Spanish Industrial Unemployment: Some Explanatory Factors

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INTRODUCTION

The high level of unemployment is probably the worst feature of the recent evolution of the Spanish economy. In 1970 the overall unemployment rate stood at 1 per cent of the civilian labour force; in 1984 it is estimated to have gone over the 20 per cent level. This is a substantial increase which has no parallel in any European country. Between 1970 and 1983 the average unemployment rate in the EEC rose by 8.6 percentage points, while the increase in Spain over the same period was of 17 points.

There is wide agreement among Spanish economists that these figures may be overstating the actual extent of the problem. The incidence of the underground economy and of fraudulent practices in unemployment registration may be wider than in most EEC countries. Nevertheless, we believe that, even taking into account these measurement difficulties, there has been a genuine worsening of the employment situation in Spain relative to that in other Western economies.

The purpose of this paper is to review the evidence of the last 20 years about the main variables that influence the Spanish labour market, and to attempt a preliminary explanation of the increase in unemployment. For the latter task we use the analytical framework recently developed by Layard and Nickell (1984a), and concentrate on those institutional factors that may have influenced the level of unemployment consistent with non-accelerating inflation (NAIRU).

The next section of the paper describes the key facts that we are trying to explain. Section II presents the analytical framework that we use, and discusses its theoretical foundations. These are dealt with very briefly, since they are fully explained in Layard and Nickell (1984a). Here we concentrate mostly on the empirical specification and on the description of the variables. The econometric results are presented in Section III and the explanation of the unemployment increase is given in Section IV. The final section summarizes our findings.

I. THE FACTS

Spain's overall economic performance was outstanding during the second half of the 1960s and the beginning of the 1970s, but afterwards has deteriorated substantially. Figure 1 shows the growth of GDP, the rate of inflation and the rate of unemployment during the last 20 years. The behaviour of GDP resembles that of other European countries, although the rates of growth during the first ten years of the period were much higher in Spain than elsewhere in Europe.

FIGURE 1. GDP growth, inflation and unemployment. 'Unemployment' refers to the overall unemployment rate of the civilian labour force; 'inflation', to the rate of growth of CPI; and 'output growth', to the rate of growth of GDP.

Sources: National Accounts and Bank of Spain.

The fall of this rate in 1975 roughly coincides with the general slowdown in economic activity that followed the first increase in the price of oil. The effects of the crisis on GDP are reflected in a decrease of almost 5 points in its average rate of growth. Although real output has managed to keep on growing even in the worst years of the crisis, it has doubtless experienced a severe reduction relative to its potential level. (Before 1974, real output was growing on average at more than 8 per cent per year.) Inflation has in general run at levels well above those of other European countries, and has proved difficult to curb in the last years of the period, even with widespread unemployment and with very low levels of output growth. Clearly, the worst feature of Spain's recent economic performance has been unemployment, which has grown to levels that ten years ago would have seemed unthinkable. We turn now to a more

detailed look at this rate, which is going to be the main object of our analysis in this paper.

Figure 2 shows the evolution of employment and of the labour force. From 1964 until 1973, both labour force and employment increase consistently and practically in the same manner, with a gap between them of about 2 percentage points. After 1973, however, while the labour force stays more or less constant, employment falls very rapidly, showing in 1984 a gap of about 20 percentage points with respect to the labour force.

Figure 3 shows again the evolution of the overall unemployment rate since 1964, and gives details of how the agricultural, industrial, building and service sectors have contributed to this rate.¹ Until 1970 the overall rate was practically stable, around the 1 per cent level. From that year onwards it began to show a moderate increase, reaching 2.7 per cent of the labour force in 1974. Since then the rise has accelerated dramatically, particularly after 1977, and in the fourth quarter of 1984 the unemployment rate was 21.7 per cent, more than 12 times the rate 20 years earlier.

FIGURE 2. Total labour force and employment (logs).
Source: Bank of Spain.

FIGURE 3. Unemployment rates: (a) overall rate; (b) sectoral rates.
Source: Bank of Spain.

The sectoral rates shown in Figure 3(b) give some idea of the unemployment structure by sector. There was a clear lead in the building sector, where unemployment began to increase markedly in 1975. In the other sectors the change in the trend did not appear until after 1977, but since then, with the exception of agriculture, unemployment has risen consistently rapidly in all sectors. There is some deceleration in the rate of growth during the last two or three years. This deceleration hardly shows in the overall rate, but this is due to the substantial increase of unemployed school-leavers that has taken place towards the end of the period considered, and which is not taken into account in the sectoral rates.

The Spanish occupational structure has experienced substantial changes during the last 20 years. The share of building and industry in overall employment has remained more or less constant. That of agriculture, on the other hand, has gone down dramatically, the fall being completely absorbed by services. In 1964, agricultural employment represented 36.5 per cent of total employment, while employment in services was 31 per cent. In 1984 the shares were 17.6 and 49.0 per cent, respectively. This is, by any standard, a major

structural change, which differentiates Spain from other European countries, and which could have had an influence on the overall unemployment rate.

We will abstract somewhat from these structural changes by concentrating our attention on the industrial sector. This is a choice forced upon us by data availability. Even for industry, it is impossible to go back before 1964 and to obtain reliable annual series of most of the variables of interest. For other sectors, the poor quality of the data, if not its outright absence, prevent any statistical analysis with even a minimum hope of rigour.² By concentrating on the industrial sector we will also be able to compare some of our estimates with other results that have been obtained by independent research, and thus will be able to evaluate more confidently the meaning of our findings.³

The cost of labour has increased substantially in Spanish industry, and this could be one of the reasons behind the huge rise in unemployment. Figure 4 shows the evolution of four measures related to the price of labour. There has been an impressive rise in the real cost of labour faced by employers. In 1984 it had more than trebled with respect to 1964. Social contributions paid by employers have also increased markedly, as is shown by the widening gap between the product wage and the real labour cost. In 1984 the average employer contribution in industry was 26 per cent of gross pay, whereas in 1964 it was only 15 per cent.

Since employee contributions represent a small fraction of gross pay, and since indirect taxes have been roughly constant over the period, the evolution of the real wage, also shown in Figure 4, is very similar to that of the product wage. On the other hand, the consumption wage, which subtracts income taxes from pay and is the closest approximation to what workers can potentially devote to consumption, has increased much less than the real wage, the difference representing the evolution of income taxes.⁴ While in 1983 the real wage was 3.46 times higher than in 1964, the consumption wage was only 3.24 times higher.

Spanish industry has undergone an important process of modernization during the period considered, and it could be argued that most of the increases in labour costs documented above are simply reflecting productivity improvements. This is to some extent true, but we believe that, even after taking that into account, labour has recently become a much more expensive factor than it was before. A rough way of accounting for productivity improvements is to consider how real labour costs per unit of output have grown.⁵ From 1970 until 1982 these increased by 41.6 per cent in Spain, while in Italy (the EEC country with the highest rise) the corresponding index was only 17.5 per cent higher. In other EEC countries the increase was much smaller, and in Denmark and the Netherlands it was even negative. We thus conclude that, in comparison with other countries, Spanish industrial labour has become much more expensive than it was in the 1960s, although this must to a certain extent be due to the relatively low level at which these labour costs started.

While the increase in labour costs is clearly endogenous to the labour market, the increase in the relative price of imported materials that also took place during this period is to a large extent exogenous. Figure 5 presents the evolution of this relative price during the period, which clearly charts very closely the incidence of the two oil price crises. There are three well differentiated periods. First, there is the period 1964-73, in which input prices were

FIGURE 4. Real cost of labour, product, real and consumption wages. The 'product wage' is defined as W/P . 'Real labour cost' is defined as $W(1+t_1)/P$, where W is gross pay, P is product price and t_1 is employer's contribution to social security. The 'real wage' is defined as $\{W(1-t_4)/P(1+t_3)\}$, where t_4 is employee's contribution to social security and t_3 , indirect taxes. 'Consumption wage' is defined as $\{W(1-t_4)(1-t_2)/P(1+t_3)\}$ where t_2 is income tax.

Source: Bank of Spain.

more or less constant. Second, there is the period that begins with the first oil price rise, which in Spain shows up with a big increase in relative input prices, particularly in 1974, and with some translation of this rise into output prices in the following five years. Despite this rise in output prices, in 1979 the relative price of materials was 21.5 per cent higher than in 1973. Third is the period from 1980 until now, which is dominated by the second oil price shock, and which has meant an increase in relative prices of an additional 66.1 per cent between 1983 and 1979. Overall, in 1983 relative input prices were 100.3 per cent higher than in 1964.

These huge changes in the relative price of labour and other inputs may have also produced a process of accelerated economic obsolescence of capital, which shows up most forcefully in industry. Some estimates of the stock of capital for that sector show that, while between 1964 and 1973 it grew at an

FIGURE 5. Relative imported input prices (price of imported inputs relative to product price).
Source: Bank of Spain.

average annual rate of 4.5 per cent, between 1974 and 1978 this rate of growth went down to 3.6 per cent, and between 1979 and 1982 to 1.9 per cent. Thus, the squeezed or even negative profit margins experienced by firms may have had serious and durable consequences both on the level of installed capacity and on its potential growth.

We therefore see that the period under analysis has been characterized by substantial increases in two relative prices: the relative price of labour and the relative price of materials.⁶ The second has been quite widespread in Europe, but the severity of the first is a rather singular Spanish phenomenon. Both increases could, in principle, have affected labour demand and thus could

explain the dramatic upsurge of unemployment in Spain. In the rest of the paper we attempt to consider these factors in the wider context of the labour market and try to evaluate the effect that they, or other possible influences, may have had on the evolution of unemployment.

II. ANALYTICAL FRAMEWORK

Theoretical considerations

The theoretical model is taken from Layard and Nickell (1984a) and consists of three equations: a labour demand equation, a wage equation, and a price equation. Probably the best way to go about the description of this model is to start first with the employment and wage equations, and then to introduce the price equation.

The labour demand and wage equations together form a fairly conventional structural model of the labour market. The main innovations introduced by Layard and Nickell, which we also take into account in our empirical work, are the possibility that cyclical aggregate demand factors enter directly in the employment equation, the specification in level terms of the wage equation, and the much more explicit and detailed consideration of labour demand and supply factors in the wage equation.⁷

In logarithms, the basic structure of these two equations can be represented as follows:

$$(1) \quad n = -\alpha(w - p) - \beta(p_m - p) + \gamma D + \lambda k + Z$$

$$(2) \quad (w - p^e) = -\delta(l - n) - \eta(p_m - p) + \rho D + \mu(k - l) + Y.$$

Employment, n , depends negatively on real wages ($w - p$) and on relative input prices ($p_m - p$),⁸ and positively on a cyclical aggregate demand factor, D . Demand for labour is defined for a given stock of capital, k , and, under certain assumptions, in the long-run it will grow as this stock grows. Finally, Z is a demand shift variable, and all Greek letters are positive parameters. Equation (1) is therefore a fairly standard labour demand equation, in which output has been substituted out, and in which possible direct aggregate demand effects are taken into account.⁹

Real wages, defined in terms of the expected price level, are in turn determined by both demand factors—($p_m - p$), D and k —and supply factors— l and Y —where l is the size of the labour force and Y a supply shift variable. Factors that raise demand will raise real wages, and factors that raise supply will depress real wages. However, the equation should be interpreted not as a reduced form but as a structural form, at least when other variables suggested by wage bargaining models, such as outside labour opportunities—which here we proxy by $(l - n)$ —also enter the model.

Writing the wage equation with actual real wages on the left-hand side (LHS) and introducing price shocks ($p^e - p$) in the shift factor Y , we have that equations (1) and (2) determine real wages and employment (or unemployment), given all the other variables in the model. The resulting employment equation is:

$$(3) \quad n = (I + \alpha\delta)^{-1} \{ \alpha(\delta + \mu)I + (\lambda - \alpha\mu)k - (\beta - \alpha\eta)(p_m - p) + (\gamma - \alpha\rho)D + (Z - \alpha Y) \}.$$

Equation (3) makes unemployment dependent on aggregate demand besides other, as yet unspecified, demand and supply factors. This is unsatisfactory because, to the extent that aggregate demand can be controlled by the government, unemployment could be reduced at will, by simply increasing D .¹⁰ It is therefore more sensible to think of (3) as a relationship that gives pairs of values of n and D that are consistent with labour market equilibrium, but which in itself cannot determine the equilibrium level of employment. For that, we need another equation to explain cyclical demand.

Within the context of this model, the only other channel through which demand can exert an influence is the pricing decisions of the imperfectly competitive firms assumed above. The mark-up of prices on costs is determined by cyclical demand, by relative import prices, by the capital-labour ratio and by expectational errors, which in the empirical model below are represented by second-differences on wages.¹¹ Ignoring these expectational errors, the basic structure of this equation is the following:

$$(4) \quad (p - w) = \sigma D + \phi(p_m - p) - \tau(k - l) + X$$

where X reflects other variables affecting the pricing decision.

Now, (4) and (1)—the labour demand function—also form a sub-model with two equations and three unknowns; the real wage, employment and cyclical demand. And, as previously, we can also eliminate real wages and this time interpret the resulting relationship as giving pairs of values of n and D that are consistent with product market equilibrium:

$$(5) \quad n = (\alpha\sigma + \gamma)D + (\alpha\phi - \beta)(p_m - p) + (\lambda - \alpha\tau)k + \alpha\tau l + (\alpha X + Z).$$

For any given level of demand, prices will be determined according to (4) so that demand is satisfied and inflation is constant. But determining prices as a mark-up on costs means implicitly also determining the real wage. And this real wage may not be consistent with labour market equilibrium, in the sense that the level of employment that follows may differ from the level of employment given by expression (3). Simultaneous labour and product market equilibrium can be obtained only when both (3) and (5) are satisfied. These form a system of two equations in the two unknowns n and D . Any level of demand above the equilibrium D given by (3) and (5) will increase employment but at the expense of increasing inflation. Setting $p = p^e$ and $w = w^e$, the level of n corresponding to equilibrium D gives the non-accelerating inflation level of employment and, for a given labour force, the non-accelerating inflation rate of unemployment.¹²

Empirical specification

In the following section we present the results of estimating equations (1), (2) and (4) using Spanish data for the industrial sector. Here we want to describe the empirical specification of these equations and the additional variables determining the shift factors Z , Y and X .

Labour demand equation. *Employment*, n , refers to male and female full-time employment in the Spanish industrial sector. We ignore hours worked owing to lack of adequate data on this variable for the whole period considered.

The relative price of labour is defined as *real labour cost*; that is, average gross weekly pay plus employer's social security contributions,¹³ relative to output price. In logarithms, if gross pay is denoted by w , output price by p

and employer's contributions by t_1 , real labour cost is defined as $(w + t_1 - p)$. Again, owing to lack of reliable data on hours, we could not define this variable in terms of hourly earnings.

Relative input prices, $(p_m - p)$, are an index of prices of imported materials relative to output price. Given that in this paper we are considering only the industrial sector, it might have been appropriate to include also an index of intermediate goods from other sectors of the economy. Data limitations prevented us from constructing such index, but, given the relative size of the other two sectors that could have contributed inputs to industry (building and agriculture), we doubt that this omission has any significant effect on our results.

We tried several variables to proxy *cyclical demand*, but in the end the only ones that exerted a significant effect were an index of *competitiveness* (the real exchange rate) (e) and an *after-tax real interest rate* (r).¹⁴ Among the variables initially tried, but which proved to be insignificant, were an index of *world trade* (deviations from trend) and a battery of *adjusted and unadjusted deficits* (as a proportion of GDP). We corrected the deficit both for inflation and for the cycle, and we carried out these corrections using several methods, but could never obtain any significant result.

The stock of capital is taken from Dolado and Malo de Molina (1984),¹⁵ and in the shift factor Z we consider two additional variables; *labour-augmenting technical progress* (a) and a measure of *firing costs* (c). Technical progress is defined as in Layard and Nickell (1984b), and the logarithm of the series is smoothed by a trend. We also impose the restriction (accepted by the data) that the elasticity of employment with respect to this variable ought to be equal to the absolute value of the real wage elasticity minus one. The measure of firing costs is defined as the ratio of average redundancy payments to wages, and is included to take into account the increasing relaxation in employment protection legislation that has recently taken place in Spain. Although this definition captures fairly well the actual cost of firing that (on average) employers have had to face when reducing their labour force, it is somewhat unsatisfactory because it depends on unemployment, and this introduces an endogeneity problem. As unemployment has become widespread, redundancy has affected workers with long periods of tenure. And the result of this is that, despite the increasing firing facilities given by the legislation, average redundancy payments as a percentage of wages have grown since 1977. We adjust for this endogeneity problem by defining the redundancy pay for an employee of a given tenure.

Wage equation. The dependent variable of the wage equation is the *real labour cost*. Note that in principle the appropriate price variable in this equation is the expected price of consumption. This expected price can be substituted by the actual consumption price by including a term $(p^{ec} - p^c)$ on the RHS of the equation, where p^{ec} is the expected consumption price. Also, if we want to define the variable in terms of output prices, as we do in equation (2), we must include *indirect taxes* (t_3) on the RHS of the equation.

Given that we are considering only the industrial sector, we face an additional problem. To be consistent with the employment equation, the price variable must be defined as the price of industrial output, which clearly is only one component of the price of consumption. We took this into account

by including in the RHS of the equation also the price of consumption relative to the price of industrial output; but this variable, as well as the expectational error term considered above, was never significant.¹⁶

The *labour force* is obtained by adding employment, as defined above, to unemployed people in industry.

The shift factor *Y* includes the following variables.

(1) *Taxes*. In addition to *indirect taxes* as a proportion of GDP at market prices (t_3), and *employer's social security* contributions as a proportion of wages (t_1), which have been discussed above, we also include *labour income tax* and *employee social security contributions* as a proportion of wages (t_2). As pointed out in Section I, these have increased substantially in the recent past and may have played an important role in collective bargaining, exerting some upward pressure on gross wages.

(2) *Firing costs*. The reduction that redundancy payments for given tenure have experienced in Spain could also have had a positive influence on gross pay.

(3) *Replacement ratio*. The larger unemployment benefits are, relative to wages, the smaller is the amount of labour supplied and, *ceteris paribus*, the higher the real wage. We tested for this possible influence on wages by including the average replacement ratio, but, as with redundancy payments, this measure is somewhat affected by endogeneity. With the number of unemployed people, unemployed duration has also increased during the period. Thus, since the amount of the benefit paid decreases with duration, the existence of more long-term unemployed people has meant that the average replacement ratio has tended to fall—and this despite a consistent improvement of unemployment benefits. So in the empirical analysis we try an adjusted replacement ratio, which corrects for this effect by holding constant the unemployment duration over the period.

(4) *Mismatch*. Unemployment arising from a mismatch between demand and supply should not exert any restraining influence on wages. So, one way of taking this into account is to include a measure of mismatch in the wage equation, which should appear with a positive sign. Mismatch is proxied by the absolute change in the proportion of manufacturing over total employment, and to some extent should capture the effect that the structural change of Spanish industry documented above may have had on industrial wages.

(5) *Union pressure*. This is a difficult variable to define for Spain. During the Franco regime all workers were compulsorily unionized, but this meant little for the real effect unions could have on wages. Also, strikes were forbidden, and there is no reliable record of the number and extent of industrial disputes, although they are known to have grown in importance towards the end of that regime. On the other hand, it is widely acknowledged that unions had a decisive influence on wages during the transition between the previous regime and the present constitutional monarchy, and that subsequently this influence has been greatly mitigated by the existence of regular and wide-ranging incomes policies.

We tried several definitions of this variable. Excluding days lost on strike, for lack of data, or union membership, for lack of meaning of this indicator, we were left with the alternative of modelling this variable on the basis of incomes policies. The problem here is that the previous regime can be characterized by a constant application of an incomes policy of some sort, and that

during the present regime incomes policies have also played an important and almost permanent role. After experimenting with several alternatives, which included using information on the agreed ceilings on wage growth, we opted for a simple 1-0 dummy, which took the value 0 until 1973, the year of the death of Franco's prime minister, Mr Carrero-Blanco; 1 from 1973 until 1977, the year in which the Moncloa Pact was signed between government, opposition and unions; and again 0 since then.

We believe that this definition captures well the period during which the pressure of unions on wages was at its highest. Before 1974 political control of unions was too great to allow them any influence. The death of Mr Carrero-Blanco in 1973 is accepted to have really signalled the end of the Franco regime, and the signature of the Moncloa Pact in 1977 marked the beginning of a series of agreements on incomes policies which have since been an almost continuous feature of Spanish economic life.

(6) *Other variables.* Since *labour-augmenting technical progress* has been included in the employment equation, it must also be considered in the wage equation, where it can have a positive or a negative effect. This variable should in principle fulfil the same neutrality condition as capital, but the data rejected this restriction.

We would have liked also to include variables proxying *changes in the intensity of search*, but data on vacancies do not exist in Spain, so it was impossible to test whether the relationship between unemployment and vacancies has remained stable over the period or has changed. We tried lagged values of the unemployment rate to see whether there is any significant 'discouraged worker' effect when unemployment rises rapidly, but the results were always negative.¹⁷

Price equation. Practically all variables that enter into the price equation have already been defined. Demand and relative input prices should have a positive effect on the price mark-up, and productivity a negative effect. We include technical progress, which should also reduce the price mark-up for given levels of the other variables. Finally, the expectational error term is measured by a *second-difference on nominal labour costs*, which we expect to have a negative influence on the mark-up. The faster labour costs grow, the more likely it is that expected wages have fallen short of actual wages, and that the mark-up has been fixed below the optimal level.

III. EMPIRICAL RESULTS

Employment equation

Table 1 presents the results of estimating equation (1) on annual data on the industrial sector for the period 1964-83. The 20 observations available prevent us from attempting to estimate any complex dynamic structure for the equation or from carrying out proper stability tests.¹⁸ Thus the results should be taken with care and interpreted as preliminary until more data become available. However, it is interesting to note that the estimates obtained for this equation are similar to those reported in Dolado and Malo de Molina (1984), with quarterly data, similar to those obtained by Raymond (1983) with annual data, and quite consistent with both economic theory and findings based on data from other countries (Layard and Nickell, 1984b).

TABLE 1
EMPLOYMENT EQUATION
Dependent variable, n

Independent variables	Coefficients	<i>t</i> -ratios
n_{-1}	0.896	14.3
$(w + t_1 - p)^*$	0.276	2.2
$(w + t_1 - p)_{-1}$	-0.373	2.6
$(p_m - p)^*$	0.0386	2.2
$(p_m - p)_{-1}$	-0.0677	4.1
c^*	—	—
a	-0.007	$\{x_L^2(1) = 2.3\}$
k	0.104	$\{x_L^2(1) = 3.0\}$
D^*	0.073	2.7
RHO		-0.38 (3.2)
s		0.009
DW		2.22
R^2		0.99
$x_{iv}^2(\cdot)$		4.5 (4)
wage elasticity		-0.935
Other input price elasticity		-0.280
Technical progress elasticity		-0.065

Notes:

1. Estimates are obtained by IV
2. The demand variable is $D = e - 1.95r$
3. RHO is the AR(1) coefficient using Fair's instruments plus some additional instruments; s is the standard error of the regression; R^2 is the coefficient of determination; DW is the Durbin-Watson statistic; $x_L^2(\cdot)$ test for the corresponding linear restriction, $x_{iv}^2(\cdot)$ test for the validity of the instruments.
4. The *t*-ratios correspond to White's heteroscedasticity-consistent *t*-ratios.
5. (*) denotes instrumented variables. The instruments used were Fair's instruments, the tax wedge and lagged labour force—in total, 10 instruments.

The estimated long-run wage elasticity is found to be -0.94, which is similar to the elasticity of -1.2 obtained by Dolado and Malo de Molina (1984) with quarterly data. Real input prices have an overall negative influence on employment in both equations, which suggests that in the long run the output effect of relative price changes dominates over the substitution effect. The net effect, however—an elasticity of -0.28—is much smaller than that exerted by wages.

To investigate possible direct demand effects, we first tried several variables on their own, and then, for efficiency, we ran the chosen linear combination as one single variable which we call D . Proceeding like this, in addition to overcoming some multicollinearity problems, also allows us to have a synthetic definition of demand effects for later use in the other equations.¹⁹ Deviations from world trade and several measures of the public sector deficit did not exert any effect on employment.²⁰ In the end, the two variables selected were the real exchange rate and the after-tax real interest rate.

The elasticity of technical progress is imposed to be the absolute value of the wage elasticity minus one, and this, which is consistent with the hypothesis

of labour-augmenting technical progress, is easily accepted by the data. The unit long-run elasticity of the stock of capital—that is, the assumption of constant returns to scale—is also imposed and is also roughly accepted by the data.²¹

Among other factors that could affect employment, we tried the firing cost variable defined above. Since its effect was very insignificant, Table 1 omits this variable from the equation.

Wage equation

Table 2 shows the results of estimating equation (2). As mentioned above, we tried a measure of price surprises in the form of a second-difference of consumption prices, but this was never significant and is therefore not included in the equation. Since on the LHS of the equation we consider the price of industrial output, and since the real wage over which workers bargain ought to be defined in terms of overall consumption, we also tried a variable measuring the price of consumption relative to the price of industrial output (see n. 16 at end of paper), but again, this was not significant and is excluded from the equation.²² A final variable that was not significant, and is omitted from the equation, is the relative price of inputs. Thus, given the effect of this variable in the employment equation, the neutrality restriction relating to this variable (see n. 12) is not accepted by the data.

The rate of unemployment exerts an important and very significant restraining influence on real wages.

Taxes play an important role in wage determination. Owing to multicollinearity, we could not discriminate between the individual effect of different

TABLE 2
REAL WAGE EQUATION
Dependent variable ($w + t_1 - p$)

Independent variables	Coefficients	<i>t</i> -ratios
U_{-1}	-3.018	4.2
$(mm + mm_{-1})^*$	0.021	1.8
$(t_1 + t_2 + t_3)^*$	1	$\{x_L^2(1) = 1.8\}$
rr^*	0.445	3.7
c^*	0.445	3.7
UP	0.065	3.4
a^*	0.024	2.4
t	0.069	5.2
$(k - l)^*$	1.070	$\{x_L^2(1) = 2.8\}$
RHO		—
s		0.019
DW		2.28
R^2		0.99
$\chi^2_{iv}(\cdot)$		6.23 (5)

Notes:

1, 3 and 4 As for Table 1.

2. (*) denotes instrumented variables. The instruments used were the exogenous plus lagged endogenous variables, lagged demand, lagged real government expenditure, and lagged real world trade—in total, 12 instruments.

types of taxes, but we found that the sum of direct and indirect taxes (the tax wedge between the product and the consumption wage) had a positive and significant effect on real wages. The results suggest that taxes are fully borne by firms, as the restriction that the coefficient on the tax wedge should be unity is easily accepted by the data.

Among the supply variables tried, we found that the mismatch index, the replacement ratio, firing costs and the index of union pressure all exerted a positive effect on real wages.²³

The coefficient on the capital-labour ratio is imposed to be the inverse of the absolute value of the wage elasticity in the labour demand equation, and this neutrality restriction is accepted by the data. The data, however, reject the neutrality condition for technical progress, although this takes the expected positive sign in the wage equation. Thus, long-run unemployment is estimated to be dependent on technical progress. This result, for Spain and for the period considered, should not be taken as totally unexpected. The index of technical progress has changed quite dramatically during these years, and it would have been quite remarkable that a period of such rapid change could have captured the long-run neutrality property that we believe technical progress should have. Finally, we included a time trend which was also significant and positive, thus suggesting that productivity changes may have not been fully captured by the included variables.

Price equation

Table 3 shows the results of estimating equation (4). Econometrically speaking, the price equation is the one that performs best out of the three considered. All variables take the expected sign, all are well determined, and the dynamic

TABLE 3
PRICE EQUATION
Dependent variable ($p - w - t_1$)

Independent variables	Coefficients	<i>t</i> -ratios
$(p_{-1} - w - t_1)$	0.406	5.4
$(p_{-2} - w - t_1)$	0.334	10.0
$\Delta^2(w + t_1)$	-0.145	2.9
D_{-1}	0.331	2.7
$(p_m - p)^*$	0.096	7.9
a^*	-0.033	2.2
$(k - l)$	-0.278	$\{x_L^2(1) = 3.1\}$
RHO		—
<i>s</i>		0.0064
DW		2.31
R^2		0.99
$x_{iv}^2(\cdot)$		4.78 (5)

Notes:

1, 2, 3 and 4. As for Table 1.

2. (*) denotes instrumented variables. The instruments used were a constant, lags of prices, nominal labour cost, price of other inputs, lags of capital-labour ratio, real exchange rate, real interest rate, technical progress, government expenditure and mismatch—in total, 12 instruments.

structure of the equation is very robust to specification changes. Perhaps the most interesting result is that relative input prices exert a substantial effect on the price mark-up, despite the fact that we have not been able to detect any input price influence in the wage determination process. Another interesting finding is the slowness with which increases in wages are passed into prices. The short-run wage elasticities are around 0.12 with median lags of around one year. The specific form of the lagged dependent variables results from the imposition of a unitary long-run elasticity with respect to wages in an original specification where the dependent variable was p . The unit elasticity was easily accepted in the long run, but it was rejected in the short run.

IV. EXPLAINING SPANISH INDUSTRIAL UNEMPLOYMENT

Actual unemployment

We first want to see to what extent these estimates explain the actual evolution of unemployment. That is, we want to evaluate how each of the variables considered, together with the level of cyclical demand, has contributed to the unemployment growth experienced during the last 20 years. Expression (3) above, expressed in terms of unemployment, answers precisely this question, and this (following Layard and Nickell, 1984a) is the accounting framework that we use in this section.

The nature of the model estimated in this paper does not allow us much precision about the dynamic structure of causes and effects. So we limit ourselves to explaining changes between averages of fairly large periods. We choose these periods according to the different regimes that can be identified in the explanatory variables. Probably, as far as recent economic history is concerned, the most representative of these is the relative price of imported inputs, which, as a result of the oil price crises, has gone through very clearly identifiable stages. As discussed in Section I (see Figure 5), there are three well differentiated periods as far as this variable is concerned: a first period of price stability (1964–73); a second period which is dominated by the initial increase in the price of oil (1974–79); and a third period, which begins with the second big increase in the price of oil and is continuing (1980–84). Given the small sample size available, we have preferred a slightly different distribution in order to make more equal the number of years in each subperiod and still keep the oil price shocks in two different subperiods. So the first subperiod runs from 1965 to 1971, while the second and third subperiods cover the years 1972–78 and 1979–83, respectively. Then we assume that changes between the averages of these periods explain changes between the unemployment averages of the corresponding periods with a one-year lead; that is, 1966–72, 1973–79 and 1980–84.²⁴

Substituting the estimates obtained into equation (3), we arrive at the following expression:

$$u = 0.244(t_1 + t_2 + t_3) + 0.079rr + 0.079c + 0.017UP + 0.010mm \\ + 0.073(p_m - p) + 0.023a - 0.184D + 0.017 \text{ time} + \text{constant}.$$

In Table 4 we show the actual changes that the explanatory variables have experienced between the three selected periods. It is interesting to note the

TABLE 4
ACTUAL CHANGES OF EXPLANATORY VARIABLES
(logarithmic differences)

Explanatory variables	1972-78	1979-83
	1965-71	1972-78
$(t_1 + t_2 + t_3)$	0.047	0.105
<i>rr</i>	0.055	0.070
<i>c</i>	0	-0.180
<i>UP</i>	0.710	-0.710
<i>mm</i>	-0.150	-0.040
$(p_m - p)$	0.280	0.315
<i>a</i>	0.526	0.170
<i>D</i>	0.231	-0.205

Note: $(p_m - p)$ has been corrected for real exchange rate changes.

very large increase in taxes. The tax wedge rose almost 5 percentage points between the first two periods and more than 10 points between the second and third, and most of this rise was due to employer contributions to social security and to labour income taxes. Changes in demand are also quite different depending on the period considered. During the first oil price crisis there was an expansion of demand, but during the second shock demand was a clear contractionary factor. The two changes in relative input prices show that the impact of the first oil price rise was smaller than that of the second. Finally, the data clearly suggest that technical improvements have taken place during the 20 years considered, but that the rate of modernization was higher between the first two periods than between the second and third.

Table 5 presents the contribution of each of the variables to unemployment growth. Looking first at the growth experienced between the first and second

TABLE 5
CONTRIBUTION OF EXPLANATORY VARIABLES TO THE
GROWTH OF UNEMPLOYMENT
(percentage points)

Explanatory variables	1966-72	1973-79
	1973-79 (1)	1980-84 (2)
$(t_1 + t_2 + t_3)$	1.15	2.56
<i>rr</i>	0.44	0.55
<i>c</i>	0	-1.42
<i>UP</i>	1.21	-1.21
<i>mm</i>	-0.15	-0.04
$(p_m - p)$	2.04	2.30
<i>a</i>	1.21	0.39
<i>D</i>	-4.25	3.77
Time	1.19	1.02
Explained change	2.84	7.92
Actual change	2.52	8.00

periods (column (1)), we see that, for an observed increase of 2.52 percentage points, the model explains an increase of 2.84 points. The main contributors to unemployment during this first comparison were, in this order, the real price of materials, technical progress, union pressure, and the tax wedge. Time also contributed with 1.2 points, and may be capturing unmeasured productivity effects. These factors alone would have meant an increase in unemployment of almost 7 percentage points. However, between the two periods considered aggregate demand acted as a clear expansionary factor and this cut unemployment by more than 4 percentage points, leaving the net increase at about 3 percentage points.²⁵

In column (2) of Table 5 we repeat the exercise for the period between the two oil price shocks. Here, out of an increase of unemployment of 8 percentage points, the model explains 7.9 points. With the exception of union pressure, all the factors that contributed positively to unemployment growth in the first comparison continue to exert an influence in the same direction in this second comparison. Among these, the tax wedge is now the most important contributor, followed by the relative price of materials, time, the replacement ratio, and technical change. The main differences with respect to the first comparison are the effect of demand, which now acts as a contractionary factor and adds 3.8 points to unemployment, and the effect of firing costs, which during this period have decreased and help to lower unemployment by 1.4 points. Overall, we find that the much higher growth of unemployment during this period is explained, on the one hand, by the negative effect that material prices and taxes have had on employment and, on the other, by the contractionary influence of demand.

So far we have looked at the factors that explain actual unemployment. But an even more interesting question is how actual unemployment compares with equilibrium unemployment, as this can give us an idea of the policy options and their consequences for inflation.

Equilibrium unemployment

The contributions shown in Table 5 have been calculated conditional on cyclical demand. This level of demand will in general be different from that associated with non-accelerating inflation. What we want to do now is to substitute out demand for the factors that explain their equilibrium level, and to see how the non-accelerating inflation unemployment rate (NAIRU) has evolved during the period. That is, we want to evaluate, on the basis of the estimates shown in Tables 1-3, the equilibrium unemployment level that comes out of the solution of equations (3) and (5). Our estimates imply:

$$(6) \quad u = 0.273t + 0.088rr + 0.088c + 0.019UP + 0.011mm + 0.088(p_m - p) \\ + 0.005a + 0.019 \text{ time} + \text{constant}.$$

Expression (6) can now be used to calculate equilibrium unemployment. To get a sensible baseline it is assumed that equilibrium unemployment can be identified with the average unemployment rate of the period 1965-72, when inflation was roughly constant. Then for subsequent periods the corresponding level can be found using (6).

Table 6 shows the results of this exercise, which we identify as NAIRU (I). It also presents alternative estimates which are obtained by adding to

TABLE 6
NAIRU ESTIMATES
(percentages)

Unemployment rate	1966-72	1973-79	1980-84
Actual rate	0.90	3.42	11.42
NAIRU (I)	0.90	6.99	11.27
NAIRU (II)	0.90	7.31	11.35

Note: NAIRU (I) uses expression (6) to determine the increment over the baseline. NAIRU (II) adds to NAIRU (I) the discrepancy between the explained and the actual change in the unemployment rate in Table 5.

NAIRU (I) the part of the growth of actual unemployment that the model cannot explain. That is, we assume that the unexplained gap in Table 6 is all due to omitted factors which would affect the equilibrium rate. We call this new estimate NAIRU (II).

During the period 1973-79, the actual rate was well below the NAIRU. This means that, with the proviso explained in n. 25, the success of the expansionary demand policy that took place during this period in keeping the unemployment rate low (see column (1) of Table 5) must have been achieved at the expense of accelerating prices. This is in fact corroborated by the data, which show that over this period inflation was both high and increasing. The last period, on the other hand, is characterized by a much higher NAIRU, and by an actual rate that is more or less around the level of the NAIRU. For this situation, the model predicts that prices should not have accelerated, and this is roughly what we find. In fact, inflation has tended to decrease, although the decreasing trend is to a very large extent determined by the substantial reductions in inflation achieved in the last two years.²⁶

Given that, at the moment, the actual unemployment rate appears to be about the same level as the NAIRU, our results suggest that achieving a reduction in unemployment through an expansion of demand will be difficult without endangering the present performance on inflation. A safer course of action would involve policies directed at reducing the present level of the NAIRU.

Our findings indicate that more effective incomes policies could go some way towards this objective. A lower level of taxation could also reduce the NAIRU, but this would have to be implemented together with a reduction in public expenditure; otherwise the public deficit would increase, and we have not been able to show that this would have any positive effect on employment.²⁷ Other types of measures that could reduce unemployment are those directed at increasing the flexibility of the labour market. The reduction in firing costs seems already to have exerted some beneficial effects in the last few years, and the fall in the extent of mismatch between supply and demand could also have helped to reduce unemployment. Finally, if the present tendency towards lower relative input prices is maintained, this should contribute significantly to lowering the equilibrium unemployment level, and thus should allow more scope for growth without inflation.

V. CONCLUSIONS

This paper has reviewed the evidence of the last 20 years about the main variables that influence the Spanish labour market, and has attempted an explanation of the substantial increase in unemployment that has occurred during the period.

Our findings suggest that, as compared with the period 1966–72, the main factors behind the rise of unemployment during the first oil crisis (roughly, during the period 1973–79) were the real price of materials, technical progress, union pressure, and taxes. But against this we must count the effect of demand, whose expansion meant a reduction of unemployment. The second oil crisis (roughly, the period 1980–84) has meant a further and much larger increase in unemployment. Tax and real materials price increases again played an important role, but this time the problem has been aggravated by the contractionary pressure of cyclical demand.

We have also been able to identify the unemployment rate consistent with non-accelerating prices. During the first oil crisis actual unemployment is found to be well below the NAIRU, while during the second oil crisis actual and equilibrium unemployment are about the same. This casts some doubt about the effectiveness of expansionary demand policies. Given the present situation, reductions in unemployment through demand expansion should be difficult to achieve without rising inflation.

The model suggests that the policies most suited to reducing unemployment without increasing inflation are those directed at lowering the present level of the NAIRU. This can be achieved by more effective incomes policies, lower taxation, and a greater degree of labour market flexibility. Our estimates indicate that the maintenance of the decreasing trend in the real price of materials could also be an important factor in a future reduction of the NAIRU.

It is important to recall that these results have been obtained with data that are not as abundant and reliable as we would have liked. Although they conform with what we would expect from economic theory, and although they are quite consistent with findings obtained by researchers in other countries, until better data become available we believe they should be viewed with more reserve than that normally accorded to this type of research.

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NOTES

1. The Data Appendix gives a detailed definition of each variable and the sources used.
2. An attempt to investigate the overall unemployment rate would also have to deal with the substantial migration flows that have existed during these 20 years. During the 1960s there was a large net outflow of workers to the rest of Europe, which by the late 1970s had turned into a net inflow. This clearly has a bearing on the definition of the labour force, but again, the poor quality of the data is bound to make any adjustment on this account extremely tentative.
3. On the other hand, it is evident that the concept of unemployment in a given sector is much more loose than that for the whole economy. In particular, as we have pointed out above, school-leavers (whatever the length of time that they have been unemployed) are excluded from the industrial unemployment rate.
4. Obviously this is a rough approximation, since it neglects the foreign component of consumption goods.

5. The relevant concept here is that of 'normal productivity'. By using observed productivity we do not correct for increases arising from adjustments in employment and for the accelerated obsolescence and scrapping of capital and installed capacity (see Rojo, 1981, and Viñals, 1984, for a detailed discussion of these biases).

6. A much more detailed analysis of these and other labour-market-related data can be found in Malo de Molina (1983).

7. The introduction of cyclical demand factors, when output prices are already present in the equation, is justified on the basis of firm behaviour in an imperfect competitive market.

8. As far as relative input prices are concerned, it is assumed that the output effect dominates the substitution effect, and thus that an increase in relative input prices leads to a long-run fall in employment.

9. See Symons (1984) and Layard and Symons (1984) for a successful empirical estimation for Britain of a labour demand relationship specified only on relative prices. Dolado and Malo de Molina (1984) also obtain satisfactory results with this type of specification using quarterly Spanish data for the manufacturing sector.

10. We are assuming that the direct effect of demand on employment outweighs the indirect effect via wages.

11. This rough approximation is based upon the fact that both prices and wages, in their univariate time series representations, do not diverge from random walks in rates of growth, and therefore $p^e - p = -\Delta^2 p$.

12. Labour force, stock of capital and input price neutrality in (3) require that $\mu = 1/\alpha$, $\lambda - \alpha\mu = 0$, and $\beta - \alpha = 0$, respectively. Input price, stock of capital and labour force neutrality in (5) imply $\alpha\phi - \beta = 0$; $\lambda - \alpha\tau = 0$ and $\alpha\tau = 1$. These restrictions will all be tested with the data in the empirical work below.

13. Apart from these, there are no other significant employer taxes on labour.

14. The first variable reflects the fact that we are dealing with an open economy where demand fluctuations are a function of the degree of competitiveness and therefore should be included in D . The second variable is a candidate to pick up monetary and fiscal stance. (In fact, when deviations of real money balances from trend and adjusted measures of the budget deficit were introduced, together with the real interest rate, a high degree of collinearity was present among the three variables.) Since, in an era of floating exchange rates, both competitiveness and real interest rates tend to be correlated, they have been estimated in a synthetic way.

15. The procedure to measure the capital stock takes into account a variable depreciation rate to capture the economic obsolescence experienced by installed capacity. Ignoring this could lead to overestimation of the capital stock and also, given that this is taken as exogenous, to biased results (see Artus, 1984).

16. If P is the price of industrial output, P^{ec} is the expected price of consumption and P^c the actual price of consumption, then $W/P^{ec} = (W/P)(P/P^c)(P^c/P^{ec})$. Passing the last two parentheses to the RHS of the equation gives the specification discussed in the text.

17. We also tried to approximate vacancies by the inverse of the unemployment rate, given that vacancy and unemployment rates appear empirically to be related in a hyperbolic fashion; but the results always failed to support the combined specification.

18. Usual Chow tests are not valid when using an IV estimation method (see Pagan and Hall, 1984). In order to use an appropriate Wald test, we need to estimate the equation over the full period, including dummy variables and instruments consisting of vectors of zeros for the first period and actual data for the second. Since the maximum number of instruments was 12 in all the estimated equations, it was impossible to compute the tests given the available sample. None the less, estimating the equations until 1980 and using Chow tests, there was no sign of serious instability in any of the equations.

19. In theory, the variable proxying cyclical demand deviations should be the same in all three equations.

20. The contemporaneous effect of both variables was always negative and non-significant, while the lagged values gave the correct signs but very low t -ratios, implying in addition a synthetic variable which was also non-significant.

21. From Gallant and Jorgenson (1979), we use the following test statistic in order to test linear restrictions in the IV framework:

$$x_L^2(q) = \frac{T-k}{\sigma_u^2} (\sigma_u^2 R_u^2 - \sigma_R^2 R_R^2)$$

where σ_u^2 and R_u^2 denote the variance estimate and coefficient of determination from the unrestricted equation; and σ_R^2 and R_R^2 denote similar statistics for the restricted equation.

22. This inability to capture the unanticipated inflation term is in fact a serious problem, as pointed out in Nickell and Andrews (1983), since this term might proxy demand shocks. If we have not represented these adequately, they will be relegated to the error term, invalidating most of the current dated instruments related to aggregate demand. In order to deal with this problem we have used only lagged instruments in the equation, except for the capital stock.

23. For efficiency, the coefficients on the replacement ratio and firing costs, which are very similar, were restricted to be the same. The data accept this restriction.

24. This procedure, which is also used in Layard and Nickell (1984a), is an approximate way of representing the estimated dynamic structure of the model, which, as can be seen in Tables 1-3, and depending on the variable considered, varies between zero and two lags.

25. We must note that, for the estimates obtained here, it is not quite correct to attribute changes in unemployment arising from changes in the variable D to pure demand factors. Neither the real exchange rate nor the real interest rate are exogenous factors, and one of the variables that to some extent could be taken as being under the control of the government—the public deficit—proved not to exert any significant effect.

26. In 1980 inflation was 15.5 per cent and in 1982 it was 14.4 per cent. In 1983 it went down by 2.2 points to 12.2 per cent, and in 1984 by 3.2 points to 9.0 per cent.

27. Similar results are reached by Mauleón and Pérez (1984), who tackle the consequences of recent high budget deficits in terms of its 'crowding-out' effects.

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Data Appendices

AUSTRIA

	U	$\log L$	$\log N$	$\log Y$	V	CU	$\log \frac{W(1+t_1)}{P}$
1964	0.271	7.795	7.768	6.085	0.168	85	-0.945
1965	0.268	7.803	7.775	6.114	0.176	86	-0.893
1966	0.251	7.803	7.778	6.164	0.192	86	-0.835
1967	0.266	7.793	7.766	6.192	0.137	83	-0.768
1968	0.294	7.787	7.758	6.233	0.118	85	-0.739
1969	0.277	7.793	7.765	6.286	0.144	88	-0.693
1970	0.239	7.802	7.779	6.348	0.190	89	-0.643
1971	0.207	7.827	7.806	6.398	0.228	88	-0.568
1972	0.192	7.848	7.829	6.458	0.247	88	-0.524
1973	0.156	7.882	7.866	6.506	0.253	86	-0.481
1974	0.153	7.900	7.885	6.545	0.217	86	-0.440
1975	0.204	7.905	7.885	6.541	0.117	81	-0.351
1976	0.201	7.916	7.896	6.586	0.109	81	-0.307
1977	0.183	7.933	7.915	6.628	0.117	81	-0.272
1978	0.208	7.943	7.922	6.634	0.107	81	-0.237
1979	0.200	7.984	7.928	6.680	0.113	83	-0.218
1980	0.187	7.952	7.933	6.709	0.131	83	-0.184
1981	0.242	7.961	7.937	6.708	0.091	83	-0.161
1982	0.367	7.963	7.925	6.718	0.062	80	-0.176
1983	0.445	7.959	7.914	6.739	0.056	79	-0.157
1984	0.454	7.964	7.917	6.760	0.063	81	-0.157

	$\log (K/L)$	$\Delta \log W$	$\Delta \log P$	UP	t_1	t_2	t_3
1964	-0.170			65.13	0.154	0.159	0.137
1965	-0.150	0.103	0.054	64.78	0.158	0.172	0.137
1966	-0.120	0.094	0.036	64.65	0.157	0.181	0.141
1967	-0.081	0.099	0.034	64.10	0.160	0.181	0.139
1968	-0.047	0.057	0.031	64.72	0.163	0.177	0.146
1969	-0.023	0.078	0.035	64.35	0.167	0.193	0.145
1970	-0.000	0.102	0.053	63.63	0.168	0.204	0.147
1971	0.014	0.136	0.060	62.18	0.167	0.204	0.149
1972	0.035	0.118	0.073	61.37	0.165	0.208	0.156
1973	0.042	0.124	0.077	59.79	0.161	0.203	0.162
1974	0.064	0.130	0.091	59.48	0.164	0.212	0.152
1975	0.093	0.144	0.063	59.76	0.173	0.199	0.141
1976	0.117	0.097	0.055	59.74	0.175	0.210	0.136
1977	0.136	0.083	0.051	59.15	0.178	0.224	0.141
1978	0.157	0.072	0.051	59.06	0.195	0.257	0.134
1979	0.184	0.057	0.041	59.18	0.198	0.260	0.135
1980	0.212	0.080	0.050	59.56	0.203	0.269	0.133
1981	0.232	0.081	0.061	58.51	0.207	0.278	0.135
1982	0.255	0.046	0.065	59.47	0.213	0.275	0.132
1983	0.280	0.051	0.037	59.49	0.219	0.282	0.133
1984	0.297	0.042	0.046		0.219	0.285	0.143

	<i>H</i>	<i>TH</i>	$\log A$	$\log N^*$	$\Delta \log PC$	$\Delta \log HPR$	<i>LU</i>
1964	2229.2					-0.182	
1965	2192.5				0.0455	-0.144	
1966	2195.2	2185.2	4.707	7.749	0.0229	-0.097	
1967	2172.9	2185.2	4.800	7.738	0.0392	-0.047	
1968	2188.6	2185.2	4.890	7.750	0.0248	-0.006	
1969	2184.7	2185.2	4.985	7.770	0.0353	0.042	
1970	2127.3	2123.5	5.098	7.827	0.0447	0.117	
1971	2090.8	2101.7	5.218	7.846	0.0485	0.157	0.228
1972	2064.7	2070.8	5.343	7.889	0.0626	0.207	0.219
1973	2064.7	2059.7	5.460	7.910	0.0639	0.217	0.207
1974	2070.0	2059.7	5.594	7.917	0.0952	0.235	0.264
1975	1997.0	1997.4	5.708	7.899	0.0763	0.267	0.199
1976	1970.9	1975.4	5.825	7.922	0.0629	0.314	0.234
1977	1965.7	1944.9	5.919	7.951	0.0526	0.341	0.210
1978	1960.5	1944.5	6.004	7.926	0.0418	0.341	0.190
1979	1960.5	1944.2	6.085	7.947	0.0427	0.381	0.194
1980	1939.6	1943.8	6.168	7.948	0.0625	0.416	0.194
1981	1918.8	1943.4	6.246	7.920	0.0719	0.422	0.161
1982	1934.4	1943.0	6.327	7.914	0.0621	0.436	0.196
1983	1929.2	1942.6	6.404	7.910	0.0310	0.471	0.258
1984	1942.7	1942.2	6.484	7.911	0.0547	0.481	0.283

List of variables

<i>U</i>	Rate of unemployment
<i>L</i>	Labour supply (employees plus unemployed)
<i>N</i>	Total number of employees, annual average
<i>Y</i>	Gross domestic product
<i>V</i>	Vacancy rate
<i>CU</i>	Capacity utilization
<i>W</i>	Gross hourly wages per employee, excluding employers' contribution to social security
<i>P</i>	Deflator of gross domestic product
<i>K</i>	Aggregate capital stock, at 1976 prices
<i>t</i> ₁	Employers' contribution to social security as a proportion of wages and salaries
<i>t</i> ₂	Workers' tax rate, including social security contributions
<i>t</i> ₃	Indirect tax rate
<i>UP</i>	Union power; trade union membership (percentage of employees)
<i>H</i>	Hours of work per employee
<i>TH</i>	Trend value of hours of work per employee
<i>A</i>	Index of labour-augmented technical progress; three-year backward moving average
<i>N</i> [*]	Desired employment emerging from the labour demand equation; see Table 2 in the text
<i>PC</i>	Deflator of private consumption
<i>HPR</i>	GDP per man-hour
<i>LU</i>	Percentage of unemployed who have been unemployed for over six months
<i>t</i>	Time trend

BELGIUM

The data are annual time series converging the period 1953–82. If not otherwise indicated, the series come from the MARIBEL Data Bank constructed by the Belgian Planning Office.

	<i>UR</i>	<i>log LS</i>	<i>log LT</i>	<i>log YT</i>	<i>log VS</i>	<i>DUC</i>	<i>log WH/P</i>	<i>log KA/LS</i>
1953	8·04060	1·31098	1·22715	6·78008	2·56125		4·36363	5·60837
1954	6·99617	1·30435	1·23182	6·82023	2·51276		4·38540	5·66632
1955	5·79042	1·29973	1·24008	6·86706	3·35829		4·43269	5·72610
1956	4·71522	1·29956	1·25126	6·89398	3·32370		4·46291	5·78568
1957	3·85778	1·30210	1·26276	6·91361	3·23884		4·52570	5·82712
1958	5·84812	1·29984	1·23958	6·91084	2·25612		4·55796	5·86272
1959	6·50527	1·28537	1·21810	6·94041	1·72669		4·59057	5·92022
1960	5·00181	1·28307	1·23176	6·99251	2·64546		4·61371	5·97287
1961	3·97636	1·28429	1·24371	7·04035	3·25721		4·66137	6·03006
1962	3·42480	1·29429	1·25944	7·09251	3·30487		4·70351	6·08645
1963	3·36710	1·29229	1·25803	7·13480	3·53736	81·30	4·75054	6·14929
1964	2·46191	1·29662	1·27169	7·20189	3·25902	83·80	4·82551	6·20369
1965	3·07636	1·29937	1·26813	7·23761	2·80808	81·87	4·87545	6·25563
1966	3·05839	1·30185	1·27079	7·26584	2·71158	82·27	4·93879	6·31739
1967	3·94967	1·30513	1·26483	7·30463	2·09013	78·27	4·99512	6·37611
1968	4·26814	1·30825	1·26463	7·34461	2·16585	78·97	5·02785	6·42746
1969	3·55346	1·31871	1·28253	7·40360	3·18672	86·00	5·06523	6·47278
1970	3·03891	1·32917	1·29831	7·46280	3·39746	86·27	5·14221	6·52201
1971	3·28906	1·33960	1·30615	7·50327	2·70511	83·67	5·21535	6·57245
1972	3·73853	1·34422	1·30612	7·55627	2·20915	82·70	5·30638	6·62423
1973	3·82085	1·35810	1·31914	7·61660	2·74148	84·70	5·37112	6·66210
1974	4·31306	1·37539	1·33130	7·66037	2·90570	83·27	5·45611	6·69598
1975	7·50164	1·38354	1·30556	7·63992	1·43818	72·23	5·57045	6·73135
1976	8·47584	1·39265	1·30408	7·69484	1·49178	75·13	5·62191	6·75911
1977	9·82973	1·40116	1·29769	7·70202	1·39252	73·07	5·66303	6·78322
1978	10·55616	1·40801	1·29645	7·73428	1·49335	73·25	5·69051	6·80729
1979	10·96395	1·42377	1·30765	7·75687	1·82729	77·25	5·72257	6·82320
1980	11·94510	1·43019	1·30298	7·79194	1·98389	76·20	5·77785	6·85310
1981	14·32945	1·43267	1·27801	7·78273	1·56381	75·10	5·83137	6·87889
1982	15·94589	1·44234	1·26863	7·79465	1·49918	76·05	5·83477	6·89605

	$\log IPC$	$\Delta \log WH$	$\Delta \log P$	$\log U_p$	$T1$	$T2$	$T3$	DUR
1953	3·94606			5·40668	0·09860	0·12906	0·05434	
1954	3·95045	0·02762	0·00584	5·47890	0·09890	0·12139	0·05253	
1955	3·96249	0·05440	0·00711	6·26137	0·10246	0·12634	0·05770	
1956	3·94288	0·06546	0·03524	6·19443	0·10379	0·12630	0·05045	
1957	3·87936	0·10064	0·03785	7·55669	0·11036	0·13311	0·05997	64·72
1958	3·88461	0·04245	0·01019	5·01086	0·10926	0·12981	0·06000	71·87
1959	3·89791	0·03158	−0·00104	6·24104	0·10662	0·13530	0·05987	49·66
1960	3·89446	0·02860	0·00547	5·14927	0·11125	0·13023	0·06014	64·00
1961	3·87739	0·05272	0·00505	3·83667	0·11787	0·13714	0·06637	50·75
1962	3·88236	0·05764	0·01550	4·89055	0·11693	0·14533	0·06872	55·78
1963	3·86846	0·07605	0·02903	4·78001	0·12531	0·14708	0·06942	56·53
1964	3·84654	0·12137	0·04639	5·33325	0·13093	0·14530	0·07166	47·84
1965	3·83171	0·10185	0·05191	3·47380	0·13730	0·15258	0·07217	31·82
1966	3·80441	0·09599	0·03265	5·50679	0·13990	0·16292	0·08354	35·77
1967	3·77500	0·08404	0·02771	4·43232	0·14052	0·16957	0·08657	32·61
1968	3·78841	0·06389	0·03116	5·12867	0·14150	0·18246	0·08757	46·83
1969	3·78730	0·08444	0·04706	4·30735	0·14373	0·18857	0·08839	33·24
1970	3·76747	0·12556	0·04858	6·48446	0·15303	0·20224	0·08839	35·36
1971	3·70559	0·12535	0·05221	6·32472	0·15739	0·20813	0·08919	37·35
1972	3·74191	0·15965	0·06862	5·09122	0·16089	0·21564	0·82280	32·66
1973	3·90759	0·13628	0·07154	5·99667	0·16217	0·22657	0·08101	44·55
1974	3·78498	0·19921	0·11422	5·54531	0·15985	0·24542	0·08365	47·05
1975	3·73895	0·23821	0·12388	5·60908	0·16717	0·27733	0·07641	42·75
1976	3·68667	0·12062	0·06916	6·02095	0·16223	0·27166	0·08427	59·64
1977	3·61526	0·11054	0·06941	5·72256	0·16613	0·29424	0·08491	65·50
1978	3·66646	0·06749	0·04002	6·15752	0·16062	0·31142	0·08834	69·00
1979	3·72246	0·07736	0·04530	5·68407	0·16131	0·32009	0·08809	71·78
1980	3·83745	0·08906	0·03378	4·66070	0·16056	0·31562	0·08638	70·59
1981	3·89966	0·10279	0·04928	5·47812	0·15386	0·32078	0·09173	69·99
1982	3·87803	0·06842	0·06502	5·41946	0·14510	0·34911	0·08979	73·56

	<i>DUL</i>	<i>log W/V</i>	<i>log C/T</i>	<i>log D/I</i>	<i>log PC</i>	<i>log MT</i>	<i>log FD</i>	<i>log PM</i>	<i>log PF</i>
1953	81-77054	5-39932	6-47368	6-55837	-0-80926	5-19929	6-87080	-0-53028	-0-92383
1954	83-12750	5-44419	6-50373	6-59064	-0-79316	5-32015	6-93379	-0-56741	-0-91375
1955	83-82182	5-44866	6-54812	6-64143	-0-79419	5-42028	6-98797	-0-56085	-0-91604
1956	84-62270	5-45016	6-56982	6-66063	-0-76345	5-55159	7-04319	-0-53776	-0-88347
1957	88-98209	5-45469	6-58820	6-66612	-0-71904	5-56825	7-05832	-0-50583	-0-83803
1958	79-40160	5-47761	6-60113	6-70354	-0-72335	5-52467	7-04231	-0-57593	-0-83787
1959	78-04346	5-54274	6-63005	6-72119	-0-70711	5-63247	7-10001	-0-59343	-0-83537
1960	85-98001	5-57570	6-66922	6-76964	-0-70053	5-75193	7-16315	-0-58902	-0-83159
1961	88-37239	5-60236	6-69825	6-80613	-0-68629	5-81179	7-22651	-0-56139	-0-82815
1962	89-08740	5-61169	6-73812	6-85319	-0-66904	5-84531	7-27252	-0-54435	-0-80610
1963	85-73256	5-65361	6-77930	6-89807	-0-64310	5-89155	7-31392	-0-48733	-0-77629
1964	92-50603	5-71585	6-80593	6-95932	-0-60293	6-00754	7-39610	-0-45659	-0-73977
1965	89-64320	5-76757	6-84548	7-00444	-0-55224	6-07847	7-43439	-0-44501	-0-69151
1966	89-97382	5-79392	6-86957	7-03078	-0-51341	6-15600	7-47188	-0-41208	-0-67028
1967	87-05145	5-81764	6-90687	7-06257	-0-48963	6-18439	7-50874	-0-40564	-0-64707
1968	88-70403	5-86771	6-95312	7-11659	-0-46466	6-28988	7-56720	-0-39107	-0-62562
1969	90-22395	5-90283	7-00010	7-17447	-0-43326	6-42679	7-64863	-0-35368	-0-59392
1970	91-39880	5-88869	7-04022	7-23702	-0-39774	6-49248	7-70812	-0-30712	-0-54180
1971	82-25768	5-91463	7-08649	7-27712	-0-34609	6-54170	7-75012	-0-27996	-0-48398
1972	90-09161	6-00357	7-14426	7-33391	-0-28896	6-61753	7-81193	-0-26371	-0-42321
1973	90-83342	6-05523	7-21017	7-38783	-0-22096	6-81326	7-90664	-0-20485	-0-35416
1974	88-91956	6-04881	7-24672	7-43083	-0-10967	6-91095	7-96821	-0-05142	-0-22858
1975	77-62975	6-09006	7-25884	7-45922	0-00000	6-81175	7-90744	0-00000	-0-11299
1976	84-12320	6-15580	7-30794	7-50107	0-08169	6-93038	7-98931	0-06220	-0-04096
1977	80-88490	6-17209	7-32173	7-50919	0-14859	7-08748	8-02210	0-09493	0-02439
1978	81-01419	6-19921	7-34955	7-52412	0-19324	7-12752	8-06011	0-11566	0-06671
1979	81-22845	6-20267	7-38441	7-55748	0-23284	7-21560	8-10429	0-18790	0-10796
1980	78-16812	6-23019	7-41481	7-58774	0-28747	7-24457	8-12726	0-26634	0-16530
1981	73-92728	6-26038	7-41317	7-59999	0-35671	7-23889	8-11044	0-35845	0-22429
1982	76-79924	6-27630	7-42648	7-57334	0-43483	7-25624	8-12723	0-47091	0-29842

	log W	log WN	log P	log PI	log LP	log YP	log YD	log MD	RED
1953	4-25826	4-06025	-0-86617	-0-86921					
1954	4-28915	4-09978	-0-86033	-0-88010					
1955	4-34494	4-14723	-0-85322	-0-84587	1-26328	6-88719	6-86190	5-44194	1-01080
1956	4-39351	4-19395	-0-81798	-0-78901	1-27508	6-92257	6-90501	5-50821	1-01656
1957	4-45951	4-24698	-0-78013	-0-73736	1-28758	6-95895	6-92412	5-52687	1-00760
1958	4-49359	4-28461	-0-76994	-0-72296	1-28841	6-98662	6-90660	5-54145	1-00022
1959	4-52171	4-30853	-0-77097	-0-74334	1-27508	7-00857	6-94010	5-63360	1-00087
1960	4-56360	4-35303	-0-76551	-0-72770	1-26948	7-03959	7-00466	5-70873	1-01397
1961	4-60303	4-38084	-0-76045	-0-71852	1-27369	7-08048	7-05020	5-77740	1-01514
1962	4-67591	4-44301	-0-74495	-0-68143	1-28813	7-12906	7-09706	5-82930	1-01622
1963	4-76022	4-51919	-0-71593	-0-64342	1-29692	7-17498	7-14007	5-87305	1-01585
1964	4-87040	4-62792	-0-66953	-0-59339	1-30101	7-22141	7-21157	5-97488	1-03596
1965	4-94847	4-69306	-0-61763	-0-53715	1-30644	7-27140	7-25042	6-03649	1-02779
1966	5-03336	4-76204	-0-58498	-0-53715	1-31614	7-32351	7-28434	6-09769	1-02124
1967	5-10157	4-82080	-0-55727	-0-51242	1-32920	7-37702	7-31178	6-16213	1-01116
1968	5-16957	4-87288	-0-52610	-0-50205	1-33289	7-42366	7-36139	6-24007	1-01616
1969	5-24526	4-93904	-0-47904	-0-46369	1-33500	7-46830	7-43392	6-34149	1-03347
1970	5-34142	5-01047	-0-43046	-0-36231	1-35403	7-52225	7-48957	6-41821	1-03884
1971	5-45175	5-10796	-0-37825	-0-32853	1-37169	7-57523	7-52437	6-48432	1-02982
1972	5-57785	5-22176	-0-30963	-0-28612	1-36788	7-61641	7-56777	6-58750	1-02787
1973	5-69720	5-32513	-0-23810	-0-23843	1-36226	7-65727	7-65405	6-72418	1-05611
1974	5-86404	5-46525	-0-12368	-0-10200	1-37372	7-70766	7-70432	6-81106	1-05550
1975	6-03040	5-58195	0-00000	0-00000	1-38053	7-74214	7-65224	6-78296	1-00765
1976	6-16107	5-72356	0-06916	0-06074	1-37422	7-76830	7-69173	6-93702	1-01141
1977	6-25840	5-78523	0-13857	0-11301	1-37245	7-79513	7-73159	7-03040	1-01826
1978	6-32335	5-82905	0-17859	0-14393	1-37067	7-82077	7-74289	7-11153	1-01244
1979	6-39371	5-88515	0-22389	0-18380	1-37372	7-84683	7-77427	7-18497	1-01668
1980	6-47378	5-97065	0-25767	0-20741	1-37447	7-87099	7-80516	7-22131	1-01791
1981	6-54578	6-03939	0-30695	0-24759	1-36609	7-88669	7-79894	7-21034	1-01023
1982	6-61353	6-07094	0-37196	0-31220	1-35067	7-89371	7-80309	7-24163	1-01035

Symbols

<i>UR</i>	Unemployment rate = $100 * (LS - LT) / LS$
<i>LS</i>	Labour force (millions of workers) = $LT +$ unemployment (including partial unemployment and unemployed occupied by public sector; homogeneous series constructed by Schuttringer and Tollet at the Belgian Planning Office)
<i>LT</i>	Total employment (millions of workers), excluding the partially unemployed and the unemployed employed by public sector
<i>YT</i>	GDP at factor cost (1975 Bfr billions)
<i>VS</i>	Vacancies (thousands of workers, annual average) (<i>Source</i> : IRES, Université Catholique de Louvain)
<i>DUC</i>	Degree of utilization of production capacities (<i>Source</i> : Banque Nationale de Belgique)
<i>WH</i>	Labour cost per hour in the private sector (Bfrs per hour)
<i>P</i>	GDP deflator (factor cost)
<i>KA</i>	Capital stock, excluding dwellings (1975 Bfr billions) (<i>Source</i> : Bureau du Plan., note (84) TdB/3445/4389)
<i>IPC</i>	Index of price competitiveness: world export prices (excluding energy) in Bfrs (at the Bfr/\$ current exchange rate), relative to domestic final demand prices net of indirect taxes.
<i>U_p</i>	Number of working days lost owing to strikes, per 1000 employees (<i>Source</i> : INS, Bruxelles, and Y. Leruth, Mémoire de Licence et Maîtrise en Sciences Economiques)
<i>T1</i>	Employers' employment tax (employers' social security contributions relative to employees' gross income)
<i>T2</i>	Workers' tax rate (direct taxes + social security contributions)
<i>T3</i>	Indirect tax rate
<i>DUR</i>	Duration of unemployment = % of unemployed for over six months (category: fully unemployed of normal aptitude) (<i>Source</i> : ONEM and IRES, Université Catholique de Louvain)
<i>DUL</i>	Degree of utilization of labour = $100 * \{1 = 10 * (\text{partial unemployment}) / LT\}$. (<i>Source</i> : INS and MARIBEL)
<i>W/V</i>	Labour cost per employee relative to the price of investment goods (Bfr thousands)
<i>CT</i>	Private consumption at constant prices (1975 Bfr billions)
<i>DI</i>	Households' real disposable income (1975 Bfr billions)
<i>PC</i>	Private consumption price index.
<i>MT</i>	Imports of goods and services, excluding energy (1975 Bfr billions)
<i>FD</i>	Private consumption + investment + exports of goods (excluding energy) at constant prices (1975 Bfr billions)
<i>PM</i>	Price index of imported goods and services (excluding energy); beginning of the period, data reconstructed by assuming same rate of growth as total imports
<i>PF</i>	Price index of domestic final demand, net of taxes
<i>W</i>	Wage cost per employee in the private sector (Bfr thousands per year)
<i>WN</i>	Net wage per employee in the private sector (Bfr thousands per year)
<i>PI</i>	Price index of gross fixed capital formation in the private sector
<i>LP</i>	Estimated potential employment level (millions of workers)
<i>YP</i>	Estimated potential output level (1975 Bfr billions)
<i>YD</i>	Estimated demand for domestic goods (1975 Bfr billions) = $YT + MT - MD$
<i>MD</i>	Estimated structural demand for non-energy imports (1975 Bfr billions)
<i>RED</i>	Estimated rate of excess demand
<i>Time</i>	1 = 1953, 30 = 1982.

FRANCE

	<i>U</i>	<i>l</i>	<i>nt</i>	<i>nb</i>	<i>yt</i>	<i>yb</i>	<i>dd</i>
1963	2·07	9·917	9·896	9·725	13·198	13·062	12·033
1964	1·86	9·926	9·907	9·739	13·262	13·130	12·131
1965	2·05	9·931	9·910	9·742	13·308	13·180	12·213
1966	2·08	9·938	9·918	9·747	13·359	13·236	12·272
1967	2·37	9·944	9·920	9·748	13·405	13·283	12·330
1968	2·61	9·944	9·917	9·742	13·447	13·324	12·373
1969	2·26	9·955	9·932	9·757	13·514	13·396	12·430
1970	2·43	9·971	9·946	9·769	13·570	13·455	12·474
1971	2·67	9·978	9·951	9·772	13·623	13·510	12·527
1972	2·77	9·985	9·957	9·777	13·680	13·571	12·584
1973	2·65	9·997	9·970	9·790	13·732	13·627	12·654
1974	2·83	10·008	9·979	9·798	13·764	13·661	12·694
1975	4·08	10·013	9·971	9·785	13·766	13·661	12·794
1976	4·39	10·023	9·978	9·789	13·816	13·710	12·831
1977	4·90	10·037	9·986	9·795	13·846	13·742	12·867
1978	5·23	10·044	9·990	9·796	13·883	13·780	12·930
1979	5·91	10·052	9·991	9·795	13·916	13·815	12·976
1980	6·30	10·057	9·991	9·794	13·926	13·825	12·995
1981	7·37	10·063	9·986	9·783	13·931	13·829	13·028
1982	8·10	10·072	9·987	9·780	13·949	13·847	13·074
1983	8·30	10·069	9·982	9·769	13·956	13·855	13·088
1984	9·76	10·075	9·972	9·754	13·969	13·870	13·098

	<i>wd</i>	<i>k</i>	<i>z₁</i>	ω	<i>w</i>	<i>k-nt</i>	φ	π
1963	3·965	13·464	84·8	4·208	2·010	3·567	0·908	5·8
1964	4·047	13·515	84·3	4·178	2·063	3·607	0·869	4·2
1965	4·129	13·565	82·7	4·142	2·109	3·654	0·855	2·8
1966	4·207	13·619	83·7	4·178	2·146	3·701	0·841	2·5
1967	4·243	13·672	82·9	4·225	2·191	3·751	0·829	1·4
1968	4·371	13·725	83·5	4·601	2·260	3·807	0·953	3·6
1969	4·496	13·784	86·5	4·605	2·311	3·851	1·017	3·9
1970	4·605	13·843	86·1	4·605	2·370	3·896	1·000	2·4
1971	4·662	13·903	85·8	4·732	2·436	3·952	0·992	4·0
1972	4·760	13·963	86·1	4·807	2·486	4·006	0·994	4·8
1973	4·912	14·022	88·1	4·953	2·549	4·052	1·030	6·3
1974	5·005	14·076	85·4	5·050	2·623	4·096	1·066	3·9
1975	4·993	14·119	78·8	5·288	2·689	4·148	1·087	6·1
1976	5·107	14·165	82·9	5·079	2·741	4·186	1·083	4·0
1977	5·163	14·207	83·6	4·982	2·787	4·221	1·081	3·0
1978	5·236	14·249	83·4	5·043	2·823	4·258	1·085	3·8
1979	5·306	14·289	84·6	5·135	2·856	4·298	1·077	4·4
1980	5·363	14·332	84·8	5·096	2·886	4·340	1·078	1·1
1981	5·370	14·368	82·1	5·020	2·918	4·382	1·109	-1·2
1982	5·370	14·402	82·2	5·128	2·978	4·415	1·129	-3·6
1983	5·385	14·432	82·0	5·097	3·005	4·449	1·141	-1·6
1984	5·462	14·458	82·0	4·968	3·017	4·485	1·162	-2·4

	γ	$\dot{w}$	$\dot{p}$	t_1	t_2	t_3
1963	78.06	9.66	6.21	24.18	5.53	18.19
1964	78.70	9.10	4.06	24.18	5.74	18.49
1965	79.40	6.32	2.69	24.71	5.91	18.28
1966	83.36	6.25	2.85	24.65	6.14	18.35
1967	83.82	6.58	3.13	25.30	6.36	17.77
1968	81.25	10.71	4.16	24.75	6.48	17.50
1969	88.77	10.80	6.36	22.72	6.87	18.07
1970	100.00	11.43	5.47	22.21	6.55	16.78
1971	102.57	11.80	5.60	22.31	6.58	16.60
1972	100.15	10.93	6.00	22.29	6.81	16.67
1973	95.27	13.37	7.49	22.44	6.92	16.49
1974	101.39	17.01	10.55	22.60	7.09	16.11
1975	90.48	16.76	12.57	24.15	7.58	15.98
1976	90.67	14.02	9.40	24.58	8.25	16.62
1977	97.10	12.28	8.60	25.14	8.84	15.75
1978	97.01	11.98	9.04	25.56	8.94	16.16
1979	93.67	12.43	9.91	26.01	10.35	16.82
1980	90.97	14.04	11.51	26.16	11.34	16.87
1981	91.10	14.07	11.15	26.13	10.97	16.83
1982	93.82	16.90	11.90	26.73	11.71	17.11
1983	96.61	10.51	9.09	27.53	12.45	17.09
1984	97.10	7.84	7.01	27.74	13.44	17.44

List of variables

All figures are annual averages. All logarithms are natural logarithms.

U	Unemployment rate. Number of unemployed (ILO definition), divided by labour force. In per cent: Regularly published in <i>Rapport sur les Comptes de la Nation</i> , INSEE, or 'Banque de données DMS', INSEE. (The series was recently revised).
l	log labour force, in thousands, same source as above.
nt	log of total employment, in thousands, same source as above.
nb	log of employment in non-financial non-governmental activities ('emploi dans les branches marchandes'), in thousands, same source as above.
yt	log of gross domestic product, at 1970 prices, in millions francs, same source.
yb	log of output in non-financial non-governmental activities ('PIB marchand'), at 1970 prices, in millions francs, same source.
dd	log of domestic autonomous demand, at 1970 prices, defined as government demand for goods and services, <i>plus</i> gross domestic investment by households and large public corporations ('Grandes Entreprises Nationales'), <i>plus</i> social transfers received by households, in millions francs. Figures come from <i>Comptes de la Nation</i> .
wd	log of world demand addressed to France (weights are shares in French exports). (Index base 100 in 1970). INSEE series.
k	log of productive capital stock, at 1970 prices, in millions francs, INSEE series.
z_1	rate of capacity utilization in industry, computed from answers to INSEE business survey (per cent). Banque de données DMS.
ω	log of relative cost of labour with respect to capital. (Index base 100 in 1970). INSEE series.
w	log of real labour cost: hourly labour cost in non-financial non-governmental activities, in 1970 francs, deflated by price of value added in these activities ('PIB marchand'). 'Banque de données DMS', INSEE.

$k - nt$	log capital/employment ratio. Difference between the two previously defined series.
φ	ratio between the minimum wage and the average wage rate. Index base 1 in 1970. 'Banque de données DMS', INSEE.
π	profitability: measure computed in Malinvaud (1983), which is the difference between an inflation-corrected net profit rate and a real interest rate, in per cent.
γ	index of competitiveness, defined as ratio of unit labour cost abroad over unit labour cost in France corrected by exchange rates changes, base 100 in 1970. 'Banque de données DMS', INSEE.
$\dot{w}$	rate of increase of the hourly wage rate in non-financial non-governmental activities, in per cent. 'Banque de données DMS', INSEE.
$\dot{p}$	rate of increase of the price of value added in non-financial non-governmental activities, in per cent. 'Banque de données DMS', INSEE.
t_1	employers' labour tax and social security contribution rate in non-financial non-governmental activities, as per cent of total labour cost. 'Banque de données DMS', INSEE.
t_2	workers' social security contribution: compulsory social security contributions of wage earners and self employed, divided by gross wages received <i>plus</i> gross operating surplus of non-corporate firms (in non-financial non-governmental activities), per cent. 'Banque de données DMS', INSEE.
t_3	indirect tax rate, per cent of total value added. 'Banque de données DMS', INSEE.

GERMANY

	Capacity utilization rates (%) (1)	Vacancies (000) (2)	Unem- ployment rate (%) (3)	Total employed persons (000) (4)	Manufacturing sector		
					Capital Stock (million DM) (5)	Employed persons (6)	Employ- ment- capital ratio (7)
1970	100.0	795	0.7	26,560			
1971	98.3	648	0.8	26,721			
1972	97.8	546	1.1	26,661	599,183	8,627,962	14.400
1973	98.4	572	1.2	26,849	622,065	8,663,522	13.927
1974	96.0	315	2.6	26,497	639,521	8,434,318	13.189
1975	92.1	236	4.7	25,746	652,292	7,887,735	12.092
1976	95.2	235	4.6	25,530	663,030	7,698,499	11.611
1977	96.1	231	4.5	25,490	673,860	7,631,789	11.326
1978	97.1	246	4.3	25,644	683,956	7,583,826	11.088
1979	99.2	304	3.8	25,986	694,277	7,606,927	10.957
1980	98.8	308	3.8	26,251	707,028	7,659,343	10.833
1981	96.7	208	5.5	26,048	719,615	7,488,720	10.407
1982	94.5	105	7.5	25,572	729,090	7,225,854	9.911
1983	94.6 ^a	76	9.1	25,126	736,501	6,926,939	9.405
1984	94.8 ^a	89	9.1	25,000 ^a		6,663,000	

^a Preliminary.

^b 1984 (I) and (II).

Notes:

Column

- (1) Capacity utilization rate = (actual GNP/potential GNP) × 100
 (2), (3) As registered at the labour offices; averages per year
 (4) Includes self-employed persons
 (5)–(7) Manufacturing industry and mining
 (8) Labour cost per man-hour divided by GNP deflator
 (9) Lost days arising from strikes as a fraction of total worked days, per million workers
 (11) Gross labour income, including employers' contribution to social security times (1 + indirect tax rate), divided by net take-home pay
 (12), (13) Defined as

$$\sum \left| \frac{U_i - V_i}{U - V} \right|$$

where U = unemployed, V = vacancies, $i = 1, \dots, 141$ (regions, col. (12)) and $i = 1, \dots, 327$ (occupations, col. (13)).

- (14) Percentage of unemployed who have been unemployed for over six months

Real labour cost (DM) (8)	Industrial disputes (per million workers) (9)	Trade union membership (%) (10)	Measure of tax wedge (11)	Regional mismatch (12)	Occupational mismatch (13)	Duration of unemployment (%) (14)
11.90	0.01317	35.93	1.67			23.9
12.45	0.36366	36.01	1.71			22.7
13.18	0.00928	36.49	1.72			26.1
14.07	0.07881	36.83	1.79			26.7
14.91	0.14961	38.36	1.82			24.5
15.37	0.01005	39.28	1.83			36.8
15.76	0.07765	39.94	1.89	0.359	0.730	40.8
16.46	0.00347	40.06	1.91	0.381	0.701	40.4
16.91	0.62599	40.95	1.91	0.443	0.707	41.4
17.39	0.06986	40.77	1.92	0.457	0.705	39.9
17.90	0.01834	40.38	1.96	0.438	0.721	36.2
18.25	0.00842	40.98	1.97	0.455	0.713	38.1
18.18	0.00221	41.31	2.00	0.456	0.703	46.4
18.22	0.00608	41.59	2.03	0.422	0.610	54.1
17.74 ^b			2.05 ^b			55.2

Sources:

Column

- (1), (10) Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Jahresgutachten 1982-1984
- (2), (3), (12), (13) Bundesanstalt für Arbeit, Amtliche Nachrichten der Bundesanstalt für Arbeit, current volumes
- (4), (8), (10) Deutsches Institut für Wirtschaftsforschung, Sozialprodukt und Einkommenskreislauf, Vierteljährliche Volkswirtschaftliche Gesamtrechnung für die Bundesrepublik Deutschland, A 11
- (5), (6) E. Baumgart, R. Mehl und J. Schintke (1984), Produktionsvolumen und-potential, Produktionsfaktoren des Bergbaus und des Verarbeitenden Gewerbes in der Bundesrepublik Deutschland, Deutsches Institut für Wirtschaftsforschung, Statistische Kennziffern 26. Folge 1972-1983, p. 41 (col. 4) und p. 18 (col. 5). Employment data for 1984 means 1984 (III), taken from Sachverständigenrat zur Begutachtung der Gesamtwirtschaftlichen Entwicklung, Jahresgutachten 1984/85, Table 43. Note that definition of manufacturing sector in this table differs from that in Tables 4 and 5
- (9), (10), (11) Statistisches Bundesamt, Statistische Jahrbücher 1970-1984

ITALY

	u*	u	L	N	N	N	N ^p	GDP	Y
1960	0-04976	0-04976	21,599	20,524-2	18,423-5	2100-7	2100-7	36,093	32,117-55
1961	0-04502	0-04502	21,535	20,565-49	18,420-09	2145-4	2145-4	39,055	35,185-24
1962	0-04494	0-04494	21,306	20,348-59	18,140-5	2208-1	2208-1	41,478	37,866-63
1963	0-03932	0-03932	20,852	20,032-0	17,775-7	2256-3	2256-3	43,805	40,445-71
1964	0-04442	0-04442	20,870	19,942-9	17,644-0	2298-9	2298-9	45,030	41,244-68
1965	0-04889	0-04889	20,612	19,604-19	17,267-09	2337-1	2337-1	46,502	42,201-00
1966	0-05273	0-05273	20,367	19,293-0	16,907-3	2385-7	2385-7	49,285	45,005-77
1967	0-04803	0-04803	20,507	19,522-09	17,085-39	2436-7	2436-7	52,823	48,739-51
1968	0-05186	0-05186	20,555	19,489-0	16,998-4	2490-7	2490-7	56,280	51,805-34
1969	0-03885	0-03885	20,369	19,577-0	17,039-6	2538-1	2538-1	59,712	55,704-34
1970	0-04052	0-0414	20,436	19,608-0	16,987-5	2602-5	2602-5	62,883	59,069-00
1971	0-04112	0-04457	20,404	19,565-0	16,785-7	2708-8	2708-8	63,916	59,383-14
1972	0-04519	0-04765	20,293	19,376-0	16,502-2	2823-9	2823-9	65,963	61,395-80
1973	0-047	0-0487	20,490	19,527-0	16,558-4	2933-8	2933-8	70,601	66,052-63
1974	0-04176	0-04451	20,714	19,849-0	16,742-8	3049-3	3049-3	73,525	68,532-88
1975	0-05008	0-0586	20,946	19,897-0	16,556-1	3162-4	3162-4	70,851	64,882-22
1976	0-05826	0-06408	21,285	20,045-0	16,700-89	3220-2	3220-2	75,011	69,420-88
1977	0-06734	0-07246	21,607	20,152-0	16,762-5	3278-9	3278-9	76,435	70,552-50
1978	0-06595	0-07277	21,730	20,297-0	16,809-9	3338-8	3338-8	78,488	72,392-06
1979	0-07147	0-07709	22,075	20,497-3	16,970-3	3403-0	3403-0	82,337	77,256-50
1980	0-07639	0-08296	22,372	20,662-9	17,076-1	3440-0	3440-0	85,558	80,803-58
1981	0-08404	0-09719	22,665	20,760-2	16,950-2	3512-0	3512-0	85,707	79,806-88
1982	0-08872	0-10371	22,746	20,728-0	16,827-1	3560-0	3560-0	85,334	79,520-44
1983	0-09664	0-11477	22,982	20,761-0	16,730-4	3614-0	3614-0	84,326	77,924-19

	CU	k	W	C'	P _K	$\hat{P}$	JFR	JSR
1960	0.881	0.52809	0.26931	0.58125		0.68204		
1961	0.9	0.47797	0.29097	0.62561	0.42106	0.69241		
1962	0.912	0.4265	0.33375	0.69315	0.50799	0.72186		
1963	0.921	0.3801	0.3975	0.78175	0.546	0.77029		
1964	0.869	0.35436	0.45976	0.84676	0.54078	0.81811		
1965	0.852	0.33224	0.50839	0.89277	0.50116	0.84641	323.15	342.58
1966	0.874	0.31094	0.5456	0.93239	0.67906	0.86615	462.30	329.71
1967	0.899	0.29766	0.58199	0.99353	0.7842	0.8874	387.79	344.39
1968	0.911	0.27895	0.61899	1.04845	0.78756	0.89872	407.41	352.83
1969	0.907	0.26336	0.67449	1.10188	0.82761	0.93393	434.08	371.32
1970	0.93	0.24668	0.77589	1.21747	0.99999	0.99923	355.28	322.84
1971	0.888	0.23032	0.89076	1.3106	0.77124	1.06388	376.25	400.91
1972	0.881	0.21509	1.00818	1.3906	0.69828	1.12572	363.74	345.68
1973	0.922	0.20382	1.25796	1.51229	1.00459	1.26974	371.11	334.73
1974	0.932	0.19488	1.56055	1.52413	0.88498	1.56824	209.24	206.82
1975	0.828	0.18633	1.96924	1.61492	0.50576	1.84835	140.54	169.22
1976	0.909	0.18153	2.36367	1.6495	2.06674	2.18813	173.40	174.03
1977	0.898	0.17644	2.95932	1.69471	3.15567	2.56421	142.41	164.20
1978	0.889	0.17196	3.45683	1.74759	3.12555	2.88888	114.86	134.04
1979	0.919	0.16818	4.11527	1.77424	5.14238	3.34219	143.45	144.70
1980	0.946	0.16268	4.9087	1.74259	6.43587	4.07637	126.56	155.11
1981	0.906	0.15582	5.95706	1.78074	9.85501	4.81823	101.03	156.26
1982	0.868	0.15066	6.92827	1.7933	11.62208	5.59577	88.97	
1983	0.806	0.14699	7.98463	1.89005	11.17249	6.36451		

	T_1-1	T_2-1	T_3-1	H	UR	SR	z_1	z_2
1960	0.32543		0.11061	2.22835		0.25642		0.01033
1961	0.33594	0.04388	0.11436	2.20933		0.22323	0.00998	0.00791
1962	0.35196	0.04793	0.10891	2.17304		0.6189	0.01507	0.00678
1963	0.37061	0.04733	0.10527	2.15249		0.41921	0.01146	0.00464
1964	0.36062	0.05555	0.10741	2.11239		0.51867	0.01389	0.00442
1965	0.34182	0.05743	0.10771	2.04267		0.24456	0.01438	0.00612
1966	0.34051	0.05724	0.10419	2.09359		0.5254	0.0124	0.0059
1967	0.36527	0.05351	0.1096	2.10279		0.25715	0.00209	0.00566
1968	0.3819	0.05932	0.10157	2.10579		0.5801	0.00398	0.00602
1969	0.39087	0.05944	0.09695	2.08632	33.5	1.22222	0.00266	0.0064
1970	0.43115	0.05095	0.09555	2.07535	37.0	0.53849	0.00601	0.00628
1971	0.43265	0.05335	0.09261	2.02941	39.3	0.50026	0.01612	0.00569
1972	0.43626	0.05682	0.0811	1.99095	41.3	0.70363	0.02	0.00694
1973	0.42064	0.05515	0.06856	1.96873	42.8	1.15139	0.00975	0.00824
1974	0.44052	0.05783	0.06326	1.94263	45.8	1.3872	0.00759	0.00648
1975	0.45125	0.05913	0.04446	1.92201	47.60001	1.66665	0.01227	0.00763
1976	0.45556	0.06913	0.04908	1.93211	50.0	0.73381	0.01051	0.00896
1977	0.39115	0.07857	0.05555	1.92012	50.0	1.694	0.00995	0.01684
1978	0.38514	0.09021	0.05439	1.90191	50.0	0.88775	0.01184	0.01928
1979	0.37572	0.09065	0.04741	1.86962	49.60001	1.55273	0.01233	0.02224
1980	0.37349	0.10742	0.05361	1.92017	49.60001	1.46162	0.00683	0.02347
1981	0.36935	0.11715	0.05182	1.92352	47.89999	0.87244	0.01669	0.02612
1982	0.37917	0.12773	0.05019	1.93069	46.60001	1.07374	0.01883	0.028
1983	0.40692	0.14465	0.07081	1.92525	45.5	0.6567	0.02204	0.035

	M	IM	X	NE	Y*	P _M	P _{IM}	P _X	P*
1960	915.56	1547.33	2058.88	426.00	101.32	1.23458	0.89798	1.01696	0.27435
1961	1076.24	1865.04	2549.28	399.00	105.12	1.12389	0.86643	0.95184	0.27534
1962	1498.63	2105.07	3005.7	584.00	115.74	0.92116	0.92348	0.91176	0.27435
1963	1896.71	2776.36	3337.07	1219.00	125.9	0.83239	0.96345	0.90939	0.27975
1964	1493.68	2620.86	3711.54	417.00	142.02	0.85485	0.98171	0.28364	0.28364
1965	1188.00	2648.65	4342.64	-338.00	154.61	0.89242	0.98773	0.9244	0.28907
1966	1516.77	2999.08	4908.85	-116.00	171.43	0.94593	0.99208	0.92203	0.29558
1967	1878.51	3444.43	5440.95	126.01	181.3	0.93391	0.998	0.93107	0.2975
1968	1607.35	3796.58	6256.92	-505.99	206.68	0.95642	0.98649	0.9251	0.29411
1969	2290.35	4573.29	7287.63	-185.00	235.83	0.91861	0.99045	0.93564	0.306
1970	2775.00	5510.00	7838.99	446.00	255.35	0.98357	0.98872	0.98626	0.321
1971	2256.14	5935.28	8212.42	93.00	271.94	1.04457	1.05108	1.03528	0.3331
1972	2521.81	6639.7	9195.51	267.00	303.58	1.02293	1.12708	1.06532	0.34498
1973	2884.63	7467.78	9592.41	2859.00	340.02	1.44159	1.3547	1.19011	0.4149
1974	2607.91	7617.34	10407.25	6182.00	356.47	3.49619	1.6857	1.51589	0.57951
1975	1649.22	7202.96	10826.18	1519.00	326.95	4.06319	1.88497	1.73279	0.6488
1976	2399.9	8002.91	12366.8	3958.00	371.89	4.77264	2.29427	2.09082	0.8306
1977	2155.5	7993.73	13198.23	891.00	391.06	5.53205	2.75368	2.50379	0.95093
1978	2003.06	8778.52	14409.59	1536.98	417.82	5.98241	2.89567	2.70235	1.03315
1979	3144.56	9788.91	16179.47	1905.01	455.05	6.01895	3.27553	3.03383	1.17444
1980	3468.62	11023.04	15422.65	15716.01	479.6	8.38588	3.82104	3.59801	1.36364
1981	2293.88	10897.33	16126.2	14056.08	478.92	15.06087	4.50998	4.31834	1.75117
1982	2506.48	11236.69	16487.17	13218.05	478.02	14.55867	5.12676	4.90569	2.00128
1983	1905.19	12462.32	17775.52	7258.03	506.06	15.84904	6.08812	5.55875	2.17524

Data sources and definitions

u^*	official unemployment rate (units) (<i>ISTAT ASL</i>)
u	'adjusted' unemployment rate (units). Includes dependent workers supported by the Wage Supplementation Fund. Adjustment relates only to the industrial sector (<i>BI RA</i>)
L	labour force (thousands of units, yearly averages). Figures include unemployed previously in employment, first job-seekers, other persons seeking employment (students, housewives, etc.) (<i>ISTAT ASL</i>)
N^*	domestic (dependent and independent) total employment (thousands of units) (<i>ISTAT ACN, ISTAT CI</i>)
N	'adjusted' domestic (dependent and independent) employment in the private sector (thousands of units). Does not include dependent workers supported by the Wage Supplementation Fund. Adjustment relates only to the industrial sector (<i>ISTAT ACN, ISTAT CI, BI RA</i>)
N^P	employment in the public sector (thousands of units) (<i>ISTAT ACN, ISTAT CI</i>)
GDP	gross domestic product (1970 L billions) (<i>ISTAT ACN, ISTAT CI</i>)
Y	'extended value added' of the private sector (1970 L billions). Defined as value added of the private sector plus net imports of productive inputs. All variables at market prices (<i>ISTAT ACN, ISTAT CI, ISCO</i>)
CU	capacity utilization rate in industry excluding construction (<i>BI RA</i>)
k	employment-capital ratio in the private sector. For employment see N ; for capital stock, our calculations largely based on RS
W	hourly pre-tax wages and salaries per dependent worker (L thousands) (<i>ISTAT ACN, ISTAT CI, PA</i>)
C'	WT_1T_3/P
P_K	user cost of capital, defined as usual. Does not include tax and other incentives, but <i>does</i> include a measure of capital gains
$\tilde{P}$	implicit deflator of Y
$T_1 - 1$	tax rate on employment borne by the firm in the private sector. Includes actual and imputed contributions to social security (<i>ISTAT ACN, ISTAT CI</i>)
$T_2 - 1$	income tax rate, calculated as income taxes off disposable income (<i>ISTAT ACN, ISTAT CI</i>)
$T_3 - 1$	net indirect tax rate (indirect taxes less subsidies) in the private sector (<i>ISTAT ACN, ISTAT CI</i>)
H	average hours worked by (dependent and independent) workers in the private sector (in thousands) (<i>PA</i>)
UR	trade union members as a percentage of total employment. Figures refer to the three major unions (CGIL, CISL, UIL) (<i>CER</i>)
SR	workers involved in industrial conflicts divided by industrial employees (<i>ISTAT ACN, ISTAT CI, ISTAT BM</i>)
z_1	change in non-agricultural employment structure. Defined as the sum of the changes (in absolute values) of the proportions of non-agricultural employment employed in industry, excluding construction, construction industry, private services, public services (<i>ISTAT ACN, ISTAT CI</i>)
z_2	high-duration (more than one-year) unemployment (as a fraction of the labour force) (<i>ISTAT ASL</i>)
M	net imports of productive inputs (1970 L billions) (<i>ISCO</i>)
IM	imports of final goods and services (1970 L billions) (<i>ISCO</i>)
X	exports of final goods and services (1970 L billions) (<i>ISCO</i>)
NE	$P_M M + P_{IM} IM - P_X X$

Y^*	OECD total imports in 1970 dollars (OECD)
P_M	implicit deflator of M
P_{IM}	implicit deflator of IM
P_X	implicit deflator of X
P^*	industrial countries export unit value (L) (<i>IMF IFS, BI RA</i>)
JFR	job-finding rate in industry excluding construction, computed as the number of newly hired employee out of existing operatives (<i>RSL</i>)
JSR	job separation rate in industry excluding construction, computed as the number of separations out of existing operatives (<i>RSL</i>)
d_j	dummy variable (= 1 in year j , 0 elsewhere)

Abbreviations for sources

<i>ISTAT ACN</i>	Istituto Centrale di Statistica, Annuario di Contabilità Nazionale
<i>ISTAT CI</i>	Istituto Centrale di Statistica, Collana di Informazioni
<i>ISTAT BM</i>	Istituto Centrale di Statistica, Bollettino Mensile
<i>ISTAT ASL</i>	Istituto Centrale di Statistica, Annuario di Statistiche del Lavoro
<i>BI RA</i>	Banca d'Italia, Relazione annuale
<i>ISCO</i>	Istituto di Studi sulla Congiuntura
<i>CER</i>	Centro Europa Ricerche, Rapporto no. 4, 1984
<i>PA</i>	P. Antonello, Investimenti in macchine e prodotto per ore lavorate nell'economia italiana, LUISS, <i>Quaderni ISE</i> , no. 12, 1984
<i>RS</i>	G. Rosa and V. Siesto, <i>Il capitale fisso industriale</i> . Bologna: Il Mulino, 1985
<i>RSL</i>	Rassegna di Statistiche del Lavoro

THE NETHERLANDS

	Unemployment rate ^a	Log labour force ^a	Log employment ^a
1960	0·012	6·627	6·621
1961	0·009	6·631	6·628
1962	0·008	6·640	6·636
1963	0·008	6·646	6·642
1964	0·007	6·653	6·650
1965	0·008	6·657	6·653
1966	0·010	6·661	6·656
1967	0·019	6·664	6·655
1968	0·017	6·667	6·659
1969	0·015	6·675	6·668
1970	0·014	6·679	6·673
1971	0·019	6·683	6·675
1972	0·030	6·684	6·671
1973	0·031	6·685	6·672
1974	0·037	6·689	6·672
1975	0·053	6·693	6·669
1976	0·056	6·694	6·669
1977	0·055	6·695	6·670
1978	0·055	6·698	6·673
1979	0·056	6·704	6·679
1980	0·063	6·710	6·682
1981	0·092	6·717	6·675
1982	0·124	6·722	6·665
1983	0·150	6·726	6·656
1984	0·154	6·727	6·655

All notes appear to end of Netherlands data.

	Growth in real national income ^a	Growth in real production by firms ^a
1960	0·075	0·099
1961	0·039	0·035
1962	0·040	0·044
1963	0·046	0·043
1964	0·088	0·099
1965	0·059	0·059
1966	0·022	0·028
1967	0·058	0·060
1968	0·071	0·070
1969	0·062	0·067
1970	0·051	0·062
1971	0·035	0·039
1972	0·048	0·041
1973	0·052	0·049
1974	0·006	0·042
1975	-0·011	-0·006
1976	0·057	0·054
1977	0·024	0·022
1978	0·021	0·025
1979	0·009	0·025
1980	-0·007	0·007
1981	-0·013	-0·011
1982	-0·008	-0·021
1983	0·010	0·007
1984	0·035	0·025

All notes appear to end of Netherlands data.

	Vacancy rate ^b	Capacity utilization rate ^c	Growth in real-wage cost ^d
1960	0.022	0.917	0.043
1961	0.028	0.902	0.056
1962	0.028	0.886	0.034
1963	0.027	0.871	0.054
1964	0.029	0.906	0.086
1965	0.028	0.903	0.061
1966	0.025	0.873	0.058
1967	0.015	0.855	0.056
1968	0.017	0.861	0.052
1969	0.027	0.881	0.076
1970	0.027	0.896	0.103
1971	0.023	0.865	0.032
1972	0.013	0.844	0.044
1973	0.014	0.880	0.074
1974	0.014	0.989	0.077
1975	0.010	0.850	0.033
1976	0.010	0.913	0.023
1977	0.011	0.916	0.022
1978	0.013	0.925	0.021
1979	0.013	0.938	0.026
1980	0.011	0.926	0.000
1981	0.004	0.908	-0.018
1982	0.002	0.864	0.003
1983	0.002		0.020
1984	0.003		-0.056

All notes appear at end of Netherlands data.

	Competitiveness ^c	Wage inflation ^a	Price inflation ^a
1960	-0.026	0.082	0.039
1961	0.012	0.072	0.016
1962	0.000	0.059	0.025
1963	0.015	0.090	0.036
1964	0.000	0.149	0.063
1965	0.008	0.111	0.050
1966	-0.018	0.110	0.052
1967	-0.008	0.088	0.032
1968	0.002	0.089	0.037
1969	-0.016	0.134	0.058
1970	-0.006	0.130	0.027
1971	-0.002	0.137	0.105
1972	-0.002	0.123	0.079
1973	-0.059	0.158	0.084
1974	-0.004	0.157	0.080
1975	0.038	0.126	0.093
1976	0.010	0.109	0.086
1977	0.036	0.087	0.065
1978	-0.031	0.072	0.051
1979	-0.030	0.062	0.036
1980	-0.027	0.059	0.059
1981	-0.019	0.043	0.061
1982	0.033	0.061	0.064
1983	0	0.040	0.020
1984	-0.010	0.005	0.061

All notes appear to end of Netherlands data.

	Unionists relative to employees ^f	Workers involved in industrial conflicts ^g
1960		0·028
1961		0·003
1962		0·001
1963		0·009
1964		0·003
1965		0·007
1966	0·32	0·004
1967	0·32	0·005
1968	0·31	0·001
1969	0·31	0·004
1970	0·36	0·016
1971	0·37	0·011
1972	0·38	0·006
1973	0·38	0·017
1974	0·40	0·001
1975	0·40	0·000
1976	0·40	0·005
1977	0·41	0·013
1978	0·40	0·003
1979	0·40	0·011
1980	0·39	0·007
1981	0·38	0·003
1982	0·37	0·022
1983	0·32	0·003
1984		

All notes appear at end of Netherlands data.

	Employers' employment tax rate ^h	Workers' tax rate ^k	Indirect tax rate ^m
1960	0·135	0·220	0·109
1961	0·127	0·230	0·111
1962	0·134	0·229	0·110
1963	0·148	0·240	0·111
1964	0·152	0·248	0·110
1965	0·151	0·257	0·111
1966	0·166	0·276	0·115
1967	0·175	0·288	0·104
1968	0·188	0·298	0·105
1969	0·192	0·306	0·101
1970	0·193	0·311	0·117
1971	0·199	0·326	0·120
1972	0·202	0·333	0·124
1973	0·216	0·346	0·122
1974	0·221	0·360	0·116
1975	0·222	0·363	0·119
1976	0·225	0·357	0·121
1977	0·220	0·343	0·129
1978	0·219	0·344	0·133
1979	0·223	0·350	0·132
1980	0·225	0·354	0·133
1981	0·225	0·348	0·130
1982	0·220	0·346	0·128
1983	0·231	0·363	0·132
1984			

All notes appear to end of Netherlands data.

User cost of capital ^c	
1960	0.031
1961	0.027
1962	0.003
1963	0.028
1964	0.082
1965	0.061
1966	0.090
1967	0.008
1968	0.018
1969	0.125
1970	0.132
1971	0.093
1972	0.028
1973	0.009
1974	0.119
1975	0.113
1976	0.053
1977	-0.009
1978	-0.058
1979	0.044
1980	0.142
1981	0.141
1982	0.060
1983	
1984	

Notes

^a Source: Central Planning Bureau, *Central Economic Plans 1978, 1979 and 1985*; new definition from 1969 onwards

^b Source: Central Bureau of Statistics, *Maandschrift*

^c Own computation

^d Source: see note (a); wage inflation minus price inflation

^e Source: see note (a); $\Delta \ln$ export price minus $\Delta \ln$ foreign competitors' price (guilders; double reweighted from 1970 onwards); energy excluded after 1972; a negative change indicates an improvement of competitiveness

^f Source: see note (b); until 1969, only members of the three most important unions

^g Source: ILO, *Yearbook of Labour Statistics*, and Central Planning Bureau, *Central Economic Plan*; relative to employees in employment

^h Source: Central Bureau of Statistics, *National Accounts*; social security contributions relative to wages plus salaries plus social security contributions

^k Source: see note (h); household direct taxes plus household social security premiums relative to total household income minus non-household social security contributions

^m Source: see notes (a) and (h).

JAPAN

	Unemployment rate	Log labour force	Log employment	Log real GDP	JOJW ratio	Capacity utilization
	(%)	(10,000 persons)	(10,000 persons)	(billion yen)	(ratio)	(index)
1953	1.85	8.29	7.41			
1954	2.25	8.30	7.44			
1955	2.38	8.34	7.48			
1956	2.29	8.35	7.55			
1957	1.96	8.38	7.62			
1958	2.04	8.38	7.66			
1959	2.23	8.39	7.71			(101.6)
1960	1.62	8.41	7.77			(106.4)
1961	1.30	8.42	7.81			(107.6)
1962	1.28	8.41	7.86		0.68	(100.8)
1963	1.16	8.44	7.89		0.70	(101.3)
1964	1.18	8.45	7.92		0.79	(106.1)
1965	1.22	8.47	7.96	11.14	0.64	(100.0)
1966	1.31	8.49	8.00	11.24	0.73	(106.5)
1967	1.26	8.51	8.02	11.34	1.00	(115.7)
1968	1.18	8.52	8.05	11.46	1.12	112.2 (117.5)
1969	1.12	8.53	8.07	11.58	1.30	112.8
1970	1.15	8.54	8.10	11.67	1.41	110.0
1971	1.23	8.55	8.13	11.72	1.12	103.7
1972	1.39	8.55	8.15	11.80	1.16	104.4
1973	1.27	8.58	8.19	11.89	1.76	108.4
1974	1.38	8.57	8.19	11.88	1.20	99.2
1975	1.89	8.57	8.20	11.90	0.61	84.6
1976	2.01	8.59	8.21	11.95	0.64	91.6
1977	2.03	8.60	8.23	12.00	0.56	90.9
1978	2.24	8.61	8.24	12.05	0.71	94.3
1979	2.08	8.62	8.26	12.10	0.75	99.9
1980	2.01	8.63	8.28	12.15	0.75	100.0
1981	2.21	8.64	8.30	12.19	0.68	95.4
1982	2.36	8.66	8.31	12.22	0.61	92.6
1983	2.64	8.68	8.34	12.25	0.60	94.1
1984	2.71	8.68	8.35		0.65	102.0

	Log labour cost per hour relative to producer prices (yen per man-hour)	Log capital- employment ratio (yen per man)	Log competi- tiveness (ratio)	Wage inflation (log hourly wages) (yen per hour)	Price inflation (log GDP deflator) (index)	Unionists as % of employees (%)
1953	(2.75)		(0.29)	4.28		36.3
1954	(2.78)		(0.29)	4.43		35.5
1955	(2.80)		(0.29)	4.49		35.6
1956	(2.79)		(0.33)	4.52		33.5
1957	(2.79)		(0.30)	4.61		33.6
1958	(2.86)		(0.33)	4.67		32.7
1959	(2.87)		(0.40)	4.66		32.1
1960	(2.90)		0.83 (0.42)	4.78		32.2
1961	(2.96)		0.95	4.88		34.5
1962	(3.07)		0.79	5.00		34.7
1963	(3.16)		0.78	5.11		34.7
1964	(3.24)		0.79	5.23		35.0
1965	3.81 (3.31)		0.80	5.31	3.85	34.8
1966	3.85	14.74	0.78	5.42	3.90	34.2
1967	3.91	14.81	0.79	5.53	3.96	34.1
1968	4.00	14.91	0.79	5.66	4.01	34.4
1969	4.16	15.02	0.79	5.82	4.05	35.2
1970	4.20	15.12	0.80	6.00	4.13	35.4
1971	4.31	15.21	0.79	6.15	4.18	34.8
1972	4.40	15.31	0.80	6.30	4.23	34.3
1973	4.48	15.37	0.71	6.51	4.34	33.1
1974	4.56	15.45	0.48	6.78	4.53	33.9
1975	4.66	15.52	0.37	6.93	4.60	34.4
1976	4.69	15.57	0.31	7.05	4.61	33.7
1977	4.73	15.62	0.31	7.13	4.72	33.2
1978	4.75	15.67	0.43	7.20	4.76	32.6
1979	4.77	15.71	0.28	7.24	4.79	31.6
1980	4.81	15.75	0.00	7.31	4.82	30.8
1981	4.85	15.80	-0.004	7.37	4.84	30.8
1982	4.87	15.84	-0.04	7.41	4.86	30.5
1983	4.89	15.87	-0.02	7.43	4.87	29.7
1984			0.01	7.50		29.1

	Industrial conflicts ^a (hours per man)	Employers' employment tax rate ^b (%)	Workers' tax rates ^b (%)	Indirect tax rate (%)	Duration of unemployment (%)	Log employed (including self- employment) (10,000 persons)
1953	0.25	(1.62)	(8.27)	(14.7)		8.27
1954	0.22	(1.70)	(8.13)	(13.8)		8.28
1955	0.19	(1.82)	(7.82)	(14.0)		8.31
1956	0.23	(1.91)	(7.80)	(13.9)		8.33
1957	0.27	(1.91)	(7.17)	(14.5)		8.36
1958	0.28	(1.95)	(7.05)	(14.2)		8.36
1959	0.26	(1.99)	(6.66)	(15.0)		8.37
1960	0.20	(2.01)	(7.12)	(15.4)		8.39
1961	0.24	(2.08)	(7.70)	(16.3)		8.41
1962	0.20	(2.16)	(8.31)	(15.1)		8.42
1963	0.10	(2.45)	(8.73)	(14.4)		8.43
1964	0.11	(2.54)	(9.07)	(13.9)		8.44
1965	0.19	2.73 (2.82)	9.24 (9.47)	12.5 (13.4)		8.46
1966	0.09	2.84	9.37	12.3		8.48
1967	0.05	2.86	9.53	12.5		8.50
1968	0.09	2.87	9.80	13.0		8.51
1969	0.11	2.87	9.98	12.7		8.52
1970	0.11	2.96	10.5	13.5		8.53
1971	0.17	3.23	11.2	13.2	24.5	8.54
1972	0.14	3.34	11.3	13.0	19.1	8.54
1973	0.12	3.25	11.5	13.0		8.56
1974	0.26	3.67	11.8	12.7	15.7	8.56
1975	0.21	4.43	12.2	11.5		8.56
1976	0.08	4.37	12.2	11.4		8.56
1977	0.04	4.72	12.8	12.1	27.5	8.58
1978	0.03	4.79	12.7	12.0	31.2	8.59
1979	0.02	4.84	14.0	12.7	37.7	8.60
1980	0.02	5.12	14.3	12.8	35.4	8.61
1981	0.01	5.57	15.2	13.1	30.2	8.62
1982	0.01	5.77	15.5	13.1	31.2	8.63
1983	0.01	5.77	15.8	12.7	32.3	8.65
1984	0.00				35.6	8.65

Notes:

^a Workers involved in industrial conflicts as percentage of employees in employment

^b Includes social security contributions

Data sources and calculation methods

- (1) *Unemployment rate*: Management and Coordination Agency, *Survey of Labour Force*.
- (2) *Labour force*: as in (1).
- (3) *Employment* (excluding self-employed): as in (1).
- (4) *Real GDP*: Economic Planning Agency, *Annual Bulletin of National Income Statistics*, 1975 constant prices.
- (5) *Job-offered–job-wanted ratio*: Ministry of Labour, *Bulletin of Occupational Stability*. Vacancy rate cannot be singled out because of data inconsistency between unemployment rate and JOJW ratio.
- (6) *Capacity utilization*: Ministry of International Trade and Industry, *International Trade and Industry Statistics*, 1968–84; average = 100 (1984). Figures in parentheses are based on average = 100 (1965).
- (7) *Labour cost per hour relative to producer price*: Economic Planning Agency, *Annual Bulletin of National Income Statistics*; Ministry of Labour, *Monthly Bulletin of Labour Statistics*; Management and Coordination Agency, *Survey of Labour Force*. Employees' income: average monthly hours worked per regular worker (whole industry including service industry since 1970) $\times 12 \times$ GNP deflator $\times$ total number of employees. Figures in parentheses are based on old SNA data.
- (8) *Capital–employment ratio*: Economic Planning Agency, *Capital Stock Statistics of Private Firms*; Management and Coordination Agency, *Survey of Labour Force*. Capital stock is on installment basis.
- (9) *Competitiveness*: Bank of Japan, *Annual Bulletin of Wholesale Price Index*, export prices divided by import prices. Figures in parentheses are based on average = 100 (1975); others on average = 100 (1980).
- (10) *Wage inflation*: Ministry of Labour, *Monthly Bulletin of Labour Statistics*; total cash earnings of regular workers, average monthly hours worked per regular worker.
- (11) *Price inflation*: as in (4).
- (12) *Unionists as percentage of employees*: Ministry of Labour, *Basic Survey of Trade Unions*; Management and Coordination Agency, *Survey of Labour Force*.
- (13) *Workers involved in industrial conflicts as percentage of employees*: Employment Ministry of Labour, *Survey of Industrial Dispute Statistics*; Management and Coordination Agency, *Survey of Labour Force*.
- (14) *Employers' employment tax rate* (including social security contributions): as in (4). Employers' social security contributions: employees' income + firms' income. Figures in parentheses are based on old SNA data.
- (15) *Workers' tax rate* (including social security contributions): as in (4). Household's sector data: Direct taxes + social security contributions; total receipts.
- (16) *Indirect tax rate*: as in (4); indirect taxes; private final consumption expenditure.
- (17) *Duration of unemployment*: the percentage of unemployed who have been unemployed for over six months; Ministry of Labour, *Special Survey of Labour Force*. Survey data are based on figures in March 1972, 1974, 1977, 1978, 1979, 1980, 1981, 1982; February 1983, 1984; and October 1971, not on yearly average figures.
- (18) *Numbers employed* (including self-employed): as in (1).

SPAIN

	$\log N$	$\log \{w(1 + t_1/P)\}$	$\log (P_m/P)$	$\log K$	$\log L$	u	cu	$\log (P^*e/P)$	LKL	mm
1964	4.559	4.064	4.584	4.362	4.561	0.01	0.835	4.468	4.406	2.00
1965	4.525	4.178	4.544	4.385	4.526	0.009	0.832	4.456	4.463	3.85
1966	4.545	4.296	4.530	4.420	4.544	0.006	0.83	4.462	4.481	1.62
1967	4.578	4.396	4.494	4.465	4.576	0.006	0.80	4.477	4.493	2.71
1968	4.577	4.438	4.570	4.505	4.577	0.007	0.805	4.589	4.533	0.77
1969	4.604	4.518	4.578	4.549	4.603	0.006	0.837	4.599	4.550	2.31
1970	4.605	4.605	4.605	4.605	4.650	0.008	0.837	4.605	4.605	0.07
1971	4.628	4.684	4.565	4.662	4.628	0.007	0.823	4.616	4.639	1.99
1972	4.656	4.783	4.486	4.704	4.663	0.015	0.868	4.590	4.646	1.27
1973	4.688	4.867	4.577	4.764	4.697	0.016	0.888	4.582	4.671	0.77
1974	4.721	4.931	5.024	4.806	4.731	0.018	0.840	4.563	4.680	2.02
1975	4.735	5.044	4.893	4.854	4.757	0.029	0.795	4.563	4.703	3.63
1976	4.741	5.155	4.869	4.889	4.765	0.031	0.815	4.580	4.728	1.89
1977	4.747	5.250	4.905	4.918	4.770	0.030	0.828	4.596	4.754	1.55
1978	4.733	5.321	4.842	4.944	4.770	0.043	0.800	4.574	4.779	0.17
1979	4.701	5.394	4.772	4.965	4.750	0.055	0.798	4.445	4.821	0.61
1980	4.668	5.406	5.103	4.985	4.737	0.073	0.788	4.472	4.853	0.47
1981	4.626	5.419	5.254	5.004	4.720	0.096	0.788	4.542	4.889	1.35
1982	4.569	5.438	5.229	5.019	4.690	0.121	0.80	4.564	4.934	4.37
1983	4.548	5.437	5.279	5.034	4.684	0.134	0.788	4.664	4.955	1.47

	t_1	$t_2 = (t'_2 + t_4)$	t_3	$\Delta \log W$	$\Delta \log P^c$	$\Delta \log P^c$	$\log Y$	$\log GDP$
1964	0.151	0.091	0.065				4.062	4.236
1965	0.149	0.085	0.068			0.123	4.172	4.292
1966	0.144	0.096	0.072	0.154	0.037	0.060	4.270	4.364
1967	0.156	0.117	0.071	0.154	0.031	0.063	4.323	4.412
1968	0.160	0.110	0.067	0.123	0.034	0.048	4.400	4.472
1969	0.165	0.108	0.072	0.072	0.030	0.021	4.527	4.557
1970	0.165	0.109	0.071	0.105				
1971	0.173	0.110	0.066	0.128	0.041	0.055	4.605	4.605
1972	0.175	0.114	0.067	0.124	0.052	0.079	4.665	4.659
1973	0.175	0.123	0.071	0.150	0.054	0.079	4.802	4.741
1974	0.176	0.115	0.060	0.164	0.080	0.108	4.904	4.819
1975	0.195	0.123	0.056	0.228	0.164	0.146	4.964	4.877
1976	0.209	0.127	0.053	0.240	0.144	0.156	4.958	4.890
1977	0.211	0.136	0.053	0.249	0.150	0.139	4.925	4.922
1978	0.235	0.141	0.043	0.260	0.175	0.232	5.037	4.952
1979	0.242	0.168	0.044	0.226	0.166	0.180	5.057	4.977
1980	0.251	0.183	0.044	0.202	0.139	0.146	5.056	4.979
1981	0.253	0.184	0.052	0.145	0.136	0.145	5.060	4.993
1982	0.252	0.190	0.055	0.133	0.126	0.136	5.065	4.990
1983	0.260	0.203	0.060	0.112	0.112	0.135	5.058	5.002
				0.119	0.123	0.115	5.088	5.023

Notes:

(i) All variables, except u , cu , mm , t_1 , t_2 , t_3 , t_4 , $\Delta \log W$, $\Delta \log P$ and $\Delta \log P^c$, are expressed as indices with base 1970 = 100.

(ii) The notation of the variables is the standard one. Some of cases that may raise doubts are:

cu = capacity utilization

LKL = log capital-labour ratio

t'_2 = income tax average rate

t_4 = employees' contributions to social security

P = GDP deflator

P^c = retail price index

Y = industrial output

Definitions

<i>n</i>	log <i>N</i> ; <i>N</i> = total number of employees in industry (annual average) (<i>BE</i>) (elaborated from <i>GTE</i> and <i>EPA</i>).
<i>u</i>	total unemployment rate in industry (annual average), excluding 'school-leavers' (<i>BE</i>) (elaborated from <i>GTE</i> and <i>EPA</i>).
<i>l</i>	log <i>L</i> ; <i>L</i> = total workforce in industry; defined as $l = u + n$.
<i>w</i>	log <i>W</i> ; <i>W</i> = average monthly earnings per employee (<i>BE</i>) (elaborated from <i>ES</i>).
<i>t</i> ₁	employer's mandatory contributions to social security; defined as the ratio of the average contribution per employee to the average wage in industry (<i>CN</i>).
<i>p</i>	log <i>P</i> ; <i>P</i> = industrial output index; elaborated from the industrial component of the wholesale price index and the index of industrial prices (<i>BE</i>).
<i>p</i> ^{<i>c</i>}	log <i>P</i> ^{<i>c</i>} ; <i>P</i> ^{<i>c</i>} = index of consumer prices (<i>BE</i>).
<i>p</i> _{<i>m</i>}	log <i>P</i> _{<i>m</i>} ; <i>P</i> _{<i>m</i>} = index of industrial import prices; elaborated as a weighted average of an index of domestic prices and the indices of unit value of imports of raw materials and semi-elaborated goods in industry (<i>BE</i>).
<i>k</i>	log <i>K</i> ; <i>K</i> = capital stock; elaborated through the integration of flows of 'total gross domestic fixed capital formation' of the non-financial firms, as defined by the <i>CN</i> (see Dolado and Malo de Molina, 1984) (<i>BE</i>).
<i>Y</i>	log <i>Y</i> ; <i>Y</i> = index of value added in industry (<i>CN</i>).
<i>a</i>	log <i>A</i> ; <i>A</i> = index of labour-augmenting technical progress. This is computed as follows. Starting from a value added production function.

$$Y = F(NA, K),$$

by taking logs and differencing, we find that

$$\Delta y = (1 - v_k)(\Delta n + \Delta a) + v_k \Delta k$$

where v_k is the share of capital. Thus we have

$$\Delta a = (1 - v_k)^{-1} \{ \Delta y - (1 - v_k) \Delta n - v_k \Delta k \}.$$

Then the variable is integrated taking an initial value. Since the production function refers to potential value added and we have used actual value added, the index might be underestimated. In order to somehow correct for this deficiency and to iron out cyclical components, the fitted values from a quadratic have been used.

<i>rr</i>	replacement ratio; defined as the ratio of unemployment subsidies per unemployed person to average earnings per employee (<i>BEL</i>). Owing to its potential endogeneity, the following adjusted version was computed. An expected measure for an individual who has a probability of 0.5 of having a complete unemployment spell of 6 months or less, a probability of 0.3 of being unemployed between 6 and 12 months, a probability of 0.1 of unemployment between 12 and 18 months, and finally, a probability of 0.1 of being unemployed for longer than 18 months. The corresponding legal replacement ratios have been 0.8 for the first spell until 1965, an additional 0.7 for the second spell between 1966 and 1975, an additional 0.6 for the third spell between 1976 and 1980, and an additional 0.5 for the fourth spell beyond 1980.
<i>c</i>	an index of firing costs; defined as the ratio of average redundancy payments as agreed by the Labour Court to average earnings per employee (<i>BEL</i>). This variable was adjusted as follows. For a given individual with a duration of 5 years of employment in a firm, the redundancy payments, when fired, accounted for 100 per cent of his (her) annual earnings until 1979 and 90, 75, 75 and 70 per cent in 1980, 1981, 1982 and 1983, respectively.
<i>mm</i>	an index of mismatch; defined as the absolute change in the proportion of 'Total employees in industry (annual average)' relative to 'Total employees (annual average)' (<i>GTE</i> and <i>EPA</i>).
<i>t</i> ₂	labour income taxes; defined as the average rate of income tax that a single worker with the same real wage throughout the period would pay, plus the rate of employee's contributions to social security (<i>MEH</i>).

t_3	indirect taxes; defined as the ratio of total indirect taxes net of subsidies to GDP at factor costs (<i>CN</i>).
e	$\log E$; E = real exchange rate; defined as the ratio of an index of export prices of industrial countries in pesetas to an index of industrial prices (<i>BE</i>).
r	after-tax real interest rate; defined as $(1 - \tau)R - \Delta p_{+1}$ where τ is the corporate tax rate, R is the interest rate on bank credits between one and three years, and p is as above (<i>BE</i>). This variable was always instrumented to take account of the measurement error induced by using Δp_{+1} as opposed to Δp_{+1}^e .
wt	$\log WT$; WT = index of world trade; defined as a quantum index of exports by industrial countries and LDC non-oil-exporting countries. The actual series used in the paper are the deviations of that index in logs from a third-degree polynomial in time (<i>IFS</i>).
m	$\log M$; M = M3 nominal holdings (billions) (<i>BE</i>).
AD	adjusted budget deficit as a proportion of GDP. The cyclically adjusted deficit has been taken from Viñals (1985).

Abbreviations for sources

<i>BE</i>	<i>Boletín Estadístico</i> (Bank of Spain)
<i>BEL</i>	<i>Boletín de Estadísticas Laborales</i>
<i>CN</i>	<i>Contabilidad Nacional</i>
<i>EPA</i>	<i>Encuesta de Población Activa</i>
<i>ES</i>	<i>Encuesta de Salarios</i>
<i>GTE</i>	<i>Grupo de Trabajo del Ministerio de Economía</i>
<i>IFS</i>	<i>International Financial Statistics</i>
<i>MEH</i>	<i>Ministerio Economía y Hacienda</i>

UNITED KINGDOM

	$\log N$	$\log K$	$\log (W/\bar{P})$	ν	AD	$\log (P^*/\bar{P})$	WT
1950							
1951							
1952							
1953	9.927	5.426	4.173	0.236	0.097	-0.556	
1954	9.944	5.452	4.220	0.232	0.089	-0.591	-0.013
1955	9.958	5.477	4.254	0.243	0.082	-0.628	-0.005
1956	9.970	5.502	4.292	0.229	0.080	-0.604	0.044
1957	9.974	5.528	4.292	0.227	0.079	-0.626	0.028
1958	9.966	5.553	4.326	0.209	0.067	-0.651	-0.055
1959	9.972	5.580	4.350	0.211	0.075	-0.661	-0.038
1960	9.994	5.618	4.408	0.226	0.083	-0.674	0.031
1961	10.009	5.651	4.443	0.211	0.080	-0.700	0.001
1962	10.019	5.682	4.467	0.205	0.074	-0.728	-0.010
1963	10.022	5.715	4.487	0.205	0.079	-0.728	0.019
1964	10.035	5.749	4.518	0.213	0.088	-0.756	0.011
1965	10.047	5.790	4.569	0.203	0.085	-0.775	0.013
1966	10.054	5.825	4.633	0.197	0.085	-0.771	0.004
1967	10.035	5.867	4.643	0.203	0.093	-0.816	-0.049
1968	10.028	5.908	4.672	0.224	0.087	-0.696	-0.004
1969	10.027	5.951	4.706	0.220	0.065	-0.697	0.011
1970	10.020	5.989	4.801	0.225	0.062	-0.715	0.005
1971	10.004	6.026	4.842	0.220	0.068	-0.765	-0.003
1972	10.004	6.061	4.909	0.223	0.083	-0.795	0.001
1973	10.028	6.097	4.935	0.267	0.095	-0.715	0.046
1974	10.034	6.130	4.913	0.336	0.097	-0.674	0.031
1975	10.031	6.160	4.973	0.282	0.092	-0.717	-0.074
1976	10.023	6.190	4.944	0.300	0.086	-0.649	-0.009
1977	10.026	6.217	4.910	0.299	0.073	-0.667	-0.015
1978	10.033	6.244	4.966	0.278	0.079	-0.713	-0.002
1979	10.049	6.269	5.010	0.285	0.077	-0.796	0.036
1980	10.041	6.295	5.037	0.258	0.069	-0.941	0.023
1981	9.992	6.312	5.052	0.247	0.059	-0.945	-0.026
1982	9.971	6.330	5.072	0.270	0.053	-0.896	-0.101
1983	9.955	6.346	5.075	0.247	0.062	-0.854	-0.165

	$\log A$	U	$\log L$	MM	ρ	$\log Y^P$ (smoothed)	$\log (U_p)$
1950							
1951							
1952							
1953		0.017	9.944	0.107	40.500	-0.030	-2.408
1954	0.010	0.014	9.958	0.160	37.800	0.034	-2.659
1955	0.021	0.011	9.969	0.487	37.500	0.067	-2.408
1956	0.037	0.012	9.982	0.161	37.700	0.096	-1.966
1957	0.053	0.016	9.990	0.275	36.200	0.127	-1.832
1958	0.067	0.022	9.988	0.244	40.100	0.142	-1.897
1959	0.084	0.024	9.996	0.535	40.600	0.164	-2.040
1960	0.107	0.018	10.012	0.359	42.000	0.196	-1.833
1961	0.132	0.017	10.026	0.065	42.000	0.226	-1.772
1962	0.157	0.023	10.042	0.729	42.400	0.254	-1.661
1963	0.187	0.028	10.050	0.668	43.900	0.285	-1.897
1964	0.218	0.020	10.055	0.159	43.000	0.317	-1.832
1965	0.246	0.017	10.064	0.061	47.500	0.351	-1.661
1966	0.276	0.018	10.072	0.181	48.200	0.381	-1.772
1967	0.309	0.030	10.065	0.586	52.600	0.410	-1.772
1968	0.344	0.033	10.061	0.534	51.700	0.442	-1.619
1969	0.375	0.033	10.060	0.031	50.800	0.470	-1.561
1970	0.407	0.036	10.056	0.487	51.200	0.496	-1.347
1971	0.441	0.047	10.051	0.999	50.600	0.524	-1.347
1972	0.471	0.051	10.055	1.270	47.000	0.552	-1.171
1973	0.501	0.036	10.064	0.603	46.600	0.587	-1.171
1974	0.524	0.036	10.070	0.311	47.200	0.613	-1.386
1975	0.545	0.055	10.086	1.542	49.200	0.640	-1.171
1976	0.560	0.071	10.094	0.793	50.000	0.664	-1.204
1977	0.577	0.074	10.100	0.095	51.300	0.687	-1.139
1978	0.591	0.072	10.105	0.432	49.800	0.701	-1.273
1979	0.612	0.067	10.116	0.518	46.000	0.722	-1.238
1980	0.627	0.087	10.128	1.012	45.800	0.740	-0.892
1981	0.641	0.137	10.129	1.807	50.300	0.745	-0.832
1982	0.659	0.160	10.131	1.076	53.500	0.756	-0.842
1983	0.681	0.167	10.122	0.986	54.400	0.766	-0.846

	t_1	t_2	t_3	V	$\log POP$	$\log G$
1950	4.503					
1951	4.498					
1952	4.505					
1953	4.503	0.086	0.029	0.044	10.426	9.561
1954	4.506	0.086	0.025	0.051	10.426	9.507
1955	4.507	0.090	0.027	0.062	10.427	9.494
1956	4.507	0.093	0.029	0.053	10.426	9.523
1957	4.505	0.098	0.026	0.041	10.427	9.521
1958	4.512	0.110	0.019	0.030	10.429	9.491
1959	4.512	0.108	0.015	0.035	10.434	9.534
1960	4.510	0.110	0.010	0.046	10.440	9.568
1961	4.509	0.116	0.010	0.045	10.446	9.618
1962	4.513	0.123	0.015	0.031	10.459	9.658
1963	4.516	0.122	0.014	0.030	10.461	9.691
1964	4.511	0.127	0.020	0.046	10.465	9.756
1965	4.517	0.141	0.030	0.054	10.462	9.803
1966	4.545	0.152	0.036	0.052	10.463	9.856
1967	4.551	0.153	0.037	0.036	10.462	9.941
1968	4.556	0.167	0.048	0.040	10.464	9.981
1969	4.563	0.175	0.067	0.042	10.463	9.986
1970	4.568	0.186	0.063	0.040	10.462	10.021
1971	4.568	0.188	0.048	0.026	10.462	10.034
1972	4.571	0.178	0.027	0.029	10.462	10.051
1973	4.583	0.186	0.019	0.056	10.464	10.142
1974	4.579	0.209	0.002	0.051	10.465	10.195
1975	4.605	0.237	0.000	0.026	10.466	10.245
1976	4.619	0.245	0.006	0.021	10.469	10.251
1977	4.634	0.233	0.022	0.025	10.473	10.192
1978	4.641	0.223	0.016	0.031	10.477	10.181
1979	4.648	0.213	0.032	0.032	10.482	10.202
1980	4.646	0.220	0.040	0.019	10.485	10.252
1981	4.648	0.238	0.046	0.013	10.493	10.236
1982	4.642	0.243	0.057	0.015	10.161	10.248
1983	4.633	0.244	0.047	0.020	10.160	10.294

	$\log (P_m/\bar{P})$	$\sigma(\text{Model 1})$	$\log (K/L)$	B/Y^P	OIL	τ
1950			-4.573			0.285
1951			-4.556			0.321
1952			-4.536			0.295
1953			-4.518			0.301
1954	0.028	0.355	-4.506	6.500		0.252
1955	0.230	0.245	-4.492	-7.990		0.256
1956	0.206	0.304	-4.480	9.952		0.245
1957	0.170	0.256	-4.463	10.543		0.232
1958	0.077	0.019	-4.435	15.584		0.175
1959	0.058	0.111	-4.416	7.078		0.171
1960	0.044	0.249	-4.394	-8.871		0.162
1961	-0.005	0.159	-4.374	1.710		0.123
1962	-0.040	0.059	-4.360	5.382		0.097
1963	-0.026	0.137	-4.334	4.085		0.105
1964	-0.029	0.203	-4.306	-10.719		0.098
1965	-0.065	0.149	-4.274	-0.836		0.048
1966	-0.087	0.144	-4.247	3.403		0.136
1967	-0.118	0.133	-4.198	-6.642		0.104
1968	-0.051	0.241	-4.153	-5.545		0.083
1969	-0.061	0.011	-4.109	10.745		0.046
1970	-0.092	-0.040	-4.067	15.981		0.044
1971	-0.130	-0.035	-4.025	19.446		0.022
1972	-0.158	0.098	-3.994	3.484		0.002
1973	-0.014	0.356	-3.968	-13.230		0.021
1974	0.161	0.405	-3.940	-38.977		0.092
1975	0.080	0.198	-3.925	-14.327	0.017	-0.191
1976	0.132	0.270	-3.904	-6.672	0.120	-0.133
1977	0.150	0.099	-3.883	0.363	0.372	0.010
1978	0.100	0.137	-3.861	6.917	0.492	0.038
1979	0.079	0.074	-3.847	-2.673	0.720	-0.025
1980	0.067	-0.169	-3.833	15.765	0.727	0.128
1981	0.050	-0.336	-3.817	28.407	0.685	0.042
1982	0.077	-0.424	-3.801	18.774	0.671	0.091
1983	0.105	-0.357	-3.776	9.678	0.704	0.156

Data sources and definitions

Abbreviations

AAS	<i>Annual Abstract of Statistics</i>
BB	'Blue Book', National Income and Expenditure (yearly).
BEQB	<i>Bank of England Quarterly Bulletin</i>
BESA 70	<i>Bank of England Statistical Abstract, 1970</i>
BESA 75	<i>Bank of England Statistical Abstract, 1975 (BESA only published twice)</i>
BLSHA	<i>British Labour Statistics, Historical Abstract, 1886-1968</i>
DEG	<i>Department of Employment Gazette (monthly)</i>
ETAS	<i>Economic Trends Annual Supplement</i>
ET	<i>Economic Trends (monthly)</i>
FS	<i>Financial Statistics (monthly)</i>
MDS	<i>Monthly Digest of Statistics</i>
NIER	<i>National Institute Economic Review</i>
YB	<i>British Labour Statistics Year Book, 1969-1976 (published eight times, between 1969 and 1976)</i>

(Data relate to UK unless otherwise stated.)

Definitions

- N** Employees in employment, males and females, mid-year, Great Britain (ETAS).
- K** Capital stock. The series used is 'gross capital stock at 1975 replacement cost', in £ billion. Data are available yearly from 1958 onward in successive issues of the *BB*, at various base years (which were easily 'spliced' together). Before 1958 only the 1954, 1951 and 1948 observations were published. Data were interpolated using real investment data, namely 'total gross domestic fixed capital formation', £ million at 1975 prices, using the usual technique involving the estimation of a decay parameter δ from the postulated relationship,

$$K_n = \sum_{i=1}^n (1-\delta)^{n-i} I_i + (1-\delta)^n K_0$$

where K_n , K_0 are end of period and beginning of period capital stocks, and I_i is investment. The missing K 's are calculated recursively by setting $n=1$ each time, and using δ . The investment series is published in *ETAS*.

- (W/P) The real product wage. W is a labour cost variable equal to $\bar{W}(1+t_1)$. $\bar{W}$ is the pre-tax wage calculated as follows. We first take E and H , the average weekly earnings and average weekly hours of full-time male manual workers (21 years and over), at October in each year, for all industries covered; and N^h , the average normal weekly hours of male manual workers, for all industries and services. Given an overtime premium of 0.3, we now compute $\bar{W}$ as the hourly earnings if the individual works 45 hours per week. Thus

$$\bar{W} = \frac{E\{N^h + 1.3(45 - N^h)\}}{45\{N^h + 1.3(H - N^h)\}}$$

All data for E , H and N^h are published in *BLSHA*, *YB* and the latest issue of *DEG*.

- ν Ratio of imports to GDP.
- AD** Adjusted public sector deficit as a percentage of potential GDP. We calculate the weighted, cyclically adjusted deficit by the method described in *NIER* 3/85, but with the following alterations: (1) the weights used on current expenditures and capital expenditures are reduced to 0.82 and 0.77 to capture the impact effects of these items on home demand; (2) instead of debt interest, we use $0.02 \times$ volume of public sector debt outstanding (AAS) as an adjustment for the inflation tax.
- $P^*/\bar{P}$ This is a measure of competitiveness. P^* is the unit value index of world manufacturing exports from the *UN Monthly Digest of Statistics*. This is converted from dollars to pounds using the \$/£ exchange rate (*ETAS*).
- WT** This measures the deviation of world trade from trend. The world trade measure is the log of the quantum index of world exports (WE) from the *UN Monthly Digest of Statistics*. The actual variable consists of the residuals from the regression

$$\begin{aligned} \log(WE) = & 1.53 + 0.50t - 0.057t^2 + 0.0033t^3 - 0.000086t^4 \\ & (2.5) \quad (2.5) \quad (2.7) \quad (2.7) \\ & + 0.0000081t^5 \\ & (2.7) \end{aligned}$$

- A** Index of labour-augmenting technical progress. This is computed via the formula

$$\Delta \log A_t = \frac{1}{(1 - \nu_{K_t})} \{ \Delta \log Y_t - (1 - \nu_{K_t}) \Delta \log N_t - \nu_{K_t} \Delta \log K_t \}$$

Y_t is GDP at factor cost (*ETAS*) and the weights are defined using the variables 'compensation of employees' and 'operating surplus' which are rows 17 and 18 in the UK table of *National Accounts of OECD Countries* (Paris, 1981). The series used in the annual estimation procedure corresponds to a five-year moving average of the 'A' index.

- U* Male unemployment rate. The series used is 'males wholly unemployed as a percentage of the number of employees (employed and unemployed) at the appropriate mid-year, for the UK'. The numbers unemployed exclude 'temporarily stopped' but include school-leavers. The data are published in *BLSHA*, the *YB*, and finally *DEG*. We consider the male rate to be the most accurate available measure of the aggregate unemployment rate (including unregistered women). The data refer to the pre-1982 definition of the male unemployment rate; more recent data have been appropriately adjusted.
- L* Labour force, defined by $\log L = U + \log N$. (Note that $\log L - \log N = -\log N/L = -\log \{1 - (L - N)/L\} = L - N/L = U$.) This definition of the labour force is consistent with the view expressed under *U* above.
- MM* An index of mismatch. This is the absolute change in the proportion of 'employees in employment, males and females, in index of production industries at each mid-year, Great Britain', to 'total employees in employment, males and females at each mid-year, Great Britain' (*BLSHA*, *YB*, *DEG*).
- ρ The replacement ratio. This variable is measured as a weighted average of different family types using the following proportions: single householder 0.35, married couple with no children 0.12, with one child 0.11, with two children 0.16 and with three children 0.12. The components of this weighted average are calculated from Table 6.4a of the DHSS *Abstract of Statistics for Index of Retail Prices, Average Earnings, Social Security Benefits and Contributions* (1983). This gives for each family type, data on supplementary benefits, plus rent addition and on net income for a one-earner family on average earnings. We compute annual income on benefit and relate it to mid-year earnings.
- Y^P Potential GDP, constructed from the equation
- $$\Delta \log Y_t^P = (1 - \nu_{Kt}) \Delta \log L_t + \nu_{Kt} \Delta \log K_t + (1 - \nu_{Kt}) \Delta \log A_t$$
- where *L* refers to the labour force.
- U_p Our measure of union power is the log of the union/non-union mark-up (*UM*). The procedure by which this variable was estimated is described in Layard, Metcalf and Nickell (1978, Table 5).^{*} Cross-section regressions have been estimated for each year, 1953–83. The modified series is plotted in Figure 3 of the text alongside series derived from *DEG* on strike activity and union membership.
- t_1 The 'employment tax' borne by the firm. This series is calculated by taking the ratio of two indices, the 'total labour costs per unit of output for the whole economy', 1975 = 100, and 'wages and salaries per unit of output for the whole economy', 1975 = 100. However, it is an index based at 1975 = 100. Thus the only way to obtain an approximation to t_{1t} is to take logs ($\log k(1 + t_{1t}) = \log k + t_{1t}$) and let $\log k$ be absorbed by the regression constant. The former series is published in *BLSHA* (Table 203), *YB* 1976 (Table 55) and the latest issue of *DEG*; the latter series is in *ETAS*.
- t_2 Income tax rate, computed as follows:
- $$t_2 = (DT + SS) / HCR.$$
- where *DT* is direct taxes on household income, *SS* is households' contributions to social security schemes, and *HCR* is households' current receipts minus employer contributions to social security schemes. All three series are from OECD *National Accounts*.
- t_3 The indirect tax rate. The log of the ratio of the GDP deflator at market prices (1975 = 100) to the GDP deflator at factor cost (1975 = 100) yields $t_3 + \text{constant}$ (*ETAS*).
- V* Vacancy rate. This is defined by $V = (V' \times 10^3) / \lambda N$, where *V'* = registered vacancies (*DEG*),

$$\lambda = \text{a correction factor}$$

^{*} See Reference list at end of paper.

$$= \frac{1}{2} \left\{ \left(\frac{\text{outflow of registered vacancies}}{\text{engagements}} \right) + \left(\frac{\text{inflow of registered vacancies}}{\text{separations}} \right) \right\}.$$

λ is discussed in Jackman *et al.* (1984).

POP

Working population (*DEG*).

G

Real government expenditure. *G* is calculated from 'general government expenditure on goods and services', in £ million, which is divided by the GDP at factor cost deflator. The GDP factor cost deflator was used because the equivalent series at constant prices do not exist (*ETAS*).

P_m

Import price index for the UK (*ETAS*).

P

A value-added price index. We define it by

$$(1 + \nu) \log \bar{P} = \log P + \nu \log P_m$$

where $\bar{P}$ is a gross output price index, P_m is an import price index and ν is the share of imports in value added.

$\bar{P}$

The output price index. $\bar{P}$ is defined as the *TFE* deflator at market prices (*BB*) divided by $(1 + NT3)$ where *NT3* is the indirect tax rate relevant to the *TFE* deflator. This is defined as $NT3 = FCA / (TFE - FCA)$ where *TFE* = total final expenditure at market prices (*ETAS*); *FCA* = factor cost adjustment which is expenditure taxes (*ETAS*) – selective employment tax (*BB*) – national insurance surcharge (*BB*) – subsidies (*ETAS*).

IPD

Incomes policy dummy. The variable is unity in 1976 and 1977, zero otherwise.

RI

Post-tax real interest rate. This is defined as $(1 - \tau_c)R_t - \Delta \log P_{t+1}$ where τ_c is the corporate tax rate, R_t is the Treasury bill rate and P_t is as above (*FS*). This variable is always instrumented to take account of the measurement error induced by using $\Delta \log P_{t+1}$ as opposed to $\Delta \log P_{t+1}^e$.

B/Y^P

Total current balance of trade (exports – imports) (*ETAS*) divided by Y^P (potential GDP).

OIL

Real output of oil:

$$OIL = \frac{\text{crude oil output (barrels)} \times \text{price of crude oil (per barrel)}}{\bar{P}}.$$

The data on crude oil output and the relevant price per barrel are found in the Annual Report of the British National Oil Corporation.

τ

The effective average corporate tax rate defined for the whole economy, following the procedure proposed by King (1975) and Beath (1979). The effective tax liability is described by

$$T = t(\Pi - D) + t_d\phi - \Sigma$$

where Π is gross trading profits, Δ is tax deductions, ϕ is gross dividends, Σ is investment grants, t is the corporate tax rate and t_d is personal tax rate on dividend income. The component series were obtained on an annual basis from the following sources:

Π

Gross trading profits after deduction of stock appreciation allowable for tax purposes, per companies and financial institutions (*ETAS*). (Stock appreciation was allowable against tax liability for 1975–83.)

ϕ

Dividends paid on ordinary shares by companies and financial institutions (*ETAS*). This series was adjusted for personal income tax post-1973, as prior to that data it was reported *gross* of tax payments.

Σ

Investment grants received by industrial and commercial companies (*BB*).

D

Interest payments by companies and financial institutions ('other' payments) (*ETAS*); capital consumption allowances are given by gross profits less net profits (*BB*).

The effective tax rate is given as the ratio of the annual tax liability series to gross trading profits. Following Beath (1979), the variable appears in the regressions as $(1 - \tau)^{-1}$. Negative liabilities were set equal to zero.