



Human resource management and labour demand dynamics in Belgium

724 A microeconomic analysis using employers' matched data

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Abstract

Purpose – This paper aims to estimate whether human resource (HR) practices influence labour demand dynamics behaviour.

Design/methodology/approach – Groups practices in terms of employees satisfaction and work organisation, financial incentives and individual's career perspectives, and explains how they may influence labour productivity and cost. Considering five HR variables, estimates two specifications of labour demand dynamics, under production constrained by demand or monopolistic competition regimes. Applies the two-step GMM estimator proposed by Blundell and Bond to a balanced panel of 452 Belgian firms observed during the period 1998-2002.

Findings – In the complete monopolistic competition specification, estimates a positive one lag relation explaining labour demand by average training hours combined with an indicator of well-being of workers, the fact that they are engaged in long term contracts and stay in firms. Some evidence therefore seems to show that some combined HR practices can improve labour demand.

Originality/value – Provides information on whether HR practices influence labour demand dynamics in a Belgian context.

Keywords Labour market, Belgium, Human resource management

Paper type Research paper

1. Introduction

Over the last years, the role played by human resource (HR) practices in the success of the organization has been increasingly emphasized by the literature.

The researches have highlighted two tendencies: it is not only accepted that HR practices contribute widely in the improvement of firm's performance (Knight-Turvey *et al.*, 2004; Storey, 2002; Pfeffer, 1998; Huselid, 1995) but it is also more and more talked about the need for implementing HR practices in order to retain and involve the employees in the success of the organization (Hiltrop, 1999; Mc Mahan *et al.*, 1998).

In that sense, we think that the success of the organization cannot be achieved without a motivated and qualified staff (Belout, 1998); therefore we acknowledge that a



number of HR practices can be associated with a high level of performance in the organization. In the context of this paper we will term these practices as “incentives”. We can notice that other authors have identified them as “new human resource management practices” (OECD, 1999), whereas others talk about “best human resource practices” (Pfeffer, 1998).

On the other hand, it seems that such incentive methods can also have a positive impact on the firm’s labour demand. In this perspective, Katz *et al.* (1983) as well as Schuster (1983) have shown that the work quality life or the teamwork management increase productivity. The same relation has been acknowledged for the trainings and the implementation of incentive practices based on rewards. According to this, a study held by Huselid (1995) regarding the “high performance work practices” (encompassing, between other things, specific recruitment and selection techniques, employee involvement or training programs) has pointed out that such practices could contribute to lower the employee turnover and to enhance the productivity in the firm that implements them.

This result has been confirmed by Guest and Hoque (1994) whose study has shown that most of the firms adopting HR practices aimed at involving their staff members, achieve higher quality standards and performance levels than those who do not use this kind of methods.

It is also largely considered that incentive HR practices can lead to an improvement of the employee’s satisfaction at work and consequently lower the absenteeism in the company.

With regard to labour demand, Forth and Millward (2004) have highlighted that incentive HR practices are generally related to higher wages. This link has been confirmed in the OECD (1999) report. Indeed, it indicates that:

... if the new human resource management practices can effectively enable a company to increase its productivity more than its competitors do, these extras of productivity will allow the organisation to make more profits and this will lead to a raise of the staff members wages.

Concerning the impact that incentive HR practices can have on labour demand, we have thus pinpointed that such practices will enable firms adopting them to increase their productivity, to lower the employee turnover and to offer higher wages. So, from a first point of view, incentive HR practices could influence labour demand (from either static and dynamic points of views) in different, non necessarily complementary, ways.

Incentive HR practices can also be linked to the organization’s innovation capacity. Indeed, even if few research appears to have been dedicated to this subject, there is some evidence that companies adopting such HR practices have a higher capacity to innovate.

In fact, we can assert that innovation is based on the knowledge (techniques, methods, ...) developed by the members of the organization. As suggested by Therrien and Leonard (2003):

... the ability to retain employees and to stimulate their motivation are essential factors to ensure the stability of the knowledge development process that leads to innovation.

Thereby, we can reckon that the introduction of practices, such as training (that improves the skills and the expertise of the workers) or job rotation (that allows the employee to have a wider understanding of the production processes), is essential for the company to develop its ability to innovate.

According to Laursen and Foss (2003), organizations are able to develop a larger innovation ability when they associate, at the same time, several HR practices than if they put them into action independently. In addition, the research conducted by Laursen and Foss (2003) shows that the firms that adopt many HR practices (merit related pay, profit sharing, access to information, flexible design of the tasks, teams to solve problems, autonomous workgroups, training, ...) are more likely to be innovations pioneers on the market. This probability grows when more than seven practices are applied together.

Other things equal, these phenomena could also favour labour demand by firms, through increasing market shares or developing new markets.

Aligned with this, Prefontaine *et al.* (1994) suggest considerable differences between corporations performing in R&D activities and corporations that do not. Indeed, R&D firms have bigger capacities in HR management: they invest more intensively in practices such as training or participative decision-making processes.

So the literature highlights potential benefits that incentive HR practices can have on performance, the companies' capacity to innovate and labour demand.

In this paper, we want to test for such an assertion in the Belgian context of labour demand dynamics. To achieve it, we first want to question firms about HR practices and further match their answers with a Belgian employer dataset, referred as Belfirst. Therefore, the second part is devoted to the HR practices we want to question for. The third part details the methodology we consider to question firms, while the fourth part summarises first results from collected questionnaires.

Given that we received too few answers to incorporate all the relevant information to estimate labour demand, we choose to estimate the relation between labour demand dynamics and fewer HR practices that we are able to collect or build directly from Belfirst. So the fifth part describes the models we estimate in order to capture the role of HR practices. The sixth part shortly defines the variables. The seventh part details and comments our results, while the eighth part concludes.

2. The three dimensions of incentive HR practices

Looking at different studies on HR practices and their contribution to performance (Hiltrop, 1996, 1999; Pfeffer, 1998; Becker and Gerhart, 1996; Huselid, 1995, ...), we selected three dimensions around which the incentive practices can be articulated.

2.1 Well-being of the worker and organisation of his work

The first dimension concerns HR practices that have a direct impact on the way the firm organises his work and develops the knowledge of his personnel. The firm may introduce these practices in order for its staff to be driven and to feel considered. This first dimension of incentives practices appears to form the pillar of the motivation and of the involvement of the worker in his job. Though other incentive practices exist, they cannot have the anticipated effect if they are not combined with the practices of the first dimension.

Among these practices, we retain the following potential ones:

Practices to involve the personnel in firm's quality improvement. The idea is to know different practices like whether the firm organizes quality meetings or if there exists

a box of ideas, in order that the staff members can contribute, due to their opinions and ideas, to improve quality.

This first practice is related to principles deriving from quality circles, defined by OECD (1999) as groups of workers within a same team that organize meetings regularly and voluntarily, in order to formulate measures to improve quality and to increase productivity.

Teamwork to gather the capabilities of different workers. Such a practice can make the worker more involved in projects achievement of the firm, due to the strengthening of his competencies and to the fact that he can share his knowledge with his workmates. Several authors Storey (1995), Hiltrop (1996, 1999), Forth and Millward (2004), ... see teamwork as an incentive practice and highlight its impact on firm performance.

Un (2000), quoted in Beer and Katz (2003), indicates that the capacity of the organizations to mobilize knowledge in order to innovate is associated with HR practices and a culture which recommend the teamwork and the communication between departments.

Participative decision process allows to benefit from the accurate knowledge that the workers have of their task. Hiltrop (1999) considers that this practice is one of the most efficient in order to attract and retain talent: he mentions Pfeffer (1994) and Marchington's (1995) results, according to which such a method can create a competitive advantage for the firm.

An enquiry conducted in Belgium by references and Vacature and mentioned in the newspaper Le Soir References (2004) reveals that decentralizing the decision-making allows the worker to be more efficient and involved in his work.

In the same way, according to Prefontaine *et al.* (1994), such a practice combined with the organization of frequent meetings is crucial to management of complexity, a characteristic of organizations having research and development activities.

Information groups can make the worker better know his enterprise and have an interest in it. These groups communicate not only on the general strategy of the firm (its projects, future investments, ...) but also on the results that each department achieves. Moreover, information relative to achieved results allows to stimulate the worker in relation to the objectives that the firm settles.

According to Hiltrop (1999), firms that set up practices to attract and retain talent seem to be characterized by a narrow communication towards their employees on information relative to the goals of the enterprise.

Pfeffer (1998) further considers that sharing information is very important within systems to increase performance. It strengthens the relation between the firm and its employees and contributes to the efficiency of training practices. Even if people are trained and motivated, their contribution to the performance of the firm will be more ambiguous if they do not have all the information related to the firm.

Job rotation allows the employee to do the work of another person. It encourages employee's mobility from one task to another. According to Forth and Millward (2004), job rotation is an incentive practice at work; Becker and Gerhart (1996) qualify it as a work practice having positive impacts on firm's performance.

Related to employment that incentive practices can create or remove, OECD (1999) shows that firms that have reduced hierarchical levels and founded a system of inside mobility have generally increased their manpower.

Flexible time practices allow the worker to better conciliate professional and private life. Indeed, Cerdin and Som (2003) assert that flextime brings an answer to the employee's desire. They also note that this practice is associated with a high performance in the enterprise that sets it up.

Sekiou *et al.* (1993) also highlight the impact that such a practice can have on employee's productivity, as they are more creative.

Training is qualified by Hiltrop (1996, 1999) as one of the most efficient ways to attract and retain the more talented persons in the firm. Bartel (1994) affirms that there exists a link between the use of training programs and firm's productivity. Pfeffer (1998) also identifies intensive trainings as a way to increase the organisational performance, because they use employee's knowledge to solve problems or to adapt their practice of working.

From a labour demand point of view, it comes out (Cappelli and Rogovsky (1994)) that skills required in companies that more intensively use new HR practices are higher. It is noticed that firms adopting more flexible HR practices train their personnel more than the others.

We therefore think that firms within which such practices exist should have a higher performance and productivity. They should also better retain their workforce and therefore experience lower adjustment costs.

We can remark that it is not enough to set up only one practice. As Ichniowski *et al.* (1997) or Becker and Gerhart (1996) point out, it is by the combination of these different practices that the firm could optimise its profits and establish a competitive advantage.

2.2 The financial side

Practices related to the financial dimension represent, in relation to preceding practices, a complementary source of involvement. They do not relate to the work organisation as such, but they reinforce the effects of practices such as training, teamwork or flextime.

Among financial incentives practices, we retained the following concepts:

- The type of financial remuneration. This aspect is interesting to consider in order to know if the wage depends on abilities, whether bonuses are related to individual behaviour, individual and/or team productivity or if there is a variable component in the wage. These alternatives can obviously influence workers attitudes in their jobs.
- Related to the type of financial remunerations, gain sharing is a source of incentives, as staff members can benefit from a productivity bonus allocated when productivity average is run over. In the opinion of Beer and Katz (2003), there exists a positive relation between systems of gain sharing, motivation, capacity to attract and retain talent and the organisational efficiency. Other variable components are profit sharing and capital sharing, qualified by Forth and Millward (2004) as practices that can contribute to employee's involvement. According to a survey realised in France by Cahuc and Dormont (1997), profit sharing systems tend to improve firm's productivity.

- Overtime payoff may involve the worker in his task, as overtime that he spends on the working place is compensated for; the employee is then less reluctant to make extra hours as he knows that the employer will take it into account.
- Among rewards allocated to employees, we make the distinction between three types of advantages: fringe benefits (like possessing a business car), extra-legal advantages (do the firm allow for a health insurance?, ...) and social advantages (is there a restaurant in the firm?, ...).

We therefore think that these types of advantages can also reinforce employee's involvement in the firm, as he then knows that the employer values his work.

Sekiou *et al.* (1993) assert that employees may feel narrower from their firm and more satisfied in their work when they receive social advantages. Moreover, it seems that such advantages enable to create a motivated organizational climate for productivity. Finally, some of these measures also reduce the necessity for labour adjustment in firms.

2.3 The legal aspect

The retained variables in this dimension relate to practices that concern the individual's career from a long run point of view, including lifetime security.

In this dimension, we retained the following aspects:

Internal promotion system may reinforce employee's involvement in his job, as he knows that he will have priority, relatively to external recruitments, for higher hierarchical job. According to Huselid (1995), internal promotion systems encourage employees to stay in the firm, especially when this method is combined with appropriated compensation systems.

Career plan may make the individual feel that he is giving value to his work because the firm thinks of him in its future development. This system should have more impact if career plans are communicated to concerned individuals.

According to Sekiou *et al.* (1993), these career programs may reinforce employee's motivation and may allow them to satisfy a need of esteem and fulfilment need.

Employment security ensures that the employee will most probably not be laid off if the firm encounters problems. According to Pfeffer (1998), employment security is essential to set up other high-performance practices such as training or information sharing.

Systems where employment security exists contribute to reinforce the trust relation between workers and employers and to ensure a long run working horizon.

The existence of employment security may reinforce some incentive practices efficiency. For example, training and participating decision processes are more efficient when the firm that sets them up certifies an employment security (Levine and Parkin (2002)).

According to different authors and referred studies, it seems that the combined use of the different practices should lead firms to an higher performance and it also seems that the joint use of various practices related to the three dimensions should bring firms to higher productivity and performance, as well as to personnel lower rotation and higher attractiveness, and to a stronger capacity of innovation compared to the firms not adopting (or adopting a little of) these practices.

The tendencies identified in the literature allow to raise some hypotheses and to draw up a questionnaire structured upon the three dimensions of HR practices. This questionnaire should enable us to gather data that will be used in order to analyse, within the limits of our sample, the relations between incentive practices and labour demand.

3. Hypotheses to be tested and methodology to collect HR data

According to the several studies that we have mentioned above, it seems clear that incentive HR practices could higher labour productivity and innovation capacity and lower the adjustment costs. Through these channels, they could also affect labour demand and the innovation capacity of firms that adopt them.

Thus, we want to answer some critical questions in the Belgian context. What are the incentive HR practices commonly used in Belgian businesses? Is there a link between the implementation of such practices and labour demand? Can we find some elements of similarity between firms that implement these practices?

In an attempt to answer these questions, we have built a questionnaire divided into three parts. The first one encompasses questions related to the incentive practices that an organisation could put into action, from our three dimensions point of view. The second part gathers information about the firm and its environment, like human capital characteristics, potential reasons for product market power, market-share or potential labour market power. The third one includes questions related to the profile of the respondent and the function he is working in.

The considered period runs from 2001 to 2003. The questionnaire has been handled over to people working in the HR department of companies employing more than 100 workers. According to the literature, there are no well-constituted HR departments in businesses with less than 100 workers. In order to obtain additional information about firm activities, we have joined data using the Belfirst database that covers a wide range of financial and social information about Belgian firms.

The respondents could take part to the survey through an internet website where the questionnaire was presented, could be filled and sent out online. To communicate the address of that website to a large number of people working in the HR field, we chose to use a system of newsletters delivered by a magazine specialized in the HR field. We also inserted a link to our questionnaire on several internet websites dedicated to HR. However, we received too few answers to be able to include joined data in an econometrical, multivariate estimation. We therefore first present bivariate results.

4. First results

We received only 19 questionnaires and we had to reject eight of them because of lacking data, related, for example, to the VAT identification number that is required to access to financial and social information available on the Belfirst database.

So the results presented concern only 11 firms, four from services and seven from industrial (food, chemical, computer industries, ...) sectors.

Concerning the size of these firms, four of them employ less than 200 people while only one employs more than 1,000 individuals.

Considering well-being of the worker and organisation of his work, we first observe that eight firms have set up systems aimed at involving personnel (principally executives and white collars) in quality's improvement. Six companies have developed

teamwork for executives and white collars and four companies have developed participative decision process. We note that executives and white collars are more concerned with information groups and that job rotation is more frequently used for white collars. Flexitime practice is more often used for executives and white collars than for blue collars (eight firms); during the analysed period, all the firms trained their personnel. We note that executives and white collars attend on average to around 30 hours of trainings, while blue collars attend to 23 hours. Choice of trainings was left to executives and white collars, not to blue collars.

From the financial point of view, we observe that only remunerations of executives and white collars (in five firms) present a variable part. Only one firm has set up a gain sharing system; four firms have developed profit sharing for all the personnel, while only one company has set up a capital sharing system.

We also see that fringe benefits are generally intended for executives (eight companies), while six companies give extra-legal and social advantages to all their personnel.

From the legal point of view, there are more internal promotions for executives and white collars. All these people have a permanent contract, while only 90 per cent of blue collars profit from such a contract.

In short, we observe that incentive practices are more intended for executives and white collars. Let us remain that our weak participation rate does not necessarily allow us to generalize our results to all the Belgian firms.

Among practices that firms have set up, we calculated Pearson's correlation coefficients and observed the following statistically significant relations (at 10 per cent or lower levels):

The flexitime practices appear to be negatively correlated with the employment of the executives (at a 10 per cent significance level) and the white collars (at a 6.8 per cent level). According to Sekiou *et al.* (1993), such a practice has a positive effect on the production of the white collars. Thus, if production does not increase proportionally, the employment should fall. As this practice is not very developed for blue collars (only in three companies), we cannot draw conclusion for the case of blue collars:

- The teamwork also appears to be negatively correlated to employment of blue collars (at a 3.5 per cent level), as well as job rotation (at a 3.5 per cent level). This practice, that aims at the communication and the common learning of working techniques, favours the polyvalence of the workers and the capacity to reduce the team size while still achieving the production.
- Overtime payoffs are negatively correlated with the employment of blue collars (at a 9.9 per cent level). Overtime tends to increase worker productivity. So the company can achieve the same work with less workers.
- As the system of profit sharing also improves labour productivity, it is also possible to engage less workers at given production level. We observed a negative relation between the number of white collars and the development of this practice (at a 3.6 per cent level).
- As employment security favours the retention of white collars in case of reduced activity and the increase of manpower in case of growing activity, we can observe a positive relation between this practice and the evolution of the number of white collars (at a 2.5 per cent level).

- Considering the existence of an internal promotion system, we observe a negative correlation between this existence and the employment of the executives (at a 4.14 per cent level). The reason could be that, if the company gives priority to its workers in case of vacancy of higher level, it in turn can slow down the executive's recruitment process as staff members then know they will have probably the opportunity to access to higher level job in the next years. On the contrary, a company that does not favour internal promotion system could then have to recruit a new executive on the labour market more rapidly.

So our first results are not that consistent with the assumption that incentive HR practices are necessarily to be associated to higher employment. It seems as if firms that practice incentive HR practices enforce their productivity but, in turn, rather reduce their employment level and our first explanations were often simply to suggest that, assuming a minimising costs process at given production level, HR practices appear to higher workers productivity and, in turn, to lower their employment.

5. Modelling labour demand dynamics with HR practices

In order to estimate the relation between fewer HR practices and labour demand, we model labour demand dynamics under two kinds of specifications. The first one assumes product demand constrain that better suits to shorter run (fixed prices) environments, the other monopolistic competition to longer run.

5.1 Product demand constrain specification

To model labour demand behaviour, we assume a standard two factors production function, where output is first constrained by product demand (Bresson *et al.* (1996)). Under this kind of framework, the profit maximising firm problem is to minimise the expected present value of the sum of production costs for time period τ ranging from 0 to ∞ :

$$\begin{aligned} \text{Min}_{L_{t+\tau}, K_{t+\tau}} E_t \left[\sum_{\tau=0}^{\infty} \left(\frac{1}{1+r} \right)^{\tau} [w_{t+\tau} \cdot L_{t+\tau} + c_{t+\tau} \cdot K_{t+\tau} + AC(\Delta L_{t+\tau}; K_{t+\tau})] \right] \\ \text{s.t. } Q_{t+\tau} = A \cdot L_{t+\tau}^{\alpha} \cdot K_{t+\tau}^{\beta\alpha} \end{aligned} \quad (1)$$

where r , w , L , c , K and Q represent the discount rate, the real wage, labour demand, the user cost of capital, the stock of capital and output, while AC is the adjustment cost function associated to changes in labour $\Delta L_{t+\tau}$ and capital, $\Delta K_{t+\tau}$. The production function is supposed to be a Cobb-Douglas.

We then assume quadratic adjustment costs. This assumption is not necessarily satisfied in the adjustment process (see, for example, Hamermesch and Pfann, 1996 or Abowd and Kramarz, 2003 quoted in Cahuc and Zylberberg, 2004). But it seems quite acceptable in the case of homogeneous labour (Dhyne, 2001a). So we assume the following adjustment costs process:

$$AC(\Delta L_{t+\tau}) = \frac{a}{2} (\Delta L_{t+\tau})^2 \quad (2)$$

where a is a constant.

We assume homogeneous labour, separability between labour and capital adjustment costs and we only modelise labour adjustment costs. Under demand constrained production, quadratic and symmetric adjustment costs and explaining variables following an AR(1) process, labour demand can be specified as a partial adjustment process (Dhyne, 2001a). We further allow for the fact that past values of output and relative costs of production factors can influence labour demand dynamics.

We therefore specify, at time t :

$$\ln L_t = \beta_1 + \beta_2 \cdot \ln L_{t-1} + \beta_3 \cdot \ln Q_t + \beta_4 \cdot \ln Q_{t-1} + \beta_5 \cdot \ln \frac{w_t}{c_t} + \beta_6 \cdot \ln \frac{w_{t-1}}{c_{t-1}} + \beta_7 \cdot D_t + u_t \quad (3)$$

where D_t is a time dummy.

Given the difficulty to measure the user cost of capital, we assume that its logarithm can be expressed as a constant and a random term (Burgess and Knetter, 1998), assuming that capital returns are set outside the firm by the world market.

We consider the following basic model for each firm i :

$$\begin{aligned} \ln L_{i,t} = & \beta_1 + \beta_2 \cdot \ln L_{i,t-1} + \beta_3 \cdot \ln Q_{i,t} + \beta_4 \cdot \ln Q_{i,t-1} + \beta_5 \cdot \ln w_{i,t} + \beta_6 \cdot \ln w_{i,t-1} \\ & + \beta_7 \cdot D_t + u_i + v_{i,t} \end{aligned} \quad (4)$$

We then enlarge this model to introduce potential effects of HR practices in a rather “ad hoc” manner. Looking at Belfirst dataset, we are able to define five variables. The first four variables can be related to the first dimension considered in Section 2, worker well-being and firm organisation. We consider two training variables, i.e. the average number of training hours per worker in the firm ($htrai$) and the proportion of trained workers in the firm ($ptra$). We have no other explicit worker satisfaction or work organisation variables. But we chose to define two proxies for “non well”, bad-being. The first one is the relative number of individuals working under long lasting – for an undetermined period – employment contracts and quitting the firm, net of individuals retiring, to total quits (qui). Besides wage opportunities, our assumption is that these workers that leave the firm could do it because they do not feel well in the firm. Another bad-being proxy variable is defined as the total number of firings with respect to total employment (fir).

We were not able to consider a variable for the second dimension, related to financial incentives.

Another fifth variable, the average security in the employment contract within the firm, is supposed to capture the legal aspect, and also probably the two others in some way. This variable is defined as the ratio between the number of workers under long lasting employment contracts to employment (sec).

So we basically specify the following model for each firm i :

$$\begin{aligned} \ln L_{i,t} = & \beta_1 + \beta_2 \cdot \ln L_{i,t-1} + \beta_3 \cdot \ln Q_{i,t} + \beta_4 \cdot \ln Q_{i,t-1} + \beta_5 \cdot \ln w_{i,t} \\ & + \beta_6 \cdot \ln w_{i,t-1} + \beta_7 \cdot htrai_{i,t} + \beta_8 \cdot htrai_{i,t-1} + \beta_9 \cdot ptra_{i,t} \\ & + \beta_{10} \cdot ptra_{i,t-1} + \beta_{11} \cdot qui_{i,t} + \beta_{12} \cdot qui_{i,t-1} + \beta_{13} \cdot fir_{i,t} \\ & + \beta_{14} \cdot fir_{i,t-1} + \beta_{15} \cdot sec_{i,t} + \beta_{16} \cdot sec_{i,t-1} + \beta_{17} \cdot D_t + u_i + v'_{it} \end{aligned} \quad (5)$$

To control for the fixed effect term, we estimate this model in logarithms and first differentials. We also control for 45 potential sectoral effects in our model which becomes:

$$\begin{aligned}
 dl_{i,t} = & \beta_1 + \beta_2 \cdot dl_{i,t-1} + \beta_3 \cdot dq_{i,t} + \beta_4 \cdot dq_{i,t-1} + \beta_5 \cdot dw_{i,t} + \beta_6 \cdot dw_{i,t-1} \\
 & + \beta_7 \cdot dhtrai_{i,t} + \beta_8 \cdot dhtrai_{i,t-1} + \beta_9 \cdot dptraai_{i,t} + \beta_{10} \cdot dptraai_{i,t-1} \\
 & + \beta_{11} \cdot dqui_{i,t} + \beta_{12} \cdot dqui_{i,t-1} + \beta_{13} \cdot dfir_{i,t} + \beta_{14} \cdot dfir_{i,t-1} + \beta_{15} \cdot dsec_{i,t} \quad (6) \\
 & + \beta_{16} \cdot dsec_{i,t-1} + \beta_{17} \cdot D_t + \sum_{s=1}^{45} \beta_{18s} \cdot D_{i,s} + v''_{i,t}
 \end{aligned}$$

5.2 Monopolistic competition

We alternatively model labour demand dynamics assuming monopolistic competition. As mentioned by Cahuc and Zylberberg (2001), monopolistic competition presents an adequate framework to study a large number of questions, as it completely determines how product prices are fixed. This kind of framework has been intensively used (Nickell and Wadhvani, 1991; Wulfsberg, 1997). The firm – which produces differentiated products – is then supposed to share the sectoral exogenous product demand. It fixes its price level and its output to maximise its profit.

The profit maximising problem is then the following:

$$\begin{aligned}
 \text{Max}_{L_{t+\tau}; K_{t+\tau}} E_t \left[\sum_{\tau=0}^{\infty} \left(\frac{1}{1+r} \right)^\tau \left[ps_{t+\tau} \cdot \left(\frac{Q_{t+\tau}}{QS_{s,t+\tau}} \right)^{-\frac{1}{\gamma}} Q_{t+\tau} - w_{t+\tau} \cdot L_{t+\tau} - c_{t+\tau} \cdot K_{t+\tau} - AC(\Delta L_{t+\tau}; K_{t+\tau}) \right] \right] \\
 \text{s.t. } Q_{t+\tau} = A_{t+\tau} \cdot L_{t+\tau}^\alpha \cdot K_{t+\tau}^{\beta\alpha} \quad (7)
 \end{aligned}$$

The price level of the firm, p , is expressed in terms of sectoral price level, ps , of the share between firm and sectoral output, Q and QS , and the price elasticity of demand, γ . Like in the product demand constrain regime, we assume homogeneous labour and separability between input adjustment costs, we modelise quadratic labour adjustment costs and allow for the fact that past values of explanatory variables can influence labour demand dynamics.

We introduce the same five HR practices and estimate the model in logarithms and first differentials to control for fixed effects. We also control for the 45 potential sectoral effects and estimate the following relation:

$$\begin{aligned}
 dl_{i,t} = & \gamma_1 + \gamma_2 \cdot dl_{i,t-1} + \gamma_3 \cdot dk_{i,t} + \gamma_4 \cdot dk_{i,t-1} + \gamma_5 \cdot dw_{i,t} + \gamma_6 \cdot dw_{i,t-1} \\
 & + \gamma_7 \cdot dq_{s,i,t} + \gamma_8 \cdot dq_{s,i,t-1} + \gamma_9 \cdot dhtrai_{i,t} + \gamma_{10} \cdot dhtrai_{i,t-1} \\
 & + \gamma_{11} \cdot dptraai_{i,t} + \gamma_{12} \cdot dptraai_{i,t-1} + \gamma_{13} \cdot dqui_{i,t} + \gamma_{14} \cdot dqui_{i,t-1} \quad (8) \\
 & + \gamma_{15} \cdot dfir_{i,t} + \gamma_{16} \cdot dfir_{i,t-1} + \gamma_{17} \cdot dsec_{i,t} + \gamma_{18} \cdot dsec_{i,t-1} \\
 & + \gamma_{19} \cdot D_t + \sum_{s=1}^{45} \gamma_{20s} \cdot D_{i,s} + \varepsilon_{i,t}
 \end{aligned}$$

6. Variables to be considered

To get micro data related to HR practices, we use the social report that firms have to fill together with their financial balance sheet. A dataset is available since 1996, but data related to 1996 and 1997 appear not to be reliable. It is probably worth to mention that some reliability problem can remain, especially in social data.

We select a balanced panel of 452 firms that occupy more than 100 employees during the period 1998-2002 and that are supposed to be profit maximising.

From this dataset, we define variables to be considered in the following way:

- labour demand, L , is the employment expressed in full-time equivalent jobs. All other variables related to employment are calculated in full-time equivalents;
- output, Q , is the value added at constant 2,000 prices;
- real wage, w , is calculated as the ratio of the wage bill (net of firms subsidies) deflated by the value added price level, to employment;
- sectoral product, QS , is the total value added at constant 2,000 prices of the main activity branch to which the firm belongs to;
- capital stock, K , is built from the perpetual inventory method, using the investment price index at the branch level as deflator;
- average number of training hours, $htra$, is the ratio of the number of annual training hours in the firm to employment;
- proportion of trained workers, $ptrai$, is the ratio of annual trained workers to total employment;
- long lasting jobs quitting rate, qui , is the ratio of annual quits of long-lasting jobs (net of (pre)retirements) to total quits;
- firing rate, fir , is the ratio of annual firings to employment;
- employment contracts average security level, sec , is the ratio of the number of workers under long lasting contracts to employment.

The following table provides descriptive statistics of the main variables.

7. Results

7.1 Product demand constrain regime

7.1.1 Estimates. The equation presented above are estimated using dynamic panel estimation methods and especially the two-step GMM estimator proposed by Blundell and Bond (1998). This method mixes both equations in first differences and in level in order to control for initial conditions.

Using the DPD for Ox package developed by Doornik *et al.* (2002), we estimated results for the first proposed specification (6) that are summarised in the first column in Table I. Robust standard errors computed using Windmeijer's (2000) small-sample correction are in brackets (Table II).

7.1.2 Comments: labour elasticities with wages and output. Under the first, product constrain demand regime, we estimate a long run elasticity of conditional labour demand with respect to wages close to unity of -1.068 , which seems rather consistent. This value is higher than the range of values, between -0.15 and -0.75 , generally estimated in the literature (Hamermesch, 1993). But it can probably partly be explained by the fact that we consider big firms. In other studies from Belgian firms,

	1998	1999	2000	2001	2002
Labour demand (l), in units					
Mean	439.6	446.5	456.1	469.8	462.9
Standard deviation	1137.7	1119.9	1115.9	1099.4	1044.5
Output (q), in keuros					
Mean	40940.3	44778.4	45306.3	45495.7	44073.6
Standard deviation	138285.3	168884.5	157436.2	149435.7	141282.2
Real wage (w), in keuros					
Mean	48.0	48.1	48.9	50.3	52.3
Standard deviation	26.5	24.7	28.9	28.1	37.2
Capital stock (k), in keuros					
Mean	67952.3	68481.1	67313.4	64184.9	59933.6
Standard deviation	264894.5	259242.8	252850.4	229321.3	205365.1
Average number of training hours (htra), in units					
Mean	12.8	12.5	13.7	13.6	11.7
Standard deviation	18.2	16.9	19.5	22.8	14.7
Proportion of trained workers (ptrai), in per cent					
Mean	36.82	39.14	40.34	42.08	41.24
Standard deviation	37.87	38.02	36.98	38.05	36.81
Long lasting jobs quitting rate (qui), in per cent					
Mean	62.51	61.93	63.01	63.34	64.55
Standard deviation	28.73	28.39	27.82	28.64	28.27
Firing rate (fir), in per cent					
Mean	5.23	4.46	4.29	4.61	4.92
Standard deviation	10.65	6.28	8.45	5.61	7.13
Employment contracts average security level (sec), in per cent					
Mean	93.84	93.65	93.33	94.08	94.60
Standard deviation	7.68	8.12	7.35	7.27	6.93

Table I.
Descriptive statistics

Konings and Roodhooft (1997), for example, estimated elasticities in the range $(-1.2, -1.7)$, while Dhyne (2001b) estimated a value of -1.139 .

We also estimate an important and significant long term elasticity of labour with respect to product demand of 0.76. As a comparison, Dhyne (2001b) estimated a value of 0.52. He also estimated higher elasticities for bigger firms. A proposed reason is that bigger firms face lower adjustment costs.

7.1.3 Comments: labour elasticities with HR practices: no significant relation. Turning to the relation between selected HR practices and labour demand, we find no significant direct effect for any one of them in our general specification. At assumed demand constrained levels of production, it therefore means that considered HR practices do not seem to affect labour demand.

We can suggest some explanations to this non significant result, in the sense that HR practices cannot necessarily influence labour cost in a significant way.

A. Potential lack of HR variables. First considering what we discussed in the second part of our paper, such a result can be explained by the fact that our model does not consider the fact that, to have an effect on performance, productivity, wages and/or labour demand, HR practices have to be considered in a complementary way, that we should have been able to consider more HR practices and considered HR practices in an interactive way. Given that training is considered to be a fundamental HR practice, we therefore built additional interaction terms between the two training variables and the

dl	Labour demand dynamics	
	Product demand constrain	Monopolistic competition
		(1) (2)
dl(-1)	0.6001*(0.0631)	0.8501*(0.0502) 0.8410*(0.0534)
dq	0.4389*(0.0688)	
dq(-1)	-0.1332*(0.0513)	
dk		0.2881*(0.0547) 0.3263*(0.0564)
dk(-1)		-0.2177*(0.0583) -0.2435*(0.0584)
dw	-0.6066*(0.1129)	-0.2925*(0.0837) -0.3204*(0.0884)
dw(-1)	0.1797*(0.0720)	0.0910 (0.0847) 0.0691 (0.0814)
dqs		0.0797 (0.1091) 0.0221 (0.1114)
dqs(-1)		0.1894*** (0.1072) 0.1713 (0.1004)
dhtra	0.0006 (0.0009)	0.0002 (0.0006)
dhtra(-1)	-0.00003 (0.0003)	0.0003 (0.0005)
dptra	-0.0382 (0.0425)	0.0137 (0.0396)
dptra(-1)	0.0173 (0.0201)	0.025 (0.0348)
dqui	-0.0484 (0.0579)	-0.0465 (0.0753)
dqui(-1)	-0.0124 (0.0318)	-0.0331(0.0394)
dfir	-0.0773 (0.1590)	-0.4435** (0.2191) -0.3480*(0.1933)
dfir(-1)	-0.0430 (0.0705)	-0.1451 (0.0913) -0.1546 (0.1211)
dsec	0.0509 (0.2862)	-0.3741*** (0.2255)
dsec(-1)	0.1090 (0.1900)	0.1138 (0.1604)
dhco2		0.0014 (0.0010)
dhco2(-1)		0.0056*(0.0023)
R ²	0.963	0.959 0.955
Sargan (df)	294.8 (526)	362 (367) 348.1 (348)
AR(1)	-4.077	-3.638 -3.806
AR(2)	0.398	0.327 0.324

Notes: Standard errors in brackets; * significant at a 1 per cent level; ** significant at a 5 per cent level; *** significant at a 10 per cent level; estimates related to the constant and the dummies are not presented for convenience; instruments: sector and time dummies+; for the equations in differences, all variables in level lagged at least two periods, except for monopolistic competition (2) where form and hform are not included; for the equations in level, all variables in first differences lagged one period, except for monopolistic competition where form and hform (specification 1) and lic, dhco2 (specification 2) are not included

Table II.
Dynamic labour demand estimations

other HR variables, and we completed the model. But we did not estimate any significant effect for each of these interactive terms. So a first way to explain non significance remains a potential lack of explaining HR variables and/or interaction terms between these non considered variables.

B. The productivity-wage feedback effect. Another potential explanation for a low impact of some HR practices – like training – on labour demand is the feedback effect of potential higher productivity on wage behaviour as pointed by OECD (1999). In a union employer bargain, increased productivity improves union power and therefore wages. In another direct employee-employer bargain, higher productivity should also influence wages in turn, especially in case of general training. In empirical terms, Cahuc and Zylberberg (2004) confirm this potential positive productivity effect in the wage equations in different European countries. In other words to say that HR practices cannot, as such, necessarily reduce labour costs.

C. Offsetting productivity effects in terms of labour inputs. A third reason for no significant effect of HR variables on labour demand could be that increasing labour productivity through HR practices could be labour saving in terms of inputs of labour needed by the firm on the first hand, but could on the other hand increase labour share because of substitution coming through an higher relative labour/capital costs ratio.

7.2 Monopolistic competition regime

7.2.1 Estimates. Second and third columns of results in Table I describe estimates obtained under the monopolistic regime. We first present estimates from column 2, related to the overall specification (8).

7.2.2 Comments: labour elasticities with wages, capital stock and sectoral output. Compared to the product demand constrain regime, we estimate more persistence in labour dynamics, while we estimate a more important long run elasticity of labour demand of -1.346 . Hamermesch (1993) estimates average unconditional labour demand elasticities at around -1 (Cahuc and Zylberberg, 2004). On the other hand, long run elasticities of labour to capital stock and sectoral output are positive and amount to, respectively, 0.47 and 1.79 , which seems rather important.

These positive labour elasticities were to be expected. Increasing capital stock leads to higher labour productivity, while increasing sectoral output leads, other things equal, to higher firm output.

7.2.3 Comments: labour elasticities with HR practices. A. No significant effects for training and quitings. Assuming a monopolistic competition regime, some HR practices induce classical effects that can offset each other. This can, for example, explain the estimated non significant effect on labour demand estimated for the average number of training hours per individual, for the average number of individuals trained in firms or for the relative individuals engaged in long term contracts quitting the firm. These effects relate to output growth (scale effects), labour productivity (labour saving effect) and to the change in relative input shares (substitution effect).

If we first consider the average number of training hours, additional training can lead to labour demand positive scale effects through innovation and increased output at given output prices, to negative labour saving through increased on the job labour productivity and to positive substitution effect, assuming feedback effects on wages are not too important. So the net effect can be non significant. Same kinds of explanations can probably explain why the change in the relative proportion of trained workers can also have a non significant effect on labour demand.

Turning to the non significant effect on labour demand estimated for the relative number of individuals engaged in long term contracts but quitting the firm, we can think that higher quitting rates from long lasting contracts are associated to firms offering less attractive job conditions. We suggest that firms offering lower job conditions could be less innovative. So scale effects could then be negative. But they probably also have to be associated to positive substitution effects because of lower labour costs. So the net effect on labour demand could still be non significant.

B. Significant effects for firings. As expected from our HR arguments from the second part, one variable related to workers "bad" being, the firing rate, is estimated to negatively influence labour demand and this significant negative effect appears with no lag. We therefore first have to be cautious to the fact that this negative effect could reflect a reversed causality, from labour demand to employers attitude. It can of course

well be the case that lower labour demand induces higher firings. Note, however, that this importance of labour demand on firings could not be that important, considering that Belgium is a country where employment protection is (quite) important (OECD, 1999; Cahuc and Zylberberg, 2004).

If we assume, as in the HR arguments, that there exists a negative causality from firings to labour demand, we can probably explain this negative relation as follows. Higher firing rates can also be associated to less innovating firms and therefore to negative scale effects, to increased labour saving and to positive substitution effects. Therefore and even though the net effect is theoretically ambiguous, the estimated negative effect of firings on labour demand appears if the positive substitution effect does not dominate the other two negative ones.

Another effect is related to employment security. We will come back to it in the next section.

C. Significant effects for firings and interactive training-employment security term. In order to capture for the fact that HR practices are expected to have effects if they are experienced together, we have – like under the product demand constrain regime – enriched our model (8) by including possible interactions between HR practices variables on labour demand in this monopolistic competition situation. Estimates of our best specification are detailed in the last column of Table I. HR variables are more significant in this more complete model.

We have estimated that one interactive term, $dhco2$, defined as the average number of training hours interacting with the variable “ $1 - qui$ ”, the relative rate of short term contracts quitting the firm over total quits and which is therefore now to be considered as an indicator of workers well-being, is positively and significantly related to labour demand with one lag. In this estimation, the firing rate remains negatively significant while employment security is no more significant.

Asides from the potential effects of training and quittings already explained in the monopolistic competition context, this result therefore tends to show a little bit of evidence in favour of the fact that HR practices could have to be exerted together and that these practices could then have an impact. More precisely, it is noticeable that when workers are more trained and do not quit the firm where they are employed in long-term contracts, labour demand is estimated to increase the year after. So causality now seems to be from the combined HR practice to labour demand, that a kind of “virtuous” phenomenon appears.

In terms of scale, labour productivity or substitution effects, that is to say that workers trained and in good working conditions can participate to innovation and to positive scale effects, to improved labour productivity through innovation and that these effects could more than offset the negative substitution related to higher labour costs, coming from additional training and better working conditions. In such a case, worker’s well being is therefore complementary to training in the way that they together increase labour demand from a firm maximising profit point of view.

8. Conclusion

Many researches stress that HR practices can be associated to higher performance, innovation and productivity. Even though these productivity changes should exert a feedback effect on wages, it could be the case that these practices could therefore exert an impact on labour demand through different channels. Though, to our knowledge,

few researches analyse the HR impact on labour demand, either in static or in dynamic terms.

In this paper, we want to test for this relation. Therefore, we have first considered, summarised the impacts and classified incentive HR practices in three dimensions. The first one, which seems to be a necessary condition for HR practices to have an effect, relates to practices that strengthen the satisfaction of the worker and the organisation of his work. We think of measures to involve the personnel like teamworks, participation in the decision process, information on firm strategy, job rotation, flextime practice or training. The other one relates to the financial side and refers to practices like financial remuneration, gain, profit or capital sharing, overtime payoff and rewards, while the last one concerns the legal side covered by internal promotion, career plan or employment contract security. We have also stressed on the fact that HR practices should probably have to be combined to have an effect.

We have then presented our methodology to collect data on these practices through a questionnaire sent to Belgian firms occupying 100 or more employees and to merge these data with others that are already available in the Belfirst employers dataset, in order to further estimate labour demand dynamic models.

Despite different trials to collect questionnaires, we received an insufficient number of answers to estimate our models. We could draw some preliminary bivariate results where we noticed that labour demand was negatively correlated with some HR practices like flexible time practices, overtime payoff systems and the existence of teamworks, profit sharing or internal promotions while it was positively related to employment security. In other words to say that HR practices were not expected to favour labour demand from this first and preliminary point of view.

We then specified two dynamic labour demand models. The first assumes production constrained by demand and is therefore rather to be associated to shorter-term considerations, while the second, monopolistic competition, better suits to longer run environment. We were able to consider five HR practices. The first four, that is to say the average number of training hours per worker, the proportion of trained workers, the ratio of individuals engaged in long term contracts quitting the firm to total quits and the proportion of firings to overall employment are related to workers satisfaction, while workers engaged in long term contracts over total employment merely refers to employment security and to the legal side.

We estimated these models on a balanced panel of 452 Belgian firms employing at least 100 workers during the period 1998-2002. Using the two-step GMM estimator proposed by Blundell and Bond (1998), we first estimated labour demand elasticities with respect to wages that are quite consistent with other studies of Belgian big firms, estimating, for example, a long run conditional labour demand elasticity with wages of -1.068 in the production constrained by product demand regime, and an unconditional elasticity of -1.346 in the monopolistic competition case.

Coming to the impact of HR practices on labour demand in the production constrained by demand regime, we found no significant effect at all. Controlling for potential interaction between these HR practices, we first explained this non-significance by a potential lag of explaining variables and by the fact that labour productivity enhancements could exert a feedback effect on wages. In a minimising cost process, we also pointed out potential offsetting effects coming from opposite on the job labour saving and input shares substitution effects.

Coming to the impact of HR variables in the monopolistic competition context, we found that firings were significantly and negatively correlated with labour demand with no lag, while the interactive variable between average training hours and individuals engaged in long term contracts and staying in the firm, an indicator of well-being, positively influenced labour demand. So this last observation presents a bit of evidence in favour of the argument that at least some HR practices combined with others could positively influence labour demand. However, this last conclusion has most probably to be qualified by the fact that we were not able to control for more practices. We also plan to enrich our basic specification in order to estimate the impact of HR variables on the adjustment process itself. We finally would like to deepen our reflexion on the sense of causality between variables.

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