Inflation and unemployment in Belgium

Michel Dombrecht and Philippe Moës[1]

Introduction

Low inflation and low unemployment belong traditionally to the objectives of economic agents as well as of governments. It is, therefore, important to know whether both of these objectives can be attained simultaneously.

As is well known, it was originally thought that there was a negative relationship between inflation and unemployment: to reduce unemployment, the economy had to be stimulated, implying a rise in inflation. On the other hand, inflation could be brought down by increasing the number of unemployed. This negative trade-off is known as the Phillips curve. In the 1970s, most economists became convinced of the inexistence of such a trade-off, at least in the long run: the long-run Phillips curve is vertical. Only in the short run could there exist a negative correlation between inflation and unemployment, but over larger intervals of time, the latter would tend towards its equilibrium value which became known as the NAIRU (Non-Accelerating Inflation Rate of Unemployment).

These considerations have continued to inspire economists, also in the recent past, and they are of course also important for monetary policy. As far as inflation is concerned, the actual mainstream idea is to stress the importance of inflationary expectations (vertical long-run Phillips curve), whereas in the short-term, inflation may also be affected by disequilibria in the markets for products and labour (negative slope of the short-term Phillips curve). An unemployment rate larger (smaller) than the NAIRU normally implies a negative (positive) output gap; i.e. an output level smaller (larger) than potential output, which puts downward pressure on inflation. As far as unemployment is concerned, special interest developed in the NAIRU concept. If a natural rate of unemployment exists and if its determinants could be identified, then this knowledge would open a unique channel for analysing the unemployment problem and for guiding employment policy. Most of the analysis in this respect has, economically speaking, been applied to large and relatively closed economies. They are not necessarily applicable to small open economies, like the Belgian one. This paper, therefore, approaches the inflation versus unemployment question from a Belgian perspective.

1. Price formation

Prices can be measured at different levels and following different methodologies. The consumer price index, which represents a fixed basket of goods and services and is quickly available, is, besides adjustment for indirect taxes, the result of a weighted average of prices of domestically produced goods and services set by domestic producers and of prices of imported goods and services set by foreign producers and converted into domestic currency. The prices set by domestic producers are themselves output prices which are determined by the costs of labour, capital, intermediate inputs (a large part of them being imported) and by a profit margin.

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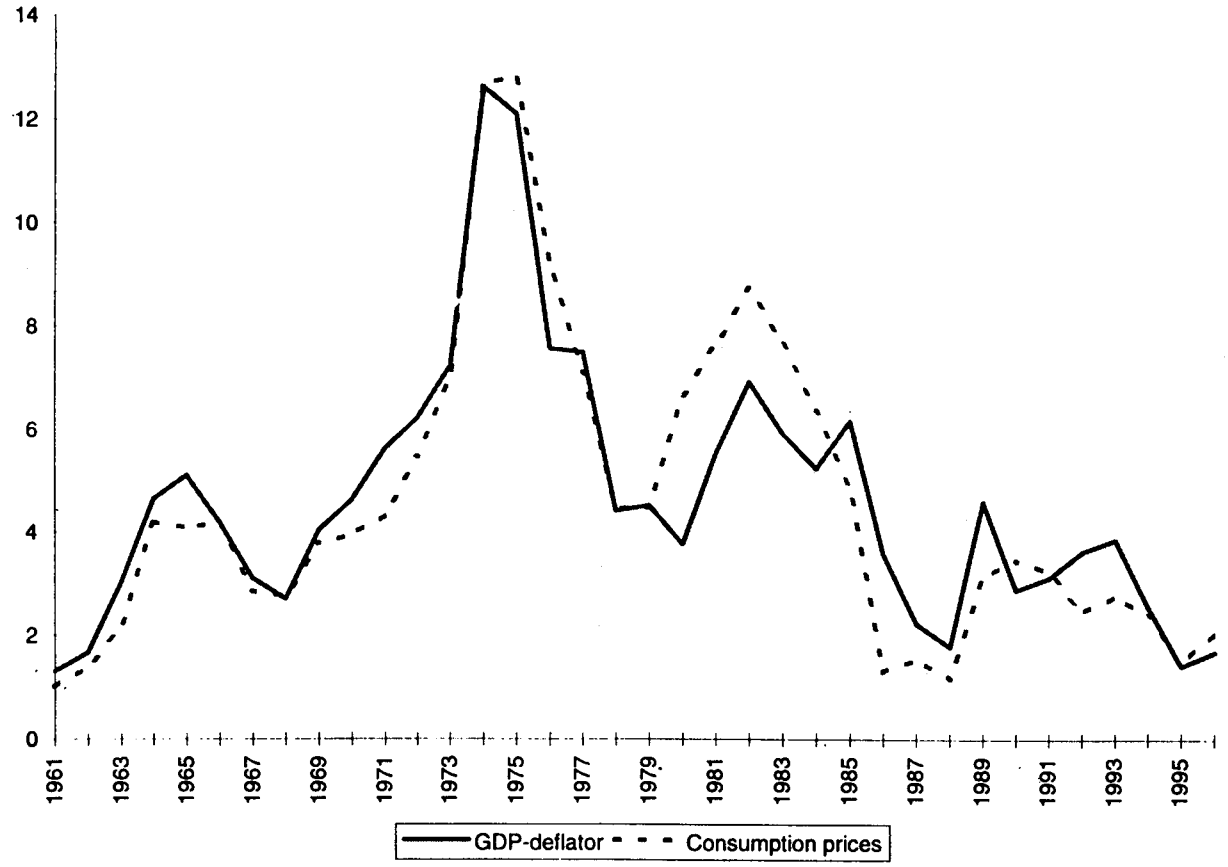
[1] The authors are members of the Research Department of the National Bank of Belgium. The views expressed in this paper are their own and do not necessarily reflect those of the Bank.

The gross domestic product (GDP) deflator is a national accounts concept which is germane to an output price concept except that it not only relates to private but also to public output and that the direct influence of intermediate input prices has been removed. The GDP deflator constitutes an important link in the explanation of consumption prices since it reflects the domestic origins of inflation (wage costs, capital costs and the profit margin). This paper focuses on the GDP deflator. Notwithstanding the conceptual differences, GDP inflation is strongly correlated with consumer price inflation as is shown in Chart 1.

Chart 1
Inflation in Belgium
Percentage changes



1.1 Historical overview

The inflation rate in Belgium has followed an upward trend since the beginning of the 1960s up until 1974 – the outbreak of the first oil price shock (Chart 2). Since then, inflation has followed a downward trend, which continued in the 1990s. In 1995, inflation was at a level equal to the historical low levels of the early 1960s. A similar evolution can be found in the OECD area and in Belgium's three neighbouring countries, which are also our main trading partners. In the 1990s a very strong convergence of inflation rates occurred in Belgium and its neighbours (Chart 3).

Chart 2
Inflation in Belgium and in the OECD
GDP deflators, percentage changes

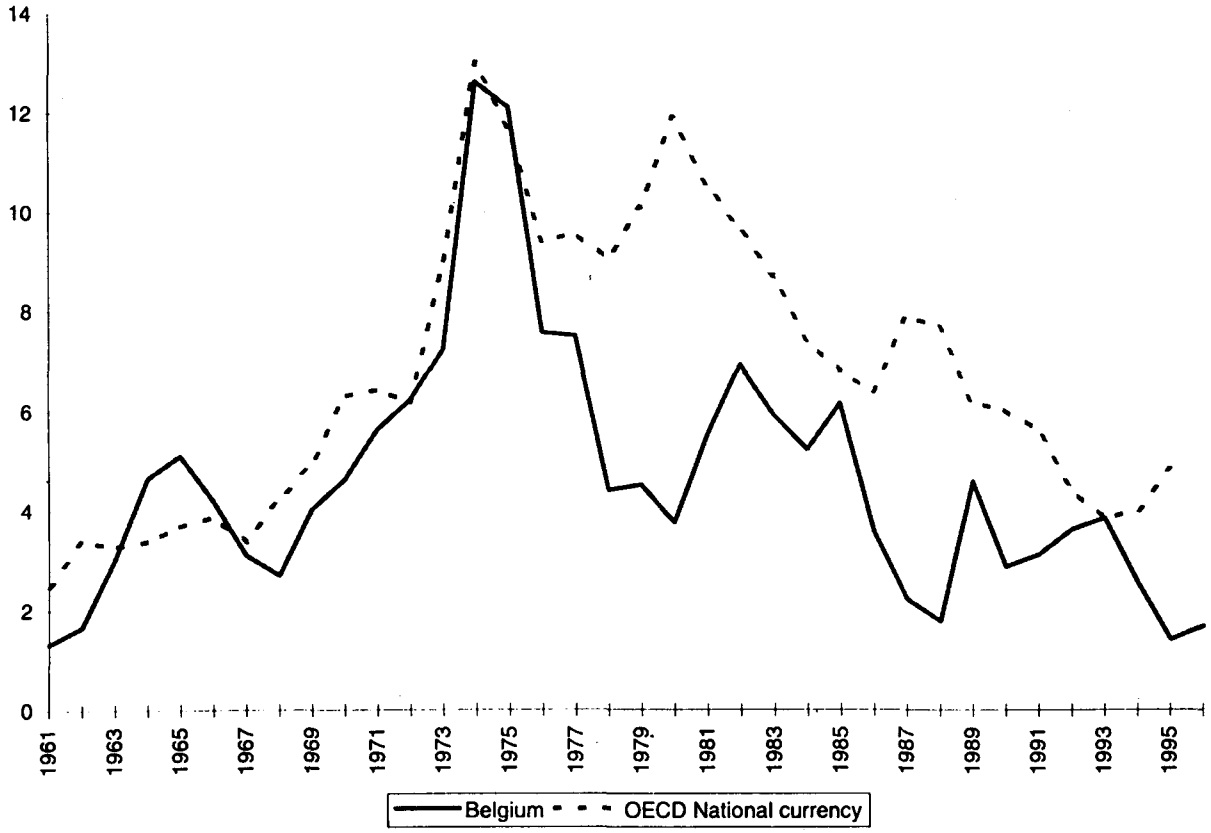


Chart 3
Inflation in Belgium and neighbouring countries
GDP deflators, percentage changes

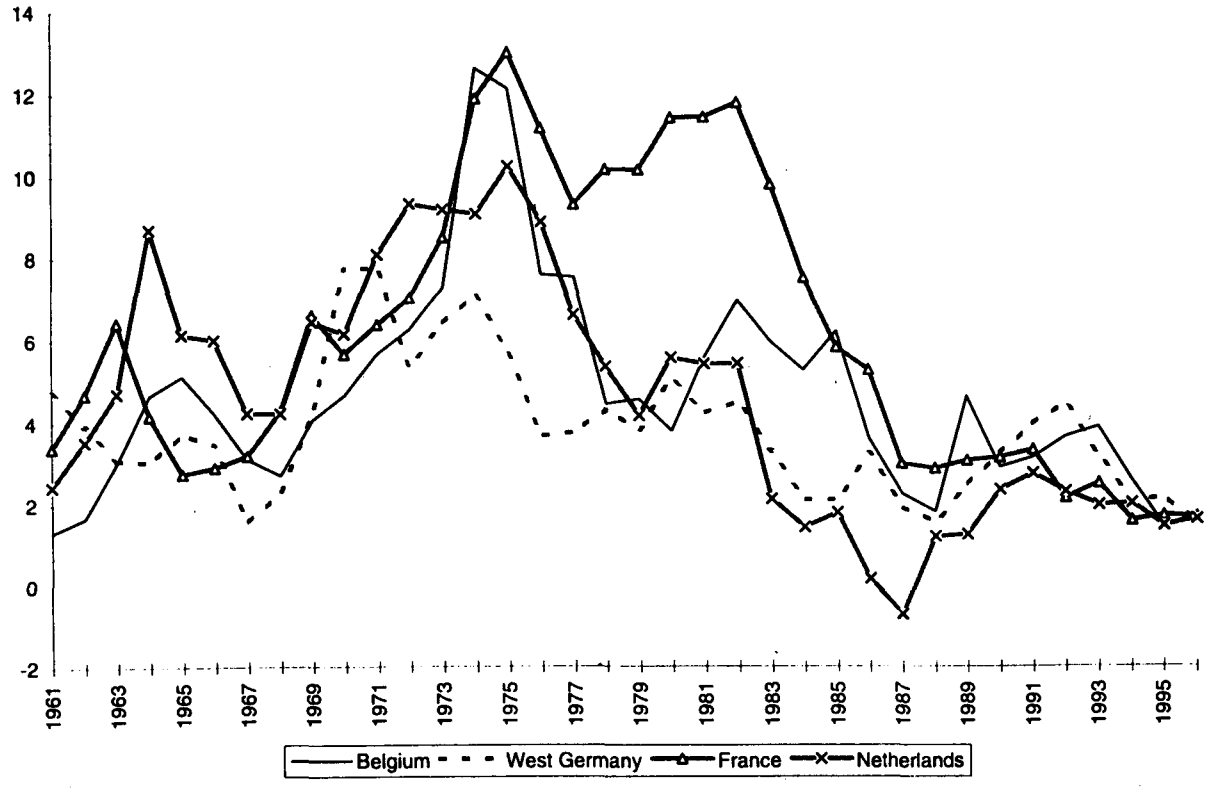


Chart 4 shows the year-on-year change of the inflation rate. It demonstrates that inflation volatility is not constant. This is confirmed in Table 1, containing averages and standard deviations of inflation in each decennium. The table shows a strong negative correlation between the level of average inflation and its volatility. For the monetary authorities, this is an important argument to focus on for the following reasons:

- high inflation entails large price volatility, implying a high degree of uncertainty for producers. Investment, process and product innovation and employment fare better when producers can more easily predict the future cash flows to be expected from such new projects;
- stable prices render relative price changes between different goods and services more visible to consumers and producers. Because high inflation is correlated with high volatility and uncertainty, market signals are less clear and, therefore, the efficiency of the market mechanism is blurred, which may lead to welfare losses;
- questionnaires[2] undertaken in different countries show a strong inflation aversion of the population. The main reason for people's concern about inflation is the perception that it hurts their standard of living. This may be due to the non-neutral character of taxation with respect to inflation. In most countries tax brackets are not being indexed to price changes and inflation accounting is not a part of standard accounting principles.

Chart 4
Year-on-year change of inflation in Belgium
In percentages

2 See, for example, Shiller, R. J. (1996): "Why Do People Dislike Inflation?" NBER, *Working Paper* No. 5539.

Table 1
Inflation: averages and volatility

Period	1961-1996		1961-1969		1970-1979		1980-1989		1990-1996	
	AVG	STD	AVG	STD	AVG	STD	AVG	STD	AVG	STD
Belgium	4.63	2.58	3.31	1.30	7.23	2.95	4.56	1.70	2.71	0.92
Western Germany	3.76	1.65	3.33	0.97	5.52	1.64	3.0	1.20	2.89	1.06
France	6.07	3.55	4.25	1.43	9.29	2.42	7.15	3.69	2.26	0.71
Netherlands	4.46	2.95	5.14	1.86	7.66	2.01	2.33	2.27	2.03	0.44
OECD	6.70	2.84	3.62	0.68	9.05	2.28	8.30	1.88	4.76	0.88

AVG = average; STD = standard deviation.

1.2 Long-run determinants of inflation

Section 2 of Annex 1 describes a model of optimal price setting in a market characterised by monopolistic competition. In such a market constellation producers take into account the degree of price elasticity of demand for their products when fixing prices. If the price elasticity of demand is small, firms can charge high mark-ups above production costs and vice versa. In the limit (perfect competition), the price elasticity is infinite and mark-ups disappear.

Consumers decide on their optimal consumption-saving behaviour as well as on the optimal mix of their consumption basket. When relative prices change, consumers will reallocate their consumption portfolio and the extent of this restructuring depends on the price elasticities of demand for all products. These price elasticities depend on:

- the clearness of market signals, mentioned above, which increases with the degree of overall price stability;
- the market structure; a cartel market limits the consumer's freedom of choice and hinders the composition of an optimal consumption basket;
- the degree of openness of the economy which determines the accessibility of the consumer to the international markets of goods and services. If domestic producers are largely exposed to competition with foreign firms both on domestic and foreign markets, their mark-ups will tend to be smaller. Contrary to the case of large and relatively closed economies, this consideration should be taken into account in the price formation process of firms in a small economy such as Belgium.

On the basis of these arguments and assuming that consumers allocate their consumption according to an Almost Ideal Demand System (AIDS), Annex 1 explains the GDP deflator by:

- unit labour costs (nominal wage cost per unit of output), which, in turn, depend on wage cost per employee (further explained in Section 2) and apparent labour productivity;
- a mark-up above unit labour costs, the extent of which depends on the price elasticity of demand. At the macro level, the price elasticity for the country as a whole, is related to the market share of domestic producers and hence to the relative price of foreign with respect to domestic firms converted into a common currency. This relative price is nothing else than the real effective exchange rate. When foreign prices are relatively high, market shares of domestic firms are relatively high as well, such that they can raise their own prices in order to reach the optimal profit maximising mix between profit margin and market share. This analysis demonstrates that even the GDP deflator, which reflects the domestic origins of inflation, is

subjected to a *direct* influence of foreign prices. This result is, of course, especially relevant in the case of countries where foreign trade represents a large proportion of final demand and is absent in the inflation analysis originating in large countries. It should be added that foreign prices also exert an *indirect* influence on domestic prices. Prices of imported consumer goods are part of the overall consumer price index, a variable taken into account in wage negotiations. Furthermore, imported intermediate inputs are part of production costs and an integral part of output prices of domestically produced consumer goods. These indirect effects do not play their role through the profit margin, but via nominal wage costs.

- The analysis of the inflation process, therefore, demands insight into the course of both nominal unit wage costs and the profit margin. If the latter cannot be sufficiently explained, it will be hard to understand and interpret the inflation process (not only on the basis of the GDP deflator but also other price indexes). Monetary policy in many large economies exerts its influence through its effects on inflationary expectations of economic agents. More specifically, credible monetary policy may contribute to wage moderation. In Belgium, wages are indexed to consumer prices such that expectations play only a minor role. Furthermore, in such a small open economy, foreign prices and exchange rates are principal factors underlying domestic inflation. Chart 5 compares unit labour costs with the GDP deflator in Belgium. It is clear that the GDP deflator can diverge for rather long periods from unit labour costs, thereby giving rise to marked changes in the macroeconomic profit margin as shown in Chart 6. According to the theoretical analysis, the profit margin is related to relative prices or, at the macro level, the real effective exchange rate of the Belgian franc. An increase (decrease) in the relative price should be interpreted as a real effective depreciation (appreciation). Although somewhat blurred during 1982-86 by the strong dollar and oil price movements, Chart 7 demonstrates the positive relationship between the mark-up and the real effective exchange rate, based on GDP deflators. This implies that foreign prices constitute a constraint on price setting by domestic firms. The pass-through from domestic unit wage costs to output prices is incomplete: if domestic wage costs increase, while foreign prices remain constant, only part of the additional labour costs can be transferred to price increases and the profit margin will decline.

Summarising, domestic output prices are determined as a function of a weighted average of the foreign price level, expressed in domestic currency, and unit labour costs (Chart 8), with the latter consisting of two components: wage costs per employee (W), which will be analysed in Section 2; the inverse of apparent labour productivity (L/Y) which itself can be decomposed into: influence induced by substitution between factors of production (due to changes in relative factor prices): (L/K) and Total Factor Productivity (TFP), i.e. the autonomous technological progress.[3] The employment-capital ratio (L/K) can itself be further decomposed, as employment (L) is the product of the active population (L^S), reduced by the proportion out of work (U): $L = L^S(1-U)$.

The econometric analysis in Annex 2 evaluates the weights of all these factors that influence inflation, and derives the following long-term steady-state inflation equation:

$$\overset{\circ}{P} = 0.62\overset{\circ}{W} + 0.44\overset{\circ}{P^*} - 0.06\overset{\circ}{OIL} - 0.65\overset{\circ}{TFP} + 0.19\left(\overset{\circ}{L^S} / K\right) - 0.002\Delta U$$

where: $^\circ$ = growth rate of the relevant variable;

P = GDP deflator;

W = nominal wage cost;

P^* = weighted average foreign GDP deflators expressed in the same currency as P;

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3 In the case of a Cobb-Douglas production function: $(Y = (TFP)L^{\alpha}K^{(1-\alpha)})$, the employment intensity of output (i.e. the inverse of labour productivity) can be written as: $L/Y = (1/TFP)(L/K)^{1-\alpha}$.

Chart 5

GDP labour and wage cost per unit of output in Belgium

Index numbers, 1960=100

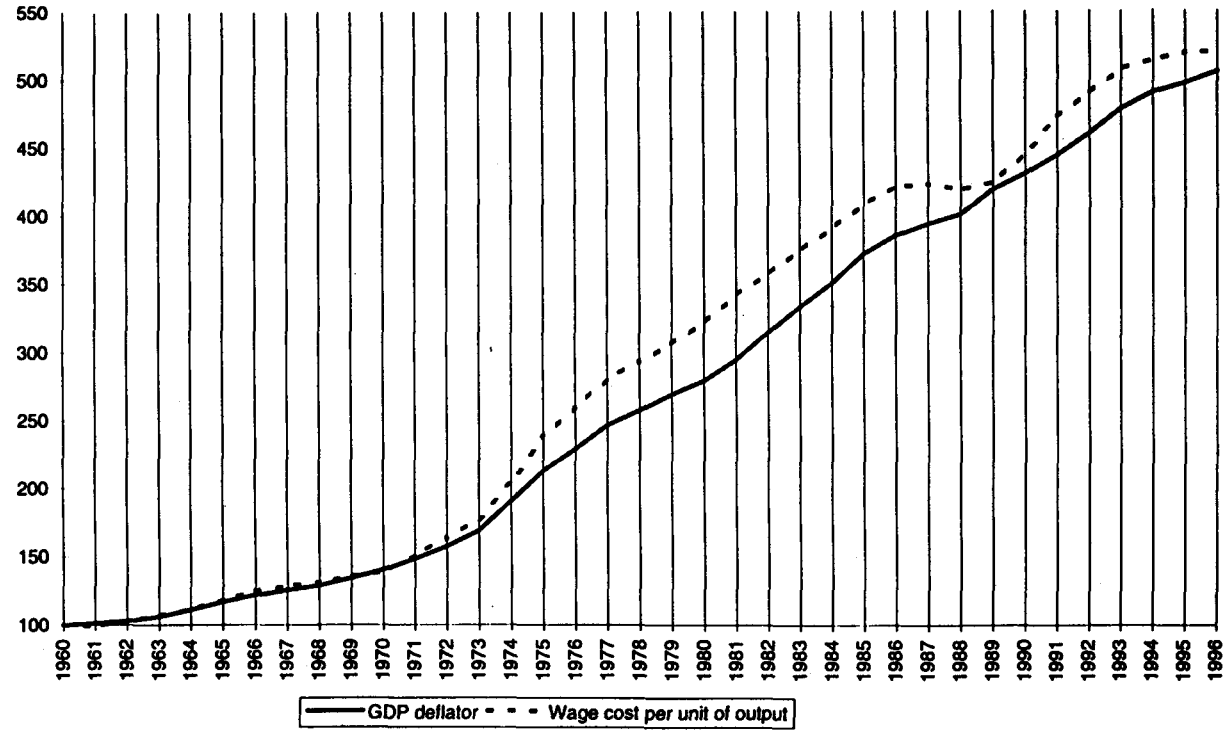


Chart 6

Macroeconomic profit margin in Belgium

Index numbers, 1960=100

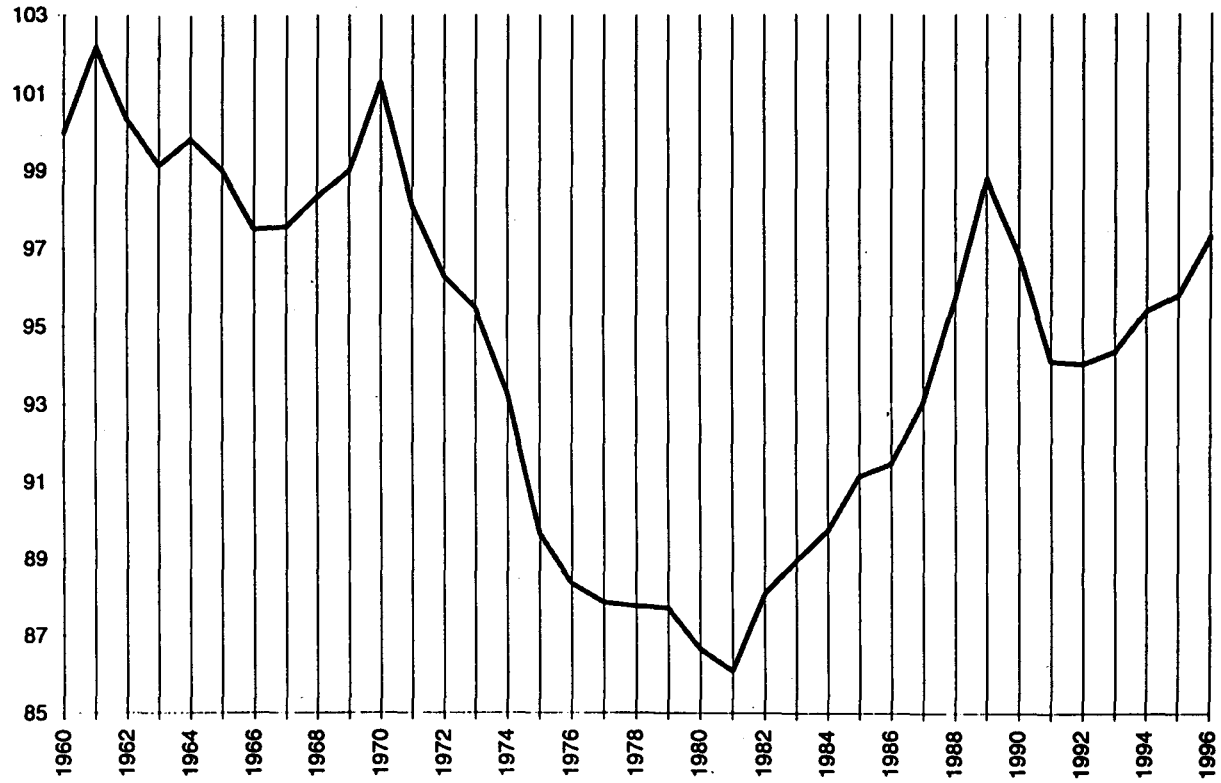


Chart 7
Profit margin and relative GDP deflator in Belgium
In logarithms

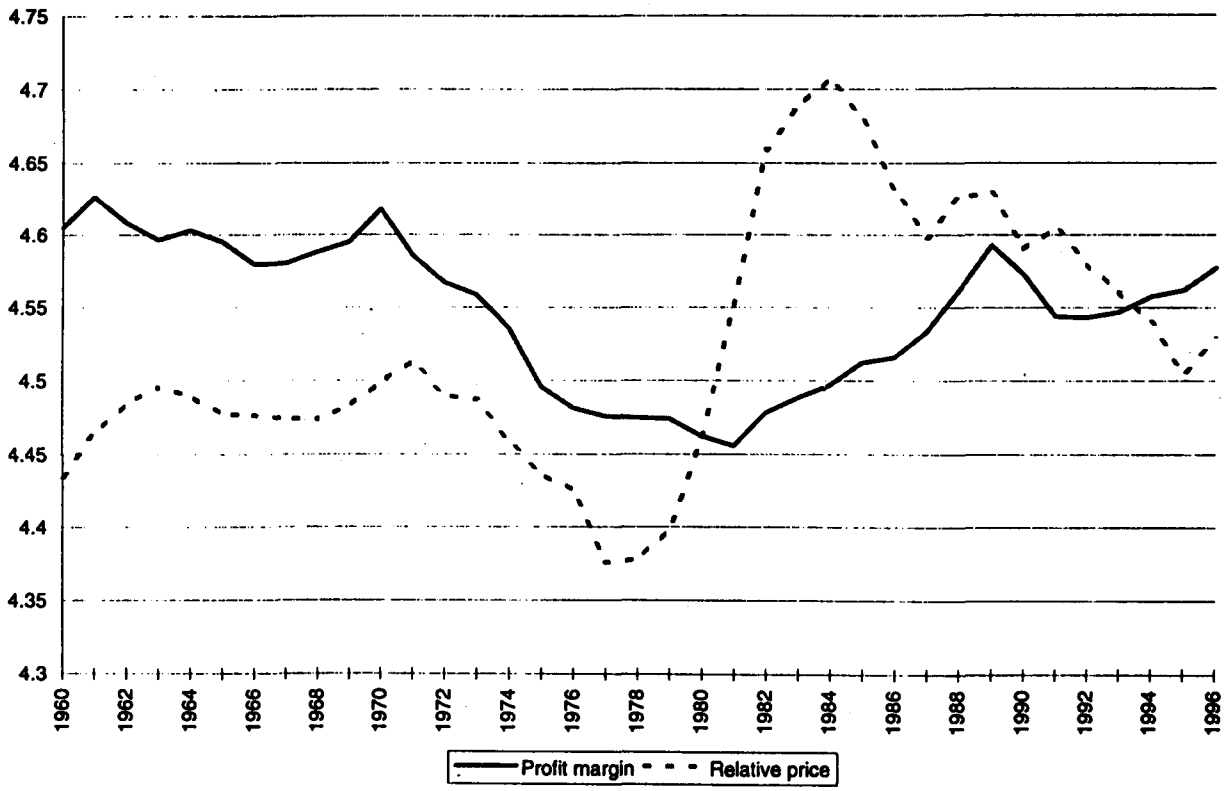
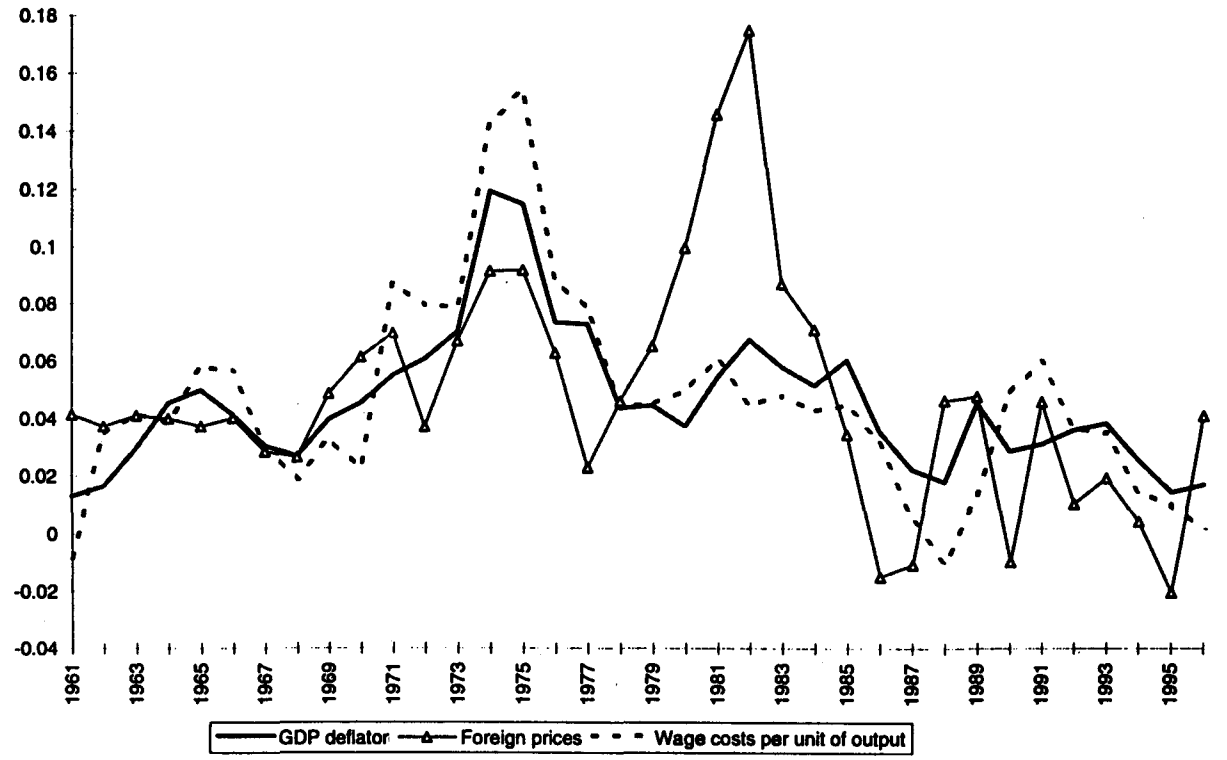


Chart 8
Explanatory variables of GDP inflation
In annual percentage changes



OIL = index of world oil prices;

TFP = total factor productivity;

L^S = active population;

K = capital stock;

U = unemployment rate.

The results indicate that the direct weight of foreign prices in domestic inflation is quite substantial. Oil price increases somewhat moderate this foreign influence as foreign countries that are producers of oil do not affect the Belgian market share because its share in those products is zero anyway. The part of foreign inflation that is connected with oil price movements is thus irrelevant for the domestic inflation rate. We may, therefore, conclude that foreign inflation has a direct weight equal to 38% in domestic GDP inflation, as compared to 62% for unit labour costs. By implication, foreign prices may drive an extensive wedge between domestic prices and unit labour costs.

1.3 Short-run determinants of inflation

In the short run, inflation reacts with a certain delay to its long run determinants. In the framework of a prediction exercise, it is important to take these reaction lags into account, while they are far less relevant in a longer-run analysis of inflation. Annex 2 contains the estimated short-term inflation equation.

2. Wage formation

Except in periods of government intervention, the formation of wages is the result of negotiations between employers and unions, as explained in Section 1 of Annex 1. The unions' objective is to obtain the highest possible after-tax net real wage; i.e. the real wage cost after correction for the tax wedge (expressed as the difference between wage cost for the firm and net wage income earned by the employee in percentage of wage cost). During the negotiations, the unions anticipate the reaction of employers to their wage demands. They take into account the probability that negotiations fail or are followed by lay-offs or that those actually unemployed may fail to find a job. This probability is proportional to the observed unemployment rate. Unions also are aware that when becoming unemployed members will earn unemployment benefits, the magnitude of which, therefore, affects their wage demands. After conclusion of the wage negotiation, firms decide on their (profit-maximising) prices, output and production technology; i.e. the optimal mix of factors of production. The result of the wage negotiation will, therefore, affect employment.

Taking account of these considerations, wage formation depends on:

- unemployment benefits: they constitute a safety net in case of becoming unemployed if wages turn out to be too high to preserve a high level of employment. The more generous this safety net, the lower the perceived opportunity cost of loosing one's job and, therefore, the higher wage demands will tend to be;
- the tax wedge: an increase in employers' social security contributions raises wage cost, and a rise in taxation on employees will induce the latter to raise their wage claims;
- the market share (and hence relative prices) of domestic producers on world markets: higher market share tends to be accompanied by higher profitability and stimulates the quest for higher wages;
- the unemployment rate: the higher this rate, the higher the perceived probability of becoming unemployed, which will exert a moderating influence on wage claims.

From the econometric estimation results, the following long-term wage growth equation can be derived:

$$\overset{\circ}{W} = \overset{\circ}{P} + 0.31\left(\overset{\circ}{P^*} / P\right) + 0.63b - 1.22\left(1 - \overset{\circ}{\tau}\right) - 0.026\Delta U$$

where b = real unemployment benefit per person unemployed;

τ = tax wedge;

ΔU = change in the rate of unemployment, expressed as a percentage.

This long-term equation shows a negative dependence of wage growth on changes in the unemployment rate; an increase of the unemployment rate by 1%, ceteris paribus, reduces wage growth by 2.6 percentage points. This coefficient is generally regarded as a measure of wage flexibility since it reflects the magnitude of price reaction to disequilibria between demand and supply, in casu of labour. A few remarks should be made in this respect. First, in Belgium, this flexibility was frequently enforced by government intervention in the wage formation process.[4] Second, despite the observed flexibility of wages to changes in the unemployment rate, the growth of wage costs has been continuously stimulated by the ever increasing tax wedge. Third, the significant rise in real unemployment benefits in the 1970s has contributed to the strong growth of wages in that period.

3. The ultimate determinants of domestic inflation

As the preceding analysis has shown, steady-state inflation and wage growth are interrelated. Taking account of all interactions (i.e. calculating the reduced form of the inflation equation) results in the following expression of the ultimate determinants of inflation:

$$\overset{\circ}{P} = 1.10\overset{\circ}{P^*} - 0.10\overset{\circ}{OIL} + 0.67b - 1.32(1-\tau) - 0.032\Delta U - 1.13\overset{\circ}{TFP} + 0.34\left(\overset{\circ}{L^S} / K\right)$$

The ultimate factors explaining inflation are, therefore:

- the foreign rate of inflation: if foreign inflation rises by 1 percentage point, domestic prices also accelerate by 1 point. This implies, of course, a strong dependence of domestic prices on exchange rates, especially with respect to Germany, France and the Netherlands, our main trading partners;
- total factor productivity: an increase in *TFP* raises labour productivity, which reduces unit wage costs and puts downward pressure on prices;
- the per capita capital stock: an increase in this variable, with a constant unemployment rate, also implies a reduction in unit labour costs and therefore reduces inflation;
- the tax wedge: when rising, this induces an upward movement of wage costs (both directly if employers' social security contributions go up and indirectly through the negotiated gross wage rate) and hence on prices;
- real unemployment benefits: an increase in this variable reduces the opportunity cost of becoming unemployed and encourages higher wage demands;

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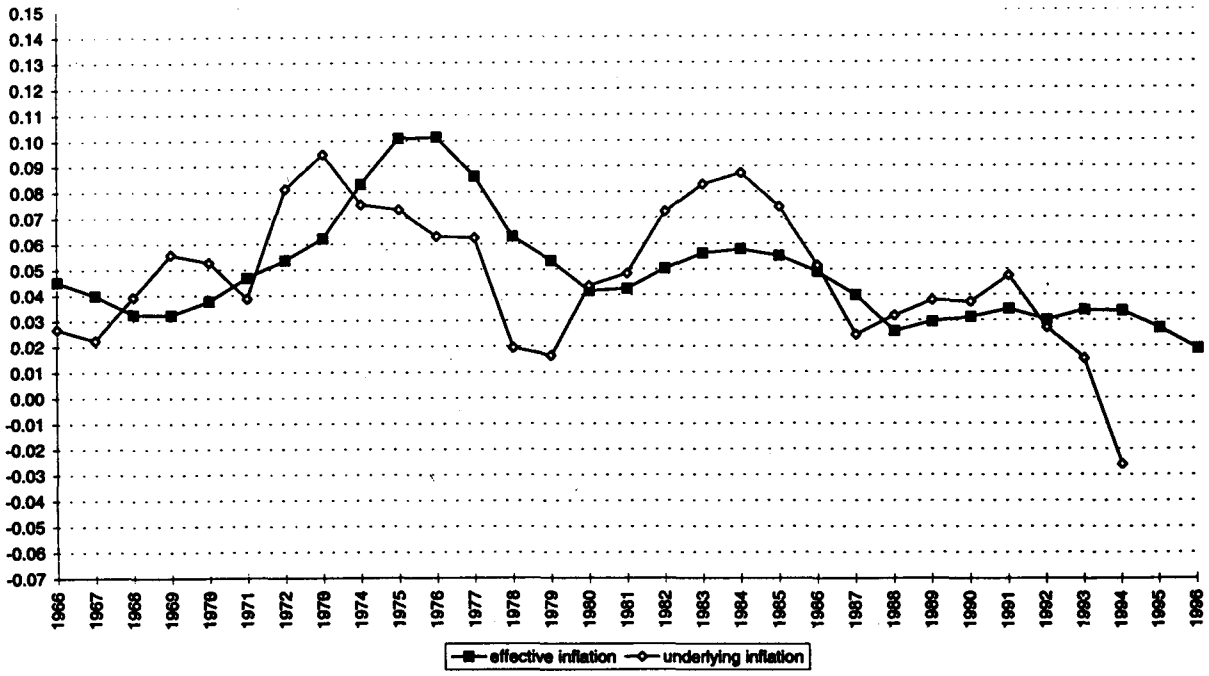
[4] These interventions took the form of real wage freezes, imposition of wage norms, limiting the indexation mechanism, changing the reference price indicator to which wages are indexed. This is no longer the general consumption price index but the so-called health index.

- the unemployment rate: this determines the perceived probability of losing one's job. It puts downward pressure on negotiated wages and on prices.

The previous equation allow us to compute an underlying inflation rate based on the growth rates of the explanatory variables. Substituting historically observed values for these variables allows us to compute the underlying inflation for each year. However, important shocks to the exogenous factors immediately and strongly affect the underlying rate of inflation whereas observed inflation adapts only slowly. Hence the use of moving averages over three years in Chart 9 where the effective and underlying inflation rates are shown. It appears that the underlying inflation rate is a leading indicator of inflation. Although the former seems to be too volatile, the turning points are well explained, showing a lead of about two years.

What have been main factors behind underlying inflation in the last thirty years? To make things simple, we aggregate the many variables given by the theoretical analysis and decompose progressively. Chart 10 gives the foreign inflation rate and the impact of all the remaining factors taken together. Until the mid-1970s the trend in Belgian inflation reflects the foreign one. The other factors are erratic around zero. But between 1978 and 1984, their contribution exceeds -2%. and even more between 1981 and 1983. As a consequence, the underlying inflation falls below imported inflation. In the second half of the 1980s, foreign inflation and the other factors have more or less the same positive impact, between 1 and 3%. From 1992 onwards, the other factors fall sharply together with the underlying inflation which in 1994 is below the foreign inflation rate. To conclude on this matter, even if the domestic inflation is indexed to the foreign one, the domestic factors are able to introduce quite significant and persistent divergencies. We now analyse more closely the contribution of these other factors.

Chart 9
Effective and underlying inflation rates
Moving averages over three years



We can distinguish between one external variable (*OIL/p**) and internal ones: real unemployment benefits, the tax wedge, *TFP*, capital stock per capita and the unemployment rate. We further distinguish between permanent and transitory internal factors. Permanent factors are those whose growth rate may permanently lie above zero: unemployment benefits, *TFP* and capital stock per capita; in contrast the tax wedge and the unemployment rate should stabilise somewhere in the long run. Hence, their contribution can only be transitory. Chart 11 gives the contributions to the

inflation differential according to this subdivision. The permanent factor is the most important one over the whole period. The transitory factor is less important until 1983 and the differential follows the "permanent" fluctuations plus some impact from the oil price. From 1984 onwards, the impact of the transitory and permanent components are comparable but the volatility of the permanent factor goes down and the differential follows the "transitory" fluctuations as well as the impact of the reverse oil price shock.

Chart 10
Underlying and foreign inflation rates
Moving averages over three years

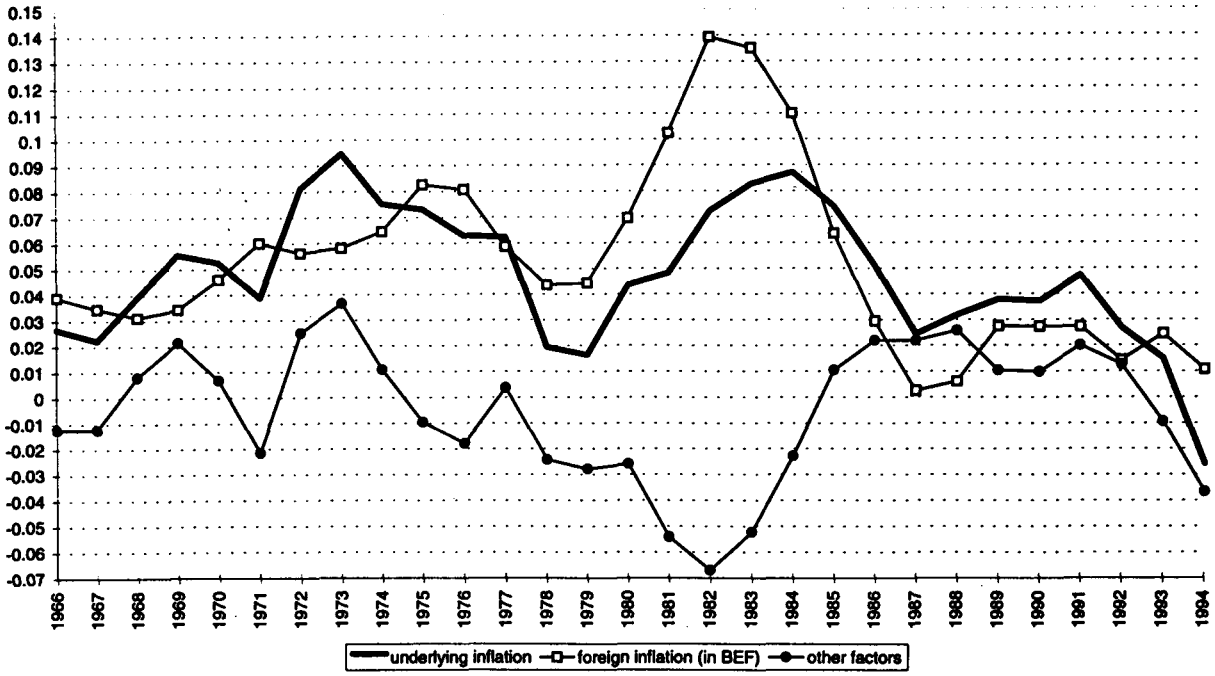
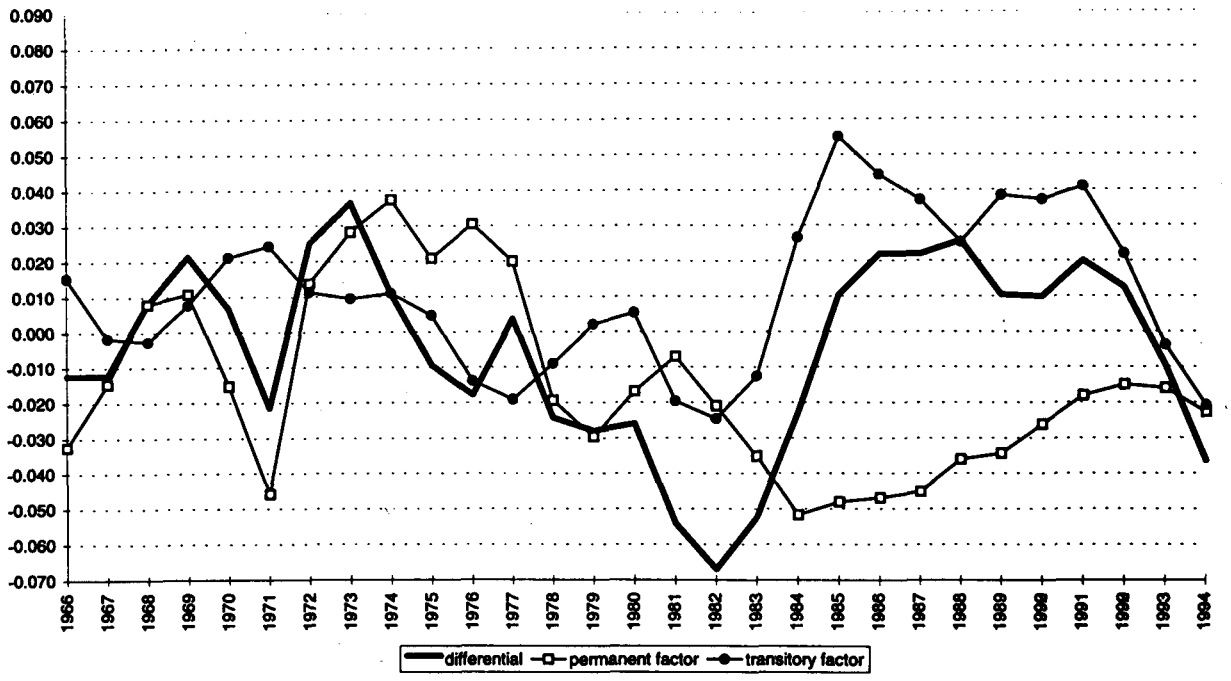
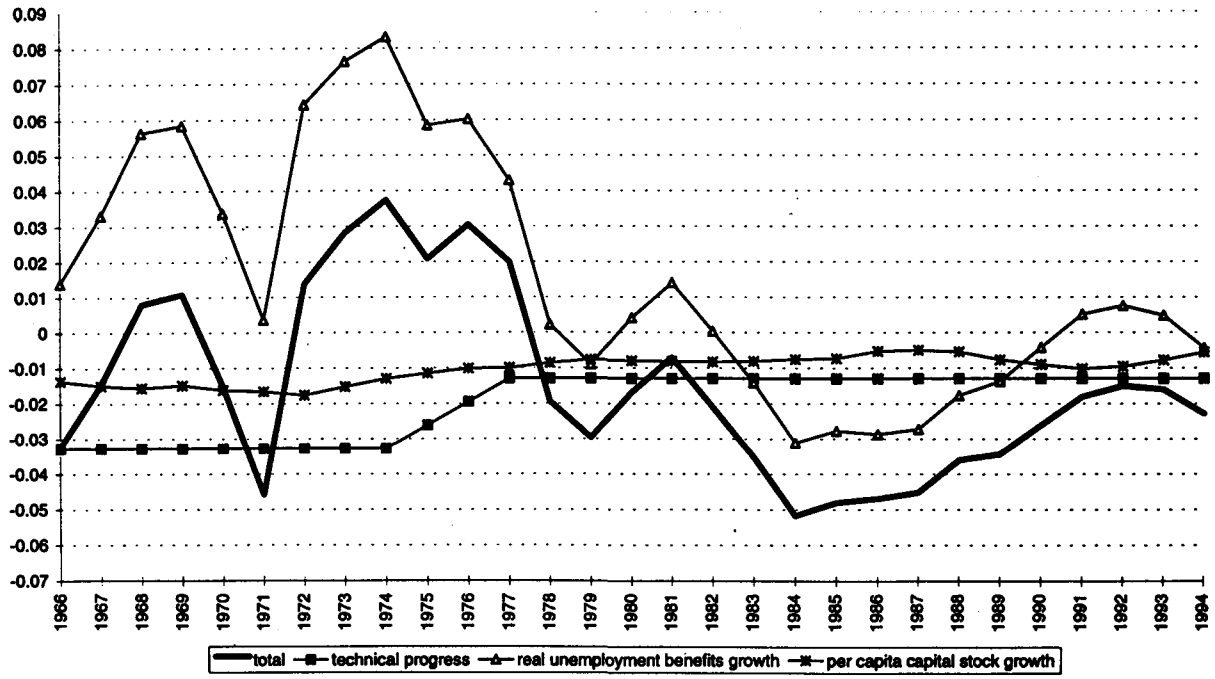


Chart 11
Infaltion differential Belgium – foreign competitors
Moving averages over three years



Behind the permanent factor (Chart 12) is the growth of unemployment benefits adjusted for productivity growth (*TFP* plus capital per head). In fact, the estimates (0.67 for the unemployment benefits and 1.13 for productivity) imply an overcorrection for productivity. Until 1971, the benefits had no link to previous wages but depended on age and gender. Real growth adjustments were only occasional but quite significant (see Chart 13). They happened in 1967, 1968 and at the junction to the present system, in 1972. These shocks explain the two first rises in the unemployment benefits contribution. Afterwards, a single shock appeared in 1975, probably as a consequence of the massive arrival of new and high-wage unemployed persons. This shock added to the previous 1972 real adjustment. In the opposite direction, a fall in real unemployment benefits occurred in the middle of the 1980s. These evolutions underlie the movements in the permanent factor. The productivity variables are very stable. The only event to mention is the 1975 productivity slowdown. *TFP* fell from 2.9% a year to 1.2%, lowering the negative contribution to the inflation differential from 3.3% to 1.3%.

Chart 12
Factors behing the permanent factor
Moving averages over three years



The transitory factor (Chart 14) follows the unemployment rate movements with one single exception: the rapid rise of the tax wedge in the early 1980s. The contribution of the unemployment rate may exceed 3% in absolute value. The tax wedge contribution is fairly constant, at +2%.

It appears that the underlying Belgian inflation rate can substantially diverge from inflation abroad. Two main factors have, in the past, contributed to discrepancies: the growth of real unemployment benefits and unemployment rate movements. However, structural shocks affected the growth of unemployment benefits in the first half of the sample and they should not repeat themselves. In the long run the benefits should follow productivity. In that case, their impact would be much less important. As far as unemployment is concerned, its fluctuations should remain transitory since a continuous divergence always calls for counteracting measures.

Chart 13
Unemployment benefits
1991=100, in logarithms

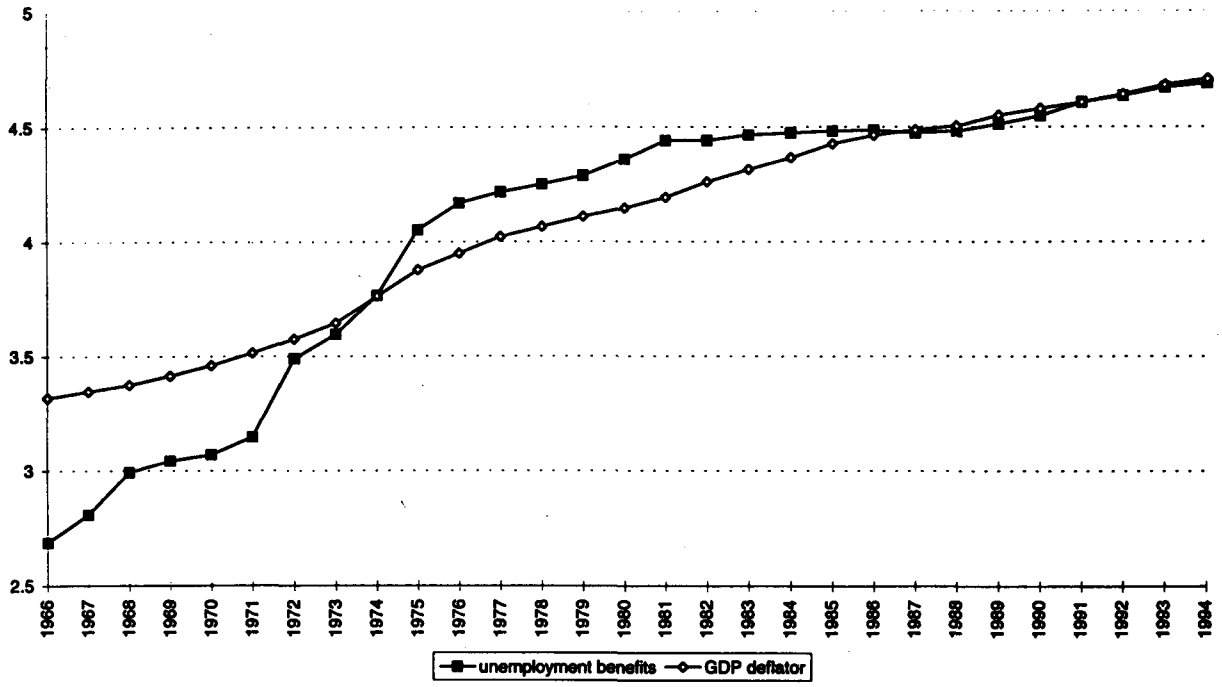
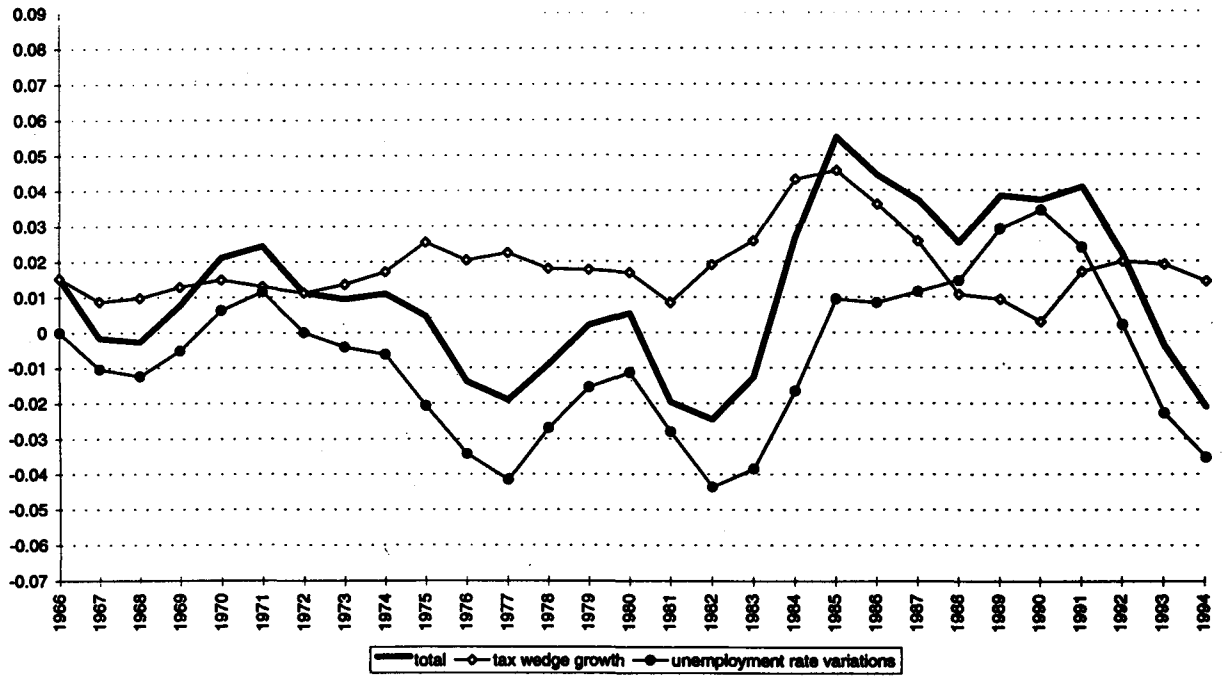


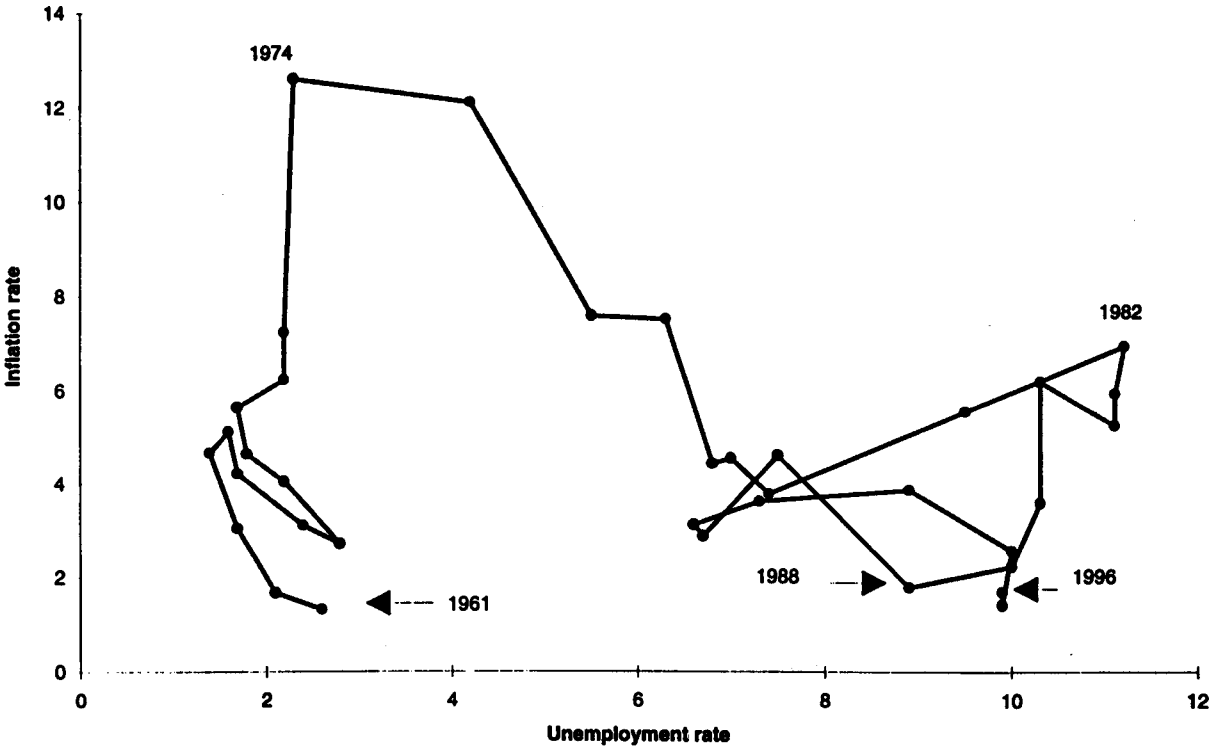
Chart 14
Factors behing the transitory factor
Moving averages over three years



4. The rate of unemployment

The reduced-form inflation equation mentioned above implies a long-run relationship between the deviations of domestic with respect to foreign inflation rates and variations of the unemployment rate. The existence of a NAIRU, on the other hand, requires long run independence of inflation with respect to both the level and variation of unemployment. In this sense no NAIRU for Belgium can be derived. Chart 15 plots the relationship between inflation and unemployment and demonstrates that the unemployment rate does not fluctuate around a relatively constant equilibrium value: the unemployment rate fluctuated around some 2% up till 1974 but shifted from 1975 onwards to about 11% in 1982. Since then, it has fluctuated within a very broad interval around some 9%.

Chart 15
Inflation-unemployment trade-off in Belgium

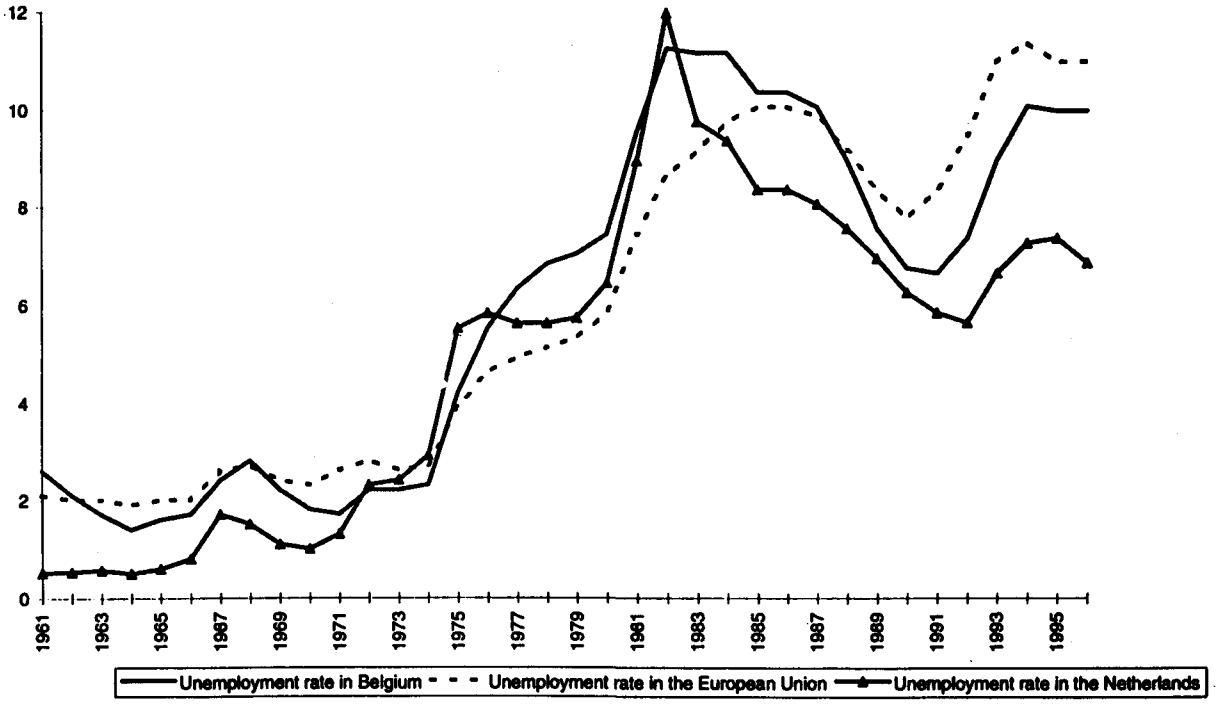


In the absence of a NAIRU, the above-mentioned price equation is not sufficient to detect the explanatory factors behind the marked shift in the unemployment rate. For that purpose, the inflation equation, which represents the supply side of the economy, has to be supplemented with a description of the demand side. This leads to the recognition that the domestic unemployment rate is not independent of foreign unemployment and, more specifically, of the unemployment situation in the rest of the European Union. Annex 3 demonstrates that in the long run the Belgian unemployment rate is determined by:

- the foreign unemployment rate. Chart 16 shows the comovement of unemployment rates in Belgium and in the rest of the Union.
- besides the foreign unemployment rate, domestic factors may play a significant role as the Dutch example so clearly demonstrates. The more extensive use of part-time employment may in part explain the lower unemployment rate in the Netherlands, although other domestic elements may also be part of the explanation. According to our analysis, these other domestic factors are related to the wage-price formation processes:

- productivity developments tend to limit the pressure on prices such that, external conditions remaining equal, demand for domestic products rises, thereby encouraging domestic employment. On the other hand, rising real unemployment benefits put upward pressure on wage claims and on inflation, thereby depressing employment. Our calculations imply that the overall contribution of these three variables on average had a positive influence on domestic employment during the period 1962 to 1994. This beneficial influence was, however, more than compensated by a fourth domestic factor:
- the development of the tax wedge, which has put upward pressure on wage costs.

Chart 16
Unemployment rates in Belgium, the EU and in the Netherlands



The analysis can be interpreted as follows. Increasing involuntary unemployment implies a growing disequilibrium in the labour market, which was not eliminated because wage formation was not sufficiently flexible. The question, however, is: why has wage formation been that inflexible? In the public debate frequent reference has been made to institutional factors such as minimum wages, inflexible working hours, wage indexation, organisation of wage negotiation, etc. Our analysis implies that the ever growing tax wedge has contributed to the explanation. Because of the lack of spontaneous and sufficient response of wages to the unemployment rate, the government had to intervene frequently in the wage formation process. At the end of periods of imposed wage moderation, wages tended to recover previously lost grounds, such that government had to intervene again, all of this giving rise to a stop-go process in wage formation. Modulating the tax wedge is probably an effective instrument to enhance the flexibility of wages towards disequilibria in the labour market. This avenue, which became part of public policies (in the form of several new measures to reduce employers' social security contributions), is, of course, constrained by the need for fiscal consolidation. This demonstrates again that a sound budget balance is a necessary condition for fiscal policy to be an effective instrument of economic policy.

Conclusions

The GDP-deflator, which is strongly correlated with the consumer price index, is in the long run determined by unit labour costs and a profit margin. The profit margin is not constant (not even in the long run) since it depends on the price elasticity of demand, which itself is related to the market share of domestic producers and therefore to the relative output price. At the macro level, this implies that domestic producers, when setting their prices, directly take account of foreign prices expressed in domestic currency.

Besides this direct influence, foreign prices also affect domestic prices indirectly through the reaction of nominal wage costs to price changes. Unit wage costs depend on wage cost per employee and on the employment intensity of output. This inverse of apparent labour productivity is itself determined by total factor productivity (the autonomous increase of labour productivity due to technical progress) and by the combination of per capita capital stock and the rate of unemployment, which reflect changes induced by movements in the relative price of factors of production. Wage costs per employee are the result of wage negotiations or of government intervention as a reaction to unfavourable changes in the unemployment rate. In general, wage costs are seen to react to prices, the profit margin of producers, the level of generosity of employment benefits, the tax wedge and the unemployment rate.

Because of the dual relation between price inflation and wage costs, the ultimate causes of price movements are those that directly affect inflation plus all other variables determining wage costs. In this way, foreign inflation, and hence the exchange rate, is a most powerful force that drive domestic prices. This explains why Belgium traditionally chooses exchange rate stability with its most important trading partners as its intermediate target of monetary policy. But even then the inflation differential is not necessarily constant: domestic sources of inflation also remain relevant. More specifically, changes in the unemployment rate in some periods have had a dampening effect on wages and on inflation.

The strong dependence on foreign inflation, often found in a small open economy, implies that the NAIRU, typical of large and relatively closed economies, cannot be derived in the case of Belgium. To obtain insight into the driving forces of the unemployment rate, the demand side also has to be entered into the analysis. The result is that domestic unemployment is determined by both external (the foreign unemployment rate) and internal factors (related to the wage formation process).

Annex 1: Wage-price dynamics in theory

1. Wage bargaining

Wage formation is derived as a simplified version of the model in Layard, Nickell, Jackman (1991),[5] with the union wishing in firm i to maximise utility (income) of potential workers. The objective of the union is thus:

$$u_i = \frac{L_i}{N}\left[\frac{W_i(1-\tau)}{PC}\right] + \left(1 - \frac{L_i}{N}\right)\frac{A_i}{PC} \tag{1}$$

where: u_i = utility;

L = number of employees employed in the firm (this number clearly depends on the outcome of the wage negotiation);

N = potential workers;

W = nominal wage cost;

τ = tax wedge, i.e. the difference between wage cost and net wage;

PC = overall consumer price index;

A = alternative nominal income of an employee outside the firm.

The alternative income consists of two elements:

$$\frac{A_i}{PC} = (1 - \varphi_i U_i)\frac{\overline{W_i}(1-\tau)}{PC} + \varphi_i U_i \frac{B_i}{PC} \tag{2}$$

where: φU = probability of being unemployed which depends on the unemployment rate scaled with φ;

$\overline{W}(1-\tau)$ = nominal alternative wage that can be earned in other firms;

B = nominal unemployment benefits.

If the wage negotiation is unsuccessful, employees would fall back on utility level u^0, being the alternative income:

$$u_i^0 = \frac{A_i}{PC} \tag{3}$$

Excess income from successful bargaining is, using equations (1) and (3):

$$u_i - u_i^0 = \frac{L_i}{N}\left[\frac{W_i(1-\tau)}{PC} - \frac{A_i}{PC}\right] \tag{4}$$

Firm i, for its part, wishes to maximise profits:

$$\Pi_i = P_i Y_i - W_i L_i - C_i \overline{K}_i \tag{5}$$

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[5] Layard, R., S. Nickell and R. Jackman (1991): *Unemployment*, Oxford University Press, Oxford, Chapter 2.

where: Π = profits;

P = output price;

Y = real output;

C = capital cost;

$\overline{K}$ = capital stock, which is a fixed production factor in the short run.

If the wage negotiation fails and workers go on strike, the alternative (negative) profit of the firm is:

$$\Pi_i^0 = -C_i \overline{K_i} \tag{6}$$

The excess profit resulting from a positive bargaining income is derived from equations (5) and (6) as:

$$\Pi_i - \Pi_i^0 = P_i Y_i - W_i L_i \tag{7}$$

The bargaining type which is considered here corresponds to the so called "right to manage" model; union and firm negotiate about the wage level, taking the employment effects into account (meaning that in equations (4) and (7), employment, L_i, should be interpreted as the profit maximisation level of employment). In a second stage, after the wage is fixed, employers decide on the actual level of employment in the firm, which will correspond to its equilibrium value given the negotiated wage level. Using the Nash maximand, the bargaining outcome is the one that maximises:

$$\Omega_i = \left(u_i - u_i^0\right)^{\beta} \left(\Pi_i - \Pi_i^0\right) \tag{8}$$

where: β measures relative union power.

Taking natural logs of (8), differentiating with respect to the gross wage rate, taking into account equations (4) and (7) and noting the envelope theorem $\delta\Pi_i / \delta W_i = -L_i$ (where L should be interpreted as its equilibrium level), the following first-order condition is obtained:

$$\frac{\delta \ln \Omega}{\delta W_i} = \frac{\beta\left[W_i(1-\tau)\dfrac{\delta L_i}{\delta W_i} + L_i(1-\tau) - A_i \dfrac{\delta L_i}{\delta W_i}\right]}{L_i\left[W_i(1-\tau) - A_i\right]} - \frac{L_i}{P_i Y_i - W_i L_i} = 0 \tag{9}$$

Working through (9), taking account of equation (2) and aggregating over all firms (supposed to be identical) yields:

$$1 - \frac{B}{W(1-\tau)} = \frac{1}{\varphi U}\left[\frac{-\delta \ln L_i}{\delta \ln W_i} + \frac{1}{\beta\left((PY/WL) - 1\right)}\right]^{-1} \tag{10}$$

Equation (10) determines the aggregate nominal net wage level. It is a positive function of unemployment benefits and a negative function of the unemployment rate, the elasticity of labour with respect to wages (in absolute values) and the labour share. The last two factors may be derived from the producers' optimisation programme.

2. Pricing and labour demand by firms

Production technology is assumed to be Cobb-Douglas:

$$Y_i = TFP_i L_i^{\alpha} K_i^{1-\alpha} \tag{11}$$

where: TFP = index of total factor productivity.

Firms are assumed to operate in markets characterised by monopolistic competition. The demand for their products is drawn from an "Almost Ideal Demand System" (AIDS), such that the market share of an individual firm is given by:

$$S_i = \frac{P_i Y_i}{R} = \omega_i + \sum_i \gamma_{ij} \ln P_j + \chi_i \ln \frac{R}{IP} \tag{12}$$

where: R = total nominal demand;

IP = general aggregate index of prices;

and with:

$$\ln IP = \omega_0 + \sum_k \omega_k \ln P_k + \tfrac{1}{2} \sum_k \sum_l \gamma_{kl} \ln P_k \ln P_l$$

and:

$$\gamma_{kl} = \gamma_{lk}, \qquad \sum_k \omega_k = 1, \qquad \sum_k \gamma_{kl} = 0, \qquad \sum_k \chi_k = 0.$$

The firm's optimum is obtained by maximising:

$$P_i Y_i - W_i L_i - C_i \overline{K_i}$$

subject to equations (11) and (12).

After substitution, the objective function can be rewritten as:

$$\max. \psi = \left[\omega_i + \sum_j \gamma_{ij} \ln P_j + \chi_i \ln \frac{R}{IP} \right] R - W_i L_i - C_i \overline{K_i} - \lambda \left[\left(\omega_i + \sum_j \gamma_{ij} \ln P_j + \chi_i \ln \frac{R}{IP} \right) \frac{R}{P_i} - TFP_i L_i^{\alpha} \overline{K_i^{1-\alpha}} \right]$$

Maximisation with respect to λ, P_i and L_i yields the following first-order conditions (under the assumption that IP, R and competitors' prices are given for each individual firm):

$$P_i = \frac{S_i R}{TFP_i L_i^{\alpha} K_i^{1-\alpha}} \tag{13}$$

$$\lambda = \left(\frac{\gamma_{ii}}{\gamma_{ii} - S_i} \right) P_i \tag{14}$$

$$W_i = \lambda TFP_i \alpha L_i^{\alpha-1} \overline{K_i^{1-\alpha}} \tag{15}$$

where, in terms of the absolute price elasticity of demand (η),

$$\left(\frac{\gamma_{ii}}{\gamma_{ii}-S_i}\right)=1-\frac{1}{\eta_{ii}} \qquad \text{with } \gamma_{ii} \text{ supposed to be} < 0 \text{ such that } \eta_{ii} > 1.$$

The absolute price elasticity is a negative function of the market share.

Converting equations (12) - (15) into growth rates gives the following system of equations:

$$\overset{\circ}{P}_i = \overset{\circ}{S}_i + \overset{\circ}{R} - \overset{\circ}{TFP}_i - \alpha \overset{\circ}{L}_i \tag{16}$$

$$\overset{\circ}{\lambda}_i = \overset{\circ}{P}_i - \frac{S_i}{S_i-\gamma_{ii}}\overset{\circ}{S}_i \tag{17}$$

$$\overset{\circ}{L}_i = -\frac{1}{1-\alpha}\left[\overset{\circ}{W}_i\right] + \frac{1}{1-\alpha}\overset{\circ}{\lambda} + \frac{1}{1-\alpha}\overset{\circ}{TFP}_i \tag{18}$$

$$\overset{\circ}{S}_i = \sum_j \frac{\gamma_{ij}}{S_i}\overset{\circ}{P}_{ij} + \frac{\chi_i}{S_i}\overset{\circ}{R} - \frac{\chi_i}{S_i}\overset{\circ}{IP} \tag{19}$$

From the reduced-form solution, it can be shown that:

$$\left.\frac{\delta \ln L_i}{\delta \ln W_i}\right|_{\overline{IP,R,P}_j} = \frac{-(S_i-\gamma_{ii})^2}{(S_i-\gamma_{ii})^2-\alpha\gamma_{ii}^2} < 0 \tag{20}$$

from which it follows that the absolute wage cost elasticity of labour demand is decreasing in S_i. When aggregating over n identical domestic firms, the demand system boils down to the allocation of total consumption between domestic (i) and foreign goods (j):

$$S_i = \frac{PY}{nR} = \omega_i + n^* \gamma_{ij} \ln\frac{P^*}{P} + \chi_i \ln\frac{R}{IP} \tag{21}$$

where: P^* = foreign price level;

n^* = number of foreign firms j;

$\gamma_{ij} > 0$; that is, we expect the aggregate market share to be a positive function of the foreign price deflated by the price of domestic firms (the effective exchange rate).

From equations (14) and (15) follows:

$$\frac{W_i L_i}{P_i Y_i} = \frac{WL}{PY} = \frac{-\alpha\gamma_{ii}}{S_i-\gamma_{ii}} \tag{22}$$

which can also be written as:

$$P = \frac{(\gamma_{ii} - S_i)}{\gamma_{ii}} \frac{WL}{\alpha Y} \tag{23}$$

It follows that although we assumed a Cobb-Douglas production technology, the labour share and price mark-ups are non-constant. Mark-ups tend to increase and the labour share tends to decline when the market share improves because firms' price elasticity of demand is inversely related to their market share.

Substituting equations (20) and (22) in (10) yields the following wage equation:

$$1 - \frac{B}{W(1-\tau)} = \frac{1}{\varphi U}\left[\frac{(S_i - \gamma_{ii})^2}{(S_i - \gamma_{ii})^2 - \alpha\gamma_{ii}^2} + \frac{\alpha\gamma_{ii}}{\beta\left[(S_i - \gamma_{ii}) + \alpha\gamma_{ii}\right]}\right]^{-1} \tag{24}$$

with: $\frac{\delta W}{\delta S_i} > 0.$

Both the labour share and the wage elasticity of labour depress the wage level and both of them are decreasing in the firm's market share. Hence, W is positively influenced by the domestic market share or the relative price of competitors. This result is independent of any myopia on the part of wage earners. Foreign prices raise the domestic wage because the wage outcome is positively affected by the lower wage elasticity of labour and the lower labour share that a rising market share implies.

The unemployment rate U can be defined as:

$$U = 1 - \frac{L}{L^S} \tag{25}$$

where: L^S = labour supply.

The complete model now consists of equations (11), (21), (23), (24) and (25). Linearising these equations, making some substitutions and assuming $\chi_i = 0$, the following price and wage equations can be obtained:

$$\ln P = \pi_0 + \pi_1 S_i + \frac{1-\alpha}{\alpha}\left(\ln\frac{L^S}{K} - U\right) - \ln TFP + \ln W \tag{26}$$

or alternatively:

$$\ln P = \pi_0 + \pi_1 S_i + \frac{1-\alpha}{\alpha}\ln\frac{Y}{K} - \frac{1}{\alpha}\ln TFP + \ln W \tag{26'}$$

$$\ln W = \sigma_0 + \ln\frac{B}{(1-\tau)} - \sigma_1 U + \sigma_2 S_i \tag{27}$$

with:

$$S_i = \rho_0 + \rho_1 \ln \frac{P^*}{P}. \tag{28}$$

In Layard-Nickell type models, given the real unemployment benefits, the equivalents of (26) and (27) are enough to derive an equilibrium unemployment rate. Here, the effective exchange rate is still present and the demand side of the model is necessary to derive the equilibrium.

Annex 2: Estimations

The wage-price model from Appendix 1 was estimated on the period 1963-94. Equations (26') and (27) are used with S_i replaced according to (28), giving the following long-run equations:

$$\ln P = a_0 + a_1 \ln P^* + (1 - a_1) \ln W + a_2 \ln \frac{Y}{KC} + a_3 \ln \frac{OIL}{P}$$

$$\ln \frac{W}{P} = b_0 + b_1 \ln \frac{B}{P} + b_2 \ln(1 - \tau) + b_3 U + b_4 \ln \frac{P^*}{P} + b_5 \ln \frac{Y}{KC} + b_6 \ln \frac{OIL}{P}$$

The specifications are more general than the theoretical model:

- on the basis of preliminary results, a relative oil price seems necessary to explain the Belgian mark-up. Since the wage bargaining anticipates the price formation process, the oil price is also introduced in the wage equation.
- the parameter on productivity in the price equation is independent of the wage coefficient (productivity plays through *Y/KC*, a combination of *Y/K* and *TFP* which, in logarithm, is a multiple of labour productivity.
- the impact of unemployment benefits on wages is not constrained to unity and productivity was introduced to conform to traditional specifications of wage formation.[6]
- the tax wedge impact is not constrained to -1 which would imply that all increases in direct taxes or social security contributions would rest on companies.

Long-run equations are introduced in an ECM-type specification to take dynamic adjustment into account:

$$\begin{aligned}\Delta \ln P = {} & c_0 + c_1 \Delta \ln P(-1) + c_2 \Delta \ln P^* + c_3 \Delta \ln P^*(-1) + c_4 \Delta \ln W + c_5 \Delta \ln W(-1) \\ & + c_6 \Delta \ln OIL + c_7 \Delta \ln OIL(-1) + c_8 \Delta \ln \left(\frac{Y}{KC} \right) + c_9 \Delta \ln \left(\frac{Y}{KC} \right)(-1) \\ & + c_{10} \Delta \ln e + c_{11} \Delta \ln e(-1) + c_{12} DUC + c_{13} DUC(-1)\end{aligned}$$

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6 Extensions to the theoretical model would also justify this addition.

$$-\mu\left(\ln P - a_1 \ln P^* - (1-a_1)\ln W - a_2 \ln\frac{Y}{KC} - a_3 \ln\frac{OIL}{P}\right)(-2)$$

Two more variables are introduced in the dynamic part, exchange rate differences to allow for incomplete pass through in the price formation and a degree of capacity utilisation (*DUC*) which is the divergence between the potential output level attainable on the basis of currently *hired* factors and realised output. Such a GDP gap is common in NAIRU-type approaches.

$$\begin{aligned}\Delta \ln W = {} & d_0 + d_1 \Delta \ln W(-1) + d_2 \Delta \ln P + d_3 \Delta \ln P(-1) + d_4 \Delta \ln P^* + d_5 \Delta \ln P^*(-1) \\ & + d_6 \Delta \ln OIL + d_7 \Delta \ln OIL(-1) + d_8 \Delta \ln B + d_9 \Delta \ln B(-1) \\ & + d_{10} \Delta \ln(1-\tau) + d_{11} \Delta \ln(1-\tau(-1)) + d_{12} \Delta U + d_{13} \Delta U(-1) \\ & + d_{14} \Delta \ln\left(\frac{Y}{KC}\right) + d_{15} \Delta \ln\left(\frac{Y}{KC}\right)(-1) \\ & - \upsilon\left(\ln\frac{W}{P} - b_1 \ln\frac{B}{P} - b_2 \ln(1-\tau) - b_3 U - b_4 \ln\frac{P^*}{P} - b_5 \ln\frac{Y}{KC} - b_6 \ln\frac{OIL}{P}\right)(-2)\end{aligned}$$

The 3SLS results are:[7]

$$\begin{aligned}\Delta \ln P = {} & 0.65 + 0.56 \Delta \ln P^* + 0.39 \Delta \ln W(-1) + 0.01 \Delta \ln OIL - 0.01 \Delta \ln OIL(-1) \\ & + 0.56 \Delta \ln e - 0.16 \Delta \ln e(-1) + \left(0.18 \ln\frac{P^*}{P} + 0.25 \ln\frac{W}{P} + 0.11 \ln\frac{Y}{KC} - 0.02 \ln\frac{OIL}{P}\right)(-2)\end{aligned}$$

DW = 2.21 s.e. = 0.007.

$$\begin{aligned}\Delta \ln W = -0.45 \; & -0.99 \Delta \ln W(-1) + 0.33 \Delta \ln P(-1) + 0.23 \Delta \ln P^* + 0.32 \Delta \ln P^*(-1) \\ & + 0.01 \Delta \ln OIL - 0.01 \Delta \ln OIL(-1) + 0.26 \Delta \ln B + 0.28 \Delta \ln B(-1) \\ & - 0.78 \Delta \ln(1-\tau) - 0.89 \Delta \ln(1-\tau(-1)) - 0.01 \Delta U(-1) \\ & - \left(0.73 \ln\frac{W}{P} - 0.46 \ln\frac{B}{P} + 0.89 \ln(1-\tau) + 0.019 U - 0.23 \ln\frac{P^*}{P}\right)(-2)\end{aligned}$$

DW = 2.00 s.e. = 0.01.

Nearly all the coefficients are significant at the 5% level or less; only the coefficient on $\Delta \ln P$ in the wage equation is significant at the 10% level. We can make a few observations:

- our wage model looks quite plausible. All suggested variables are present and productivity was not significant. Thus, there is a relationship between the wage level and the unemployment rate. NAWRU-type approaches cannot be justified for Belgium since they ignore the levels in both wages and prices;
- oil prices have an impact on the long-run mark-up and on the dynamics of both equations but not on long-run wage formation;

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[7] *B*, *U* and *Y* are taken as (potentially) endogenous, with past values used as instruments.

- in the long run, the coefficient on Y/KC in the price equation is such that the coefficient on labour productivity would equal -0.27, close in absolute value to the wage coefficient. Hence, it is the unit labour cost that is present in the price formation;
- adjustments to exchange rate changes are sluggish. The exchange rate and the foreign price share the same coefficient in the current period. It is thus the foreign price in foreign currency that is relevant in the short run;
- the relative influences in the price formation change with time: from foreign prices (competition) in the short run to domestics costs, that is wages, in the long run;
- our GDP gap measure turned to be nonsignificant, which puts into question NAIRU-type approaches in addition to the fact that we have an explanation relating the price levels to the unemployment rate in the reduced form.

To recover the steady-state equations for price and wage inflation used in Sections 1 and 2, one simply takes the difference of the long-run part of the dynamic equations (the following identity derived from the production function is also used: $\Delta\ln(Y/KC) = -.7/.3\ \Delta\ln TFP + .7\Delta\ln(L^S/K) - .7\Delta(U/100)$, where .7 is the labour elasticity of output and U is in percent).

Annex 3: General equilibrium

The reduced-form wage-price model gives a link between Belgian inflation in the long run and unemployment rate variations as well as other factors. It was introduced in Section 3 and can be rewritten:

$$\left(\frac{\overset{\circ}{P}}{P^*}\right) = 3.12\left(\frac{\Delta UD - \Delta U}{100}\right)$$

where:

$$\frac{\Delta UD}{100} = \frac{-0.10\left(\frac{\overset{\circ}{OIL}}{P^*}\right) + 0.67\overset{\circ}{b} - 1.32\left(1-\overset{\circ}{\tau}\right) - 1.13\overset{\circ}{TFP} - 0.34\left(\frac{\overset{\circ}{K}}{L^S}\right)}{3.12}$$

$$= -0.03\left(\frac{\overset{\circ}{OIL}}{P^*}\right) + 0.22b - 0.42\left(1-\overset{\circ}{\tau}\right) - 0.36\overset{\circ}{TFP} - 0.11\left(\frac{\overset{\circ}{K}}{L^S}\right)$$

ΔUD accounts for the factors other than unemployment affecting the inflation differential and the relation can be seen as a supply curve: a higher activity level (lower unemployment) requires higher prices. It is important to recognise that an opposite relationship should exist, a "demand" curve,

with a negative link between prices (low competitiveness) and demand, that is a positive link between prices and unemployment.

We don't pretend to model, in this paper, the complicated relationship between competitiveness and unemployment. But to shed some light on the impact of this second relation on the link between inflation and unemployment, we make a crude approximation. An equation relating the variations in the unemployment rate differential (Belgium with respect to the EU) to our inflation differential was estimated and gave the following long-run demand equation (in variations):

$$\left(\frac{\Delta U - \Delta U^*}{100}\right) = 0.061\left(\frac{\overset{\circ}{P}}{P^*}\right) = \frac{1}{16.5}\left(\frac{\overset{\circ}{P}}{P^*}\right)$$

No significant constant was found implying a continuous divergence of Belgian unemployment from its EU counterpart. Combining supply and demand, we get

$$(\Delta U - \Delta U^*) = \frac{3.1}{3.1+16.5}(\Delta UD - \Delta U^*)$$

and

$$\left(\frac{\overset{\circ}{P}}{P^*}\right) = \frac{16.5*3.1}{3.1+16.5}\left(\frac{\Delta UD - \Delta U^*}{100}\right)$$

The same factor is present in the unemployment and inflation differentials, the difference between exogenous inflationary factors and unemployment evolution abroad. One could speak of a domestic component (*OIL/P** excepted) and a foreign component. This is even more apparent if we rewrite ΔU as

$$\Delta U = \frac{3.1}{3.1+16.5}\Delta UD + \frac{16.5}{3.1+16.5}\Delta U^*$$

where, relying on relative weights, the foreign component seems the most important. The 3.1 coefficient is a multiple (via the wage-price spiral) of the sensibility coefficient of wages to the unemployment rate; if this reaction increases, thanks to the denominator, the domestic as well as the foreign factors will loose some impact and the unemployment rate changes will be lower. What are the implications of the demand curve for our previous analysis of inflation? The final price equation stays close to the previous one since the 16.5/(3.1+16.5) factor is close to unity. But it is the foreign unemployment rate that now appears in the equation, not the domestic one. Their evolutions are, however, similar. Finally, the presence of the same factor in the unemployment and inflation differential suggests that the same change in domestic factors could lower unemployment and inflation at the same time. The fights against inflation and unemployment would be compatible in the long run. However, this conclusion relies upon our demand approximation and upon the fact that this change would not immediately affect domestic activity.

Comments on: "Inflation and unemployment in Belgium" by Michel Dombrecht and Philippe Moës

by Gregory Sutton

This paper represents a significant theoretical advance in the area of inflation determination in small open economies. From their model, we learn that the NAIRU concept may not be a particularly useful one for understanding the behaviour of inflation in small open economies. For these economies, foreign inflation may be a more important determinant of domestic inflation than labour market conditions. The authors use their model to interpret the Belgian inflation history and conclude that foreign inflation was the principle cause of domestic inflation over the 1962-94 period.

From a theoretical perspective, an important contribution of the paper is the incorporation of imperfect competition into an equilibrium model of price and wage determination. By relaxing the assumption of perfect competition in product markets, the authors are able to analyse the impact of foreign inflation on domestic inflation that arises from the equilibrium response of profit margins to shifts in consumer expenditure between domestic and foreign goods. A decline in foreign prices, holding domestic prices and the exchange rate constant, induces a shift of consumption expenditure from domestically produced goods to foreign goods. This leads to a decline in the market shares of domestic firms, inducing them to lower profit margins and prices. Likewise, an increase in foreign prices works to raise domestic prices. In this way, foreign inflation has a direct impact on domestic inflation via the price-setting behaviour of domestic firms.

As noted by the authors, there are also indirect influences of foreign inflation on domestic inflation. These include the impacts of import prices on the outcome of wage negotiations and on production costs.

Chart 7 of the paper plots both the profit margin and the relative GDP deflator in Belgium. There is clearly a positive relation between changes in these series, as predicted by the model. The results of formally estimating the model are also encouraging. The evolution of the rate of inflation predicted by the model closely follows actual Belgian inflation over the period studied. The conclusion reached from the empirical exercise is that foreign inflation was the principle cause of Belgian inflation over the sample period, with the growth rate of per capita capital stock and the slowdown in productivity also contributing significantly.

Therefore, I believe that the authors have made an important theoretical contribution to our understanding of the causes of inflation in small open economies. The concept of equilibrium unemployment employed in the paper, a level of unemployment that equates foreign and domestic inflation rates, is certainly a more reasonable measure than the NAIRU for the case of a small open economy.