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Unemployment Hysteresis, Wage Determination, and
Labor Market Flexibility: The Case of Belgium

Prepared by Reza Moghadam and Caroline Van Rijckeghem 1/

Authorized for Distribution by Ke-young Chu and Paul R. Masson

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Abstract

This paper examines the potential contribution of unemployment hysteresis theories to the understanding of the Belgian labor market. It estimates models of wage determination using aggregate and firm-level panel data. Two main conclusions emerge: (i) the long-term unemployed do not exert a negative impact on wages; and (ii) there is some evidence that the incumbent workers, the "insiders," exercise market power in wage determination, taking greater account of their own interests than those of the unemployed "outsiders." In addition, it is argued that the automatic indexation of wages to prices in Belgium can cause a downward rigidity in real wages, given the multi-tier real wage bargaining process. Recent initiatives, including the introduction of a competitiveness norm for indexation, and labor market programs aimed at the long-term unemployed and the young, such as the *plan d'accompagnement* and the *plan d'embauche des jeunes*, are appropriate in view of the existence of insider power in wage determination.

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Summary

This paper examines the potential contribution of unemployment hysteresis theories to the understanding of the Belgian labor market. It gives an overview of the Belgian labor market, reviewing the indexation system and the wage bargaining process. It estimates models of wage determination using aggregate data (1970-90) and firm-level panel data (312 manufacturing firms during 1978-84).

The time-series results suggest that there is strong persistence in unemployment and that it occurs primarily because the long-term unemployed cease to exert downward pressure on wages. The results also show that the suspension of indexation during 1982-86 had a significant and negative long-run impact on real wages. Furthermore, the two-yearly bargaining round and the indexation system induce long lags in wage determination.

The panel results provide evidence of insider power in wage determination but also indicate that the industry-wide and national unemployment rates continue to play a role in wage determination. However, as with the time-series results, this impact diminishes when the proportion of long-term unemployed increases.

The policy implications are threefold. First, the finding that the long-term unemployed exert no downward impact on wages points to the usefulness of tightening up the benefit system in order to encourage the unemployed to seek jobs, and of providing targeted training and employment opportunities. Second, insider power in wage determination needs to be reduced to help employment generation by, for example, reducing hiring and firing costs or removing entry barriers to new firms. Third, insider power suggests the need for flexibility in applying indexation during a recession to prevent layoffs that, given an insider wage setting, would become irreversible. Recent initiatives, including the introduction of a competitiveness norm for indexation and labor market programs aimed at the long-term unemployed and the young, such as the *plan d'accompagnement* and the *plan d'embauche des jeunes*, are consistent with these policy implications.

I. Introduction

Unemployment in Belgium rose continuously from 1970 to 1984 and, in spite of declining between 1984 and 1989, unemployment has not subsequently fallen below its 1980 level (Chart 1). The slowdown in economic activity since 1990 has taken its toll on employment growth, leading to sharply rising unemployment. In June 1994, unemployment stood at about 10 percent of the labor force on a standardized basis or 13 percent according to the national definition. 1/

Labor market expenditure in Belgium, at about 4 percent of GDP, is among the highest in the industrial world. 2/ This reflects the high number of individuals receiving some form of unemployment benefit as well as the introduction of various employment, early retirement, and training schemes. Given the social costs associated with unemployment, the need to reduce the budget deficit and to improve labor market efficiency, it is necessary to identify and remedy the underlying causes of structural unemployment and, more generally, the under-utilization of labor.

This paper examines the potential contribution of unemployment hysteresis, or persistence, theories to enhancing the understanding of the Belgian labor market. These theories provide a means of determining the causes of labor market imperfections and identifying the measures needed to correct them. The idea of unemployment hysteresis can be traced to Phelps (1972) who argued that economic shocks could have long, lingering effects on the labor market. Accordingly, a rise in unemployment, by itself, could cause a temporary, or even permanent, increase in the NAIRU (non-accelerating inflation rate of unemployment).

The history of unemployment can affect the NAIRU in a number of ways. Firstly, if wage bargainers are primarily concerned with the interests of those who are employed--the "insiders"--rather than those who seek employment--the "outsiders"--then they may take advantage of high turnover costs or the uncertainties associated with employing an outsider, to exact higher wages than would be justified by economic fundamentals. Lindbeck and Snower (1989a) have developed a theoretical framework for considering insider-outsider models, while Gregory (1985) and Blanchard and Summers (1986), among others, have provided some empirical support for the insider-outsider hypothesis.

1/ The official unemployment figures published in the *Bulletin de Statistique* are usually considerably higher than the "standardized" or "harmonized" figures provided by the OECD and the EC. The main reason for the discrepancy is the method of compiling the figures. The OECD and EC measures are based on surveys of the labor force whereas the official Belgian data are based on the number of unemployment benefit claimants. Also the official unemployment rate is expressed as a proportion of the insured labor force rather than the total labor force.

2/ See OECD (1993).

In the extreme case of the insider-outsider hypothesis insiders are both insulated from downward pressure on wages by outsiders and unconcerned about the welfare of anyone but those currently employed in the firm. Therefore, an adverse shock which reduces employment leads to a reduction in the number of insiders, who in turn set wages which validate the new lower level of employment. Employment would thus follow a random walk: employment and unemployment would not tend to return to their original values. 1/ Although this is the extreme case of the insider-outsider hypothesis, it suggests that adverse shocks could lead to persistent unemployment and to a low rate of employment growth (see Section II). The insider-outsider phenomenon, by impeding the employment of new entrants, could also lead to high youth unemployment. Furthermore, the insider-outsider theory could explain high rates of non-employment. 2/ All of the above can be observed in Belgium.

A second way in which the history of unemployment can affect the NAIRU is through the composition of the pool of job seekers. According to this hypothesis, the longer someone is unemployed the more detached he becomes from the labor market and the less effective he will be in searching for employment. Those who experience a long period of unemployment may lose their human capital through enforced inactivity and thereby become less attractive to employers. The long-term unemployed may also become less active job seekers if the unemployment benefit system does not provide adequate incentives to seek employment. Layard and Nickell (1986) and Nickell (1987) find support for this hypothesis.

Finally, past unemployment--associated with a slowdown in economic activity--can affect the NAIRU because a higher level of unemployment is associated with a lower level of capital formation and, therefore, with a lower rate of growth of the warranted real wage. Consequently, it may take a long period of high unemployment before wage expectations are brought down to a sustainable level.

1/ In fact employment would follow a random walk with drift. The drift would be positive when insiders chose a wage so that on average employment exceeds membership, to guard against loss of employment in the case of unexpected shocks (see Blanchard and Summers (1986), p. 34). Note also that the result of full persistence is weakened to the extent that insiders become more adverse to risking unemployment when unemployment is high (and new job prospects low) and set wages more cautiously as a consequence.

2/ The non-employment rate is defined as:

$$\frac{U + (PW - U - E)}{PW} = 1 - \frac{E}{PW}$$

where U is unemployment, E is employment and PW is population of working age.

CHART 1
BELGIUM
Unemployment 1/
(Thousands)

Less Than One Year
One to Two Years
More Than Two Years
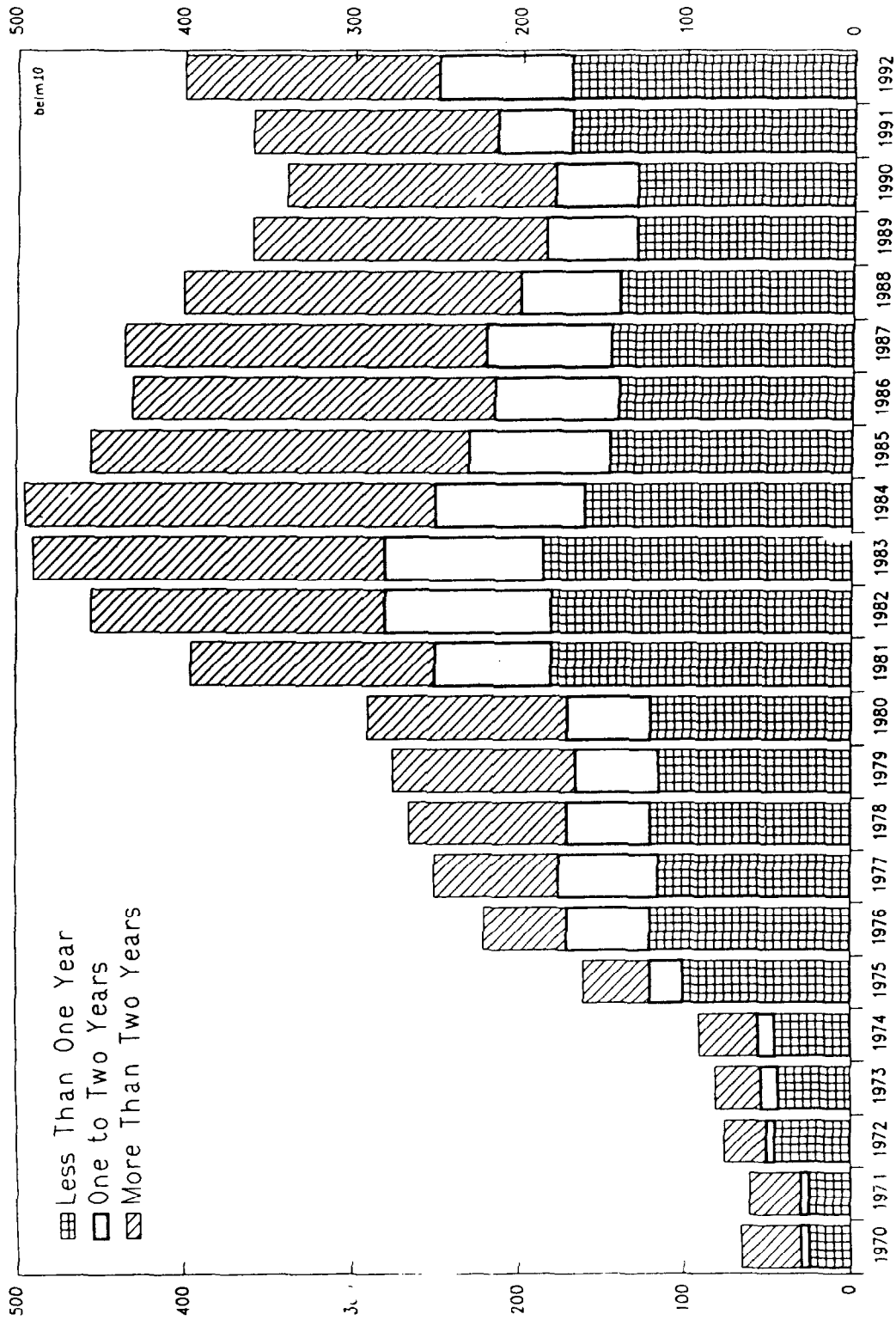
Source: Belgian Ministry of Labor.
1/ National definition.

In this paper we utilize macro and micro data to test the implications of the theories of unemployment hysteresis. The paper is organized as follows: Section II gives an overview of the Belgian labor market to underpin our empirical analysis; given the importance of wage determination in hysteresis theories, Section III reviews the indexation system and the wage bargaining process in Belgium; Section IV provides two theoretical models of hysteresis which are then tested using aggregate and firm level data in Section V. Finally, Section VI provides some preliminary thoughts on the policy implications of the empirical results.

II. Labor Market Overview

Perhaps the most striking aspect of unemployment in Belgium is the problem of long-term unemployment, i.e., those unemployed for more than a year (Chart 1). This is especially apparent in comparison to other industrial countries: Belgium suffers from the highest incidence of long-term unemployment among women and the second highest among men among the OECD countries. The high rate of long-term unemployment has persisted for much of the last decade. Although the aggregate unemployment rate started to decline in 1984, the long-term unemployed as a proportion of the total did not decline until 1989. Even then, the drop was very modest; falling from 77.5 percent in 1988 to 69.9 percent in 1990, before starting to rise again. A particularly disturbing feature is that about 70 percent of long-term unemployed men and women have been unemployed for more than two years.

Unemployment is highest among the young, i.e., those who are less than 25 years old (Table 1). Youth unemployment in Belgium rose to 25 percent in 1984, partly due to demographic developments. It then fell rapidly to 13.5 percent in 1990. However, the slowdown in economic activity has had a detrimental effect on youth employment as it is particularly sensitive to cyclical changes: by June 1994 youth unemployment had risen to over 20 percent.

An international comparison of the Belgian labor market reveals some startling facts: relative to other industrial countries, Belgium has a very low participation rate. This has persisted over the last two decades and is especially conspicuous among men: Belgium has the lowest male participation rate in the OECD. This, together with high unemployment, implies that the rate of non-employment in Belgium is well above the OECD average, especially among men.

This picture is reinforced when looking at employment growth in Belgium. Mulkay and Van Audenrode (1993) show that the Belgian labor market is characterized by a low rate of employment growth. Although the labor force (defined to include early retirement) increased by 388,000 between 1980 and 1992, employment grew by only 53,000 (Table 2), while the number of

Table 1. Unemployment Rates by Age, 1992

	Total	Aged		
		14-24	25-49	50-64
Males				
EC 12	7.1	15.6	5.7	5.2
Belgium	4.6	11.0	4.1	2.5
Germany	3.6	3.7	3.3	4.3
France	7.2	17.0	6.0	5.7
Netherlands	5.6	10.4	4.7	4.7
United Kingdom	9.4	15.9	5.7	5.2
Females				
EC 12	10.7	18.7	9.6	5.9
Belgium	10.6	17.1	10.2	4.6
Germany	4.8	3.6	4.8	6.1
France	11.7	22.6	10.3	8.0
Netherlands	10.0	12.2	9.6	7.5
United Kingdom	7.4	11.4	6.7	5.2

Source: European Communities.

Table 2. Composition of the Working Age Population

(In thousand of persons)

	1970	1980	1985	1991	1992	Change 1980-92
Population of working age 1/	6,073	6,446	6,646	6,675	6,676	230
Gross labor force 2/	3,770	4,144	4,292	4,510	4,532	388
Total employment	3,699	3,747	3,606	3,819	3,800	54
Unemployment 3/	71	322	506	391	436	114
Numbers of participants in early or temporary withdrawal programs 4/	None	75	180	300	295	220

Source: Data provided by the authorities.

1/ Those aged between 15 and 65.
2/ Defined as total employment plus unemployment plus number of participants in early or temporary withdrawal programs.
3/ The national definition.
4/ Early retirement, and career or unemployment interruption in June of each year.

those taking early retirement and participating in other government programs
that facilitate withdrawal from the labor market increased by 220,000. 1/

The under-utilization of labor imposes a heavy burden on government
finances, through both lost tax revenue and increased social security
expenditure. Although full-time unemployment fell continuously between 1984
and 1990, the number of people receiving unemployment benefits actually rose
(Chart 2). For example, in 1992 about one million people, equivalent to
22 percent of the labor force, received some form of unemployment benefit,
while only 411,000 of them were considered full-time unemployed and seeking
work (*chômeurs complets indemnisés*) (Chart 2). In the same year Belgium
spent about 4 percent of its GDP on unemployment benefits and special public
works programs aimed at creating jobs.

III. Indexation and Wage Bargaining in Belgium

Any study of wage formation in Belgium has to pay due attention to two
institutional features of the labor market in Belgium: wage indexation and
the prevalence of wage bargaining.

1. The indexation mechanism

In Belgium wages are, by law, indexed to the CPI and full compensation
occurs on the basis of a four-month moving average of the price index. The
actual process of incorporating indexation into wages varies widely. A
study carried out by the Belgian National Bank (1992) identified 43
different indexation systems in Belgium. However, the study found that the
systems can be classified into two broad categories: in one set of schemes,
the increase in the CPI is incorporated into wages at regular intervals, say
every three months; and in the other, wages are increased whenever the CPI
index exceeds a previously agreed threshold.

Since there are wide variations within each category, it is difficult
to ascertain exactly how long it would take for a rise in prices to be
reflected in average wages. However, simulations in the study by the
National Bank mentioned above, indicate that, on average, 50 percent of an
increase in the CPI is incorporated into wages after five months, more than
90 percent after seven months and 100 percent after 11 months.

2. The wage bargaining system

Given the indexation mechanism, employees and employers always
negotiate over the real wage. There are three levels of wage bargaining in
Belgium:

a. An "interprofessional agreement" is negotiated every two years at
the national level by the social partners, i.e., representatives of the
national employers' federations and the main unions. The national agreement

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1/ During the same period the aggregate participation rate increased from
64.3 percent to 67.9 percent: a drop in male participation being more than
offset by an increase in female participation.

serves as the guideline for negotiations at the sub-national level and could also include guidelines on nonpecuniary aspects of employment such as holidays or working time;

b. About 125 sectoral level collective agreements are individually negotiated currently. Sectoral wage bargains, which usually cover the same two year period as the national agreement, determine the rate of increase in real wages as well as the way in which indexation is applied in each sector; and finally,

c. Bargaining at the enterprise level may augment the sectoral settlement. It is also conceivable, though rarely observed, that the enterprise level negotiations could reverse a real wage settlement agreed at the sectoral or national level in order to, say, save jobs.

3.   Maintaining competitiveness

The principles of indexation have not changed much since the Belgian model was introduced after the Second World War. However, the government has twice intervened and imposed limits on wage increases in order to restore the country's competitive position. On the first occasion, the government suspended automatic indexation from April 1 to December 31, 1976 on the portion of wages in excess of BF 40,250 (equivalent to the average wage in industry in 1976).

The second intervention followed the devaluation of the Belgian franc on February 22, 1982, when the authorities suspended full wage indexation until August 1983. 1/ Thereafter, real wages were frozen, by Royal Decree No. 180, and wage increases were limited to the increase in the CPI until collective bargaining was restored in 1987. This was supplemented by two additional measures: (i) firms were required to reduce hours by 5 percent, decrease wages by 3 percent, and increase employment by 3 percent; 2/ and (ii) in 1984, 1985, and 1987 the indexation of wages was reduced by 2 percent (*sauts d'index*). 3/ Private sector employers paid this 2 percent into a fund to balance the social security account (*le fond pour l'équilibre financier de la sécurité sociale*). The public sector was exempted from this and thus saved 2 percent of the wage bill. 4/

Full indexation and collective bargaining was resumed in 1987. However, in 1989 a law (*Loi de sauvegarde de la compétitivité*) was enacted to safeguard competitiveness. This law requires the *Conseil central de*

1/ Wages were only partially indexed: a portion equivalent to the minimum wage was allowed to increase in line with the CPI.

2/ Enterprises which did not achieve the targeted employment increase had to contribute the gains from the reduction in wages to a special employment fund.

3/ In 1986 prices actually fell.

4/ Measures (i) and (ii) left the employers' labor costs unchanged after the application of the Royal Decree No. 180; however, they reduced employees' real disposable income to help finance the social security deficit.

CHART 2
BELGIUM

Beneficiaries of Unemployment Insurance Benefits
(Thousands)

Wholly Unemployed Receiving Benefit
Unemployed Receiving Training
Early Retirement & Non-Job Seekers
Part-Time Unemployed
Temporarily Unemployed
Career Interruptions

belm11
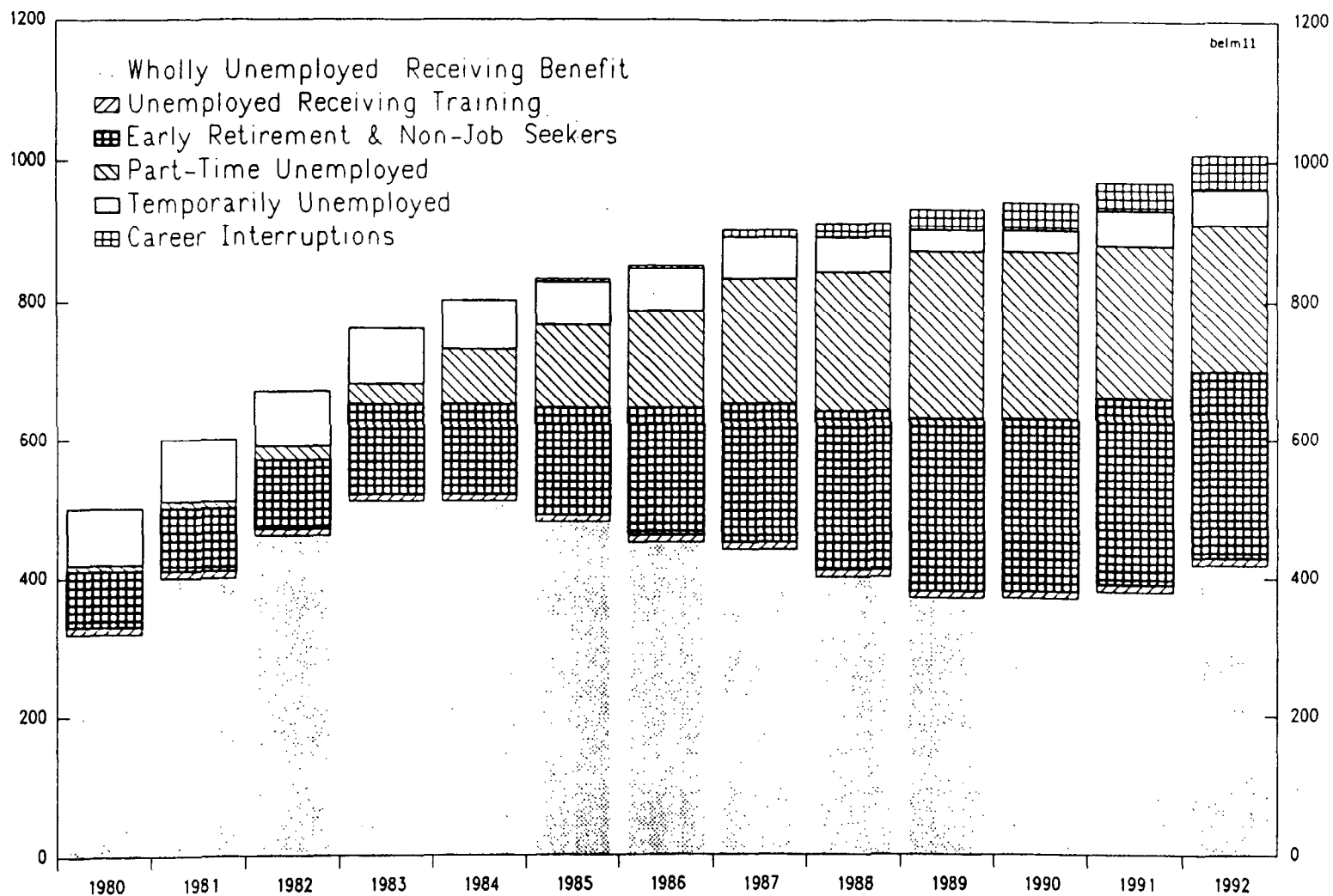
Source: National Bank of Belgium.

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l'économie, which is composed of representatives of the social partners, the government, and a number of experts, to produce an annual report on the competitiveness of the Belgian economy vis-à-vis its major trading partners. On the basis of this report, the government can, with parliament's consent, suspend indexation if it perceives that competitiveness is threatened.

Following the September 1993 report of the *Conseil*, which concluded that all the principal criteria of competitiveness 1/ had deteriorated appreciably compared to 1987, the government decided to freeze real wages for the period 1995-6 and base indexation not on the CPI but on a price index which excludes certain items such as tobacco, alcohol, and petrol. 2/

IV. The Theory of Wage Determination and Hysteresis

In this section we examine two models of wage determination which incorporate hysteresis. The first is the stylized insider-outsider model of Blanchard and Summers (1986) and the second is essentially a bargaining model which incorporates the impact of long-term unemployment. The two models are not necessarily alternatives, they highlight two different channels through which unemployment hysteresis may arise: insider power and the duration composition of unemployment.

1. Insider-outsider effects and aggregate unemployment

Blanchard and Summers (1986) specify the following labor demand function in which employment (n) depends on last period's employment (because of adjustment costs), the real wage and productivity:

$$n = s\, n_{-1} - (1 - s)b(w - p) + e \qquad (1)$$

where ($w - p$) is the real wage and e is productivity (all variables are in logs). Blanchard and Summers also assume that the union is primarily concerned with the employment of its own members so it chooses wages so as to set expected employment (En) equal to a weighted average of last period's employment and desired union membership, n^*:

$$En = (1 - a)n^* + a\, n_{-1} \qquad (2)$$

If $a = 1$ (membership is linked to current employment; those losing their jobs become disenfranchised), then expected employment would only depend on past employment and there is hysteresis. The case where $a = 0$ corresponds to the case where the union's policy is independent of history (membership is invariant) and so there is no hysteresis. The weighted average formulation (2) corresponds to membership rules somewhere between those two extremes.

1/ Export market share, real wages and the cost of borrowing.
2/ This new index was named *l'index santé*.

Suppose that the wage which satisfies (1) and (2) is denoted by w^* and that the actual wage is given by:

$$w = w^* + u$$

where the disturbance term u is assumed to be white noise, uncorrelated with w^*. Combining this assumption with equations (1) and (2) yields the following wage and employment equations:

$$w = Ep + [\frac{1}{b(1 - s)}][- (1 - a)n^* + (s - a)n_{-1} + Ee] + u \qquad (3)$$

$$n = (1 - a)n^* + a\, n_{-1} + [e - Ee + (1 - s)b(p - Ep - u)] \qquad (4)$$

The union wage is a decreasing function of n^*: the larger desired union membership, the lower the union would set wages. The impact of n_{-1} is ambiguous: a larger value of n_{-1} raises the size of the group which the union represents but it also increases labor demand.

The employment equation implies that employment follows a first-order process. The degree of persistence depends on a alone; s has no role. Unexpected movements in employment are due to price and productivity surprises, and deviations of wages from target.

Equation (4) can be estimated by ordinary least squares (OLS), as the error term of the equation--the term between brackets--is uncorrelated with the dependent variables of the regression. This is, however, not the case for equation (3) as Blanchard and Summers (1986) argue that expected productivity (Ee) is likely to be correlated with past productivity and thus with past employment. They derive a reduced form wage equation by assuming that e follows a random walk ($Ee = e - 1$). Therefore, lagging (1) and expressing (1) as a function of $e - 1$ and substituting it in (3) yields:

$$w - w_{-1} = k + (Ep - p_{-1}) + [\frac{1}{b(1 - s)}][(1 + s - a)n_{-1} - s\, n_{-2}] + u \qquad (5)$$

where $k = -[\frac{1}{b(1 - s)}](1 - a)n^*$.

This equation (which can be estimated by OLS) gives the rate of wage inflation as a function of expected price inflation, and employment lagged once and twice.

If there are no costs of adjustment in labor demand ($s - 0$), then (5) gives a relationship between expected real wage growth and lagged employment

only. If $a = 1$, then expected wage growth does not depend on employment. However, if $a < 1$, it does: after an unexpected decline in productivity, which leads to lower employment, the remaining workers accept a cut in real wages only to the extent that they care about the workers who have been laid off.

If there are costs of adjustment to employment, then expected real wage growth depends on employment lagged both once and twice. If $a = 0$, then the ratio of the coefficient on employment lagged twice to the coefficient on employment lagged once cannot exceed 1/2. But as a increases, the ratio tends to 1. If $a = 1$, the ratio equals unity: expected real wage growth depends on the change rather than on the level of employment. 1/ The latter is the strong insider-outsider hysteresis case for which Blanchard and Summers (1986) find empirical support in France, Germany, and the UK.

2.   A bargaining model of wage determination

From Section III it is clear that wages in Belgium are determined through a well established system of collective bargaining. Therefore any realistic model of wage and employment determination must incorporate this aspect of the labor market. There are two ways of incorporating bargaining: firms and unions bargain over wages and the firm sets employment (the so-called "right to manage" model); or the firm and the union bargain directly over the wage and the level of employment. The latter is the only model which can generate Pareto efficient outcomes. On the other hand, in the "right to manage" model the firm is on its labor demand schedule. Also, firms do continuously adjust employment without re-negotiating contracts.

Nickell (1984) shows that the outcome of bargaining in the "right to manage" model is the following aggregate wage equation: 2/

$$ w - p = a_1 + a_2(b - p) + a_3 t_1 + a_4 t_2 + a_5 t_3 + a_6(y - n) + a_7(p_m - p) + a_8 q \quad (6) $$

where w is the nominal wage, p is the consumer price index, b is a measure of the reservation wage, t_1 is the employers' tax wedge, t_2 is the direct tax wedge, t_3 is the indirect tax wedge, $y - n$ is productivity measured as output per man, $p_m - p$ is real import prices and q is the probability of

1/ a and s cannot be identified separately from estimation of the wage equation. However, a must be positive if the ratio described above is larger that 1/2. a can be directly obtained from the employment equation.
   2/   Nickell (1984) assumes that wages are the outcome of a Nash bargain which maximizes the product of the firm's profit and the union's utility. Real wages and the level of benefits affect union's utility function.

becoming unemployed (w, p, b, y, n and p_m are in logs). 1/ Nickell (1984) demonstrates that $a_2 > 0$, $a_3 < 0$, $a_4 > 0$, $a_5 < 0$, $a_6 > 0$, $a_7 > 0$, $a_8 < 0$.

We assume that the probability of becoming unemployed depends on the unemployment rate. To introduce the possibility of hysteresis through unemployment duration we separate the unemployment rate into two terms: the short-term and long-term unemployment rates. 2/ Hysteresis would imply that the probability of being unemployed depends positively on the short-term unemployment rate and negatively on the long-term unemployment rate. The concept of short-term or total unemployment as a source of excess demand for labor is clear. The long-term unemployed, one can argue, diminish the excess demand for labor because they no longer actively seek work and because they lose their human capital through enforced inactivity making them less attractive to employers. However, this is an issue which we will examine empirically in the next section.

$$q = \beta_0 + \beta_1 \text{ } SUR + \beta_2 \text{ } LUR(7) \tag{7}$$

where SUR represents the short-term and LUR, the long-term unemployment rate. Substituting (7) into (6) we obtain the following final equation

$$(w - p) = a_1 + a_2(b - p) + a_3 t_1 + a_4 t_2 + a_5 t_3 + a_6(y - n) + a_7(p_m - p) +$$
$$a_9 \text{ } SUR + a_{10} \text{ } LUR \tag{8}$$

This equation, which we will estimate directly in the next section, has a rich set of economic variables and has the advantage of setting wage formation in a theoretically plausible bargaining context.

Equations (5) and (8) form the basis of our empirical investigation. As regards the Blanchard and Summers (1986) model of hysteresis, the key hypothesis to test in equation (5) is whether it is the change in employment, rather than the level of employment or unemployment, which affects wages. In the bargaining model the key to unemployment persistence

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1/ These data were kindly provided by the Belgian National Bank. The reservation wage, b, is proxied by the unemployment insurance replacement ratio. t_1, t_2, t_3 are proxied by the ratio of employers' contributions to the wagebill, the ratio of social security and income taxes paid by households to take home pay, and indirect taxes as a proportion of consumer expenditures, respectively.

2/ The short-term unemployment rate is defined as SUR=SU/(E+SU) and the long-term unemployment rate as LUR=LU/(E+LU), where SU is the number of those who have been unemployed for less than a year and LU is those who have been unemployed for more than a year.

is the significance and sign of the long-term unemployment term: hysteresis occurs if LUR does not have a negative impact on wages. 1/

V. Empirical Evidence

In order to assess the contribution of hysteresis theories to the understanding of unemployment, we carried out empirical tests of the two models presented in Section IV. We first report estimates of aggregate time series wage equations. However, given that the hysteresis theory, especially the insider-outsider model, is about wage determination at the firm level, it is particularly interesting to test its implications with disaggregated data. Therefore, we go on to present estimates using a panel of firm-level data.

1. The data

The aggregate data are for the whole economy for the period 1970:1- 1990:4 and were kindly provided by the Belgian National Bank. 2/ The disaggregate data for employment, wages and sales by enterprise were obtained from a sample of 312 manufacturing firms for the period 1978-84. It was collected by the ASLK, the Belgian Savings Bank. The data cover 19 industries (a list is given in the Data Annex) in the 9 provinces. 3/ The sample covers 190,000 blue-collar and 79,000 white-collar workers, about one third of those in manufacturing employment. 4/

1/ See Layard and Nickell (1986). Even if LUR is significant and negative, the impact will have to be as large as SUR in order to reject hysteresis.

2/ The short-term and long-term unemployment variables only exist from 1987:1. The earlier data was interpolated from annual observations.

3/ The industry classification is NACE-CLIO. Except for industries with NACE 23, 35, 36, 37, 44, 45, and 49, there are at least 10 enterprises in each industry (see Data Annex for definitions). In regressions with the industrial unemployment rate, two industries (37 and 49) are dropped because the unemployment data are not available.

4/ Averages for the 7 year period.

The firm level data were supplemented by industry level employment, wages, and unemployment data published in *Statistiques Sociales* and the *Statistical Abstract*. 1/

2.   Time series results

Table 3 presents direct estimates of the Blanchard and Summers (1986) insider-outsider wage equation using 84 quarterly observations from aggregate data for the period 1970:1-1990:4. 2/ The first equation is an exact representation of equation (5) above. 3/ On the face of it, the estimated coefficients lend support to the strong insider-outsider theory: both employment lagged once and twice are significant (although the latter only marginally) and the hypothesis that their respective coefficients are equal in magnitude and opposite in sign ($a = 1$ in equation 5, Section IV) cannot be rejected. The second equation replaces employment lagged once and twice with the lagged change in employment; the third equation adds a time trend. The conclusions remain unchanged: in both equations the change in employment is significant.

The last two wage equations in Table 3 have the change in the real wage as the dependent variable rather than the change in the nominal wage. The results again appear to support the strong insider-outsider hypothesis: employment lagged once and twice in equation (iv) is significant, with nearly equal and opposite coefficients, as is the change in employment in (v). However, the results in Table 3 are not conclusive evidence of the insider-outsider theory for the following reasons:

(1)   The pure insider-outsider wage equations do not allow for a rich set of economic variables. It could be that other "outsider" variables, such as those in the bargaining model wage equation in (8) above, perform better than employment in determining wages;

(2)   The equations in Table 3 are all dynamic with no long-run properties and as such they say nothing about the determinants of wages beyond the short-term;

1/ For industry unemployment, the reported data were aggregated across subsector for some sectors, and when data was not available, the unemployment in related sectors had to be used. The *Statistical Abstract* and *Statistiques Sociales* needed to be combined as the *Statistical Abstract* does not cover all industries (in particular, NACE 23, 32, 34, and 36, are not covered). Employment and unemployment for NACE 24 are defined as the sum of unemployment in glass, diamond, and ceramics; for 45 as the sum of footwear and clothing; and for 47 as the sum of paper and rubber. For NACE 35 and 36, the unemployment rate in vehicle manufacturing is used. For NACE 37 and NACE 49, there is no unemployment data which corresponds to the industry definition. The industrial wholesale price index and industrial wages are from the *Statistical Abstract*, and could easily be linked to the industrial classification of the enterprise data.

2/ All the time series results in this paper are obtained using MICROFIT version 3.1; see Pesaran and Pesaran (1991).

3/ t-statistics are given in brackets.

Table 3.   Insider-Outsider Wage Equation, 1970:1-1990:4

OLS with Δw as Dependent Variable

	Δp_{-1}	n_{-1}	n_{-2}	Δn_{-1}	$T*100$	DW	R^2	LM(4)	Ramsey's[1] RESET $\chi^2(1)$	Normality[2] $\chi^2(2)$
(i)	1.07 (7.95)	0.98 (2.39)	-0.74 (1.75)			1.75	0.55	29.6	1.3	79.6
(ii)	1.21 (8.60)			1.14 (2.55)		1.57	0.47	36.5	2.1	38.9
(iii)	0.83 (6.15)			1.08 (2.89)	-0.02 (6.04)	1.94	0.63	20.6	14.6	10.7

OLS with Δ(w - p) as Dependent Variable

	Δp_{-1}	n_{-1}	n_{-2}	Δn_{-1}	$T*100$	DW	R^2	LM(4)	Ramsey's[1] RESET $\chi^2(1)$	Normality[2] $\chi^2(2)$
(iv)		0.64 (2.13)	-0.43 (1.41)		-0.02 (6.13)	2.27	0.43	11.4	2.5	13.3
(v)				0.84 (2.50)	-0.02 (6.02)	1.88	0.30	15.4	12.1	7.7

1/ Ramsey's RESET test is based on square of the fitted values.
2/ The Normality test is based on a test of skewness and kurtosis of residuals.

(3)   The diagnostic tests imply that the equations in Table 3 have poor econometric properties. 1/

Given these difficulties, it is useful to investigate the insider-outsider model further using cross-section or panel data. However, before turning to this, we examined the time series results using the bargaining model. Since equation (8) above is essentially a long-run model, we first estimated a long-run level equation and then derived the dynamics. 2/

In our preliminary estimates, we typically found that the replacement ratio and the employers' tax wedge were incorrectly signed. Excluding these variables from equation (8) gives the long-run, or co-integrating, vector reported in Table 4. 3/   All the coefficients are correctly signed and have plausible magnitudes. 4/   The equation also appears to have satisfactory long-run properties judging by the test statistics. 5/

Turning to the estimates presented in Table 4, the coefficient on the productivity term is close to unity and the equation indicates that if the import price wedge rises, wage earners would resist a fall in purchasing power by pushing up the real consumption wage. The interesting coefficients are those of the short-term and long-term unemployment rates. Short-term unemployment has the expected negative impact on wages. However, this impact is rather small: if the short-term unemployment rate rose by one percentage point, wages would only fall by 1 percent. This is a weaker impact than typically found for industrial economies (see Layard et al, 1991). Furthermore, the impact of the unemployment rate is considerably diminished by the long-term unemployment rate which has a positive impact

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1/   All the equations fail the normality test and the LM test for serial correlation. Equations (iii) and (v) also fail Ramsey's test for functional form.

2/   This is done using the Engle-Granger (1987) two step procedure. This involves first estimating a long-run vector with cointegration techniques and then imposing the lagged residuals from this vector on a freely estimated error correction model (ECM). This methodology has the advantage of separating the stationary variables (which contribute to the dynamics) from those which are integrated of order 1 or higher (these variables affect long-run behavior).

3/   We found that all the variables appearing in (8) were non-stationary, in fact they were all integrated of order one. The long-run equation is estimated using OLS. Stock (1984) demonstrates that, in the case of co-integrated nonstationary series, OLS estimates of the co-integrating vector are not only consistent, they converge on their true parameter values much faster than in the stationary case.

4/   In this table $w - p$ (the real wage), $y - n$ (smoothed productivity) and $p_m - p$ (the import tax wedge), are in logs while t_2 (the direct tax wedge), t_3 (the indirect tax wedge), SUR (the short-term unemployment rate), and LUR (the long-term unemployment rate), are in percent as in equation (8) above.

5/   DF and ADF in Table 4 stand for Dickey-Fuller and augmented Dickey-Fuller tests of stationarity of the residuals.

Table 4. Long-Run Wage Equations, 1970:1-1990:4

OLS Estimates with $w - p$ as Dependent Variable

C	$y - n$	$p_m - p$	t_2	t_3	SUR	LUR
-2.96	0.83	0.14	0.01	-0.03	-0.01	0.03
(10.80)	(9.90)	(2.50)	(5.20)	(9.04)	(2.10)	(8.40)

$R^2 = 0.97$ DW = 1.40   DF = -6.39   ADF = -4.35

on wages. 1/ This evidence supports the unemployment hysteresis argument based on the duration structure of unemployment.

We now turn to the dynamics of wage determination in Belgium. The existence of indexation suggests that it is proper to model real rather than nominal wages; moreover, indexation also implies that wages are backward rather than forward looking with potentially long lags (see BNB, 1992). Also, since indexation and collective bargaining were suspended in 1982 and were fully restored only in 1987, it is necessary to investigate how differently wages behaved during this period relative to the rest of the sample.

Table 5 presents our estimated dynamic model for real wages. The equation is estimated using the instrumental variable technique as the change in productivity term is a contemporaneous determinant. In addition to this variable, the model contains lagged dependent variables, changes in the tax wedge variables, the lagged residual from Table 5, res_{-1}, and a zero-one dummy for the 1982-86 period, D.

A number of features of this model are worth noting. The suspension of indexation during 1982-86 had a significant and negative long-run impact on real wages; and, as expected, the two-yearly bargaining round and the indexation system induce long lags in wage determination. In contrast to the pure insider-outsider models of Table 5, the dynamic model of Table 5 has very satisfactory diagnostics: tests for the validity of instruments, serial correlation, functional form, normality, and heteroscedasticity give very satisfactory results.

When we included the lagged change in employment on the right-hand side to test the insider-outsider hypothesis, it was insignificant (t-statistic = 0.7). The same result was obtained when including the lagged change in the level of unemployment (t-statistic = -0.5) or the lagged change in the unemployment rate (t-statistic = -0.5).

1/ We also tested for cointegration of SUR and LUR. This was rejected.

Table 5. Dynamic Wage Equations, 1970:4-1990:4

Instrumental Variables Estimation

$$\Delta(w - p) = 0.003 + 0.16\Delta(w - p)_{-3} + 0.39\Delta(w - p)_{-4} + 0.12\Delta(y - n)$$
$$\quad\quad\quad\quad\quad (1.9) \quad\quad\quad\quad\quad (4.1) \quad\quad\quad\quad\quad\quad (2.0)$$

$$- 0.01\Delta t_3 - 0.003\Delta t_2 - 0.01res_{-1} - 0.01D$$
$$\quad (3.2) \quad\quad\quad (2.1) \quad\quad\quad (2.6) \quad\quad\quad (2.56)$$

$\bar{R}^2 = 0.55$ DW = 2.21   SEE = 0.007

Sargan's χ^2 (6) = 3.92

LM (χ^2 (4)) = 2.97   Ramsey's χ^2 (1) = 0.89

Normality χ^2 = 0.83   Heteroscedasticity χ^2 (1) = 2.76

In summary, the time series results suggest that there is unemployment hysteresis. This occurs primarily through the duration composition of unemployment. Furthermore, the negative impact of unemployment on wages is very moderate in Belgium in comparison to other industrial countries. However, the time series results were not conclusive in assessing the relevance of the insider-outsider model in Belgium. Therefore, it is useful to explore this model further using micro data. In fact, since the insider-outsider model is based on wage determination at the firm level, cross-section or panel analysis can lead to a conclusive test of the hypothesis. In the next section we use micro data and consider the wages paid by an individual firm in view of the insider variables such as firm level productivity and profitability, and outsider variables such as unemployment, in order to be able to appropriately test for the relevance of this theory to the Belgian labor market.

3. Firm level results

Here we attempt to test for the unemployment hysteresis theories by using the firm level data set described above. This data is from a sample of 312 manufacturing firms for the period 1978-84. The data set provides us with 2,184 observations; however, since there are some gaps in a few industry-level variables, the regressions utilize about 1,520 observations.

The firm-level results are presented in Table 6. The first panel wage equation contains mainly lagged variables and is estimated using OLS. The second panel includes current employment, n, and is, therefore, estimated using the instrumental variables (IV) technique. All the variables are at the firm level apart from aggregate real wages (wagg), and industry-level unemployment rate (UIND). The other explanatory variables are the firm's productivity (y - n), measured as sales per worker; and the firm's real profit (π). To test the insider-outsider hypothesis, the OLS equation also contains employment lagged once and twice and the IV equation has current

Table 6. Wages Equation Using Firm Level Data:
Observations from 312 Firms Over 7 Years (1978-84)

OLS

$$w - p = 0.31 + 0.91(w - p)_{-1} + 0.05(y - n)_{-1} + 0.03\pi_{-1}$$
$$(89.5) \qquad\qquad (2.2) \qquad\qquad (2.1)$$

$$- 0.09UIND_{-1} + 0.85wagg$$
$$(4.6) \qquad\qquad (7.6)$$

$$+ 0.05n_{-1} - 0.04n_{-2}$$
$$(5.9) \qquad\qquad (5.1)$$

N = 1,520

R^2 = 0.90   DW = 2.06   SEE = 0.064

Instrumental Variables 1/

$$w - p = 0.32 + 0.91(w - p)_{-1} + 0.05(y - n)_{-1} + 0.05\pi_{-1}$$
$$(89.3) \qquad\qquad (2.1) \qquad\qquad (2.8)$$

$$- 0.08UIND_{-1} + 0.94wagg$$
$$(4.1) \qquad\qquad (8.2)$$

$$+ 0.06n - 0.05n_{-1}$$
$$(2.4) \qquad (2.1)$$

N = 1,520

R^2 = 0.90   DW = 2.08   SEE = 0.064

1/ Past values of n and (w - p) were used as instruments.

and lagged employment. All the variables apart from the industry level unemployment rate, UIND, are in logs.

A number of features of the regressions in Table 6 are worth noting. The industry-wide unemployment rate exerts downward pressure on firm-level wages even though we allow the firm's employment to enter the regression. This is at variance with the pure insider view of wage determination set out in Section IV above. At the same time, both employment lagged once and twice (or current and lagged employment in the instrumental variable case) as well as the insider variables such as the firm's profits and productivity, are significant. In both the OLS and the IV estimates the hypothesis that employment lagged once and twice (current and lagged in the IV case) have equal and opposite coefficients cannot be rejected. This implies the existence of some insider power.

To test for the hysteresis effect through the duration composition of unemployment, we added the proportion of those who have been out of work for more than a year, LTU, to the equations in Table 6. 1/ The results of this exercise are presented in Table 7. The long-term unemployment variable is highly significant and positive in both the OLS and the IV estimates (the same result that Layard and Nickell (1986) obtained for the UK).

A number of variations on the results presented in Tables 6 and 7 were also attempted. Instead of the aggregate wages, we included industry-level wages. This variable was highly significant and the results remained unchanged but the diagnostics were not as good as those in Tables 6 and 7. When we substituted the aggregate unemployment rate for the industry-level unemployment rate, the results remained identical bar the coefficient of the aggregate unemployment rate which was much lower (-0.01, t-statistic = 4.3). Since our data spanned only seven years, we chose to keep the industry-level variable which provides more variation over the data set. Finally, the long-term unemployment variable was highly significant and positive in every single regression that we estimated regardless of the method of estimation or the other variables included.

In short, the firm-level investigation supports the time series result that the effects of the duration composition of unemployment shows evidence of hysteresis in the Belgian labor market. Furthermore, although the results reject the strong insider-outsider hypothesis, they do indicate the existence of some insider power in wage determination.

VI. Conclusion and Policy Implications

The empirical investigation of the previous section is very preliminary and further analysis is necessary for concrete policy implications to emerge. However, the results convey two conclusions: (i) the long-term unemployed do not have a negative impact on wages; and (ii) there is some evidence that the incumbent workers, the "insiders," exercise market power

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1/ The aggregate wage variable, wagg, was left out of these regressions because of collinearity with LTU.

Table 7. Wages Equation Using Firm Level Data:
Observations from 312 Firms Over 7 Years (1978-84)
(Including the Long-Term Unemployment Variable)

OLS

$$w - p = 0.01 + 0.91(w - p)_{-1} + 0.05(y - n) + 0.03\pi_{-1}$$
$$\quad\quad\quad (89.4) \quad\quad\quad (2.2) \quad\quad\quad (2.1)$$

$$- 0.09UIND_{-1} + 0.05n_{-1} - 0.04n_{-2}$$
$$\quad (4.7) \quad\quad\quad (5.9) \quad\quad\quad (5.1)$$

$$+ 0.23LTU$$
$$\quad (7.4)$$

N = 1,520

$R^2 = 0.90$ DW = 2.06   SEE = 0.064

Instrumental Variables 1/

$$w - p = 0.32 + 0.91(w - p)_{-1} + 0.05(y - n)_{-1} + 0.04\pi_{-1}$$
$$\quad\quad\quad (89.2) \quad\quad\quad (2.5) \quad\quad\quad (2.8)$$

$$- 0.08UIND_{-1} + 0.06n - 0.05n_{-1}$$
$$\quad (4.2) \quad\quad\quad (2.4) \quad (2.1)$$

$$+ 0.27LTU$$
$$\quad (8.0)$$

N = 1,520

$R^2 = 0.90$ DW = 2.08   SEE = 0.064

1/ Past values of n and (w - p) were used as instruments.

in wage determination, taking greater account of their own interests than those of the unemployed "outsiders."

In addition, the automatic indexation of wages to prices in Belgium can cause a downward rigidity in real wages, given the multi-tier real wage bargaining process. For example, if a two-year-ahead national collective agreement is reached just before the economy enters a recession (as in 1992) and this is supplemented by positive sectoral and enterprise settlements, then the impact on employment could be severe. Furthermore, given the existence of "insider" power, it would be difficult to re-employ the newly unemployed "outsiders."

How should labor market policy respond to these characteristics in order to effectively generate employment, reduce unemployment and, more generally, lower the under-utilization of labor?

One implication of the work presented here is that market forces by themselves cannot be expected to lead to a quick reduction in unemployment so that there is a need for government involvement in reducing unemployment, and particularly long-term unemployment. This can be done in two ways: (i) tightening up the unemployment benefit system for the long-term unemployed in order to encourage job search; and (ii) providing targeted training and employment opportunities for the long-term unemployed.

The government has taken a number of measures along these lines in the last two years. The benefit eligibility rules for the part-time or temporarily unemployed have been tightened. Furthermore, the national government, in cooperation with the regions and communities, introduced the *plan d'accompagnement* in September 1992 which provides training or employment opportunities for all the full-time unemployed under the age of 46 when they commence their tenth month of unemployment.

Although the above are positive developments, further steps could be taken to reduce long-term unemployment.

a. The *Plan d'accompagnement* could be extended and improved in a number of ways. For example, the suspension of benefits for those whose duration of unemployment exceeds twice the regional average could become automatic rather than being left to the discretion of regional unemployment offices (unemployment benefits are financed by the central government but administered locally). Currently, the initiative applies to those who "commence" their tenth month of unemployment. It would be useful to extend the plan to all the long-term unemployed. For instance, in France extensive interviewing of those who have been unemployed for more than 12 months has been effective in increasing the outflow of the long-term unemployed.

b. In spite of tighter unemployment benefit regulations, benefits are still available for a longer duration in Belgium than in most other industrial countries (Table 8). In this respect, unemployment compensation also acts as a form of long-term income support. However, unlike the income support system, MINIMEX, unemployment compensation is not means tested, so there is a danger that social security benefits are not going to those who need them most and that job search incentives are reduced. In the same vein, there are large numbers of individuals receiving unemployment benefits

Table 8. Maximum Duration of Unemployment Benefits and
Replacement Rates

	1981	1989
EC countries		
Belgium	Indefinite	Indefinite
Denmark	130 weeks	130 weeks
France	156 weeks	130 weeks
Germany	52 weeks	52 weeks
Ireland	65 weeks	65 weeks
Italy	26 weeks	26 weeks
Netherlands	...	156 weeks
Spain	104 weeks	104 weeks
United Kingdom	52 weeks	52 weeks
Non-EC European countries		
Austria	30 weeks	30 weeks
Finland	100 weeks	100 weeks
Norway	40 weeks	80 weeks
Sweden	60 weeks	60 weeks
Switzerland	36 weeks	50 weeks
Non-European OECD countries		
Canada	50 weeks	50 weeks
Japan	26 weeks	30 weeks
United States	39 weeks	26 weeks

Source: OECD, **Employment Outlook**, 1993.

who are employed part-time, temporarily unemployed, on career breaks or who have retired early (Chart 2). This imposes a heavy financing burden on unemployment insurance leading to a high wage wedge. There is a need for more transparency here. This could be achieved through separating the cyclical, short-term, function of unemployment insurance from its permanent and redistributive income support function.

The other conclusion of this paper is the need to reduce "insider" power in order to help employment generation. Lindbeck and Snower (1989b) discuss in some depth the policies which could be effective in this respect. They include:

(1) Reducing hiring and firing costs and relaxing job security regulations;

(2) lowering the cost of employing "outsiders," for example, through reduced employer payroll taxes for the young and the long-term unemployed; 1/

(3) enhancing competition in the product market through reducing the barriers to the entry of new firms by, say, providing tax incentives and business start funds to hire the unemployed;

(4) vocational training schemes which provide marketable skills to the unemployed, making them more attractive to firms; and finally

(5) profit sharing, which reduces the marginal cost of employment (see Lindbeck and Snower, 1989a and 1989b).

An additional complicating factor is wage indexation. The empirical results of the last section demonstrate that the suspension of indexation in 1982, in the wake of the devaluation of the Belgian franc, was effective in reducing the real wage. In Belgium there is a consensus among the social partners in favor of indexation as a means of maintaining stable pay expectations. In any case, the law on competitiveness is a way of taking action if necessary.

However, given rising unemployment, the downward rigidity of wages, and the evidence of "insider" power presented here, it is necessary to ensure some added wage flexibility in order to address unemployment. The recent decision of the government--announced in the "global plan"--to exclude petrol, tobacco, and alcohol prices from indexation and to freeze real wages for the period 1995-96 will help in restraining wages and improving competitiveness. It may also be desirable to strengthen the competitiveness law, so that the suspension or modification of indexation becomes automatic in the event of an adverse shock or a loss in competitiveness.

1/ In this respect the *plan d'accompagnement* and the recently announced *plan d'embauche des jeunes* will be helpful.

NACE CODES

22	production and preliminary processing of metals (metals)
23	Extraction of minerals other than metalliferous and energy-producing minerals; peat extraction
24	manufacture of non-metallic mineral products (glass, diamond, ceramics)
25	chemical industry
31	manufacture of metal articles (except for mechanical, electrical and instrument engineering and vehicles)
32	mechanical engineering
34	electrical engineering
35	manufacture of motor vehicles and of motor vehicle parts and accessories
36	manufacture of other means of transport
37	instrument engineering
41	food and drink
42	tobacco
43	textile
44	leather and leather goods industry (except footwear and clothing)
45	footwear and clothing industry (footwear + clothing)
46	timber and wooden furniture industries
47	manufacture of paper and paper products, printing and publishing (paper + publishing)
48	processing of rubber and plastics
49	other manufacturing industries

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