WHERE DO REAL WAGE POLICIES LEAD BELGIUM?
A General Equilibrium Analysis

S. ERLICH
University of Brussels, 1050 Brussels, Belgium

V. GINSBURGH
University of Brussels, 1050 Brussels, Belgium and CORE

L. VAN DER HEYDEN*
School of Management, Yale University, New Haven, CT 06520, USA

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This paper is concerned with an application to Belgium of a two-period general equilibrium model; in the short run, market imperfections (like downward rigidities on real wages) may generate a temporary disequilibrium; in the long run, flexible prices and substitution between factors restore equilibrium on all markets. The 'dynamic' structure is thus actually meant to represent a short-run disequilibrium embedded in a long-run equilibrium, and only the short-run results are of real interest, but with a theoretically sound long-run analysis as a background. We show that in the short run, real wage policies can only do very little to alleviate the burden of unemployment. They however have strong effects in the medium and the long run, provided that they are supported by fairly large capacity increases.

1. Introduction

Like most other European countries facing rising unemployment, Belgium has, during the last years, followed income policies tending to decrease the real wage rate. Unlike in other countries, however, the first problem was compounded with two others: an unfavorable trade balance and large public deficits.

In early 1982, the government decided to devalue the Belgian currency; simultaneously, wage indexation, effective for many years, was interrupted during two years. Higher income taxes and social security contributions were levied to decrease the booming public deficit.

What are the results of these policies, three years after they were

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implemented? The trade deficit has decreased; Belgium seems even to be running a small surplus. Unemployment has not receded; quite on the contrary, it has steadily grown from 350,000 unemployed in 1980 to some 550,000 in 1985.

In this paper we try to calculate by how much real wages should be decreased to ensure long-run full employment. We also give estimates of the effects of such wage decreases on the short (three years) and the medium run (seven years). To do this, we have built a small two-period general equilibrium model, in which there are four groups of agents (consumers, producers, the government and the rest of the world) trading 52 commodities (24 goods, and 28 production factors including 24 production capacities, labor and three non-substitutable imports).

The institutional framework is perfect competition, with three exceptions in the short and medium run: a downward real wage rigidity prevents the labor market from clearing; the external account may be in a temporary disequilibrium and there is no capital–labor substitution per sector in the short run. In the long run, on the contrary, all prices are fully flexible and all markets do clear, the external account is balanced, and there is capital–labor substitution. Moreover, since, as will be seen, the model is solved in an intertemporal optimization framework, agents can be considered as endowed with perfect foresight.

The two-period concept is meant to embed the short- (three-year) or medium-run (seven-year) disequilibrium into a long-run (ten-year) world in which market forces have the time to operate, and restore equilibrium. The main focus of the model is the first period, however; the second period has no other role than that of a theoretically sound background for the first one.

For the short run, the results are qualitatively very close to those obtained in Ginsburgh and Erlich (1984) and Ginsburgh and Van der Heyden (1985a), who consider a one-period general equilibrium model, with a downward rigid real wage. Because of capacity constraints, the short-run elasticity of employment with respect to real wages is very low (of the order of −0.2), and even if the savings rate is increased by some 10%, a decrease of 10% of the real wage will allow for only 100,000 more jobs (some 2% of the labor force) within a three-year time span.

In the medium run, results are more encouraging. An 8% decrease of the real wage rate is sufficient to restore full employment some seven years later; the elasticity of employment with respect to real wages is −1.2.

The paper is organized as follows. Section 2 describes the model. Section 3 briefly covers computational aspects, while results are given in section 4.

1 Capital and labor are substitutes in the medium run.
2 The dynamic model used here is an outgrowth of the static model considered in these two papers.
2. The model

2.1. The behavior of agents

Belgian consumers are aggregated into one agent whose intertemporal utility function is

$$U(x_1) + \rho_2 U(x_2) + \rho_3 \phi(k_2),$$

where $x_t$ is the consumption vector at the end of period $t$, $k_2$ is a vector of terminal capital stocks, $\rho_2$ and $\rho_3$ are discount factors, $U(\cdot)$ is a utility index, while $\rho_3 \phi(k_2)$ represents the discounted sum of utilities of future consumption streams, consistent with a terminal capital stock $k_2$. $U(\cdot)$ is obtained by integrating a linear expenditure system estimated for Belgium by Cherif et al. (1978), while $\phi(\cdot)$ is logarithmic in $k_2$.

The choice $x_t$, $l_t$, and $v_t$ ($t = 1, 2$) of the Belgian consumer results from the following maximization problem:

$$\text{max } U(x_1) + \rho_2 U(x_2) + \rho_3 \phi(k_2)$$

s.t.

$$\sum_{t=1}^{2} p_{it} x_t + p_{it} V v_t \leq \sum_{t=1}^{2} (w_i l_t + q_t k_t - z_t - b_t),$$

$$l_1 \leq l_1 - u_1,$$

$$l_2 = l_2,$$

$$b_1 + b_2 = 0,$$

where, by definition, $k_1 = Dk + Qv_1$ and $k_2 = D_1 k_1 + Q_1 v_1 + Q_2 v_2$. The following notation is used: subscript $t = 1, 2$ refers to the two periods, $x_t$ is consumption, $v_t$ are investment, $l_t$ labor demand, $k_t$ the capital stock, $z_t$ government taxes, $b_t$ the short-run deficit in the current account, $p_t$ represents commodity prices, $q_t$ capital rents, $w_t$ the wage rate. Finally, $\hat{l}_t$ is the labor supply, $u_t$ the first-period unemployment; the matrix $V$ converts investment by origin (commodities) into investment by destination (firms), while $Q$, $Q_1$, and $Q_2$ are diagonal matrices the elements of which transform investment flows $v_i$ into capital stocks $k_i$ and $D$, $D_1$ and $D_2$ are diagonal matrices the elements of which take into account capital depreciation; $\hat{k}$ is the vector of initial capital stocks.

The first inequality is the intertemporal budget constraint: the consumer

\[1\text{For details on this approach, see Boucher et al. (1985).}]}
spends $\sum p_x x_t$ on consumption and saves $\sum p_i V_t$; his income consists of labor income $\sum w_t l_t$, capital income $\sum q_t k_t$, while $\sum z_t$ is a net lump-sum transfer to the government and $b_t$ a (possibly zero) transfer to the rest of the world (the first period's current account deficit or surplus). Note that in the long run, the transfer is zero [constraint (2.1e)]. The second inequality constrains the agent's supply of labor and allows unemployment $u_t$ to coexist with a positive wage rate $w_t$ [see, for example, Driët (1975)]. In the long run, there is full employment, as implied by (2.1d). Note that the consumer makes his choice, with $u_t$, $p_n$, $q_t$, $w_t$, $z_t$ and $b_t$ given, and that first- and second-period savings will be determined by $\rho_2$ and $\rho_3$.

The second agent is the government, whose consumption bundles $g_t=\hat{g}_t$, are exogenous. In the long run, the government budget is balanced:

$$\sum_{t=1}^3 p_t \hat{g}_t = \sum_{t=1}^3 z_t. \quad (2.2)$$

An activity analysis model describes the productive side of the economy. The square matrix $A$ denotes net outputs of commodities by the various 24 sectors, while $A^t$ is a $3 \times 24$ matrix of inputs of non-substitutable imports (oil, natural gas, nuclear fuels); $\lambda_t$ is a vector of labor coefficients, while $K_t$ is a diagonal square matrix of capital coefficients. Producers choose activity levels $y_t$ to maximize profits:

$$\max_{y_t \geq 0} (p_t A - w_t \lambda_t - p_t^t A^t - q_t K_t) y_t, \quad t = 1, 2, \quad (2.3)$$

where $p_t^t$ stands for the price vector of non-substitutable imports. The coefficients $A$, $A^t$, and $\lambda_t$ are estimated from input–output tables [see Guillaume et al. (1983)]; $\lambda_t$ and $K_t$ ($t = 1, 2$) are both functions of labor costs relative to capital costs. To see how they vary, consider the cost-minimization problem of a sector $j$ ($j = 1, 2, \ldots, 24$) facing a Cobb–Douglas technology $y = BL^{\kappa} K^{1-\kappa}$ (to lighten notation we drop the sector index $j$). The first-order condition leads to

$$\kappa = \frac{w}{r} \frac{1-\beta}{\beta} \lambda, \quad (2.4)$$

where $\kappa = K/Y$ and $\lambda = L/Y$, while $w$ and $r$ represent labor and capital unit incomes. Let

$$BL^\kappa K^{1-\kappa} = 1 \quad (2.5)$$

be a unit isoquant of the production function. Replacing $\kappa$ by (2.4) in (2.5)
gives:

\[
\lambda = B^{-1} \left( \frac{\beta}{1 - \beta} \frac{r}{w} \right)^{1 - \beta}.
\]

(2.6)

Knowing \( B \) and \( \beta \) for every sector, it is easy to compute \( \lambda \) [using (2.6)] and \( \kappa \) [using (2.4)] for any relative price combinations \( w/r \); we set \( r_s \), period \( t \)'s capital income, equal to \( \sum_j q_j k_j / \sum_j k_j^t \), where \( q_j^r \) is the rent accruing to one unit of capital in sector \( j \), while \( k_j^t \) represents capital in sector \( j \); note thus that \( r_s \) is common to all sectors.

There is thus, in the medium and in the long run, scope for substitution between labor and capital; this substitution is however limited since inputs of commodities are fixed and probably, specifying a larger set of activities, would make room for more substitution possibilities between capital and labor.

The last agent is the rest of the world, whose preferences are represented by an intertemporal trade welfare function:

\[
W(e_1, m_1, m_c^e) + \rho_4 W(e_2, m_2, m_c^e),
\]

which relates utility to trade with Belgium (\( e \) represents Belgian exports, while \( m_i \) and \( m_c^e \) represents Belgian imports of substitutable and non-substitutable goods). This shortcut is common in trade theory and avoids representing the rest of the world by a full model [see, for example, Negishi (1972)]. The trade welfare function has been chosen as

\[
W(e, m, m^c) = \sum_j \tilde{e}_j e_j^{(1/\gamma_j + 1)} - \sum_j \tilde{\mu}_j m_j^{(1/\eta_j + 1)}
\]

\[
- \sum_j \tilde{\kappa}_j m_j^{(1/\eta_j + 1)},
\]

with the index \( j \) running over commodities, while the \( \tilde{e}_j, \tilde{\mu}_j, \eta_j, \kappa_j \) are parameters. The \( \tilde{\xi}_j, \eta_j \) and \( \eta_j \) can be interpreted as price elasticities, if one assumes that the rest of the world's marginal welfare w.r.t. its trade deficit is constant. See Ginsburgh and Van der Heyden (1985a) for further details on how \( W(\cdot) \) is constructed.

The choice \( e_i \), \( m_i \) and \( m_c^e \) (\( i = 1, 2 \)) of the rest of the world results from the following maximization problem:

\[
\max W(e_1, m_1, m_c^e) + \rho_4 W(e_2, m_2, m_c^e)
\]

(2.7a)

s.t.

\[
\sum_{i=1}^{2} (p_i e_i - p_i m_i - \rho_4 m_c^e) \leq b_1 + b_2 = 0.
\]

(2.7b)
(2.7b) is the intertemporal balance of trade constraint; note that if \( b_1 \neq 0 \), the first period's trade is not in equilibrium, while equilibrium is imposed in the long run.

2.2. The markets

There are 52 markets for each period: 24 for commodities; 28 for factors (24 production capacities, three non-substitutable imports and labor). On every market, the equilibrium condition requires supply to be at least equal to demand. For the goods market, the condition is

\[
x_t + \hat{g}_t + V_t e_t + e_t \leq A_t y_t + m_t, \quad t = 1, 2.
\]

(2.8)

The left-hand side represents total demand (private and public consumption, investment and exports) while the right-hand side gives total supply (net production and substitutable imports).

On the markets for production capacities, we have:

\[
K_1 y_1 \leq k_1 = Dk + Qv_1, \\
K_2 y_2 = k_2 = Dk_1 + Q_1 v_1 + Q_2 v_2.
\]

(2.9)

Demand by firms \( K_t y_t \) may not exceed supply, equal to (depreciated) initial capacities, plus additions during the period. In \( t = 1 \), it may happen that capacities are not fully used; for \( t = 2 \) we assume equilibrium to prevail in all sectors.

Demand for non-substitutable imports \( A_t y_t \) may not exceed the rest of the world's supply \( m_t \):

\[
A_t y_t \leq m_t, \quad t = 1, 2.
\]

(2.10)

Finally, on the labor market,

\[
\lambda_1 y_1 \leq \tilde{l}_1 - u_1, \\
\lambda_2 y_2 = \tilde{l}_2.
\]

(2.11)

In (2.11) \( \lambda_t y_t \) is the demand for labor, while \( \tilde{l}_1 - u_1 \) is the rationed supply of the first period; equilibrium is imposed for the second period. Unemployment in the first period is the consequence of a downward rigidity on the real wage. If \( w_1 \) denotes the nominal wage rate, while \( P(p_t) \) is a suitably defined price index, we have

\[
w_t / P(p_t) \geq w_1,
\]

(2.12)
where \( w_1 \) is a lower bound on the real wage rate. Market clearing on the labor market is ensured through a rationing of the labor supply \( l_t = \bar{l}_t - u_t \), where \( \bar{l}_t \) is full employment. Rationing can occur only if the real wage hits the lower bound \( w_1 \); the following equality must thus hold:

\[
\begin{align*}
\hat{u}_1(w_1 - w_1 P(p_1)) &= 0.
\end{align*}
\]  \tag{2.13}

2.3. The market equilibrium

The vectors \( x_t, \hat{g}_t, v_t, e_t, m_t, m_t^1, y_t \) together with the scalars \( z_t, b_t, \) and \( u_t \) supported by the price vectors \( p_t, q_t, p_t^1 \) and \( w_t \) \((t = 1, 2)\) define a market equilibrium with a downward rigidity on the first period's real wage rate, if they satisfy (2.1) to (2.13) and, if moreover, for \( t = 1, 2 \) the following conditions hold:

\[
\begin{align*}
\hat{p}(x_t + \hat{g}_t + V u_t + e_t - A y_t - m_t) &= 0, \\
q_t(K_t, y_t - k_t) &= 0, \\
p_t^1(A^t y_t - m_t^1) &= 0.
\end{align*}
\]

Conditions (2.14) require a price to be zero if there is excess supply on the corresponding market.

All budget constraints are homogeneous of degree zero in prices provided that \( z_t \) and \( b_t \) are specified in relative terms. Since the government budget is balanced, \( \sum z_t = \sum p_t \hat{g}_t; b_t \) is specified as a percentage of imports, i.e. \( b_t = \pi(p_t m_t + p_t^1 m_t^1) \).

3. Calibration and computational aspects

We use two versions of the model:

(a) the 'short-run' version, in which the first period extends from 1977 to 1980, the second from 1981 to 1990;

(b) the 'medium-run' version, in which the time spans are, respectively, 1976–1983 and 1984–1990.

The idea will be to compare what can be achieved in the short run (three years) and in the medium run (seven years). In both cases the first period is embedded into the long run. In the short-run version, however, we assume that capital–labor substitution will take place only during the second period; in the medium-run version, there is capital–labor substitution in both periods (i.e. after seven years and a fortiori after 14 years).
We describe calibration and computational aspects for the medium-run version; the short-run version can be considered as a special case in which the capital and labor coefficients for $t=1$ are constant. The short-run version is calibrated in order to reproduce 1980 (for $t=1$); for the medium-run version, 1983 is the benchmark (again for $t=1$).

Negishi (1960) has shown that an equilibrium can be generated as a solution of a mathematical program the objective function of which is a weighted sum of the utility functions of the various agents, while the constraints set consists of the market clearing conditions. Ginsburgh and Van der Heyden (1985b) have extended this result to the case of downward price rigidities, which can be handled by appending to the Negishi welfare function a term representing the rationing needed to verify the price constraints. These results suggest that a solution of our model can be computed by solving the following mathematical program:

$$\max U(x_1) + \rho_2 U(x_2) + \rho_3 \phi(k_2) + \alpha_1 [W(e_1, m_1, m_1^a)] + \rho_4 W(e_2, m_2, m_2^a)] + \gamma w_1 u_1 \quad (\alpha > 0)$$

s.t.

$$x_t + \nu_t + \varepsilon_t - Ay_t - m_t \leq -\delta_t, \quad (p_t), \quad t = 1, 2,$$

$$A^\prime y_t - m_t^c \leq 0 \quad (p_t^c), \quad t = 1, 2,$$

$$K_1 y_1 - k_1 \geq 0 \quad (q_1),$$

$$K_2 y_2 - k_2 = 0 \quad (q_2),$$

$$\lambda_1 y_1 + u_1 \leq \tilde{f} \quad (w_1),$$

$$\lambda_2 y_2 = \tilde{f} \quad (w_2),$$

with $k_1 = D_1 + Q_1$, and $k_2 = D_1 k_1 + Q_1 + Q_2 v_2$; the variables in parentheses are the prices associated with the constraints.

It can be shown [see Ginsburgh and Van der Heyden (1985b)] that a solution to this program with $\gamma = P(p_t)$, and which satisfies the budget constraints (2.1b), (2.2) and (2.7b), is an equilibrium. We give some intuition on why the result holds.4

4The existence result of Negishi (1960) and of Ginsburgh and Van der Heyden (1985b) holds under somewhat less general assumptions. This means that in this model an equilibrium will not necessarily exist for any a priori specified distribution of income. It is however plausible that equilibria will exist for distributions which are not too far from actual distributions. That is at least what experimentation with the model leads us to believe.
It is easy to check, by duality, that if \( \gamma = P(p_1) \), we necessarily have (2.12) and (2.13). The other problem is to satisfy the budget constraints; we briefly show that this will be achieved by choosing in a suitable way \( \alpha \). At an optimum of the mathematical program, the Kuhn–Tucker conditions lead to

\[
p_t x_t + p_t \delta_t + p_t V_t + p_t e_t - p_t A_t y_t - p_t m_t = 0, \quad t = 1, 2,
\]

\[
p_t A_t y_t - p_t m_t = 0, \quad t = 1, 2,
\]

\[
q_t K_t y_t = q_t k_t, \quad t = 1, 2,
\]

\[
w_1 \beta_1 y_1 + w_1 u_1 = w_1 f_1,
\]

\[
w_2 \beta_2 y_2 = w_2 f_2.
\]

Adding these equalities, and noting that, because of constant returns to scale in industry, optimal profits are zero, i.e.

\[
p_t A_t y_t - w_0 \beta_0 y_t - p_t A_t y_t - q_t K_t y_t = 0, \quad t = 1, 2,
\]

and that, by definition,

\[
\sum p_t \delta_t = \sum \zeta_t,
\]

we are left with

\[
\sum (p_t x_t + p_t V_t + p_t e_t - p_t m_t - p_t m_t) = \sum q_t k_t + w_1 (f_1 - u_1) + w_2 f_2 - \sum \zeta_t,
\]

which shows that the sum of constraints (2.1b) and (2.7b) is satisfied. If we can force (2.7b) to be satisfied, i.e. if

\[
\sum (p_t e_t - p_t m_t - p_t m_t) = \sum h_t = 0,
\]

then

\[
\sum (p_t x_t + p_t V_t) = \sum q_t k_t + w_1 (f_1 - u_1) + w_2 f_2 - \sum \zeta_t,
\]

and (2.1b) will also be satisfied.

To force constraint (2.7b) to be satisfied, we are free to choose a specific value \( \alpha \).

This suggests a fairly straightforward way of computing an equilibrium with downward wage rigidities. Pick weights \( \alpha \) and \( \gamma \); compute a solution to the mathematical program. Verify whether \( \gamma = P(p_1) \), and the external balance
is satisfied. If so, a solution is obtained. If not, change the weights and start a
new iteration.

We are now ready to discuss the problem of generating a reference solution to which we can compare alternative runs. There are still parameters for which values have to be set: $\rho_2$, $\rho_3$ and $\rho_4$, the 'discount' rates; $\gamma W_1$, the lower bound on the real wage rate (multiplied by $\gamma$); $K_t$ and $\lambda_t$, the capital and labor coefficients.

Note first that, since $\rho_2$ and $\rho_3$ are marginal rates of substitution between future (second-period and post-horizon years, respectively) and today's (first-period) consumption, they will govern the allocation of income between savings and consumption; note also that since $\rho_2$ and $\rho_3$ generate savings, and hence capital stocks $k_t$, their value will also, to some extent, generate capital income $q_t k_t$ and hence the allocation of income between capitalists and workers. On the other hand, changing the objective function coefficient $\gamma W_1$ affecting first-period's unemployment $u_1$ will modify the value of the latter, and hence also the distribution of income between capital and labor. This suggests using $\rho_2$, $\rho_3$ and $\gamma W_1$ to reproduce a reasonable pattern of savings, income distribution, and first-period's unemployment. We thus have three degrees of freedom ($\rho_2$, $\rho_3$ and $\gamma W_1$) to set five 'variables'; the allocation of income between savings and investment in both $t=1$ and 2, the allocation of income between labor and capital in $t=1$ and 2, and unemployment in $t=1$. Clearly, not all of these can be controlled by using $\rho_2$, $\rho_3$ and $\gamma W_1$. A choice had to be made and we decided to set $\rho_2$, $\rho_3$ and $\gamma W_1$ to reproduce

(a) the observed unemployment rate and savings rate in $t=1$; fortunately, this also set the correct distribution of income between capital and labor; and

(b) a fixed distribution of income between capital and labor in $t=2$. This leaves the savings rate endogenous. The reason for this choice is that we think we know more about income distribution (which is relatively stable over time) than about the savings rate (or the investment rate) which fluctuates much more.

Note that once $\gamma W_1$ is known, it is easy to compute $W_1$ equal to $\gamma W_1/P(p_t)$.

The parameter $\rho_4$ is the marginal rate of substitution between first- and second-period allocations in the rest of the world; it can thus be set in order to reproduce $b_1$, the first-period current account surplus or deficit, while $\alpha$ is chosen to generate the long-term equilibrium ($b_1 + b_2 = 0$).

In short, to generate a reference solution, we set $\rho_2$, $\rho_3$ and $\gamma W_1$ to reproduce a realistic distribution of income in both periods, and the first-period unemployment rate; $\rho_4$ and $\alpha$ are set to reproduce the external account in both periods.\(^5\)

\(^5\)The base case values for these parameters are the following for the medium-term solution: $\rho_2 = 0.5$ (which corresponds to an annual discount rate of 10\% for the Belgian consumer); $\rho_3 = 0.4$ (discount rate of 14\% for the rest of the world); $\rho_4 = 0.128$; $\alpha = 1.368$. The last two parameters have no straightforward interpretation.
To calibrate the $\beta$ and $B$ coefficients of the Cobb-Douglas production functions, we set $w/r = 1$ and, using the observed first-period's labor and capital coefficients $\lambda^*_t$ and $\kappa^*_t$, we compute $\beta$ and $B$ using (2.4) and (2.6). The second-period coefficients $\lambda_2$ and $\kappa_2$ are then simply obtained by iterating on

$$\lambda_2 = B^{-1} \left( \frac{\beta r_2 w^*_2}{1 - \beta r_2 w^*_2} \right)^{1-\beta}$$

and

$$\kappa_2 = \frac{w_2}{r_2} \frac{r^*_2}{w^*_2} \frac{1 - \beta}{\beta} \lambda_2$$

until convergence is obtained; $w^*_t$ and $r^*_t$ will be referred to as the base case values.

### 4. Results

To analyze the effects of real wage policies, we change the floor wage rate $w_1$ and compute solutions generating long-run equilibrium on all markets. This amounts to looking for a value of $\gamma = P(r_1)$ and a value of $x$ generating a long-run equilibrium of the trade balance. Moreover, to account for possible substitution effects between labor and capital, we modify the input coefficient using

$$\lambda_t = B^{-1} \left( \frac{\beta r_t w^*_t}{1 - \beta r_t w^*_t} \right)^{1-\beta}$$

and

$$\kappa_t = \frac{w_t}{r_t} \frac{r^*_t}{w^*_t} \frac{1 - \beta}{\beta} \lambda_t$$

for $t = 1, 2$ (in the short-run version, $\lambda_1 = \lambda^*_1$ and $\kappa_1 = \kappa^*_1$ since we assume no substitution between factors within three years).

Let us first analyze the short-run effects of a real wage decrease. The important result is given in fig. 1 which represents the unemployment rate as a function of real wage decreases. It can be seen that it does not seem possible to seriously decrease unemployment. Indeed, a 10% decrease of the real wage increases employment by some 100,000 workers (2% of the labor force).

*Or, alternatively, using column generation algorithms as suggested by Boucher and Smeers (1984).*
This should be taken as a clear indication that today's Belgian unemployment, even if it is partly the consequence of ailing world demand conditions, can hardly be cured by demand policies alone: capacity increases are needed to restore equilibrium on the labor market.

Though our model has very little in common with those considered by Drèze and Modigliani (1981) or, more recently, by Sneessens (1985), it is interesting to notice that results point in the same direction. Drèze and Modigliani have shown that the short-run elasticity of employment w.r.t. the real wage rate is of the order of $-0.2$. Sneessens, who has a mixture of various types of unemployment (while our model only allows for classical unemployment), shows that there is a gap of 350,000 workers (two-thirds of total unemployment) between supply and potential (i.e. full capacity) demand of labor.

Similar results have been shown to hold for the United Kingdom: Layard and Nickell (1985) provide econometric evidence of the fact that only a small fraction of Britain's 13% unemployment rate could be cured without increasing the inflation rate; the British economy seems thus also to be facing a short-run capacity constraint.

Let us now turn to the medium-run effects of such a wage decrease. The results are summarized in fig. 2, which gives the consequences of a decrease of the real wage represented on the horizontal axis, on

(a) the medium-term unemployment rate (the labor market is in equilibrium in the long run);

(b) the long-run real wage rate as a percentage ($\times 100$) of the real wage rate in the medium run – i.e. $w_2 P(p_1)/w_1 P(p_2)$;

(c) the medium-term investment rate (as a % of income); and

(d) the increase of the medium-term capital stock, necessary to reduce unemployment (index, base case = 100).

Or suspicious, as pointed out by the referee.

The measure of the capital stock is very crude. It is obtained by simply adding production capacities, and should be taken as rough indicator of capital.
Fig. 2. Medium-run effects of a real wage decrease.
The curves in solid lines represent solutions of the model in which capital-labor substitution can take place both in the medium and the long run; the solutions represented by the broken lines do not allow for substitution in the medium run; and quite evidently substitution allows for more rapid changes (the unemployment rate decreases faster) at lower investment rates and capital needs. We concentrate on the case in which substitution may take place.

As can be seen, an 8% decrease in the real wage would be sufficient to restore full employment seven years later; the elasticity of employment with respect to real wages is of the order of −1.2. However, decreasing the real wage alone is not sufficient; indeed, the model shows that the capital stock would have to be some 10% higher than in the base case (with a 12% unemployment rate). This seems to indicate that even in the medium term, the capital stock has to be increased substantially to cope with unemployment problems. The second part of fig. 2 gives the medium-run–long-run tradeoff of wage cuts. It shows that a 0% cut in the medium run would cost a 7% cut in the long run to restore long-run full employment, while an 8% cut in the medium run would allow for an increase of 6% between 1983 and 1990, thus bringing the real wage rate back to its initial level. Note, finally, that a medium-run decrease of some 4–5% seems to be sufficient to restore full employment in the long run, without further wage cuts. Moreover, the cut has to be backed up by a 25% increase of the capital stock within 15 years.

How do the results of the model compare with what has actually happened in Belgium since 1982, and what do they teach us?

First, the 5% real wage cut corresponds to the observed decrease of wages paid by firms; workers’ per capita real income, on the other hand, was subjected to a decrease of more than 10%, as a sequel of increases in tax rates and social security contributions levied to heap up the public deficit. And it may well be the case that this sharp decrease in income has created a Keynesian unemployment situation. Our model takes into account neither wedges between wages paid and wages earned (taxes are lump sum), nor situations of Keynesian unemployment.

Second, large capital increases are necessary to widen capacities. That this happens is questionable in the light of the recent Belgian experience, since investment has only very mildly answered to the decrease of the wage rate. In the model, we have a classical saving–investment ‘closure’ and there is no possibility of exporting capital.

For these two reasons, it is difficult to assess whether the model correctly predicts the effects of a policy which has not been followed. We do think that a 5% real wage cut alone would have had the short-, medium- and long-run

*This may be partly due to the fact that the government has taxed in several ways the increase of profits by firms, as a consequence of the real wage decrease.
effects generated by the model. We also believe that the actual decrease in income has offset, at least partly, the positive effects the wage decrease has had on production costs. It is perhaps again time to think of Keynes.

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