



STUDIECENTRUM VOOR ECONOMISCH EN SOCIAAL ONDERZOEK

VAKGROEP MACRO-ECONOMIE

The decline in unemployment (1984-90)  
and the wage formation hypothesis (\*)

A. VAN POECK  
J. VAN GOMPEL

report 91/257

May 1991

(\*) The authors are indebted to G. Peersman for excellent research assistance and to H. Meersman and J. Plasmans for helpful comments.

Universitaire Faculteiten St.-Ignatius  
Prinsstraat 13 - B 2000 Antwerpen

D/1991/1169/11

## Abstract

In this paper we assess the role of macroeconomic demand policy and wage formation for the reduction in unemployment in the OECD countries during the second half of the 1980s. We attempt to explain the varying degree of success between the OECD countries by differences in their macroeconomic policy stance and in the characteristics of the wage formation mechanism of these countries.

The role of macroeconomic wage formation and of labour market institutions have been stressed by many economists in the context of rising unemployment rates. The contribution of this paper, however, lies in the empirical investigation of the role of wage formation in the light of declining unemployment and favourable supply shocks.

The empirical results suggest that countries whose wage formation is not responsive to changes in the terms of trade or to short-term changes in productivity, on average, performed better during the second half of the 1980s. The degree of wage responsiveness to labour market pressure is also an important characteristic, but the degree of nominal wage indexation to consumer prices or the extent of (de)centralization of wage bargaining do not 'explain' differences in unemployment decline between countries.

These findings are most relevant from the point of view of labour market policy and reform, because they suggest that 'superior' wage formation mechanisms (or institutional characteristics of the labour market) which outperform the other in all circumstances probably do not exist.

## 1. Introduction

One of the most typical macroeconomic developments of the second half of the 1980s is the reduction in unemployment in the OECD economies. As table 1 shows declining unemployment rates have characterized almost all OECD countries, although to a varying degree. E.g. the decline was very pronounced in the United Kingdom, the Netherlands, Belgium and the United States, but only moderate in Austria, Japan, Denmark and France. Greece, Italy, Norway and New Zealand even experienced a rise in unemployment between 1984 and 1990<sup>1</sup>.

TABLE 1

This overall picture is commonly attributed to the favourable supply shocks at the beginning of the period (e.g. the oil price decline of 1986) and to the structural reforms that were carried out in the OECD economies.

In this paper we assess the role of macroeconomic demand policy and wage formation for the observed decline in unemployment. In other words, we attempt to explain the varying degree of success between the OECD countries by differences in their macroeconomic policy stance and in the characteristics of the wage formation mechanism of these countries. The role of structural reform is

---

<sup>1</sup>. For most countries the top level of unemployment was reached in 1983 or 1984. We computed the unemployment decline starting from 1983 or 1984, according to which is highest. Switzerland is left out because the flexible supply of immigrant labour in that country makes the unemployment rate a less meaningful indicator of labour market performance. To some extent this also holds for New Zealand (see OECD, 1989).

not considered explicitly in this paper and, since their number has been impressive<sup>2</sup>, this could be considered as a serious shortcoming. A partial justification for this omission is that early attempts to assess quantitatively the significance of these changes for aggregate wage developments have found little or no evidence that the basic structure of macroeconomic wage formation has changed<sup>3</sup>.

The role of macroeconomic wage formation and of labour market institutions have been stressed by many economists in the context of rising unemployment rates between the early 1970s and the mid of the 1980s. However, the emphasis has generally been placed on supply-side explanations, as noticed by J.F. Helliwell (1988) who is also very critical about this one-sided approach. In this respect, the concept of real wage flexibility has received some respectability and the view that highly centralized and decentralized economies are better equipped to deal with the shocks of the 1970s and the early 1980s has become very influential<sup>4</sup>.

The contribution of this paper lies in the investigation of the role of wage formation in the light of declining unemployment and favourable supply shocks. This should enable us to draw some conclusions with respect to the consistency of the relationships reported in the literature.

---

<sup>2</sup>. For an overview, see : OECD (1990).

<sup>3</sup>. See J.H. Chan-Lee, D.T.Coe & H. Prywes (1987). On the other hand the OECD (1989) reports that re-estimations of the wage equation suggest that the price coefficients in the wage equation for France and Germany have fallen in the period 1984-87.

<sup>4</sup>. See L. Calmfors & J. Driffill (1988).

The structure of the paper is as follows. In section 2 we pay attention to the demand side of the economy. Measures of monetary and fiscal policy stance are presented, which are assumed to represent quantitatively shifts in the level of aggregate demand. In section 3 we turn to the supply side, and more specifically to the working of the labour market. We show several indicators, taken from recent empirical work done at the OECD, that reflect various aspects of wage formation. In section 4 demand and supply indicators are brought together in an attempt to explain the observed differences in the decline of unemployment between countries<sup>5</sup>. The estimated equations can be considered as reduced form equations of an underlying aggregate demand/aggregate supply framework as commonly explained in macroeconomic textbooks. A formal application of the AD/AS framework is however beyond the aim of this article. Finally the conclusions are set out in section 5.

## 2. Monetary and fiscal policy

Table 2 shows summary indicators of monetary and fiscal policy for the second half of the 1980s. To measure the stance of monetary policy we compare the average yearly growth rate of a broad monetary aggregate (money plus quasi-money) during 1985-1989 with the same measure for the preceding five-year period (1980-1984). The result is reported as  $\Delta \dot{M}2$  in table 2. This measure avoids several problems that may arise because financial systems and institutions are not always comparable between countries. In line with the arguments set out by A. Crocett & M. Goldstein (1987), we use a nominal monetary aggregate to reflect the stance of monetary policy.

Fiscal policy is approximated by the average yearly change in the cyclically-adjusted government budget balance during 1985-1989.

---

<sup>5</sup>. This approach owes a lot to McCallum (1986).

TABLE 2

Table 2 reveals that monetary and fiscal policy have in general been rather firm during the period under consideration. With respect to monetary policy, this is especially so in Denmark, The Netherlands, Australia, France, Sweden and Italy. Moreover, there were only a few countries that experienced an increase in their money supply growth in the second half of the 1980s as compared with the first half : New Zealand, the United Kingdom, Japan and Belgium.

The same overall picture holds for fiscal policy : in most countries it was restrictive, on average. This is especially the case for Ireland, Sweden, Denmark, Japan, and Australia. Fiscal policy in Norway and Greece, on the contrary, was expansive<sup>6</sup>.

These 5-year averages for the summary indicators of monetary and fiscal policy, of course conceal the frequent policy changes that occurred during the period under investigation. This holds especially for monetary policy.

To complete this section on demand shifts, we consider the change in international competitiveness. This is measured by the real exchange rate (based on relative unit labour costs) in table 2. For some countries the change in international competitiveness was quite important. E.g. the sharp real depreciation of the US dollar immediately catches the eye. At the other side, Japan, Sweden, Germany and Denmark experienced a rather sharp increase in their real exchange rate (based on relative unit labour costs).

---

<sup>6</sup>. For Norway, this observation, to a large extent, goes hand in hand with the fall in oil prices.

### 3. Wage formation and labour market characteristics

Wage formation and the institutional characteristics of the labour market have received widespread attention in the context of the rise in unemployment, often in combination with demand factors<sup>7</sup>. In this section we first briefly pass in review the several aspects of the wage formation process. Next we turn to centralization as an important aspect of labour market institutions.

The discussion of the wage formation process usually starts from estimates of a wage equation, generally reflecting an expectations-augmented Phillips curve. We used recent re-estimations of the wage equations, as originally reported in D. Coe (1985)<sup>8</sup>.

The general form of this wage equation is as follows :

$$(1) \quad w = a_0 + \hat{p}_c + a_2 u + a_3 \hat{q} + a_4 (p_c - p_{gdp})$$

$$\begin{aligned} \text{with } \hat{p}_c &= \alpha_0 p_c + \alpha_1 p_{c,-1} + \alpha_2 p_{c,-2} + \dots & \Sigma \alpha_i &= 1 \\ \hat{q} &= \beta_0 q + \beta_1 q_{-1} + \beta_2 q_{-2} & \Sigma \beta_i &= 1 \end{aligned}$$

with  $w$  : growth rate of the nominal wage rate;  
 $p_c$  : growth rate of the consumer price index;  
 $u$  : unemployment rate;  
 $q$  : growth rate of average labour productivity;  
 $p_{gdp}$  : growth rate of output prices (value added price index).

---

<sup>7</sup>. See e.g. D. Grubb, R. Jackman & R. Layard (1983), M. Bruno & J. Sachs (1985), C. Bean, R. Layard & S. Nickell (1986).

<sup>8</sup>. See H. Kawasaki, P. Hoeller & P. Poret (1990) for the smaller OECD countries and J.H. Chan-Lee, D.T. Coe & H. Prywes (1987) for the large ones.

a) short-run responsiveness of wages with respect to (consumer) prices)

This aspect of the wage formation process is measured by the  $\alpha$ -coefficients, as wages are assumed to follow prices fully in the long run. (The coefficient of  $\hat{p}_c$  is for most countries restricted to one, and for those countries where the equation has been estimated without restriction, the coefficient is highly significant and near to one).

Table 3 shows the weight of the current price inflation ( $\alpha_0$ ), the current plus one period lagged price inflation ( $\alpha_0 + \alpha_1$ ) and the current plus one and two periods lagged price inflation ( $\alpha_0 + \alpha_1 + \alpha_2$ ) in the constructed price inflation variable ( $\hat{p}_c$ ) that enters the wage equation (1). Since these estimates are based on semi-annual data ( $\alpha_0 + \alpha_1$ ) reflects the degree to which nominal wages are adjusted to a change in consumer prices within one year.

TABLE 3

Notice that the speed of nominal wage adjustment is in general quite high. However, a few countries merit special attention. A well-known case is the United States which exhibits a high degree of nominal wage inertia to price changes (this holds also for Canada and Spain, although to a smaller degree). At the other side of the spectrum we notice Belgium<sup>9</sup> and Germany, followed by Japan, Ireland and Italy.

---

<sup>9</sup>. The Belgian wage equation was estimated with annual data and consequently for Belgium  $\alpha_0$  reflects the weight of the current plus the one-period lagged price inflation. Nevertheless, it is well known that the Belgian indexation mechanism implies a quick adjustment of nominal wages to consumer prices.



**b) sensitivity of wages to the unemployment rate**

The sensitivity of wages to the unemployment rate is usually measured by the semi-elasticity of nominal wages with respect to unemployment, i.e. the coefficient  $a$ , from equation (1). Table 4 shows the results. All reported coefficients, with the exception of Norway and Spain, are significantly different from zero at the 95 per cent confidence level (and most of them also at the 99 per cent level).

For some countries, better estimation results for the wage equation were obtained when the unemployment rate was entered in the inverse ( $1/u$ ) or the log-form ( $\log u$ ), instead of the linear form. Indeed, the inverse specification proved superior for Norway, Sweden and Japan, while the log form was preferred for Austria, Denmark, Finland, Ireland, Netherlands, Spain and Germany. In the case of a non-linear specification the value of the (semi-)elasticity of nominal wages with respect to unemployment is influenced by the choice of the unemployment rate, i.e. the point on the Phillips curve for which the elasticity is computed. The results shown are based on the average unemployment rate during 1985-90, since we are specifically interested in the sensitivity of wages to unemployment during the period of declining unemployment.

Table 4 shows that unemployment exerts a negative influence on wage inflation in all countries, as expected on theoretical grounds, but this influence differs between countries. Indeed, according to these estimations Sweden and Japan have the largest wage responsiveness to labour market tightness or slack, whereas Norway, the Netherlands, the UK, Denmark, Ireland, Spain and Germany are characterized by a very low responsiveness. In Norway and Spain there is even some indication of a 'hysteresis'-effect. This is also the case in the United Kingdom where a wage equation with  $\Delta u$  instead of  $u$  as independent variable yields marginally better estimation results (equation not used).

### c) responsiveness of wages with respect to productivity

Another aspect of wage formation, which however has received less attention, is the responsiveness of wages to short-term productivity. This is measured by a combination of the  $a_3$  and the  $\beta$ -coefficients in equation (1). Table 5 reproduces the results<sup>10</sup>. The first column gives the impact of productivity growth on wages within the current period (semi-annual data). This figure is obtained by multiplying the coefficients  $a_3$  and  $\beta_0$ . In a similar way, the second column gives the effect of the current and one-period lagged change in productivity, i.e.  $a_3(\beta_0 + \beta_1)$ . The last column equals  $a_3(\beta_0 + \beta_1 + \beta_2)$ .

According to the OECD estimations, wage formation is influenced by short-run changes in labour productivity in about half of the countries of our sample. The short-run sensitivity of wages to productivity is highest in Greece, New Zealand and Belgium, followed by Japan and Norway.

### d) terms-of-trade effects

A final characteristic of wage formation which is surveyed here is the extent to which wages react to changes in the terms of trade. This is revealed by the value of the parameter  $a_4$ . Indeed, if  $a_4 = 0$ , this implies that wages do not react to changes (deterioration or improvement) in the terms of trade. On the contrary, if  $a_4 = -1$ , wages are de facto indexed to producer prices instead of consumer prices, implying moderate wage increases in the wake of a deterioration in the terms of trade.

The implications of the existence of a terms-of-trade effect are different in the case of an improvement in the terms of trade

---

<sup>10</sup>. For those countries where the productivity growth rate has been retained as an explanatory variable, the regression coefficient is always significantly different from zero at the 95 per cent confidence interval. The same holds for the terms-of-trade effect (see section 2.d), except for Greece where the coefficient  $a_4$  has been set at -0.50.

(e.g. favourable oil price shock), implying  $p_c < p_{gdp}$ . In this case, the absence of a terms-of-trade effect ( $a_4 = 0$ ) means more moderate nominal wage growth as compared to the case when a terms-of-trade effect is in existence ( $a_4 = -1$ ).

TABLE 6

Table 6 summarizes the finding with respect to the existence of a terms-of-trade effect. Such an effect is found to exist in about half of the countries considered in this paper.

#### e) institutional aspects of the wage bargaining process

One aspect of the institutional wage-bargaining process, that has received widespread attention in the literature is the level at which wage negotiations tend to be conducted<sup>11</sup>. Indeed, it has been shown that countries with a highly centralized, as well as with a decentralized wage bargaining system have outperformed the intermediate group in terms of unemployment and some overall macroeconomic performance indexes, when the period of the 1970s and the beginning of the 1980s is considered.

TABLE 7

Table 7 repeats the Calmfors & Driffill rankings for centralization. It is, of course, tempting to investigate whether the Calmfors & Driffill conclusions still hold for a period of reversed supply shocks, such as the second half of the 1980s.

---

<sup>11</sup>. Other aspects that are not considered in this paper are : the degree of unionization, the formal aspects of the indexation system, the provisions with respect to the unemployment benefit system, the taxation of wages and capital, and labour legislation (hiring and dismissal procedures, minimum wages). For an overview, see OECD (1989).

#### 4. Aggregate demand, aggregate supply and unemployment

In this section we bring together the building blocks that were presented in section 2 and 3, in an attempt to explain the differences in the decline of unemployment in the OECD countries. In order to assess the relative importance of demand shifts, structural characteristics of wage formation and institutional aspects of the labour market, we estimate unemployment equations which correspond to the following general forms :

$$(2) \quad \Delta u = a + b u_{84} + c (\text{DEMAND}) + d (\text{WAGE}) + e (\text{CEN})$$

with  $\Delta u$  : the absolute change in the unemployment rate (as a percent of active population) between 1984 and 1990 ( $\Delta u < 0$  refers to a decline in unemployment and  $\Delta u > 0$  to an increase);

$u_{84}$  : the unemployment rate in 1984;

DEMAND : a variable (variables) reflecting the stance of macroeconomic policy during 1985-1989 (this includes monetary as well as fiscal policy and the change in international competitiveness, i.e. the real exchange rate);

WAGE : a 'variable' ('variables') reflecting certain characteristics of the macroeconomic wage formation process;

CEN : alternative measures of centralization of wage bargaining (viz. CEN, CENA, CENB<sup>12</sup>).

---

<sup>12</sup>. The original ranking order CEN is taken from Calmfors & Driffill, adjusted for those countries that are not included in our sample (e.g. Switzerland). The revised ranking order CEN A is obtained by listing the most centralized economy and the most decentralized one first, followed by the second most centralized and the second most decentralized, etc. Revised ranking order CEN B ranks the three most centralized economies first, followed by the three most decentralized, etc.

The specification of equation (2) is quite obvious and in line with the aggregate demand/aggregate supply framework that we evoked in the introduction. We added  $u_{84}$  to correct for differences in the original position between countries. Indeed the decline in unemployment has in general been more pronounced in countries that experienced a high unemployment rate at the beginning of the period. Equation (2) was estimated on a cross-section basis for 19 countries.

It goes without saying that equation (2) is a very crude way to assess the influence of demand shifts and supply conditions on the labour market performance. For this reason, this approach has also been criticized<sup>13</sup>. One form of criticism states e.g. that the relative importance of demand-side and supply-side influences is likely to differ between countries, whereas equation (1) assumes them to operate in a uniform way. This could be 'solved' by weighting the demand and supply-side variables in order to reflect this differential impact. E.g. monetary and fiscal policy are generally expected to be more effective in relatively closed economies, while a change in international competitiveness is likely to be more important for a small open economy. Yet, estimations with transformed demand variables often merely confirm the conclusions based on a simple specification like eq. (2)<sup>14</sup>. Consequently, as a first approximation we assume the same influence of demand and supply conditions in all countries.

Another, more fundamental form of criticism concerns the use of the point estimates of the regression coefficients of the wage equation (1) as right-hand side variables in the cross-section estimation of equation (2). This approach is likely to be criticized on conceptual as well as on methodological grounds. A crucial aspect e.g. is whether the international differences in

---

<sup>13</sup>. See e.g. J.F. Helliwell (1988).

<sup>14</sup>. See e.g. A. Van Poeck (1991).

the wage formation process are statistically significant and not too sensitive to small changes in the specification of the wage equation. This is indeed a serious drawback. Taking it all in all this implies that the results for equation (2) should be considered more as suggestive.

We experimented with several versions of equation (2), under the condition that all countries for which we have data should be included in the regressions<sup>15</sup>. The results were mostly disappointing, indicating that difference in unemployment decline between countries cannot be explained in a simple way by a combination of aggregate demand variables and supply characteristics. This finding throws serious doubt upon the self-confidence that characterizes a lot of empirical results reported in the literature. The only lasting finding from these regressions is the positive correlation between the level of unemployment (in 1984) and the decline between 1984 and 1990, indicating that countries with a high unemployment rate on average experienced a larger unemployment decline. To some extent this relationship merely reflects the 'potential for unemployment decline'.

#### TABLE 8

In table 8 we report some 'best' estimates, giving maximum support to the hypothesis that a combination of demand and supply variables is able to explain the differences in the decline in unemployment in the OECD countries. These estimations are obtained by leaving out as little 'perverse' countries as possible. In the case of 18 observations (equation 4 to 6), Italy is left out. With 17 observations (1 to 3) New Zealand is also excluded. (In some cases it is possible to increase the

---

<sup>15</sup>. The data set consists of 19 countries. When the cyclically-adjusted budget balance is included in the regressions, the number of countries reduces to 18. The centralisation rank order is only available for 16 out of the 19 countries.

explanatory power of the regressions by leaving out an additional number of countries). We briefly comment upon these findings.

- As already stated above, the unemployment level appears to contribute significantly in explaining the decline in unemployment.

- The evidence that differences in macroeconomic demand policy contribute to explaining differences in unemployment decline is rather weak. Indeed, neither fiscal policy ( $G$ ) nor changes in international competitiveness ( $\dot{E}_r$ ) enter significantly in the unemployment equation, neither independently nor in combination. Besides, only in equation (2) of table 8 differences in monetary policy stance ( $\Delta \dot{M}2$ ) to some extent explain differences in unemployment behaviour. The coefficient of  $\Delta \dot{M}2$  has a negative sign, indicating that countries with an expansive monetary policy had, *ceteris paribus*, a stronger decline in unemployment.

- Differences in wage responsiveness to labour market slack, measured by the semi-elasticity of nominal wages to unemployment, also to some extent explain differences in unemployment decline. Countries with a high degree of wage responsiveness, *ceteris paribus*, are able to realize a higher decline in unemployment (remember that  $a_2$  is always negative). This finding is in line with earlier estimations which found a positive relationship between a measure of real wage rigidity and the rise in unemployment in the 1970s and early 1980s<sup>16</sup>.

- Countries with a wage formation mechanism including a terms-of-trade effect, on average, have a smaller decline in unemployment.

---

<sup>16</sup>. See e.g. D. Grubb, R. Jackman & R. Layard (1983); F. Klau & A. Middelstädt (1986). The measure of real wage rigidity referred to is equal to the absolute value of the inverse of the unemployment coefficient ( $1/a_2$ ) or the ratio between the inflation coefficient and the unemployment coefficient. Starting from wage equation (1) these two measures coincide.

This is shown by the positive regression coefficient of the terms-of-trade dummy ( $D_{TOT}$ ) defined in table 8. The estimated value of the coefficient is rather high, indicating that countries with a terms-of-trade effect, ceteris paribus, realized an increase in unemployment (a smaller decline) of 0.97 to 1.38 percentage points.

- Wage responsiveness to short-term productivity growth also contributes significantly to explaining differences in unemployment decline. Indeed, the results indicate that for countries where such an effect is present, unemployment decline is smaller. The value of  $a_3(\beta_0 + \beta_1)$  varies between 0 and 1 (see table 5), with an average of 0.63 for the countries where a productivity effect is in existence. This means that for those countries, the decline of unemployment was, on average, about 1.3 percentage points less than in the countries where such an effect is absent.

This finding, as well as the previous one on the terms-of-trade effect throws some light on the importance of wage formation characteristics, in combination with the kind of shocks that the economy is subjected to. Indeed, the period considered here is quite different from the situation in the 1970s and early 1980s, in that it was characterized by falling oil and commodity prices, with positive effects for labour productivity as it is commonly measured. Countries where wage increases did not react to this terms-of-trade plus productivity improvement experienced a smaller rise in (real) wages and a better labour market performance.

Table 8 is also indicative for the variables that are not restrained as explanatory variables, because they do not contribute in a statistically significant way in explaining the differences in unemployment decline. This holds for the short-run elasticity to prices and the degree of centralization. With respect to the latter, this reaffirms the absence of a consistent



relationship over time between bargaining structure and macro-economic performance. Indeed, figure 1, which however is drawn for a quite restricted number of countries, rather points to the opposite relationship than that found by L. Calmfors & J. Driffil (1988). It suggests that countries with an intermediate bargaining level realized a better labour market performance. (This is, of course, consistent with the Calmfors & Driffil finding combined with our observation that countries with the highest unemployment rate also realized the largest unemployment decline).

#### FIGURE 1

We complete these estimation results with those reported in table 9 and 10. The results in table 9 were obtained, using dummy variables for all supply-side variables. To some extent, this method meets the criticism regarding the use of point estimates as explanatory variables<sup>17</sup>, although a clear-cut delimitation of the different groups of countries remains difficult, indeed impossible. In table 10, all variables, except u84 are defined as dummy variables. In general lines, these results confirm those of table 8, but the role of the demand variables increases.

#### TABLE 9

#### TABLE 10

---

<sup>17</sup>. The use of stochastic regressors like e.g.  $a_2$ ,  $a_3$  and  $a_4$  can evoke a major econometric problem. Indeed, correlation between these stochastic variables and the disturbance term is likely to arise, which definitely endangers the consistency of the ordinary least-squares estimators. However, by using well-specified dummy variables, i.e.  $Da_2$ ,  $Da_3$  and  $D_{TOT}$ , we can reduce the possible correlation with the error term and therefore increase the validity of the estimated coefficients.

## 5. Concluding remarks

Wage formation is an important aspect of the working of an economy which to a large extent determines success or failure in labour market performance. This holds for the period of rising unemployment as well as for the more recent years of declining unemployment rates, which were considered in this paper. However, which characteristics precisely matter is highly dependent on the kind of shocks that the economy undergoes. Our analysis suggests that countries whose wage formation is not responsive to changes in the terms of trade or short-term changes in productivity, on average, performed better during the second half of the 1980s, if we take into account the different starting position of the countries at the beginning of the period. The degree of wage responsiveness to labour market pressure is also an important characteristic, but the degree of nominal wage indexation to consumer prices or the extent of (de)centralization of wage bargaining do not 'explain' differences in unemployment decline between countries.

These findings are most relevant from the point of view of labour market policy and reform, because they suggest that 'superior' wage formation mechanisms (or institutional characteristics of the labour market) which outperform the other in all circumstances probably do not exist.

The question remains whether the findings reported in this paper are sufficiently robust to warrant general conclusions. In this context, a substantial dose of scepticism is probably not misplaced. However, experimentation with the unemployment equation (different selection of time periods, alternative measures of fiscal and monetary policy, and of the real exchange rate) reveals that the overall conclusions of this paper remain unchanged.

Table 1 : Change in unemployment rates in OECD countries between the top level<sup>1</sup> and 1990<sup>2</sup>.

	top level	change
Canada	11.80	-3.70
France	9.80	-0.90
Germany	7.10	-2.10
Italy	10.10	1.00
Japan	2.70	-0.60
United Kingdom	11.40	-5.60
United States	9.60	-4.10
Australia	9.90	-3.10
Austria	3.80	-0.50
Belgium	13.20	-4.50
Denmark	10.40	-0.80
Finland	5.40	-2.00
Greece	8.10	0.20
Ireland	15.50	-1.50
Netherlands	11.20	-4.80
New Zealand	5.40	2.20
Norway	3.40	1.90
Spain	20.10	-3.90
Sweden	2.90	-1.30

<sup>1</sup>. 1983 or 1984

<sup>2</sup>. as a % of the labour force; commonly-used definitions

Source : OECD, Economic Outlook.

Table 2 : Summary indicators of monetary and fiscal policy stance and of the change in international competitiveness for the period 1985-1989

	$\dot{\Delta M2}$	G	$\dot{E}_r$
Canada	-0.04	0.28	2.17
France	-3.86	0.10	-0.42
Germany	0.56	0.14	3.45
Italy	-3.04	-0.02	1.83
Japan	1.82	0.74	4.61
United Kingdom	2.24	0.24	-0.59
United States	-2.06	-0.08	-7.35
Australia	-4.32	0.56	-
Austria	-1.66	-0.30	-0.92
Belgium	1.26	-0.02	-1.39
Denmark	-5.50	0.86	3.05
Finland	0.08	0.12	0.69
Greece	-1.48	-1.50	-
Ireland	-2.76	2.53	-1.00
Netherlands	-5.44	-0.12	0.58
New Zealand	5.78	-	-
Norway	-0.54	-1.92	0.26
Spain	-1.48	0.14	2.63
Sweden	-3.44	1.34	4.20

$\dot{\Delta M2}$  : yearly growth rate of money in 1985-89 versus 1980-1984 (a positive sign refers to an increase in the nominal money growth rate);

G : average cyclically-adjusted government budget balance based on a potential output benchmark during 1985-89 (changes as a per cent of potential GNP/GDP). A positive sign indicates a lower deficit or a higher surplus;

$\dot{E}_r$  : average yearly change in the real exchange rate (based on relative unit labour costs) during 1985-89.

Source :  $\dot{\Delta M2}$  and  $\dot{E}_r$  : IMF, International Financial Statistics.

G : OECD, Economic Outlook.

Table 3 : Measures of the short-run responsiveness of wages with respect to consumer prices

	$\alpha_0$	$\alpha_0 + \alpha_1$	$\alpha_0 + \alpha_1 + \alpha_2$
Canada	0.20	0.40	0.60
France	0.50	1.00	1.00
Germany	0.75	1.00	1.00
Italy	0.60	1.00	1.00
Japan	0.67	1.00	1.00
United Kingdom	0.33	0.67	1.00
United States	0.14	0.28	0.43
Australia	0.50	1.00	1.00
Austria	0.33	0.67	1.00
Belgium	1.00	1.00	1.00
Denmark	-	-	-
Finland	0.33	0.67	1.00
Greece	0.50	1.00	1.00
Ireland	0.62	1.00	1.00
Netherlands	0.50	1.00	1.00
New Zealand	-	-	-
Norway	0.39	1.00	1.00
Spain	0.25	0.50	0.75
Sweden	-	-	-

Source : H. Kawasaki, P. Hoeller & P. Poret (1990); J.H. Chan-Lee, D.T. Coe & H. Prywes (1987)

Table 4 : Semi-elasticity of wages with respect to unemployment

	$a_2$	level of $u^1$
Canada	-0.51	
France	-0.33	
Germany	-0.07	6.10
Italy	-0.60	
Japan	-1.09	2.50
United Kingdom	-0.15	
United States	-0.60	
Australia	-0.39	
Austria	-0.51	3.40
Belgium	-0.54	
Denmark	-0.13	8.70
Finland	-0.46	4.50
Greece	-0.41	
Ireland	-0.13	16.40
Netherlands	-0.21	8.30
New Zealand	-0.65	
Norway	-0.24	3.40
Spain	-0.09	19.30
Sweden	-2.16	1.90

<sup>1</sup>. in case of unemployment rate entering in the inverse (1/u) or log-form (log u) (average unemployment rate during 1985-90).

Source : See table 3

Table 5 : Responsiveness of wages to short-term productivity

	$a_3\beta_0$	$a_3(\beta_0 + \beta_1)$	$a_3(\beta_0 + \beta_1 + \beta_2)$
Canada	0.00	0.00	0.00
France	0.00	0.00	0.00
Germany	0.33	0.65	0.65
Italy	0.00	0.00	0.00
Japan	0.43	0.64	0.64
United Kingdom	0.00	0.00	0.00
United States	0.18	0.27	0.27
Australia	0.00	0.00	0.00
Austria	0.00	0.00	0.00
Belgium	0.76	0.76	0.76
Denmark	0.15	0.31	0.46
Finland	0.28	0.55	0.83
Greece	1.01	1.01	1.01
Ireland	0.00	0.00	0.00
Netherlands	0.00	0.00	0.00
New Zealand	0.78	0.78	0.78
Norway	0.41	0.81	0.81
Spain	0.26	0.51	0.77
Sweden	0.00	0.00	0.00

Source : See table 3

Table 6 : Terms-of-trade effect (yes/no<sup>1</sup> or value of  $a_4$  if available)

	$a_4$
Canada	no
France	no
Germany	no
Italy	no
Japan	yes
United Kingdom	no
United States	no
Australia	0.00
Austria	-1.03
Belgium	-0.46
Denmark	0.00
Finland	0.00
Greece	-0.50
Ireland	-0.73
Netherlands	0.00
New Zealand	-0.80
Norway	-0.60
Spain	0.00
Sweden	-0.62

yes : estimations include terms-of-trade effect  
no : estimations without terms-of-trade effect

Source : See table 3



Table 7 : Rank order of centralization

	original rank order	revised rank orders	
	CEN <sup>1</sup>	CEN A <sup>2</sup>	CEN B <sup>3</sup>
Canada	16	1.5	4
France	11	11.5	12
Germany	6	11.5	9
Italy	13	7.5	10
Japan	14	5.5	6
United Kingdom	12	9.5	11
United States	15	3.5	5
Australia	10	13.5	16
Austria	1	1.5	1
Belgium	8	15.5	14
Denmark	4	7.5	7
Finland	5	9.5	8
Greece	-	-	-
Ireland	-	-	-
Netherlands	7	13.5	13
New Zealand	9	15.5	15
Norway	2	3.5	2
Spain	-	-	-
Sweden	3	5.5	3

<sup>1</sup>. 1 : country with the most centralized wage bargaining system  
 16 : country with the most decentralized system

<sup>2</sup>. 1.5 : countries with most centralized and most decentralized wage bargaining system  
 3.5 : countries with second most centralized and second most decentralized system  
 etc.

<sup>3</sup>. 1, 2, 3 : three most centralized economies (numbered consecutively)  
 4, 5, 6 : three most decentralized economies (idem)  
 etc.

Source : L. Calmfors & J. Driffill (1988)

Table 8 : Estimation results for the unemployment equation (see eq. 6)

	C	u84	$\Delta \dot{M}2$	$a_2$	$a_3(\beta_0 + \beta_1)$	$D_{TOT}$	N	$\bar{R}^2$	F	DW
1	-0.20 (0.02)	-0.26 (3.02)	-0.16 (1.26)	1.52 (1.87)	-	1.14 (2.76)	17	0.56	6.13	2.08
2	-0.83 (0.85)	-0.25 (2.95)	-0.25 (1.66)	-	1.97 (1.75)	-	17	0.42	4.84	2.11
3	-1.28 (1.27)	-0.19 (2.24)	-0.15 (1.05)	-	-	0.97 (2.21)	17	0.48	5.89	1.87
4	0.05 (0.05)	-0.26 (2.84)	-	1.55 (1.81)	-	1.38 (3.32)	18	0.59	9.16	2.38
5	-0.37 (0.35)	-0.26 (2.80)	-	-	2.06 (1.75)	-	18	0.40	6.76	2.04
6	-1.23 (1.17)	-0.19 (2.11)	-	-	-	1.21 (2.79)	18	0.53	10.49	2.07

Note : Dependent variable  $\Delta u$  : change in unemployment between 1984 and 1990. Independent variables :

C : constant

$\Delta \dot{M}2$  : measure of monetary policy stance (see text);

$a_2$  : wage responsiveness to unemployment;

$a_3(\beta_0 + \beta_1)$  : wage responsiveness to short-term productivity (idem);

$D_{TOT}$  : terms-of-trade dummy :

0 : terms-of-trade effect absent ( $a_4 = \text{no or } 0$ )

1 : terms-of-trade effect present ( $a_4 = \text{yes}$ ) and  $0 > a_4 > -0.50$

2 :  $-0.50 \gg a_4 \gg -1.03$

N : number of countries;  $\bar{R}^2$  : adjusted coefficient of determination; F : F-value; DW : Durbin Watson statistic.

Figure 1

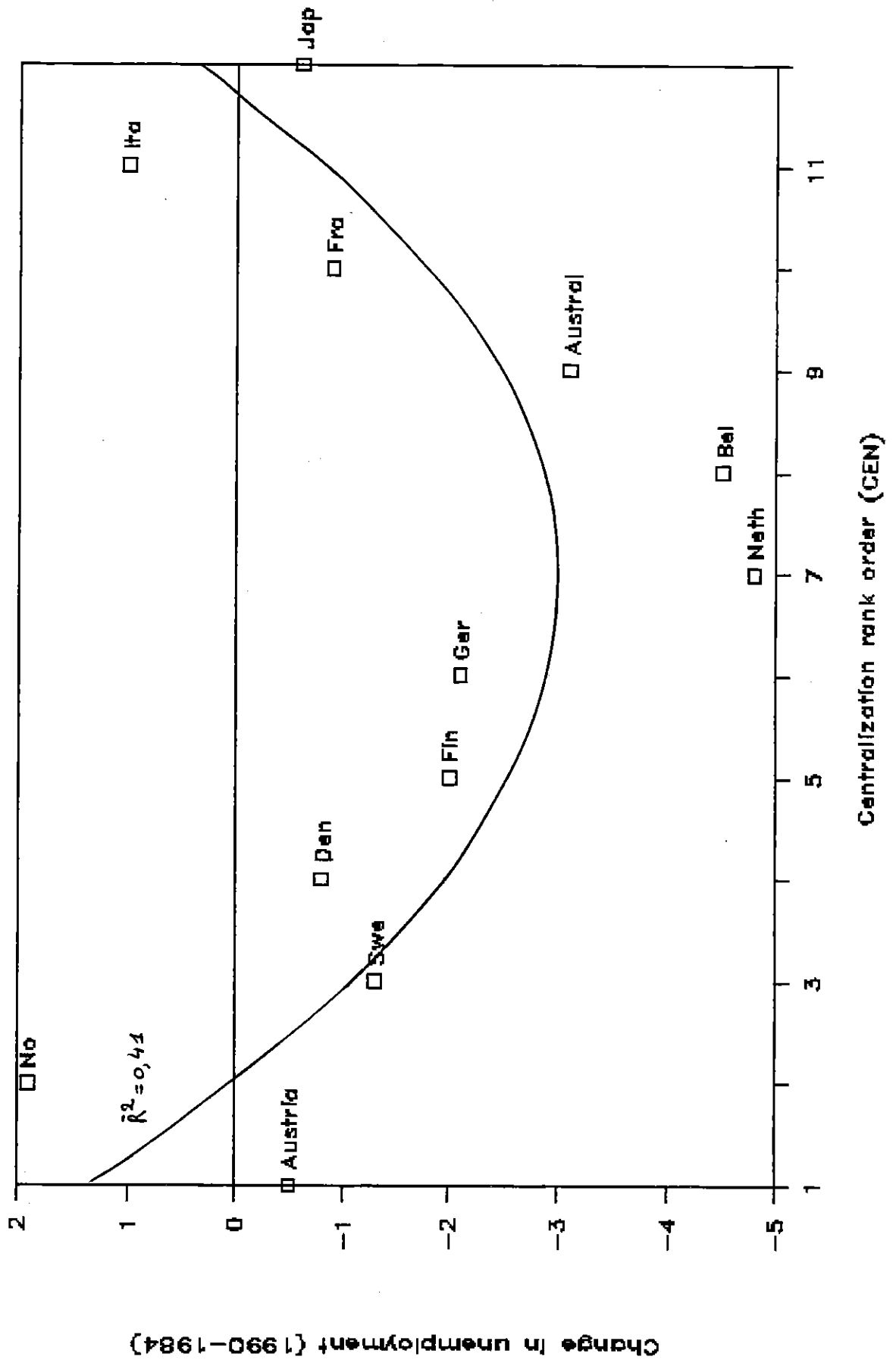


Table 9 : Revised unemployment equations

	C	u84	$\Delta \hat{M}2$	Da <sub>2</sub>	Da <sub>3</sub>	D <sub>TOT</sub>	N	$\bar{R}^2$	F	DW
1	1.01 (0.65)	-0.27 (3.02)	-0.13 (0.99)	0.75 (1.85)	-	1.09 (2.66)	17	0.56	6.09	2.08
2	-1.49 (1.29)	-0.23 (2.84)	-0.26 (1.77)	-	0.50 (1.92)	-	17	0.44	5.20	2.17
3	1.04 (0.63)	-0.27 (2.80)	-	0.74 (1.71)	-	1.33 (3.21)	18	0.58	8.88	2.37
4	-1.10 (0.88)	-0.24 (2.65)	-	-	0.52 (1.99)	-	18	0.43	7.48	2.07

Note : see table 8. New independent variables :

Da<sub>2</sub> : dummy for wage responsiveness to unemployment;

Da<sub>3</sub> : dummy for wage responsiveness to short-term productivity;

Explanation of the dummy variables :

Da<sub>2</sub> : 0 : a<sub>2</sub> >> -0.15

1 : -0.46 ≤ a<sub>2</sub> < -0.15

2 : -0.65 ≤ a<sub>2</sub> < -0.46

3 : a<sub>2</sub> < -0.65

Da<sub>3</sub> : 0 : a<sub>3</sub> = 0

1 : 0 < a<sub>3</sub>(β<sub>0</sub> + β<sub>1</sub>) ≤ 0.31

2 : 0.31 < a<sub>3</sub>(β<sub>0</sub> + β<sub>1</sub>) ≤ 0.55

3 : 0.55 < a<sub>3</sub>(β<sub>0</sub> + β<sub>1</sub>) ≤ 0.77

4 : a<sub>3</sub>(β<sub>0</sub> + β<sub>1</sub>) > 0.77

N = 17 : without Italy and New Zealand

N = 18 : without Italy

Table 10 : Revised unemployment equations (continued)

	C	u84	D <sub>M</sub>	D <sub>G</sub>	Da <sub>2</sub>	Da <sub>3</sub>	D <sub>TOT</sub>	N	R <sup>2</sup>	F	DW
1	0.21 (0.14)	-0.25 (3.23)	-0.97 (2.43)	-	0.55 (1.55)	0.41 (1.93)	0.80 (2.18)	17	0.68	7.94	1.87
2	-1.77 (1.11)	-0.23 (3.44)	-1.10 (3.11)	0.69 (2.10)	0.45 (1.45)	0.57 (2.83)	0.78 (2.44)	17	0.76	9.41	1.56

Note : see table 9. New independent variables :

D<sub>M</sub> : dummy variable for monetary policy;  
D<sub>G</sub> : dummy variable for fiscal policy.

Explanation of the dummy variables :

D<sub>M</sub> : 0 :  $\Delta \dot{M}2 \leq 0$   
1 :  $0 < \Delta \dot{M}2 \leq 1$   
2 :  $\Delta \dot{M}2 > 1$

D<sub>G</sub> : 0 :  $G < 0$   
1 :  $0 < G \leq 0.50$   
2 :  $G > 0.50$

N = 17 : without Italy and New Zealand

## References

- BEAN, CH., LAYARD, R. & NICKELL, St. (1986) : "The Rise in Unemployment : a Multi-Country Study". Economica, Supplement, S1-S22.
- BRUNO, M. & J. SACHS (1985) : Economics of Worldwide Stagflation. Cambridge, Harvard University Press.
- CALMFORS, L. & DRIFFILL J. (1988) : "Bargaining Structure, Corporatism and Macroeconomic Performance". Economic Policy, 6, 14-80.
- CHAN-LEE, J.H., COE, D.T. & PRYWES, N. (1987) : "Microeconomic Changes and Macroeconomic Wage Disinflation in the 1980s". OECD Economic Studies, Spring, no. 8, 121-157.
- COE, D. (1985) : "Nominal wages, the NAIRU and wage Flexibility". OECD Economic Studies, Autumn, no. 5, 87-126.
- CROCKETT, A. & GOLDSTEIN, M. (1987) : Strengthening the International Monetary System : Exchange rates, Surveillance, and Objective Indicators. IMF Occasional Paper no. 50, February.
- GRUBB, D., JACKMAN, R. & LAYARD, R. (1983) : "Wage Rigidity and Unemployment in OECD countries". European Economic Review, March/April, Vol. 2/(1/2), 11-39.
- HELLIWELL, J.F. (1988) : "Comparitive Macroeconomics of Stagflation". Journal of Economic Literature, Vol XXVI, March, 1-28.
- KAWASAKI, K., HOELLER, P. & PORET, P. (1990) : Modelling Wages and Prices for the Smaller OECD Countries. OECD Working Papers, no. 86 (October).

- KLAU, F. & MIDDELSTÄDT, A. (1986) : "Labour Market Flexibility".  
OECD Economic Studies, Spring, no. 6.
- MCCALLUM, J. (1986) : "Unemployment in OECD countries in the  
1980s". The Economic Journal, December, 942-959.
- OECD (1989) : Economics in Transition. Structural Adjustment in  
OECD Countries. Paris, Organisation for Economic Co-  
operation and Development, Chapter 2.
- OECD (1990) : Progress in Structural Reform, Supplement to OECD  
Economic Outlook 47. Paris, Organisation for Economic Co-  
operation and Development.
- VAN POECK, A. (1991) : "Labour Market Characteristics, Wage  
Formation and Unemployment in EMS and non-EMS Countries".  
In : C. de Neubourg (ed), The Art of full Employment.  
North Holland (to be published)

## LIJST VAN RECENTE SESO-RAPPORTEN

HEYLEN F. and P. VERHULST, The Phillips curve slope and the cost of disinflation in the 1980s - An institutional account of differences among OECD countries, February 1990, 33 blz. (90/242)

TORMANS G., CARRIN G., CLARA R., EYLENBOSCH W. en P. VAN DAMME, Cost-effectiveness analysis of prenatal screening and vaccination against hepatitis B virus - the case of Belgium, April 1990, 37 blz. (90/243)

DE GRAEVE D., Economische evaluatie van in-vitro fertilisatie, augustus 1990, 32 blz. (90/244)

TORMANS G., CARRIN G., LAUWERS P. en L. MARTENS, The costs of coronary heart diseases, August 1990, 53 blz. (90/245)

DE BORGER B., KERSTENS K., MOESEN W. en J. VANNESTE, Efficiency and equity in block grant design : simulating some alternatives for Flemish municipalities, August 1990, 35 blz. (90/246)

DE BRABANDER G. en E. GIJSBRECHTS, City marketing, van promotie tot plan ? een verkennend overzicht van een nieuw gebied, augustus 1990, 38 blz. (90/247)

VAN POECK A. en J. VAN GOMPEL, Unemployment and wage formation in small industrial countries (1973-1989), September 1990, 44 blz. (90/248)

DE BORGER B., The economic environment and public enterprise behavior : Belgian railroads 1950-1986, October 1990, 44 blz. (90/249)

KESENNE S., A guaranteed basic income as a cultural policy, October 1990, 12 blz. (90/250)

VANNESTE J. en W. MOESEN, De gemeentefinanciën in Vlaanderen : verkenning en verklaringen, oktober 1990, 47 blz. (90/251)

HENDRICKX K., Sectoriële bronnen voor produktiviteitsmeting : Definities, classificaties en methodologie, december 1990, 122 blz. (90/252)

PLASMANS J. en J. VANNESTE, The incidence of corporate taxation in Belgium on employment and investment, December 1990, 30 blz. (90/253)

DE BRABANDER G., m.m.v. BLOMMAERT K., GILLE A., LEZY L., MAES T. en F. Witlox, Aspecten van het Antwerpse economische en financiële draagvlak, maart 1991, 60 blz. (91/254)

SCHROYEN F., Demand system under rationing : an introduction with special reference to the implications of separability assumptions, March 1991, 26 blz. (91/255)

TORFS K. en D. DE GRAEVE, A cost-effectiveness analysis of AOTAL, a drug used to prevent relapse in weaned alcoholics, April 1991, 43 blz. (91/256)