are striking. The short run wage elasicity is -1.0 while the long run elasticiy is -1.25. These estimates are much higher than was initially believed based on macro economic time series data. We experimented with alternative functional forms and found that the dynamic nature of labour demand is fairly simple with most adjustment occuring via employment. The estimated coefficients are robust to those alternative forms.

These new results could have an important impact on economic policy and wage negotiations between the social partners in Belgium, all aimed at stimulating employment. It suggests that any measure reducing labour costs will have big effects on job creation in large Belgium firms. Most likely, similar results will hold for other European countries with high labour costs. We suggest that the problem of high labour costs could in the long run have drastic effects on employment generation. We did not address the issue of increased international competition from low wage countries and most likely at this stage the impact of for example competition from Central and Eastern Europe is still fairly modest. However, the awareness of the impact of labour costs on the job generation process is important especially for the long run when new economies will want to obtain an increasingly larger share of the international market. Those issues rank high on our research agenda.

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Table 1: averages in 1991

	mean
unit labour cost	877,000
unit employer contribution	335,000
employment	278
value added	568,082,000

Table 2: Gross Job Flows in Belgium

job creation rate	job destruction rate	job reallocation rate	net employment growth	excess job reallocation
0.043 (0.013)	0.044 (0.004)	0.088 (0.011)	-0.0002 (0.016)	0.073 (0.015)

Table 3: Structure of the panel

number of consecutive periods we observe the same firm	number of firms
4	591
5	441
6	426
7	1196
8	921
9	29
total number of firms in the sample	3,586

Table 4: Instruments for the wage

variable in year	valid instruments available
Δw_{i88}	w_{i86}
Δw_{i89}	w_{i86}, w_{i87}
Δw_{i90}	w_{i86}, w_{i87}, w_{i88}
Δw_{i91}	w_{i86}, w_{i87}, w_{i88}, w_{i89}
etc.	etc.

Table 5: Results, dependend variable L_{it}

explanatory variables	(1)	(2)	(3)	(4)
L_{it-1}	–	0.19 (0.028)	0.19 (0.028)	0.23 (0.084)
y_{it}	0.50 (0.034)	0.47 (0.027)	0.47 (0.027)	0.32 (0.15)
w_{it}	-1.04 (0.10)	-1.016 (0.07)	-1.010 (0.07)	-0.87 (0.24)
K_{it}	0.014 (0.007)	0.015 (0.006)	0.015 (0.006)	0.169 (0.06)
$L_{it-1(91-94)}$	–	–	–	-0.107 (0.098)
$y_{it(91-94)}$	–	–	–	0.234 (0.214)
$w_{it(91-94)}$	–	–	–	-0.261 (0.270)
$K_{it(91-94)}$	–	–	–	-0.238 (0.093)
time dummies	Yes	Yes	Yes	Yes
regional dummies	Yes	Yes	Yes	Yes
industry dummies	No	No	Yes	Yes
SOC test	-1.558	-0.922	-0.942	-0.900
Sargan test	35.38 (df=26)	64.11 (df=52)	65.31 (df=52)	44.0 (df=48)
number of firms	3604	3604	3604	3604

Note: lagged employment is instrumented using all available moment restrictions from t-2 backwards, wage is instrumented using all available moment restrictions from t-2 backwards, heteroskedastic consistent standard errors in brackets.

Table 6

explanatory variables	(1)	(2)
L_{it-1}	0.36^{*} (0.05)	0.65^{*} (0.05)
L_{it-2}	-0.02^{*} (0.009)	-0.01 (0.013)
y_{it}	0.46^{*} (0.02)	0.49^{*} (0.08)
y_{it-1}	-0.05^{**} (0.032)	-0.31^{*} (0.06)
y_{it-2}	0.013^{**} (0.008)	-0.004 (0.011)
w_{it}	-1.05^{*} (0.08)	-1.16 (0.108)
w_{it-1}	0.20^{*} (0.06)	0.44^{*} (0.05)
K_{it}	0.015^{*} (0.006)	-0.049 (0.04)
K_{it-1}	0.004 (0.011)	-0.03 (0.03)
K_{it-2}	-0.004 (0.003)	-0.002 (0.005)
SOC	0.656	1.531
Sargan test	62.33 (df=50)	41.23 (48)
Number of firms	3604	3604

Note: All equations include time, regional and sectoral dummies, * stands for significant at the 5% critical level. In equation (1) we treated the wage and employment as endogenous variables. In equation (2) we also treated the other variables as endogenous and used as instruments the level and differenced value added in period t-2, the level and differenced capital in period t-2.

Figure 1: Distribution unit labour cost in 1991

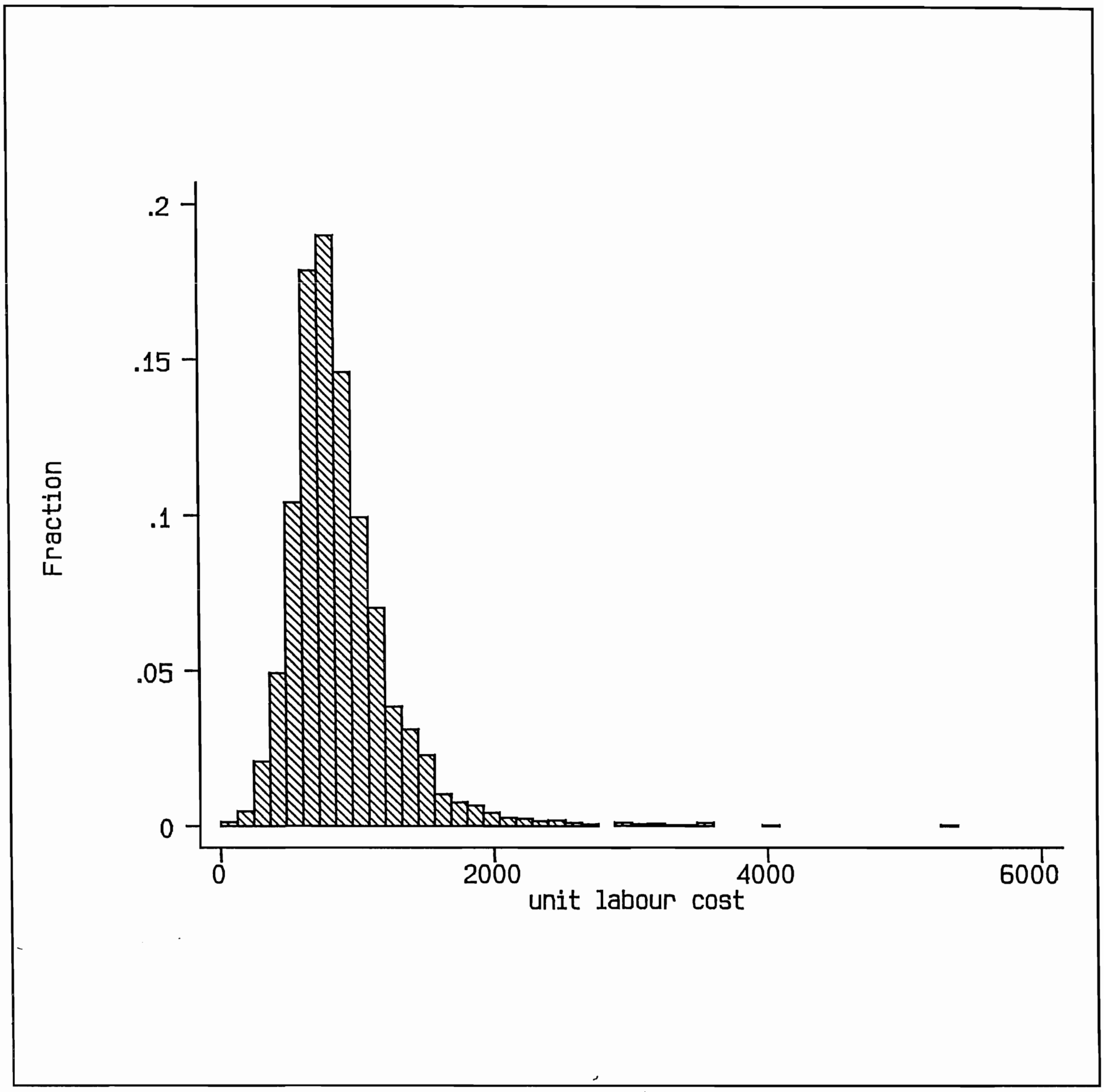


Figure 2: The Evolution of employment, labour cost and employer contribution

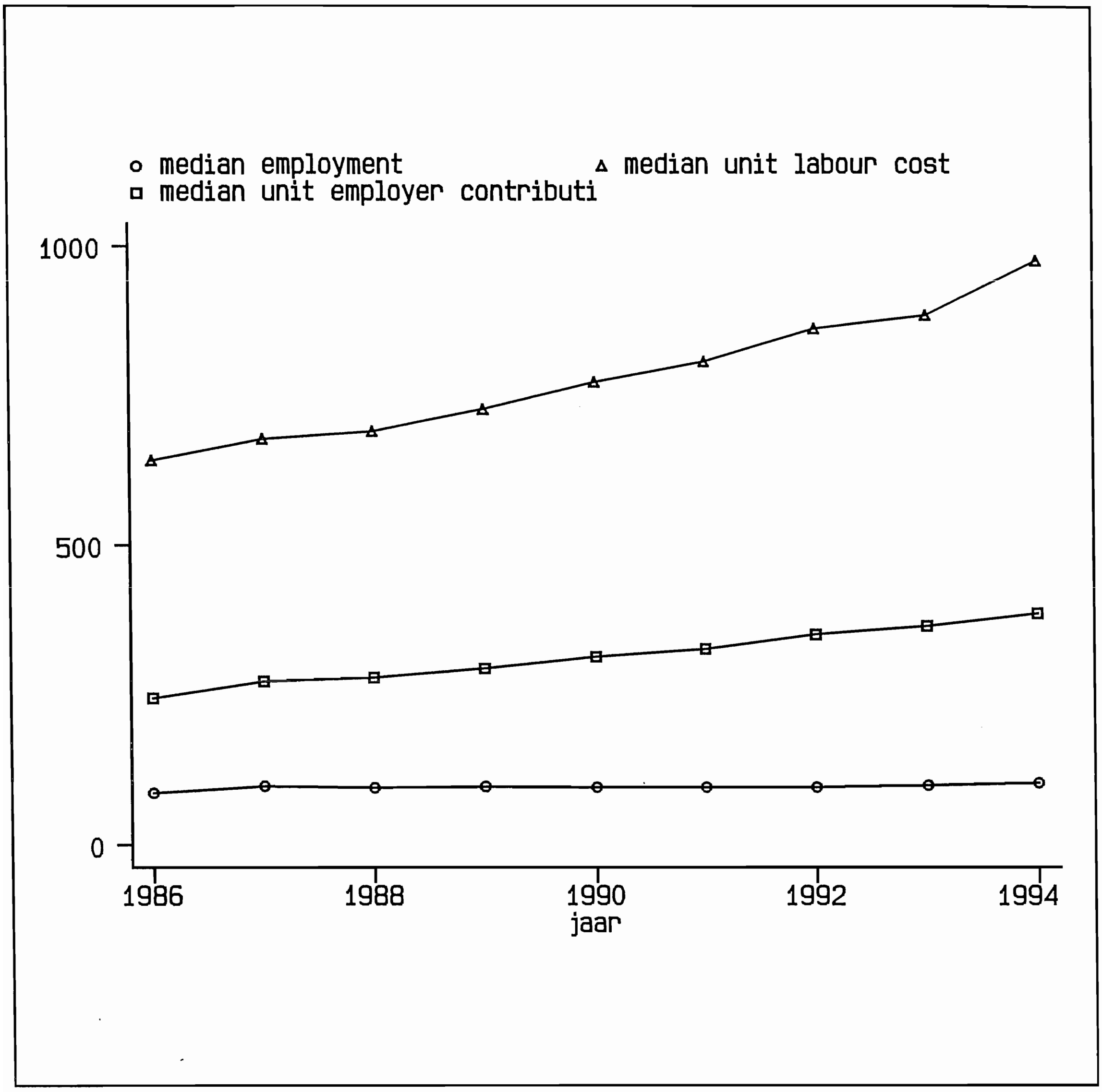


Figure 3: The evolution of growth in employment, labour cost and employer contribution

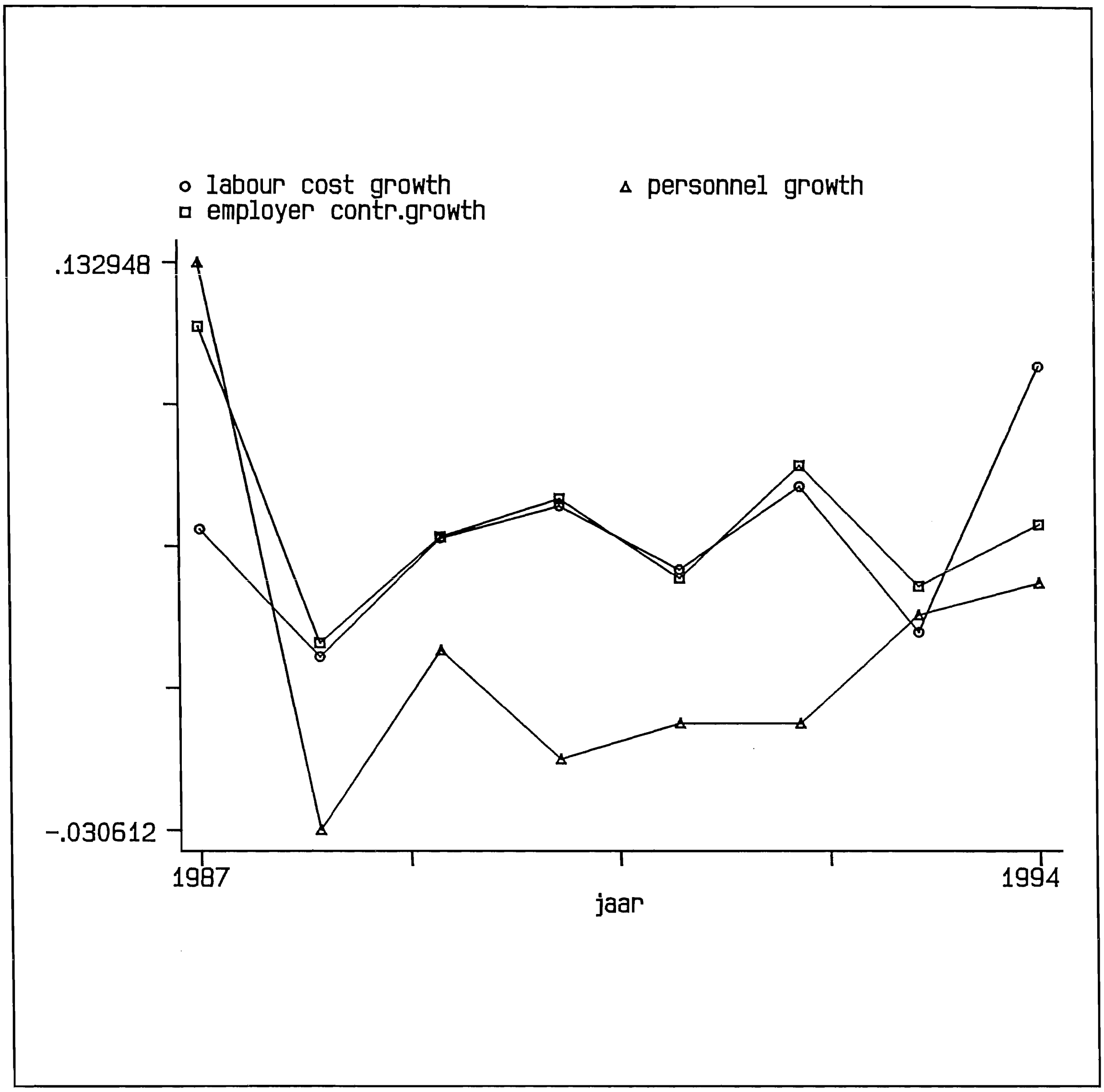
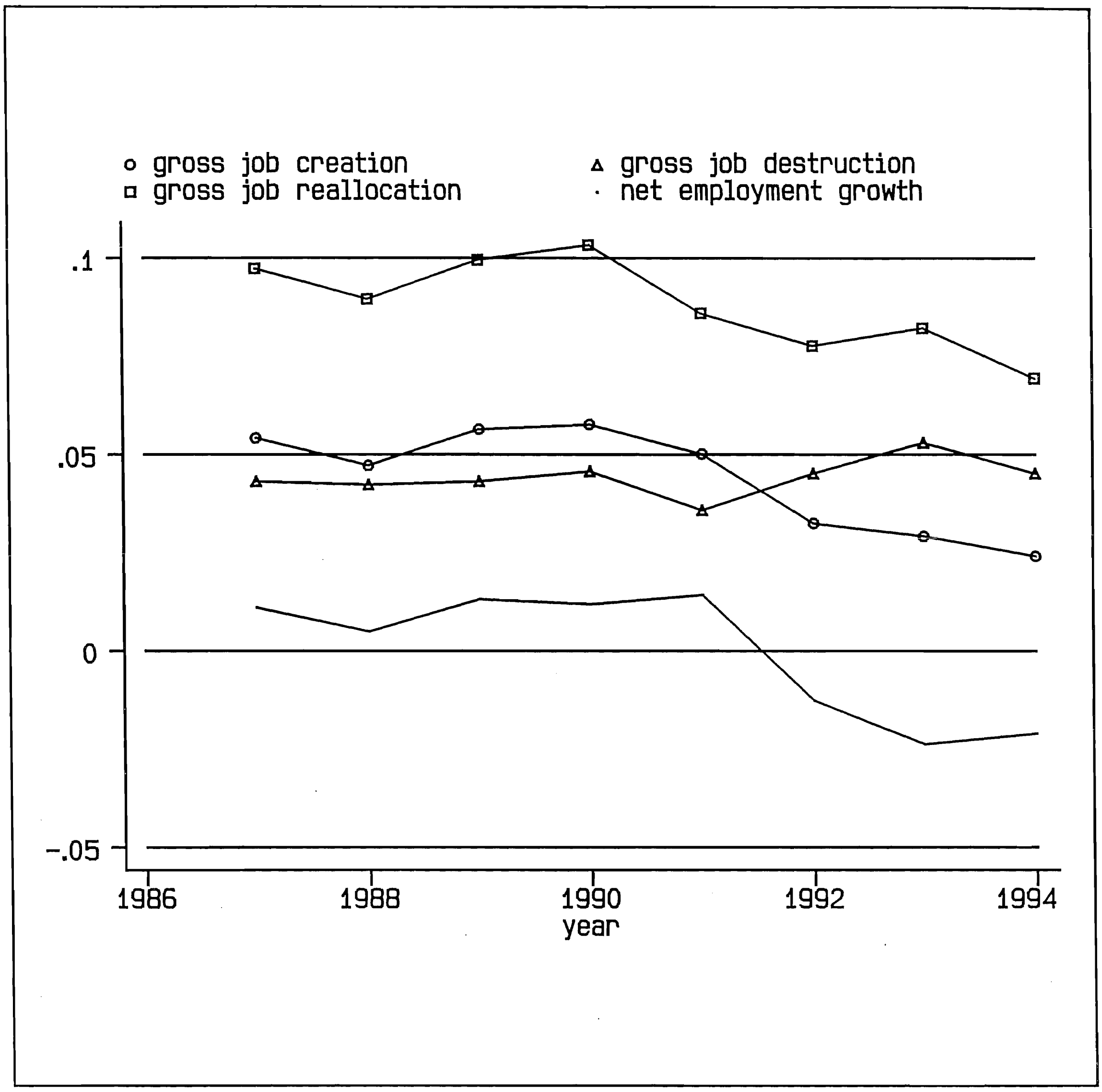


Figure 4



gross job creation
gross job destruction
gross job reallocation
net employment growth
.1
.05
0
-.05
1986
1988
1990
1992
1994
year