The long-run effects of low inflation rates [*]

VICTORIA C. HOOGENVEEN and SIMON K. KUIPERS

1. Introduction

Inflation performance in Europe over the last two decades shows a tendency towards very low rates. The monetary policies of the individual central banks and the European Central Bank explicitly aim at inflation rates close to zero. Persistent low inflation rates produce confidence in the effectiveness of monetary policy. The monetary authorities are generally convinced that the positive effect a high inflation rate might have on economic growth does not hold in the long run. Further, a consistent policy irrespective of real economic performance generates a stable monetary environment in which a lower long-run unemployment rate can be achieved.

New Zealand and Canada are two countries outside Europe where successful low inflation policies have been applied. New Zealand experienced double digit inflation for most of the period after the first oil shock until 1989, and a low inflation targeting policy has been applied since 1990 (Mishkin and Posen 1997). The disinflation of the late Eighties coincided with a considerable increase in the unemployment rate. In the early Nineties the GDP growth rate and the unemployment rate showed a further deterioration. Since then, recoveries and deteriorations have alternated. Fortin (1996) considers the Canadian slump of the 1990s following upon the rigorous anti-inflation policy of the monetary authorities, pointing out that Canadian unemployment rates were higher than in the USA although similar before the inflation rates were brought towards zero.

A reason why low inflation rates may have a negative effect on economic growth, mentioned by Fortin and others (see *e.g.* Akerlof, Dickens and Perry 1996), is nominal wage rigidity. Nominal wage rigidity can derive from the unwillingness of employees to accept a lower growth of the nominal wages than that achieved in industries other than their own, or lower than in the preceding years. In a number of interview studies, including surveys by Blinder and Choi (1990) and Bewley (1998), respondents were asked what combinations of wage inflation and price inflation they preferred, and when a wage decrease is perceived to be fair. These studies suggest that money illusion is a widespread phenomenon and, furthermore, that a company has to be in great financial distress before a wage cut is accepted by the employees. The threat of job loss convinces them to agree with a cut which otherwise would have led to a sense of being unfairly treated by the employer. Akerlof and Yellen (1990) present a model in which the fairness of the nominal wage level is determinant for the effort with which an employee carries out his tasks. The lower the wage rate is, the lower labour productivity will be. This is a reason for employers not to bring nominal wages down, although low or negative profits may justify doing so.

Trade union practice shows that a wage demand is largely determined by what is achieved in sectors other than that in which the trade union in question operates. Trade union members expect the union to negotiate in their best interests, which is doubted when employees in other industries achieve higher nominal wage increases. Therefore the wage inflation rate is markedly determined by the wage increases in the sector that can set the highest wage given their labour productivity growth and level of profits. Given this wage inflation rate, industries with low labour productivity growth or low profits see themselves forced to lower their demand for labour, which negatively affects output growth in these sectors. If these negative effects are not offset by higher growth rates in the sectors with the higher productivity growth, overall economic growth is negatively affected. The decline of employment growth in the low-productivity growth sectors is aggravated by low price inflation rates since low wage increases are more easily achieved when they are still positive. But when a somewhat lower real wage increase means that nominal wages have to decrease, this is almost impossible unless the company runs the apparent risk of going bankrupt. In other words, a positive price infla-

tion rate enables an employer to achieve a real wage decrease while still maintaining a positive nominal wage increase. When price inflation is zero, an increase in nominal wages pushes up real wages with a decline in employment as the result.

Therefore, when price inflation rates are low, the positive relation between price inflation and employment growth depends essentially on the empirically observed skewness in distribution of nominal wage increases, resulting from the absence of money wage decreases (cf. Akerlof, Dickens and Perry 1996). This also applies implicitly to the negative relation between price inflation and the unemployment rate.

The wage inflation rate of a firm must be between zero and the maximum wage inflation set by the highest labour productivity growth sector. If, in cyclically neutral years, output growth rates are distributed symmetrically around a normal rate, so the increases in goods prices will be distributed symmetrically around the low price inflation rate aimed at by the monetary authorities. In this situation there will be firms with falling prices and below-normal output growth rates due to output demand growth lagging behind, and there will be firms with increasing prices and an output growth rate higher than the normal growth rate. Given the fact that wage inflation must be positive, firms with falling prices will then experience rising real wages, whereas in firms with constant or rising prices real wages may remain constant. Firms in the former category will therefore show a less than normal increase in employment or even a decline in employment, whereas the firms in the latter category are on the normal employment path. Macro-economically, the consequence is a rise in real wages and a below-normal increase in employment.

This argument and the conclusion it leads to bring us back to Tobin's address to the American Economic Association in 1971 (Tobin 1972). A change in monetary policy aimed at price stabilisation will inevitably produce an increase in real wages with a fall in employment as the result. The fall in employment will continue until unemployment has reached the level by which the initial increase in real wages is redressed. Ultimately, a high equilibrium level of unemployment will result, also known as the natural level of unemployment by new-classical economists, corresponding to the low level of price inflation. Hence, at low rates of inflation the Phillips curve is not vertical but, on the contrary, shows the negative inclination Keynesian economists have expected it to have ever since Phillips's pioneering 1958 article.

In this paper we shall examine whether an adverse effect of low price inflation rates on unemployment can be found in the data for a group of European countries. What this would come down to is a minimum wage inflation rate that can only be approached at the cost of strong negative real effects on employment growth. We construct a model in which the relation between wage inflation, on the one hand, and unemployment, labour productivity growth and price inflation, on the other, changes when wage inflation reaches low rates.

Having estimated the model, we then go on to determine the natural unemployment rate for each country in the sample as a function of the price inflation rate. The ECB's monetary policy aim of price stability is reflected by a target range of 0-2%. This target range is confronted with the long-run unemployment rates according to our findings. The actual inflation and unemployment rates are considered in view of the long-run relationship between these quantities.

The following two sections describe the regression model and its results for each country in the sample, which consists of Belgium, France, Germany, Italy, the Netherlands and the United Kingdom. Section 4 deals with the relationship between the natural rate of unemployment and the price inflation rate given the regression results; Section 5 concludes.

2. Model

The specification we used for the wage equation to be estimated contains a minimum level for wage inflation. The relation we intend to examine may graphically be reflected as in Figure 1, where wage inflation (w) is the variable on the vertical axis and where the variable on the horizontal axis denotes the linear (wage) equation

$$y = \lambda_0 p + \lambda_1 (x - n) + \lambda_2 u + \lambda_3, \qquad \lambda_0, \lambda_1, \lambda_3 > 0; \; \lambda_2 < 0 \qquad (1)$$

where p denotes the price inflation rate, $x - n$ the growth rate of labour productivity, and u the unemployment rate. When wage inflation is sufficiently high, it approaches the $w=y$ line. The wage equation then reads:

$$w = \lambda_0 p + \lambda_1 (x - n) + \lambda_2 u + \lambda_3. \qquad (2)$$

This is the standard linear inflation and labour productivity augmented Phillips curve relation. If $\lambda_0 = 1$, the new-classical invariance theorem holds: the unemployment rate is independent of nominal quantities, which means that money is neutral.

When wage inflation approaches its minimum level

$$w = \lambda_4, \tag{3}$$

it has become independent of price inflation, labour productivity growth and unemployment. In Figure 1 this occurs if y has become negative, i.e. if there is sufficient price deflation *ceteris paribus*. A positive value of λ_4, as depicted in Figure 1, implies ever-rising real wages, and hence a continuously rising rate of unemployment. In Figure 1 the economy is continuously moving to the left.

FIGURE 1

NON-LINEAR RELATIONSHIP OF WAGE INFLATION
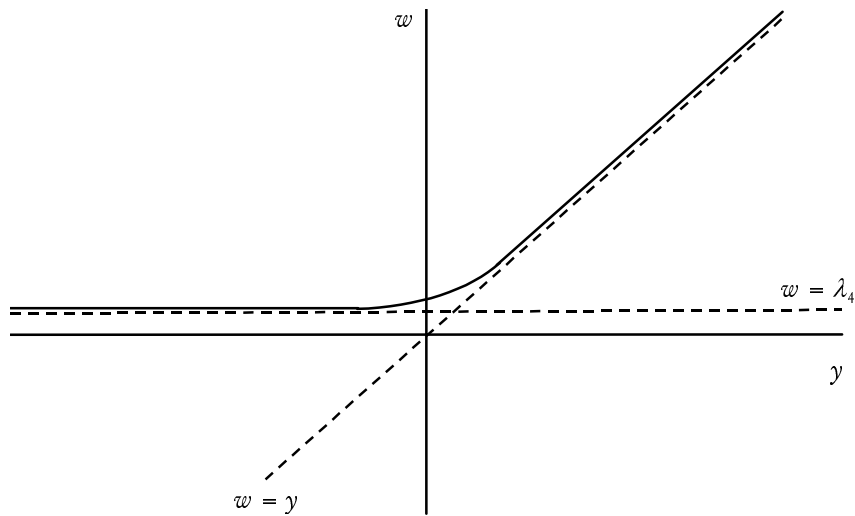
In between the extreme cases of the linear Phillips curve and the exogenously determined money wage increase, the rate of wage inflation depends on the rate of price inflation, the growth rate of labour productivity and the unemployment rate in a non-linear way. One of the consequences of the non-linearity is that in the steady state, where

$$w = p + x - n, \tag{4}$$

the unemployment rate, i.e. the natural rate, is not independent of the rate of price inflation, and would not be so even if λ_0 were equal to 1. Under these circumstances, the new-classical invariance theorem does not hold.

A non-linear function that has the asymptotic properties of Figure 1 is

$$w = \frac{y - \lambda_4}{1 - \exp\left[-\left(y - \lambda_4\right)\right]} + \lambda_4, \tag{5}$$

where λ_4 is the value of the minimum wage inflation rate, as depicted in Figure 1.[1] It can easily be derived that $\lim_{y \to \infty} w = y$ and $\lim_{y \to -\infty} w = \lambda_4$. Equation (5) thus has the claimed asymptotic properties.

3. Results

The equation of estimation we used is given by equations 1 and 5. The productivity growth data we used are for the economy excluding government services; the wage data are the growth rate of compensation per employee in the business or private sector; the others are total economy data (unemployment and price inflation).

The estimation results presented in this section were achieved by non-linear regression using the Gauss-Newton algorithm. The starting values for λ_0, λ_1, λ_2 and λ_3 were obtained with a linear regression for a sub-period 1960-75. The starting value for λ_4 was chosen in the interval (0,15). It appeared that all regressions were robust with respect to the chosen sub-period and initial value of λ_4 except, in some cases, for sub-periods ending before 1972. The software package used was RATS386. The data sources can be found in the Appendix. The Dutch data are from domestic sources, the data for the productivity growth from the Groningen Growth and Development Centre Sectoral Data Base; the others OECD data are provided by Datastream. The regression periods are the following: Belgium: 1961-95, France: 1964-96, Germany: 1961-97, Italy: 1961-96, the Netherlands: 1961-97 and the United Kingdom: 1962-96.

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[1] This function has been suggested by Florian Wagener.

Tables 1 to 6 show the estimation results of the best specification for each country. The estimated coefficients and their t-statistics are presented as well as the $\bar{R}^2$, the Durbin-Watson statistic (DW) and the sum of squared residuals (SSR) of the estimation. As an additional test for autocorrelation we calculated a Portmanteau statistic (Q^*) for small samples. This statistic shows $\chi^2(1)$ distribution, the 5% critical value standing at 3.84. For none of the regressions was the hypothesis of non-auto-correlation rejected. We experimented with lagged variables. Where the labour productivity growth parameter λ_1 was either negative or insignificant, the variable was omitted. The price inflation parameter λ_0 was tested as being different from 1. Where it was not, we modelled full price compensation and implemented $\lambda_0 = 1$ in the regression model.

3.1. Belgium

In the case of Belgium, estimations of the parameter for labour productivity growth gave implausible outcomes and therefore labour productivity was left out. Table 1 shows the regression outcomes.

TABLE 1

REGRESSION RESULTS FOR BELGIUM

	p_{t-1}	$(x - n)_t$	u_t	λ_3	λ_4
Coefficient	1.00	–	–0.77**	8.76**	2.31*
t-statistic	–	–	–7.77	12.97	1.88
$\bar{R}^2$	0.79				
DW	1.52				
Q*	2.24				
SSR	130.67				

* Significance at the 10% level.
** Significance at the 5% level.

Wage demands and wage negotiations in Belgium are not based on labour productivity growth. The inclusion of lagged price inflation suggests wage indexation based on last year's inflation experience. Wage controls have been widely applied by the Belgium government (see Mommen 1994), but there has also been a powerful social movement preventing over-stringent cuts in wage increases, so that a mi-

nimum wage inflation rate can be found in the data above which the wage equation behaves non-linearly.

3.2. *France*

The specification we found for France does not contain labour productivity growth either. Furthermore, the price inflation parameter did not significantly differ from 1. The estimations show a significant minimum wage inflation rate of 2.55%.

TABLE 2

REGRESSION RESULTS FOR FRANCE

	p_t	$(x - n)_t$	u_t	λ_3	λ_4
Coefficient	1.00	–	–0.60**	6.26**	2.55**
t-statistic	–	–	–9.25	17.33	5.00
$\bar{R}^2$	0.96				
DW	1.95				
Q*	0.01				
SSR	24.03				

* Significance at the 10% level.
** Significance at the 5% level.

Decentralised wage negotiations taking place in France might induce *ex ante* expectations that there is no such minimum rate since decentralised negotiations might be geared to the economic performance of the individual firm. However, the 1984 law obliging all firms with over fifty employees to engage in firm-level negotiations did not make reaching an agreement obligatory. Firm-level negotiations already often had the function of further negotiating on labour conditions with the industry-level agreement as a benchmark (see Freyssinet 1993). Industry level negotiations developed further to become the institution where minimum wage levels were set for firm-level negotiations. So, despite the legal decentralisation of collective bargaining from the industry to the firm level, the existence of a minimum wage increase was maintained.

3.3. *Germany*

Table 3 contains the regression results for Germany. Regression results of specifications with labour productivity growth showed either implausible outcomes for the productivity growth parameter or were sensitive to the starting values of the parameters. Therefore labour productivity growth is not included in the model for Germany. The price inflation parameter was not significantly different from 1. The proportion of the variance in w explained by p and u is somewhat low.

TABLE 3

REGRESSION RESULTS FOR GERMANY

	p_t	$(x - n)_t$	u_t	λ_3	λ_4
Coefficient	1.00	–	–1.53**	7.10**	3.26**
t-statistic	–	–	–3.53	7.43	4.60
$\bar{R}^2$	0.53				
DW	2.40				
Q*	1.77				
SSR	234.02				

* Significance at the 10% level.
** Significance at the 5% level.

Collective bargaining in Germany has a long tradition of more than a century. After the Second World War, the procedures for collective agreements have been established by law. The agreement gives a minimum wage for all employees, including the non-organised employees of employers taking part in the collective bargaining. The other employers and employees may be included by declaration of the minister of labour. Government interference in labour negotiations other than this is rare (see Paqué 1993).

3.4. *Italy*

A striking result of the regression for Italy is that the price inflation parameter is significantly smaller than 1. It seems that wage demands are not dominated by price inflation. Labour productivity growth is not implemented because of insignificant estimated parameters.

TABLE 4

REGRESSION RESULTS FOR ITALY

	p_t	$(x - n)_t$	u_t	λ_3	λ_4
Coefficient	0.79**	–	–1.09**	12.67**	4.03*
t-statistic	9.91	–	–4.95	8.74	1.99
$\bar{R}^2$	0.83				
DW	1.66				
Q*	0.98				
SSR	216.15				

*   Significance at the 10% level.
** Significance at the 5% level.

The minimum wage level is higher than that of the other countries, in keeping with the higher level of the average price inflation rate. Italy's economy is characterised by a large proportion of small firms and self-employed people, which is expected to have a negative effect on wage demands and a weakening effect on the existence of a minimum wage inflation rate. However, this effect is not marked enough to prevent a minimum wage inflation rate above which wage inflation is non-linearly related to the unemployment rate.

In Italy the trade unions were late in gaining power, starting to do so no earlier than the late Sixties. Negotiations take place at several levels. Above all during years of economic slowdown those at the national level have been especially important, guaranteeing a minimum income for all workers. Industry-wide agreements in Italy also function as a minimum above which employees can reach better working conditions through negotiations at the firm level (see Tiziano, Geroldi and Maiello 1993).

3.5. *The Netherlands*

The estimations with the Dutch data result in a specification containing labour productivity growth in the business sector. Collective bargaining in the Netherlands is strongly based on labour productivity growth, with a relatively broad consensus between employers and employees to control wage increases by considering the extent to which the sum of price inflation and labour productivity grows. The estimated price inflation parameter suggests full price compensation and is therefore set equal to 1.

TABLE 5

REGRESSION RESULTS FOR THE NETHERLANDS

	p_t	$(x - n)_t$	u_t	λ_3	λ_4
Coefficient	1.00	0.55**	–1.04**	5.49**	1.98*
t-statistic	–	3.86	–5.98	6.43	4.19
$\bar{R}^2$	0.92				
DW	1.68				
Q*	0.37				
SSR	58.45				

  * significance at the 10% level.
** significance at the 5% level.

     Government intervention in the labour market has traditionally been of fairly frequent occurrence in the Netherlands. Subsequent to 1974 wage control tools were once again applied by the Dutch government, having been out of use for about ten years. Collective bargaining takes place mostly at the sector and industry level, launched yearly after publication of the previous year's macroeconomic results and the econometric predictions for the following year. The trade unions then place their bids, which are based on past and expected performance of price inflation and labour productivity growth (see Korver 1993). The latter is found to have a significant parameter in our estimated model. The Dutch data set is the only one where an effect on wage inflation of labour productivity growth in the business sector could be found.

3.6. *United Kingdom*

The trade unions in the United Kingdom had a history of being very fragmented, and powerful at the firm level, until legislation was changed in the early Eighties. The wage inflation series shows a clear drop in the early Eighties and another in the early Nineties. After the second drop it fluctuates at a lower level. No effect of labour productivity growth on wage inflation could be found.

     Inclusion of lagged price inflation improves the results considerably, suggesting that the wage level needs a year to incorporate the price inflation rate.

     During the post-war period collective bargaining in the United Kingdom was complicated by multi-unionism at the firm level, which

REGRESSION RESULTS FOR THE UNITED KINGDOM

	p_t	$(x - n)_t$	u_t	λ_3	λ_4
Coefficient	1.00	–	–1.05**	6.95**	5.32**
t-statistic	–	–	–2.85	4.06	4.19
$\bar{R}^2$	0.49				
DW	1.70				
Q*	0.78				
SSR	555.15				

*   Significance at the 10% level.
** Significance at the 5% level.

forced employers to reach agreements with several unions. At the same time national agreements were widespread, which provided the individual firms with a minimum of labour conditions. In the 1980s the British government carried out some deregulatory measures that were to diminish trade union power. Furthermore, the number of issues negotiated in collective bargaining declined (see Addison and Siebert 1993). The declining power of the trade unions seems to have brought about a breaking point in the data.

This breaking point might validate the inclusion of a dummy variable for the Nineties. However, regression of such a model gives no satisfying results, probably because the Nineties are too small a sub-period in our sample. Furthermore, the specification reflected in Table 6 does produce a significant value for λ_4 despite the apparent decline in price and wage inflation rates. However, the sum of squared residuals is rather high. As in the case of Germany, moreover, the coefficient of determination is fairly low.

4. Natural rate of unemployment

As explained in Section 2, non-linearity in the wage equation implies a non-constant natural rate of unemployment (NRU). We plotted the estimated equations in the (u, π)-plane to reflect the long-run Phillips curves. During the period under consideration in this paper, namely 1960-97, labour productivity growth shows a downward trend. Since

we intended to compare the results with current inflation and unemployment performance, we did not use the average rate of labour productivity growth of the whole period. Instead we calculated the average labour productivity growth rate for 1982-97 and included this in the model together with estimates of the λs. Thus we are able to consider the implications of the current inflation target given a low growth rate in labour productivity. Figure 2 shows the six long-term Phillips curves, obtained by assuming that in the long run wage inflation is equal to price inflation plus labour productivity growth:

$$w = p + (x - n) = \frac{y - \lambda_4}{1 - \exp[-(y - \lambda_4)]} + \lambda_4$$

$$y = \lambda_0 p + \lambda_1 (x - n) + \lambda_2 u + \lambda_3$$

The graphs have the characteristics derived in Section 2. We again consider three sections of the curve, each with its own characteristics: first the part with high inflation rates, secondly the part with low inflation rates, and finally the part in between.

In the range of the first part, that is above the 4-6% range, the long-term Phillips curves are vertical at the long-run rate of unemployment. Here Italy is the exception, the new-classical natural rate hypothesis applying. The minimum long-run unemployment rate differs per country and is found in the 3-9% range.

In the second part we see that, where price inflation rates are low, the long-term Phillips curves tend to a minimum level of price inflation which equals the minimum wage inflation rate minus the average growth rate of labour productivity. With the United Kingdom as an exception, these minimum price inflation rates lie between 0 and 1%.

Finally, in between the two extreme cases the Phillips curve has a negative slope. Thus, at intermediate levels of price inflation, the monetary authorities face the trade-off between inflation and unemployment, central to Keynesian macro-economics.

The graph for Italy differs from the others in that it does not have a vertical asymptotic line at the lowest rate of natural unemployment. The model estimations for Italy show a price inflation rate

parameter that is significantly different from 1, thus making the long-run unemployment rate negatively related to price inflation.

The ECB's inflation target of 0-2% has different implications for the long-run unemployment rate among the six countries. Below we compare the model outcomes with the predictions for 1999 made by the OECD in June 1999.

<div align="right">Figure 2</div>

<div align="center">EQUILIBRIUM UNEMPLOYMENT AS A FUNCTION OF PRICE INFLATION</div>

The current Belgian price inflation and unemployment rate of approximately 1% and 11% lie somewhat above although very close to the graph in Figure 2. This means that the current 1999 rates of price inflation and unemployment coincide with the long-term outcomes of our model. The minimal natural rate of unemployment lies at 8.7% in the graph. The minimal price inflation rate is at least around 0.3%.

France's current inflation and unemployment rate are at the same levels as Belgium's. This combination of rates also lies very close to the long-run curve, which implies that for France, too, the long-term outcomes coincide with the actual inflation and unemployment rates. The model outcomes suggest a long-run unemployment rate of at least 8% for inflation rates between 0 and 2% and a minimal long-run rate of about 7%.

The graph for Germany shows a curve that, lying further to the left, implies that the long-run unemployment rate can reach lower levels. The minimum rate for price inflation lies at 0.9% for Germany. In the target range for the price inflation rate, unemployment is at least 3.7%. The 1999 rate for inflation lies below 1%, and that of unemployment above 10%. This combination is near the horizontal part of the long-run curve.

The inflation target range implies very high unemployment rates for Italy as well, and also some slight danger of instability. Since full price compensation is not supported by the data, the results indicate no minimum for the long-run unemployment rate. The current rates of price inflation and unemployment are reflected by a point in the graph close to and somewhat above the horizontal part of the curve, namely around (12,2).

The results for the Netherlands show a minimum rate for price inflation that is close to zero. This, combined with the long-run curve lying relatively far to the left, indicates that the inflation target range should not cause too many problems. The current unemployment rate lies somewhat below the minimum of the long-run unemployment rate, namely 4.5% versus 4.7%. This low unemployment rate is caused by the vast expansion of consumption in the Netherlands, which is not expected to continue growing at this high a rate.

The ECB's inflation target range lies below the target of the Bank of England, which is 2.5% with 1%-bands both below and above. The graph suggests a danger of instability in the range of this

target. The 1999 inflation and unemployment rate in the United Kingdom (approximately 2.5% and 6.5%) do not coincide with the long-run curve in Figure 2. Given the above mentioned structural break in the labour market, there is reason to believe that the actual long-run curve lies lower and more to the left than the one reflected in this figure. If it does lie lower, then the above mentioned danger of instability might not obtain. In 1997 the economy approached its capacity constraints, to which the monetary authorities reacted with interest rate increases. However, the current economy no longer seems near these constraints, so that overconsumption is not the reason for inflation and unemployment to lie below the long-run curve.

5. Conclusions

The causes for the negative effects of low rates of price inflation on employment and economic growth lie in employees' ideas of fairness and the employers' desire to prevent negative effects on labour productivity when low wage increases were reached. In this paper's model the negative employment effects of low inflation are reflected by the non-linear relation between wage inflation and the other wage equation variables below a certain inflation rate. The model's non-linearities are supported by the significant estimated parameter that reflects the minimum wage inflation rate. Even if the wage equation had been linear for high inflation rates as well as for low inflation rates, the non-linear model could still have been estimated but this parameter would have been found insignificant.

We found the following minimum wage inflation rates: 2.31% for Belgium, 2.55% for France, 3.26% for Germany, 4.03% for Italy, 1.98% for the Netherlands and 5.32% for the United Kingdom. The differences in the specifications we found stem from what factors play a role in the wage negotiations. For instance, in some countries labour productivity growth is considered, in others it is not. Italy was the only country for which we found a price inflation parameter significantly different from 1, and in fact we were able to model full price compensation in all the other cases.

Finally, we plotted graphs of the long-run relationship between the price inflation rate and the unemployment rate. At intermediate rates of price inflation, the long-term Phillips curve is negatively sloped. Only above these rates is the long-term Phillips curve vertical. Since we found minimum wage inflation rates, these curves show that low inflation rates go together with very high long-run unemployment rates. Given the ECB's inflation target range of 0-2% all long-run unemployment rates cover a wide range starting rather high. Moreover, in some countries this target range may give rise to an unstable process of real wage and unemployment increases.

Part of the nominal wage rigidity is based on former experience with wage increases from which the acceptability of a wage increase offer is derived. It is not unthinkable that a persistent low price inflation may decrease wage increase demands (see for instance Mankiw in discussion of Akerlof, Dickens and Perry 1996), but it is hardly likely to happen in just a few years. Ideas about fairness are deeply rooted and do not change easily. Furthermore, there is the problem that no one wants to be the only one to pay for the low price inflation rates, which is the risk run by the first to accept low wage increases with no certainty that other sectors will join in. In conclusion, we believe that nominal wage rigidity may disappear only after a considerable period of persistent low price inflation and therefore only at considerable macroeconomic costs.

APPENDIX

Data sources

Belgium: *wage inflation*: 1961-70: growth of compensation per employee for the whole economy, 1971-97: growth of compensation per employee in the business sector; *output growth*: 1961-95: growth of production of the whole economy minus the government services; *employment*: 1961-97: growth employment in the business sector; *unemployment*: 1961-97: total unemployment; *price inflation*: 1961-97: growth of CPI. Output growth data are from the Groningen Growth and Development Centre Sectoral Data Base. The others are OECD data.

France: *wage inflation*: 1964-97: growth of compensation per employee in the private sector; *output growth*: 1960-96: growth of production of the whole economy minus the government services; *employment*: 1964-97:

growth employment in the business sector; *unemployment*: 1960-97: total un-employment; *price inflation*: 1961-97: growth of CPI. Output growth data are from the Groningen Growth and Development Centre Sectoral Data Base. The others are OECD data.

Germany: *wage inflation*: 1961-97: growth of compensation per em-ployee in the private sector; *output growth*: 1960-97: growth of production of the whole economy minus the government services; *employment*: 1961-97: growth employment in the business sector; *unemployment*: 1960-97: total un-employment; *price inflation*: 1961-97: growth of CPI. Output growth data are from the Groningen Growth and Development Centre Sectoral Data Base. The others are OECD data.

Italy: w*age inflation*: 1961-97: growth of compensation per employee in the private sector; *output growth*: 1960-96: growth of production of the whole economy minus the government services; *employment*: 1961-97: growth employment in the business sector; *unemployment*: 1960-97: total un-employment; *price inflation*: 1961-97: growth of CPI. Output growth data are from the Groningen Growth and Development Centre Sectoral Data Base. The others are OECD data.

The Netherlands: *wage inflation*: 1960-97: growth of compensation per employee in the private sector; *output growth*: 1961-97: growth of production of the whole economy minus the government services; *employment*: 1960-97: growth employment of the private sector; *unemployment*: 1960-97: total un-employment; *price inflation*: 1960-97: growth of CPI. Output growth data are from the Groningen Growth and Development Centre Sectoral Data Base. The other data are from Jongbloed *et al.* (1989) for 1960-69 and from the database of the CPB Netherlands Bureau for Economic Policy Analysis (1998) for 1970-97.

United Kingdom: *wage inflation*: 1962-97: growth of compensation per employee in the private sector; *output growth*: 1960-96: growth of production of the whole economy minus the government services; *employment*: 1962-97: growth employment in the business sector; *unemployment*: 1960-97: total un-employment; *price inflation*: 1961-97: growth of CPI. Output growth data are from the Groningen Growth and Development Centre Sectoral Data Base. The others are OECD data.

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