STUDIECENTRUM VOOR ECONOMISCH EN SOCIAAL ONDERZOEK

Reducing working time for reducing unemployment ?

A macro economic simulation study for the Belgian economy*

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Abstract

In this paper we investigate the impact of a reduction of working time (RWT) on some main aggregate economic variables, such as (un)employment, production, final demand, profits and the financing shortage of the government. This investigation is performed by simulating the MARIBEL-model, being the current official model of the Belgian Planning Office, over a time period of five years (1985-1989).

We found that a single 10 % contractual RWT in the private sector in 1985 leads to a smaller percentage of job increase. Unemployment reduces most when the RWT is accompanied by a decrease in the purchasing power per employee. Hence, there is a trade off between a creation of jobs and buying power.

The results of this simulation study are compared with other national and international investigations.

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1. Introduction

In this paper, we investigate, on some main macro-economic variables, the impact of a 10 % once and for all reduction of working time (RWT) with the Belgian Maribel model. There is also a comparison with some other national and international models where experiments of RWT have been made.
The major point of the paper concentrates upon the effect of RWT upon employment and unemployment. Also covered is the effect upon production, productivity, profits and competition, and upon the budget deficit of the government.
In this paper RWT is defined as the decrease of total hours worked per employee per year. A RWT over the whole life cycle, by means of increasing the school leaving age or earlier retirement, is kept out of this study.

In the second section, some essential relationships of the model that we have used are discussed. In the third section, the simulations are described. In the fourth section of the paper, the effects of a RWT for the employees are investigated, while in the fifth section the impact for the employers is pointed out. The results on the government's deficit are reviewed in the sixth section. In section seven, an international comparison has been made. Lastly, general conclusions are discussed in section eight.

2. The MARIBEL-model : an overview

2.1. Introduction

The Maribel-model of the Belgian Planning Office, is used twice a year (January - July) for forecasting the Belgian economy for a planning horizon of 5 years.

Maribel (Model for Analysis and Rapid Investigation of the Belgian Economy) is a macro-economic model for the postwar open economy of Belgium. The databank of Maribel is called Mirabel, and contains statistical information from 1953 onwards. The main source of the data are the National Accounts of the National Institute of Statistics. Maribel itself is very aggregated for private households and for private firms. The model ignores sectoral or regional subdivisions. The information collected about the public sector is more disaggregated (i.e., local and central government, social security, ...)

In sections 2.2. and 2.3., two of the principal relations w.r.t. RWT, i.e. the production function and the employment function respectively, are described. For the purpose of this paper, these relationships are the most important. However, when relevant, other functions will be discussed too. Both, production and employment functions, are those of the private sector only.

2.2. The production function of the Maribel model

2.2.1. Production

The production model used in Maribel considers homogeneous output produced by homogeneous inputs. In the medium run the production technology is described by a Cobb Douglas production function with Hicks' neutral technical progress, showing a unitary elasticity of substitution between capital and labour. Relationships for the (average) labour productivity and the (degree of utilization of the) production capacity of Maribel are discussed now.

2.2.2. Productivity

The parameters of the productivity function are estimated by the following equation, written for period $t = 1, 2, \ldots, T$ as :

$$\ln QAFEHF_t = c_1 + c_2 \cdot \ln\left(\frac{KF}{LF}\right)_t + c_3 \cdot t + c_4 \ln QAFEHF_{t-1} + \varepsilon_t \qquad (1)$$

where :

$QAFEHF_t$ = the (average) labour productivity, constant BF of 1975
= 1000 x $(QAFF/LF)_t$

$QAFF_t$ = the volume of production, i.e., the gross domestic product at factor cost of the private sector in constant prices (10^9 BF of 1975)

KF_t = the capital stock of the private sector in constant prices (10^9 BF of 1975)

LF_t = quantity of labour input in the private sector (10^6 working hours per year)[1)]

ε_t = a random error term with expectation 0 and variance σ^2_ε

An econometric estimation of relationship (1) over the period 1954 - 1981, by ordinary least squares, yields the following point estimates (t-statistics between brackets)

$\hat{c}_1 = 1.88$ (2.2)
$\hat{c}_2 = 0.25$ (1.88)
$\hat{c}_3 = 0.002$ (0.36) (2)
$\hat{c}_4 = 0.70$ (6.3)

Durbin Watson statistic = 1.6
$R^2 = .99$

One notices that the estimate of the rate of technological progress, c_3, is very small (0.002) and insignificant. An adjustment of the parameter of technological progress from 0.002 to 0.010 - this would mean an average extra technological progress of 1 % per year - seemed to be impossible : estimating this leads to a diverging model.

[1)] A reduction of LF does not necessarily imply a RWT, since LF is the product of the average working time and the number of workers.

2.2.3. Production capacity and degree of utilization of capacity

In Maribel, the capacity of production is constructed by substituting potential inputs for real inputs in the long run CD-production function. So, one obtains from (1), the long run production function (3) :

$$\ln QAFF_t = \left(\frac{c_1}{1-c_4} - \ln 1000\right) + \frac{c_2}{1-c_4} \ln KF_t + \left(1 - \frac{c_2}{1-c_4}\right) \ln LF_t + \frac{c_3}{1-c_4} t + \frac{\varepsilon_t}{1-c_4} \qquad (3)$$

In (3), one can replace real input of labour (LF) by the potential quantity of labour input (LPF), LPF being defined as

$$LPF_t := (EOF_t + UL_t) \times HPDF_t \qquad (4)$$

where :

EOF = total employment in the private sector,
UL = unemployment, all categories
HPDF = the number of per capita contractual working hours per year.

If you combine (4) and (3) together, this will result in (5), which is the potential production function :

$$\ln QPF_t = c_1' + \frac{c_2}{1-c_4} \ln KF_t + \left(1 - \frac{c_2}{1-c_4}\right) \ln LPF_t + \frac{c_3}{1-c_4} t + \eta_t \qquad (5)$$

where :

QPF = potential output, i.e. the production capacity
LPF = potential quantity of aggregate labour input in the private sector (10^6 hours/year)

The degree of utilization of capacity ZQF, is defined as the ratio between actual production and the production capacity, or

$$ZQF_t := (QAFF/QPF)_t \quad ^{1)} \qquad (6)$$

where :

ZQF_t denotes the degree of utilization of capacity.

In table 1, postwar data for the volume of output, production capacity, and the degree of utilization of capacity are collected.

Figures 1 and 2 represent the same data.

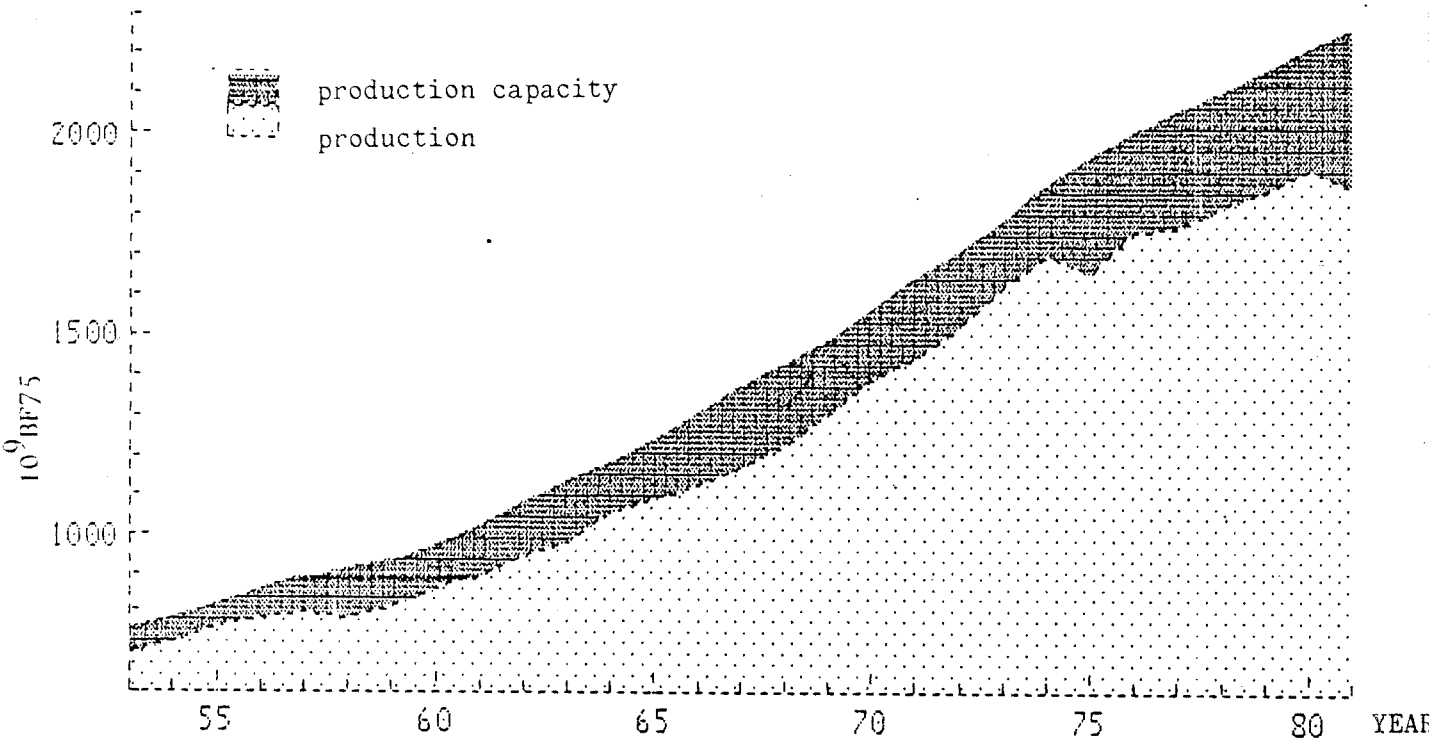
Table 1 : Production, production capacity and degree of utilization of capacity, orivate sector, Belgium, 1953 - 1981

year	production QAFF 10^6BF75	production capacity QPF 10^6BF75	degree of utilization of capacity % ZQF
1953	693776	753554	92.0
1954	722546	783535	92.2
1955	757751	815952	92.9
1956	780655	857783	91.0
1957	795004	890043	89.3
1958	752577	914260	85.0
1959	800443	937060	86.1
1960	851587	973308	87.5
1961	897540	1021561	87.5
1962	940604	1052076	87.4
1963	982594	1136102	86.5
1964	1057599	1184912	89.3
1965	1091898	1235166	88.4
1966	1122983	1302165	86.2
1967	1107076	1368235	85.3
1968	1220163	1423340	85.7
1969	1299414	1436178	87.4
1970	1384770	1560020	88.8
1971	1439034	1637301	87.9
1972	1516843	1704752	89.0
1973	1615004	1781713	90.7
1974	1691692	1871907	90.4
1975	1646225	1943105	84.7
1976	1751090	2002303	87.5
1977	1759497	2053455	85.7
1978	1810633	2102555	86.1
1979	1852423	2153727	86.0
1980	1903779	2209404	86.4
1981	1862504	2254723	82.6

Source : Mirabel

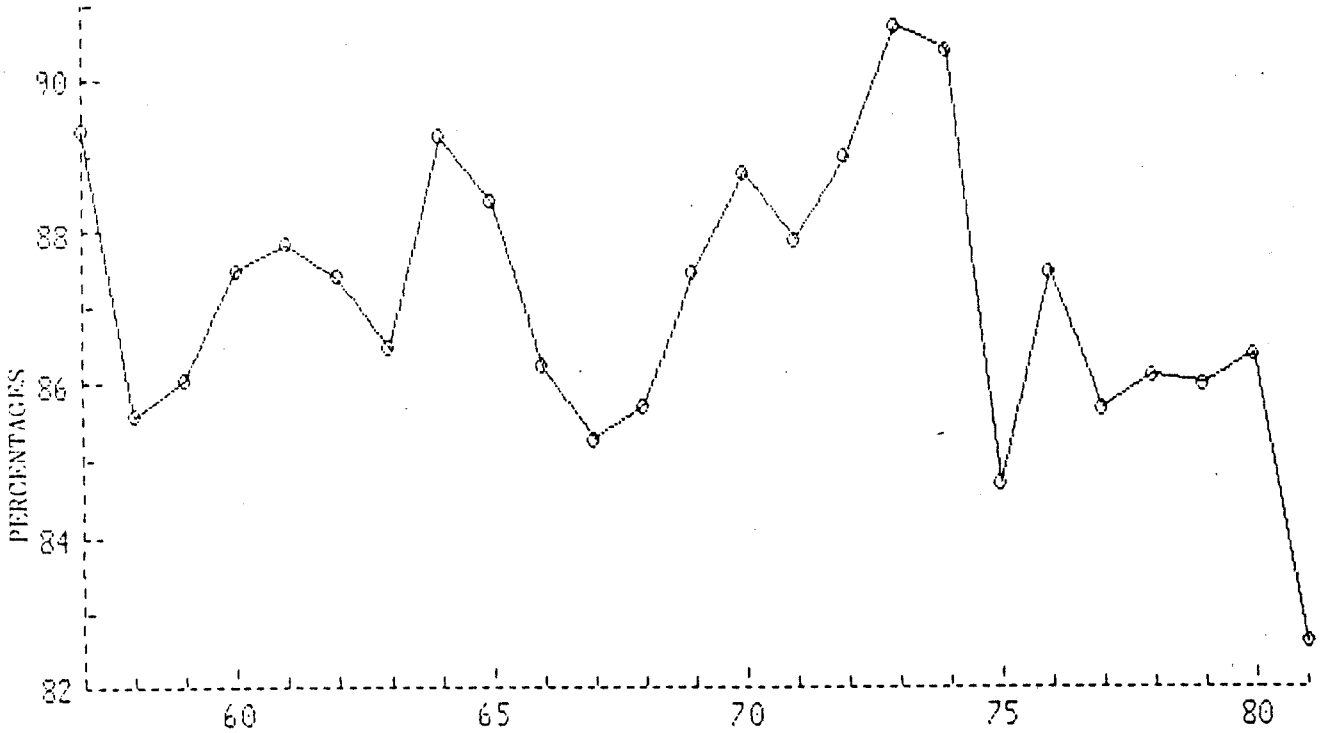
1) Notice that underutilization of production capacity is assumed to be proportional to underutilization of potential labour input.

Figure 1 : Production capacity and actual production, private sector, Belgium, 1953 - 1981



Source : Maribel (1985)

Figure 2 : Rate of utilization of production capacity, private sector, Belgium, 1953 - 1981



Source : Maribel (1985)

2.3. The employment function of the Maribel-model

2.3.1. Employment

The firms demand for a theoretical aggregate number of hours of work. Dividing this by the contractual working time per worker, leads to the number of people employed. There are 2 distorting variables, which are the real wage cost and a tension on the labour market, which can be noted as in (7) and (8)

$$\frac{WFR}{PAFF} \tag{7}$$

where :

WFR = the rate of wage cost in private sector (per hour per worker)
PAFF = the price index (1975 = 1) of gross domestic product at factor cost of the private sector,

and $$\frac{(NA - EGO) - EOFT}{NA - EGO} \tag{8}$$

where :

NA : active residential population
EGO : total employment in the public sector (included the unemployed occupied by public authorities)
EOFT : employment theoretically planned by the enterprises.

These two distorting variables produce a gap between the theoretically maximum planned employment and the actual employment. Because of the rigidity on the labour market, firms do not recruit (or dismiss) immediately in times of an increase (or decrease) in production. They do however reorganize the disposable labour (labour hoarding). The short run employment function can be written as

$$\Delta \ln EOF_t = \alpha_1 \Delta \ln EOF^{*}_t + \alpha_2(\ln EOF^{*}_{t-1} - \ln EOF_{t-1}) + \alpha_3 \ln(WFR/PAFF)_t + \alpha_4[1 - (LF/HPDF)/(NA-EGO)]_t + z_t \tag{9}$$

while the planned employment function is assumed to be :

$$\ln EOF_t^{*} = \hat{\alpha}_5 \cdot \ln(LF_t/HPDF_t) \qquad (10)$$

where HPDF = the yearly number of contractual working hours.

z_t = a random error term standing for omitted variables.

The short run function takes care of the two above mentioned distorting factors. The estimation of employment function (9), where (10) has been substituted, by the non linear generalized least squares procedure leads to the following results, for the sample period 1954 - 1984 :

$$\hat{\alpha}_1 = 0.65 \ (6.77)$$
$$\hat{\alpha}_2 = 0.67 \ (4.58) \qquad (11)$$
$$\hat{\alpha}_3 = 0 \qquad 1)$$
$$\hat{\alpha}_4 = 0.42 \ (3.18)$$
$$\hat{\alpha}_5 = 0.99 \ (915.)$$
$$\text{Durbin Watson} = 1.4$$

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1) Notice that, although the short run employment elasticity of real wages is found to be zero (which is typical for a recession period : see J. Drèze (1985), p. 15 and conclusions), the long run partial employment elasticity of real wages is equal to -1 for a Cobb Douglas production technology, since under perfect competition :

$$\frac{WFR_t \cdot LF_t}{PCO_t \cdot QAFF_t} = \frac{w_t \cdot L_t}{p_t \cdot Q_t} = \frac{w_t \cdot N_t \cdot H_t}{p_t \cdot Q_t} = \frac{\partial Q_t}{\partial L_t} \cdot \frac{L_t}{Q_t} = \alpha \qquad (12)$$

being the constant output elasticity of labour input, or :

$$N_t = \alpha \frac{P_t \cdot Q_t}{w_t \cdot H_t}, \text{ i.e.,}$$

$$\ln N_t = \ln \alpha - \ln \frac{w_t}{p_t} + \ln Q_t - \ln H_t \qquad (13)$$

with $N_t := EOF_t$ and $H_t := HDF_t$.

./..

The results can be interpreted as follows :

- contractual employment is almost equal to the theoretically planned employment ($\hat{\alpha}_5$ is almost 1);
- in the short run, there is a considerable difference between actual and theoretically planned employment ($\hat{\alpha}_1 = 0.65$), which remains for a large part in the long run;
- $\hat{\alpha}_3$ hasn't a value in this estimation, since other estimations lead to very low values of this coefficient (.004 or .008) with large variances, which points to multicollinearity. Hence, real wage costs do not have a significant impact on the division of total labour between employment and working time;
- the indicator of the tension on the labour market is very significant.

One should not forget that the employment functions (9) and (10) are only valid for the private sector. The employers' employment isn't estimated separately.

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1) (continuation)

Under a C.E.S. production technology, we find that the factor shares are varying over time under perfect competition because :

$$\frac{w_t L_t}{p_t Q_t} = \frac{\partial Q_t}{\partial L_t} \cdot \frac{L_t}{Q_t} = \frac{v(1-\delta)}{\left(\delta\left(\frac{K_t}{L_t}\right)^{-\rho} + (1-\delta)\right)} \qquad (14)$$

with δ = the capital intensity parameter,

v = the degree of homogeneity parameter,

ρ = the substitution parameter

K_t = the capital stock at period t.

2.3.2. Contractual and actual working time

As we have seen in 2.3.1., the contractual working time is important to determine the aggregate theoretically planned labour input. The actual working time is given by dividing total quantity of labour by employment (the outcome of the employment function). In symbols, this can be written as follows

$$HDF = \frac{LF}{EOF} \qquad (15)$$

where HDF = the number of actual working hours per year.

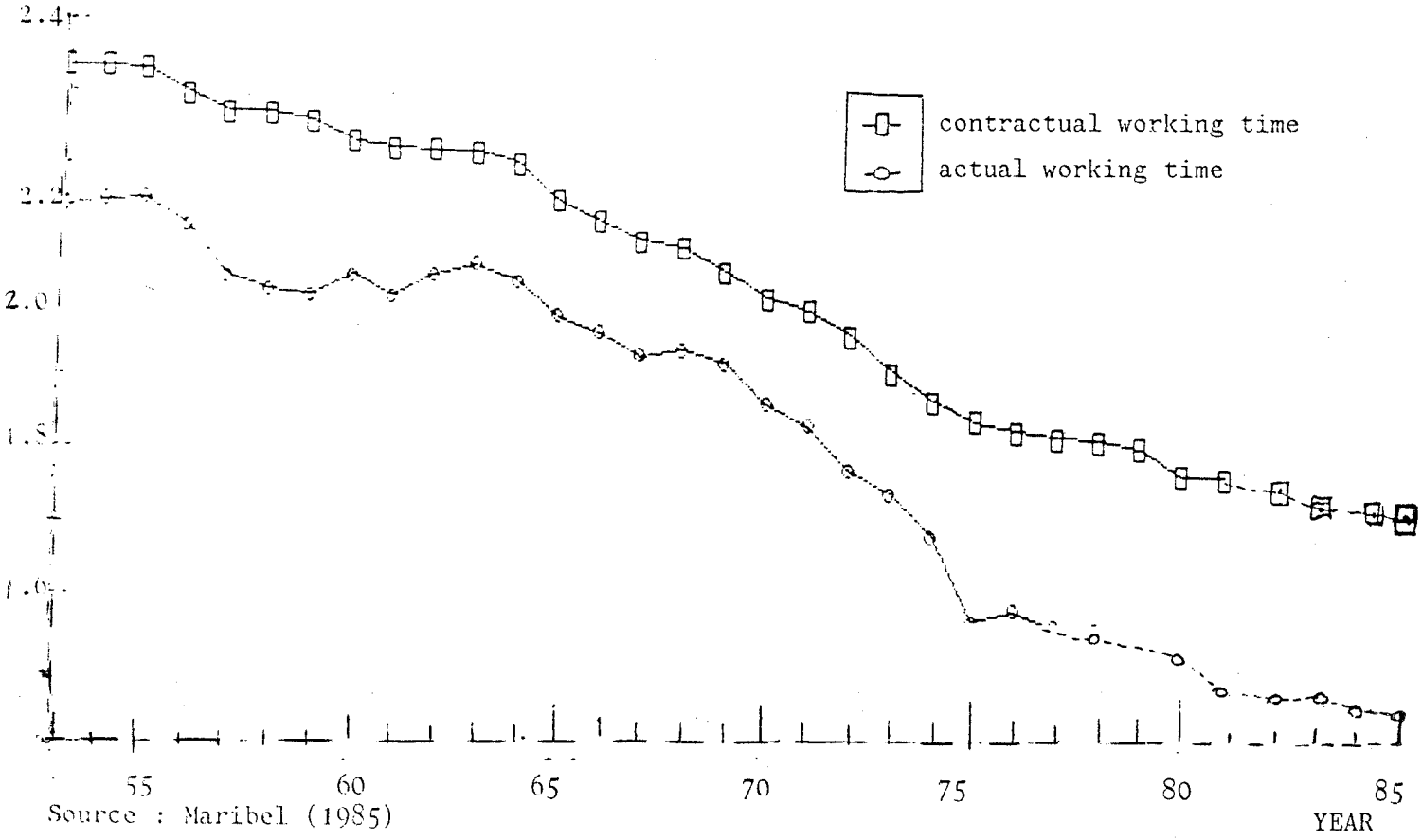
In table 2, the development of contractual and actual working time is summarized; figure 3 gives an other presentation of the same data.

Table 2 : Contractual and actual working time, private sector, Belgium, 1953 - 1985

year	contractual WT(HPDF) hours/year/employee	actual WT(HDF) hours/year/employee
1953	2336	2140
1954	2335	2147
1955	2332	2150
1956	2298	2114
1957	2274	2042
1958	2274	2025
1959	2262	2015
1960	2236	2045
1961	2227	2015
1962	2225	2040
1963	2223	2000
1964	2209	2043
1965	2157	1995
1966	2129	1973
1967	2102	1942
1968	2093	1950
1969	2061	1933
1970	2024	1877
1971	2008	1840
1972	1975	1755
1973	1926	1758
1974	1857	1702
1975	1859	1654
1976	1847	1660
1977	1840	1579
1978	1836	1575
1979	1827	1584
1980	1792	1550
1981	1790	1503
1982	1784	1502
1983	1775	1503
1984	1760	1494
1985	1762	1474

Source : Mirabel

Figure 3 : Contractual and actual working time, private sector, Belgium, 1953-1985



Source : Maribel (1985)

Contractual working time decreased with 24.6 % and actual working time with 31.1 % during the period 1953 - 1985.

2.3.3. Degree of utilization of the potential quantity of labour

This degree of utilization of potential quantity of labour is defined as the real quantity of labour divided by the potential quantity of labour, or

$$ZHF_t := (LF/LPF)_t$$

$$= (EOF \cdot HDF)_t/(EOF + UL)_t \; HPDF_t \qquad (16)$$

where :

ZHF = degree of utilization of the potential quantity of labour;

LPF = potential quantity of labour input in the private sector (10^6 hours/year);

UL = unemployment of all categories.

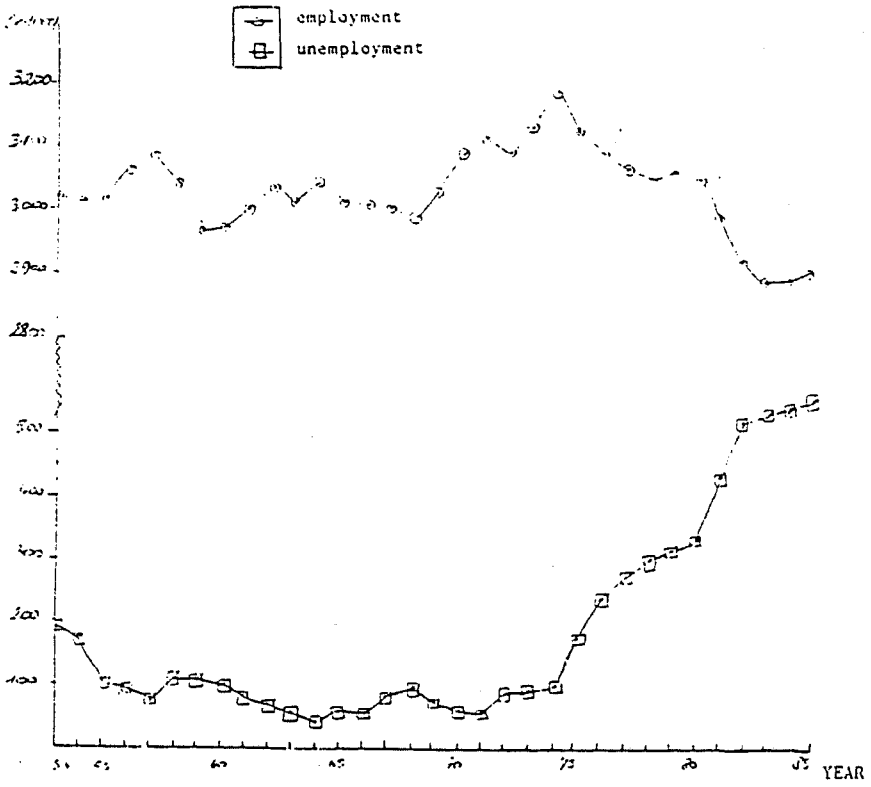
In table 3, all the variables of formula (13) are given.

Table 3 : Employment, unemployment, quantity of labour, potential quantity of labour and degree of utilization of potential quantity of labour, Belgium, 1953 - 1985.

year	employment private sector (EOF) employers + employees	unemployment (UL)	quantity of labour (10^4 hours/year), private sector (LF)	potential quantity of labour, (10^4 hours/year), private sector (LPF)	degree of utilization of potential quantity of labour (ZHF) (%)
1953	3022091	191890	6467.3	7507.9	86.1
1954	3013494	173701	6471.0	7443.3	86.9
1955	3015426	104775	6489.6	7283.3	89.1
1956	3061046	95656	6471.1	7254.1	89.2
1957	3059054	82487	6307.8	7212.1	87.5
1958	3038541	121227	6153.0	7185.3	85.6
1959	2967851	119620	5988.1	6983.9	85.8
1960	2974824	103793	6083.5	6883.8	88.4
1961	3000770	80903	6055.6	6862.9	88.2
1962	3036295	70871	6221.4	6913.4	90.0
1963	3029062	57037	6258.0	6860.4	91.2
1964	3041156	47329	6213.1	6822.5	91.0
1965	3026277	60208	6037.4	6657.5	90.7
1966	3021351	60032	5961.1	6560.3	90.9
1967	3000034	82321	5826.1	6479.1	89.9
1968	2990548	99514	5831.6	6407.5	90.2
1969	3039000	78695	5874.5	6425.7	91.4
1970	3086034	65067	5792.5	6393.9	90.7
1971	3114243	66456	5758.2	6356.8	90.2
1972	3095396	85254	5534.6	6281.8	88.1
1973	3132595	90038	5507.1	6206.8	88.7
1974	3179254	97040	5411.1	6182.4	87.5
1975	3123000	177535	4940.8	6135.7	80.6
1976	3090595	235550	4944.5	6149.5	80.4
1977	3074908	273705	4855.4	6161.0	78.8
1978	3050876	299997	4805.1	6152.2	78.1
1979	3061626	316041	4788.4	6171.0	77.6
1980	3051557	336314	4729.9	6071.1	77.9
1981	2973005	433445	4468.4	6097.5	73.3
1982	2922921	511785	4390.2	6127.5	71.6
1983	2895797	545109	4352.4	6107.0	71.3
1984	2897335	546064	4330.2	6082.6	71.2
1985	2903047	549553	4280.3	6083.5	70.4

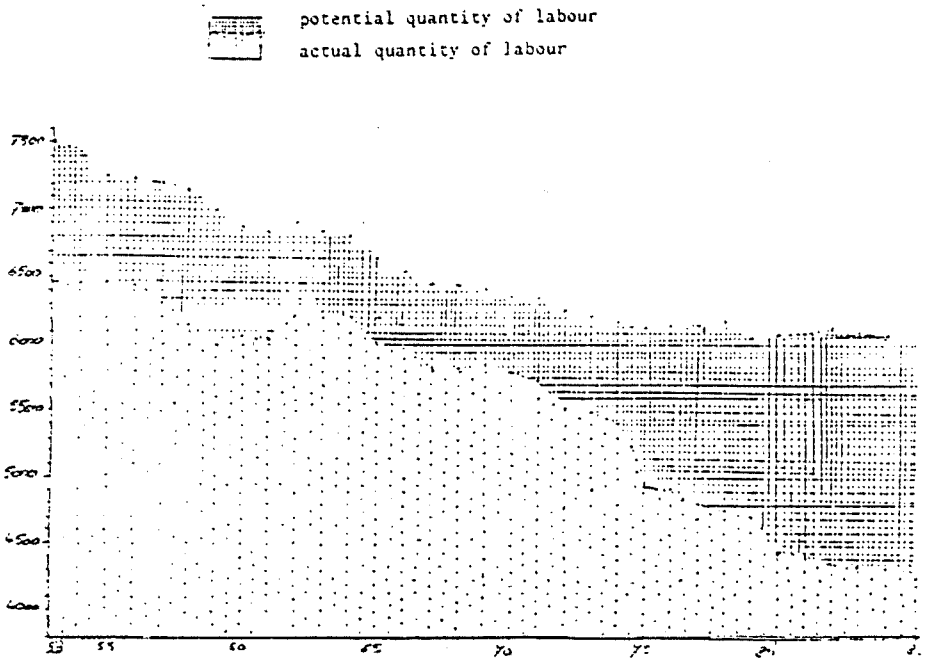
Source : Mirabel

Figure 4 : Employment and unemployment, Belgium, 1953 - 1985



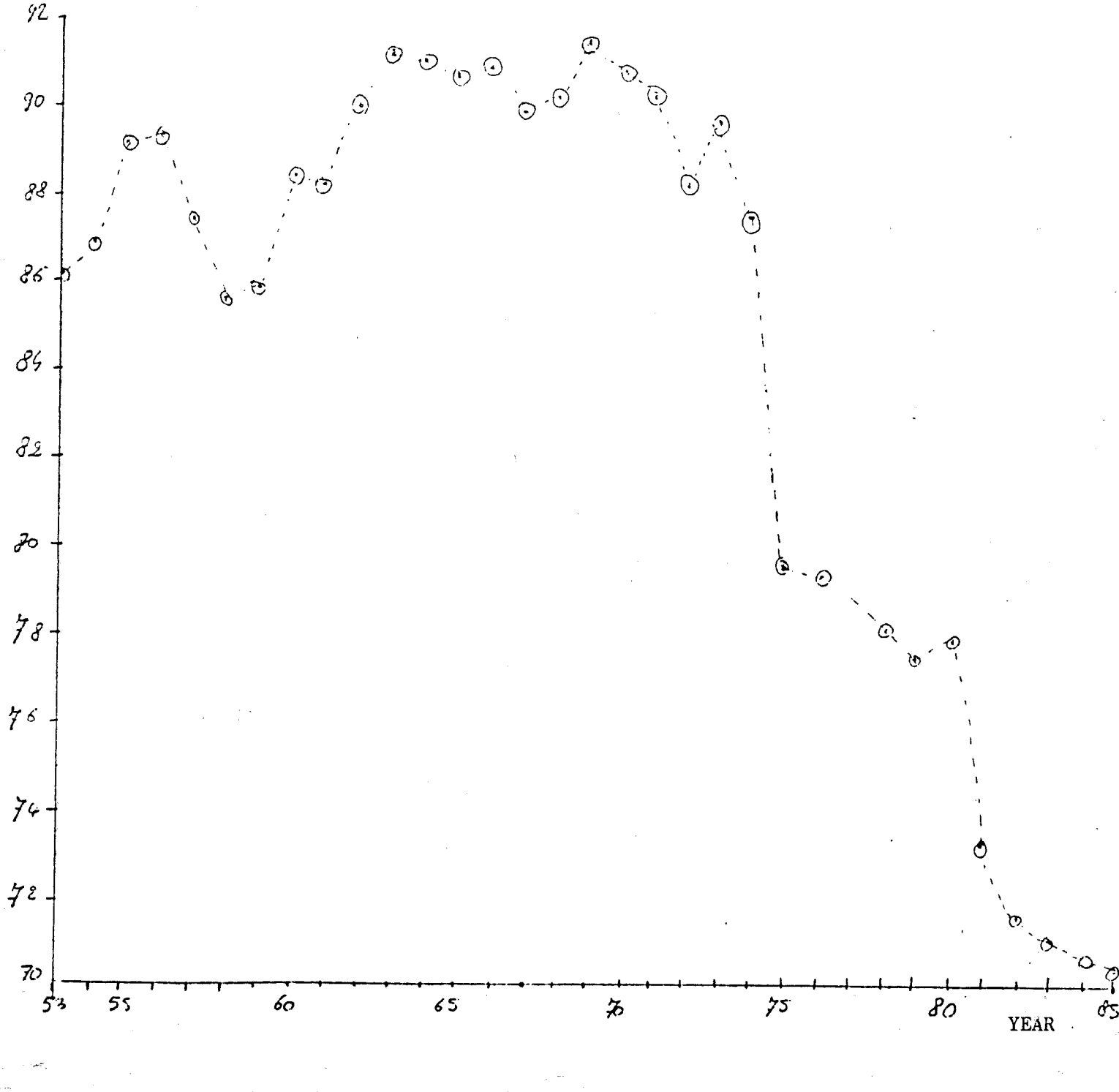
Source : with the help of MIRABEL-data

Figure 5 : Quantity of labour and potential quantity of labour, Belgium, 1953 - 1985



Source : Maribel (1955)

Figure 6 : Rate of utilization of potential quantity of labour, Belgium, 1953 - 1985



Source : with the help of Mirabel data

3. The simulations of RWT, performed by the Maribel-model

3.1. The base projection is the May 1985-projection 1985-'89 of the Belgian Planning Office. There were 2 alternative plans in this projection : one with and one without a fiscal decrease. We opted for the latter scenario, because the expenditures' side of this projection was not built yet when we started this investigation (and isn't yet available at this moment).
In the base projection, there is already implied a small RWT value unless the one simulated later : the contractual working time is 1 766 hours per worker per year in 1985, and 1 744 in 1989 (-1.25 %). Table 4 shows the values of some of the main variables as they are shown in the base projection.

3.2. In the eight simulations of RWT we investigate here, we have a reduction of contractual working time of 10 % in 1985, which is a single but one-and-for-all reduction. According to the model, this leads to a reduction of actual working time of 5.6 % in that first year, which results in a decrease of 2 hours a week.
Simulation 1 models the effect of reducing the contractual working time in the private sector by 10 %, all the other endogenous variables of the base projection staying endogenous. The exogenous variables of the base projection remain exogenous. Simulation 2 repeats the same scenario but looks at the effect of a single real wage increase of 5 % per hour in 1985. Together with a 5.6 % actual RWT, this leads to almost constant real gross wages per year per employee in 1985. In simulation 3 the real gross wages per employee are at least kept equal compared to the base projection for the next 5 years. This is made by increasing the real hourly wages each year by the same amount as the decrease of the actual working time in the same year. The result of this operation is at least to maintain the gross purchasing power per employee per year. Simulation 4 is identical to simulation 3, but together with a so called 'Maribel operation'. This means that the employers' labour costs will be reduced by lowering their social security contributions with 50 billion BF. The governmental budget does not reduce, because the operation is financed by increasing the VAT also by 50 billion BF. Whilst the extra real wage increase is 5 % in simulation 2, it is just 2.5 % in simulation 5. At the same time, mandatory

employment is imposed. Both, the total number of hours worked in the private sector, and the number of employees, are increased by 2.5 % w.r.t. the base simulation. Simulation 6 is almost identical, but only the number of employees must increase (nothing is said about an increase in the total number of working hours). In simulation 7, which is based on simulation 1, RWT is also introduced for the public sector. The contractual RWT is only 5 %, whilst in the public sector, the contractual and the actual working time are equal, because of absence of overtime hours. In all the simulations mentioned until now, the supply of labour is supposed not to be influenced by RWT. In simulation 8, this assumption is changed. Because of lower real wages per year, it may be necessary for some families to have a second earner (additional workers' effect). Moreover, just because of the RWT, for a lot of people (almost all women), it's more practical to enter labour force now. This results in an assumed increase of labour force by 20 % of the extra employment. Wage formation is free (endogenous). The assumption of 20 % of extra employment is based on a survey for the Netherlands (Bakhoven, Jansen, 1984). Maybe this rate is too high for Belgium, where the female employment rate is already much higher than in the Netherlands. We also wanted to simulate RWT taking care of the phenomenon of scrapping capital goods:through RWT, firms reorganise and modernise labour. Older, labour intensive, investments will be scrapped earlier and substituted by more capital intensive investments. Simulating this seems impossible with the available version of Maribel. A survey of all the simulations is given in table 5.

Table 4 : The May 1985 projections '85-'89 of the Belgian Planning Office : Hypotheses and main results of the base projection.

	1984	1985	1986	1987	1988	1989
A. International context						
volume of world trade Δ	7.15	4.75	4.39	5.14	5.21	4.60
world export price in $ Δ	-4.40	-1.45	5.24	4.75	5.27	5.79
world export price in BF Δ	7.97	3.32	3.76	3.27	3.80	4.32
(average) exchange rate (BF/US$)[1]	57.71	60.51	59.66	58.82	58.00	57.19
german discount rate Δ	4.30	4.00	4.00	3.90	3.90	4.10
eurodollar discount rate Δ	11.00	10.00	10.00	9.62	11.10	12.00
B. National context						
priv. cons. 10^9 BF 75	1651.9	1639.2	1630.0	1644.1	1663.9	1687.1
publ. cons. 10^9 BF 75	460.1	468.8	464.4	464.7	464.9	465.3
investments 10^9 BF 75						
- firms	288.0	304.1	309.7	324.1	338.0	352.8
- government	79.9	78.5	78.4	78.4	78.4	78.5
- buildings	87.8	93.3	93.9	92.6	94.0	100.0
GNP, market price 10^9BF75	2723.2	2767.6	2806.7	2872.8	2947.6	3022.8
infl.:price of cons. (1975 = 1)	1.773	1.869	1.940	2.003	2.074	2.151
employment 10^3 persons						
- private sector	2897.3	2903.0	2890.1	2881.6	2878.2	2871.7
- public sector	656.7	666.5	669.2	668.5	667.7	667.0
unempl. 10^3 persons	547.0	549.6	575.3	599.3	616.3	629.6
net financing shortage of the government[2] 10^9 BF and % GNP	-505.3 (-11.2)	-510.8 (-10.7)	-510.8 (-10.2)	-494.3 (-9.4)	-457.0 (-8.2)	-410.7 (-6.9)

Source : Belgian Planning Office, May 1985

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[1] This value is considered too high : on December 31, 1985, the exchange rate of 1US$ was 50.36 BF, on January 31, 1986, it was 48.87 BF per US$. This lower dollar rate than the one supposed in Maribel, leads to a better competitive position of the Belgian economy, with all the consequences.

[2] February 1986 : the net financing shortage of the government is calculated to be 553.4 billions BF in 1985, without public housing debt (11.7 %) ; 575 billions BF public housing debt included.

Table 5 : Survey of all the RWT-simulations, with the help of the Maribel-model (deviations from the base simulation).

variable / simulation	contractual working time	private real wage cost/employee/hour	employment private sector	employment public sector	active population
1	- 10 % in '85, private	endog.	endog.	-	-
2	- 10 % in '85, private	+ 5 % in '85	endog.	-	-
3	- 10 % in '85, private	+ 5 % in '85 + ↗ '85 - '89 = ↙ actual working time	endog.	-	-
4	- 10 % in '85, private	idem 3 + 50 billion BF operation SS and VAT	endog.	-	-
5	- 10 % in '85, private	+ 2.5 % in '85	+ 2.5 % mandatory recruitment + LF ↗ 2.5 %	-	-
6	- 10 % in '85, private	+ 2.5 % in '85	+ 2.5 %	-	-
7	- 10 % in '85, private - 5 % in '85, public	0 %	endog.	+ 5 %	-
8	- 10 % in '85, private	0 %	endog.	-	+20 % Δ employment

4. The effects of a RWT for the employees

4.1. Employment and unemployment, wages and purchasing power, by the Maribel-simulations of RWT

4.1.1. Some data and main observations

In this study, we focus our interest principally on the impact of a RWT on employment and unemployment. Table 6 gives growth rates of employment, unemployment, and working time. A distinction is made between the short run and medium term impact.

It's clear that, over the whole period 1984-'89, the actual working time decreases more than the contractual working time, although the extra decrease of the contractual WT in the variants w.r.t. the base projection is resulting in a slightly extra decrease of actual WT, also w.r.t. the base projection. In 1985, the effects are vice versa. During that first year, adjustments of the production process are quite impossible, these become possible only in the medium run. Employment increases less than the working time, even the actual one, decreases, except in simulation 5. The employment effect has its largest impact in the short run. This effect has weakened in the medium term, though over the whole period there is still a positive effect, certainly compared to the base projection.

Table 7 summarizes the effect of RWT on employment and unemployment of the employees in the private sector, in absolute numbers. Employment and unemployment are also expressed as percentages of active population.

Out of tables 6 and 7, we can deduce some conclusions concerning the impact upon (un)employment as a consequence of a RWT.

1. The employment is decreasing in the base projection over the period 1985-'89. That same phenomenon is visible in the simulations, but the decrease is not as pronounced.
2. The simulations where the real wage costs are increasing, most are those where the fewest jobs are produced. When the hourly wage cost per employee is kept constant, the employment effect is the largest.

Table 6 : Growth rates of working time, employment and unemployment in the private sector, by a contractual reduction of working time of 10 % in 1985 - Belgium.

var. / sim.	contractual working time		actual working time				employment				unemployment			
	'85	'84-'89	'85	'84-'86	'86-'89	'84-'89	'85	'84-'86	'86-'89	'84-'89	'85	'84-'86	'86-'89	'84-'89
basis	-0.2	-1.2	-1.1	-2.7	-1.6	-4.3	0.1	-0.5	-1.0	-1.5	0.5	5.2	9.4	15.1
sim 1	-10.2	-11.2	-5.6	-8.8	-2.8	-11.4	4.4	5.0	-1.2	3.8	-17.1	-17.8	13.2	-6.9
sim 2	-10.2	-11.2	-5.8	-9.6	-3.1	-12.4	4.1	4.2	-2.2	1.9	-16.2	-14.6	17.9	0.6
sim 3	-10.2	-11.2	-5.9	-9.8	-4.1	-13.5	4.1	4.1	-3.5	0.5	-16.2	-14.1	24.4	6.9
sim 4	-10.2	-11.2	-5.8	-9.5	-4.1	-13.3	4.2	4.4	-3.2	0.0	-16.3	-15.1	23.3	4.7
sim 5	-10.2	-11.2	-5.7	-9.1	-3.3	-12.1	8.0	6.7	-3.5	3.0	-32.3	-24.9	28.1	-3.8
sim 6	-10.2	-11.2	-7.6	-9.8	-2.3	-11.9	6.8	5.4	-2.4	2.9	-27.0	-19.5	20.3	-3.2
sim 7	-10.2	-11.2	-5.4	-8.6	-2.8	-11.1	3.9	4.4	-1.3	3.0	-21.3	-21.3	14.4	-9.9
sim 8	-10.2	-11.2	-5.6	-9.0	-2.8	-11.5	4.6	5.3	-1.1	4.2	-14.7	-15.7	12.7	-5.1

Table 7 : Employment and unemployment in private sector, by a contractual RWT of 10 % in 1985, absolute numbers + % of active population (between brackets).

Variable / Simulation	Employment			Unemployment		
	'84	'85	'89	'84	'85	'89
basis	2267335 (53.0)	2270047 (53.5)	2232744 (52.1)	546904 (12.4)	549553 (13.0)	629556 (14.7)
sim 1	2267335 (53.6)	2361458 (55.8)	2353011 (54.9)	546904 (12.4)	453442 (10.7)	509289 (11.9)
sim 2	2267335 (53.6)	2301079 (55.7)	2311947 (54.0)	546904 (12.4)	458520 (10.8)	550352 (12.8)
sim 3	2267335 (53.6)	2301036 (55.7)	2277601 (53.21	546904 (12.4)	458564 (10.8)	584639 (13.6)
sim 4	2267335 (53.6)	2301600 (55.7)	2289895 (53.4)	546904 (12.4)	457999 (10.8)	572404 (13.4)
sim 5	2267335 (53.6)	2449473 (57.8)	2336250 (54.5)	546904 (12.4)	370126 (8.7)	526043 (12.3)
sim 6	2267335 (53.6)	2420589 (57.1)	2332667 (54.4)	546904 (12.4)	399011 (9.4)	529633 (12.4)
sim 7	2267335 (53.6)	2355878 (55.5)	2336105 (55.5)	546904 (12.4)	430399 (9.4)	492861 (11.5)
sim 8	2267355 (53.6)	2371848 (55.7)	2361980 (54.9)	546964 (12.4)	466747 (12.8)	519283 (12.1)

3. The extra supply of labour is leading to an increase in the creation of jobs.
4. Legal levels of employment are producing more jobs only in the short term.
5. A new 'Maribel-operation' (cfr. supra) leads to a considerable increase in job creation only in the medium term.
6. A RWT in the public sector accompanied by legal extra increase in jobs, resultsin a decrease in the gross purchasing power of public servants.

These conclusions will be investigated more in detail in sections 4.1.2. to 4.1.7.

4.1.2. The decrease of employment is smaller in the simulations of RWT than in the base projection. One notices that employment is declining in all simulations during the period 1986-'89. The decrease is larger than in the base projection. This is due to the planned employment function (cfr. supra sub. 2.3.1. eq.(10)). Employment is only a function of total labour quantity divided by contractual working time in (10). A smaller contractual working time goes together with a larger employment level in the short run. In the medium run, a part of the employment is lost; the decrease is larger in the simulations : because of the RWT, the planned employment decreases.

4.1.3. A choice to make : more employment or more purchasing power.
Gross purchasing power per employee is defined here as the gross real wage per employee per year. Wealth income is not taken into account. Contributions and taxes are not substracted neither are social security benefits added.
The purchasing power of the self employed and the public servants is not included in table 8. The purchasing power of officials decreases by 4.5 % over the period 1984-'89, except in simulation 7. There is a RWT for functionaries of 5 %, without any real wage increase; the fall in buying power is 9 %. The purchasing power of the unemployed people does not change due to a RWT.

Table 8 : Growth rates of yearly nominal wages per employee, inflation and gross purchasing power per employee, private sector, by a contractual RWT of 10 % in 1985 - Belgium.

var. / sim.	nominal wage/employee/year				inflation (consumption prices)				gross purchasing power/employee/year			
	'85	'84-'86	'86-'89	'84-'89	'85	'84-'86	'86-'89	'84-'89	'85	'84-'86	'86-'89	'84-'89
basis	2.0	3.3	22.0	26.0	5.4	9.4	10.9	21.3	-3.2	-5.6	10.1	3.9
sim 1	-1.7	-1.8	22.0	19.8	6.1	10.9	11.1	23.3	-7.3	-11.5	9.8	-2.8
sim 2	3.6	3.5	22.6	27.0	6.8	12.5	11.4	25.4	-3.0	-8.0	10.0	1.3
sim 3	3.4	6.7	27.4	35.9	6.8	12.9	13.0	27.6	-3.2	-5.5	12.7	6.5
sim 4	4.6	7.6	27.0	36.6	8.0	13.9	12.8	28.5	-3.1	-5.5	12.5	6.3
sim 5	1.4	1.9	24.0	26.4	6.9	12.7	11.5	25.6	-5.2	-9.6	11.3	0.6
sim 6	1.0	0.2	23.2	23.4	6.5	11.7	11.3	24.4	-5.2	-10.3	10.6	-0.8
sim 7	-1.4	-1.5	22.2	20.4	6.1	11.1	11.2	23.5	-7.1	-11.3	9.9	-2.5
sim 8	-1.8	-2.0	22.0	19.5	6.1	10.9	11.1	23.2	-7.4	-11.7	9.8	-3.0

Out of tables 6, 7 and 8, one can conclude that the results on job creation are larger the less the hourly wages per employee rise. The extra creation of newly specified full time jobs is the largest in the simulation where real gross yearly salary per employee decreases due to the RWT, because of a constant real hourly wage per employee (simulation 1). A RWT of 10 % in 1985, produces in that same year 99 000 extra jobs w.r.t. 1984 (+ 4.4 %). This is a difference of 96 000 (+ 4.2 %) w.r.t. the base projection. In 1989, the results do decrease in absolute numbers : w.r.t. 1984, there are 85 000 (+ 3.8 %) extra jobs. Compared to the data for 1989 in the base projection, there are 120 000 (+ 5.4 %) more jobs. Hence, an introduction of a RWT results in a smaller employment decline, so that more newly specified full time jobs are remaining.
Unemployment, as a percentage of the active population, decreases from 13.0 % in the base projection to 10.7 % in simulation 1 for 1985. For 1989, these percentages are respectively 14.7 % (base) and 11.9 % (simulation 1). This last percentage is lower than in 1984, when unemployment was 12.4 %. When the gross real hourly wages of the employees increase during the simulation period 1985-'89, raising gross purchasing power, the increase in job creation is smaller. In this case (simulation 3) in 1985 there are 94 000 (+ 4.1 %) jobs more than in 1984, which means a surplus of 91 000 (+ 4.0 %) w.r.t. the base projection in 1985. For 1989, however, there remain only 10 000 (+ 0.5 %) more people employed in comparison with 1984, or 45 000 (+ 2.0 %) w.r.t. the base projection in 1989. This leads to an unemployment rate of 10.8 % and 13.6 % respectively for 1985 and 1989.

If one wants to keep the gross buying power per employee constant, the result will be between simulations 1 and 2. In simulation 2, the hourly real wage increase is equal to the RWT only in the first year. Reducing the number of working hours has in all cases positive results w.r.t. the base projection, but the effects are smaller when hourly wage costs increase. In this case, the firms try to reorganise labour to increase the productivity of labour. Table 9 gives the forecast of labour productivity per hour per employee in the private sector. The medium run growth rates are higher the more the real wages increase.

Table 9 : Growth rate of hourly labour productivity per employee in private sector, by a contractual RWT of 10 % in 1985 - Belgium.

variable / simulation	labour productivity/hour/employee '85	'84-'86	'86-'89	'84-'89
base	3.1	6.8	10.7	18.2
sim 1	3.4	7.5	11.7	20.1
sim 2	3.5	7.9	12.3	21.1
sim 3	3.5	8.0	13.1	22.1
sim 4	3.5	7.9	12.9	21.8
sim 5	0.0	5.0	13.7	19.4
sim 6	3.3	7.7	12.0	20.7
sim 7	3.3	7.6	11.8	20.3
sim 8	3.3	7.5	11.7	20.1

4.1.4. Extra supply of labour leading to an extra job creation

In simulation 8, a surplus supply of labour due to RWT is assumed. This can be explained by the additional worker effect that exists in the case of RWT, as has already been mentioned in paragraph 3.2. The surplus of workers entering the labour market is supposed to be 20 % of the additional employment created by RWT (19 000 people). In this case, an extra 5 700 jobs become available in 1985 w.r.t. simulation 1, or 102 000 (+ 4.5 %) more jobs than in the base projection. Unemployment is 12.8 % (13.0 % in the base projection and 10.7 % in simulation 1 . For 1989, the forecasts are as follows : 95 000 (+ 4.2 %) above the 1984 level, which is an increase of 129 000 (+ 5.8 %) w.r.t. the base projection and of almost 9 000 w.r.t. simulation 1 . One notices that the increase of employment (+ 5.8 %) in this case is larger than the reduction of working time (- 5.6 %). This is the only simulation where the reoccupation of jobs is larger than the RWT. Unemployment is higher than in simulation 1, also in 1989 : it's 12.1 % in simulation 8, 11.9 % in simulation 1 and 14.7 % in the base projection.

The reason for this phenomenon can be found in the Maribel employment function. This takes care of the tension on the labour market, which is partially explained by the rise of the active population (cfr. supra, sub. 2.3).

4.1.5. Legal levels of recruitments just lead to more jobs in the short run. The effect of legal levels of recruitment is investigated in simulation 6 : 10 % RWT, 2.5 % hourly wage increase and 2.5 % compensating recruitment. The results are as follows. In 1985, there are 153 000 (+ 6.8 %) jobs more than in 1984, of which 2.5 % are due to legal levels of employment. This results in 150 000 (+ 6.6 %) extra jobs compared to the base projection. In 1989, there are only 65 000 (+ 2.9 %) jobs left in comparison with 1984, or 100 000 (+ 4.5 %) more w.r.t. the base projection. One thirth of the surplus is lost in the medium run. Unemployment in 1985 is 9.4 % and in 1989 12.4 % (= stagnation w.r.t. 1984).

4.1.6. A new 'Maribel-operation' shows how more jobs can be created in the medium run. Some years ago, there has been a so called Maribel-operation in Belgium. Part of it is a reduction of social security contributions by the employers, which was financed by a raise in V.A.T. Such an "operation" is portrayed here. There is a rise in indirect taxes in 1985 by 50 billion BF and a decrease of contributions to social security by the same amount. The intention of this operation is of course to lower the labour costs per employee.
This is done in simulation 4, which is the same as simulation 3 but with as extra measure the Maribel-operation.
In this simulation, an increase of gross purchasing power appears which will be financed partly by the VAT. In 1985, this results in only 560 jobs more than the 94 000 mentioned in simulation 3. In 1989, there are already 12 000 jobs more than in 1984, which totals in 22 000 (from which 10 000 already available in simulation 3). So, it's clear that the effect of the simple Maribel-operation is considerably positive in the medium run.

4.1.7. RWT in public sector

Simulation 7 treats a RWT in public services. There is no variable in Maribel that defines working-hours of functionaries. There is no difference between contractual and actual working time in the public sector. Neither overtime nor temporary unemployment are supposed, and the introduction of a contractual RWT is considered being in force immediately. Although, the 5 % creation of jobs will be an overestimation : also in public sector there are some jobs that are not separable. Higher skilful jobs must be

done by 1 person, even if there is a RWT or not.
A reduction of working hours of 5 % in 1985, together with 5 % legal increase in recruitments, produces 43 000 (+ 6.6 %) jobs, in comparison with 1984. That means 33 000 (+ 5.0 %) more civil servants w.r.t. the '85 base projection. In 1989, there are 44 000 (+ 6.7 %) more jobs than in 1984, or 33 000 (+ 5.0 %) more w.r.t. the base projection. This creation of jobs does remain, in contrast with the jobs created by enforcing the legal levels of recruitments in the private sector (cfr. supra, sub. 4.1.5.). This switch can be explained by looking at the wages : in 4.1.5., there is an increase of purchasing power, which isn't the case here. In this simulation, purchasing power of the public servants is decreasing with 9.0 % during the period 1984-'89 (base : 4.5 %).

4.1.8. An evaluation of the results

A conclusion of the simulations mentioned here, is that the impact on employment of a contractual RWT by 10 % in 1985, becomes more positive the more there is a reduction in the hourly wage rate. The growth rate is always less than the RWT.
A single once-and-for-all RWT cannot have the same impact on employment and unemployment as a RWT carried through during 5 successive years. This last scenario has been investigated by the Planning Office (Planbureau, (1985), 42 pp.). The RWT is annually 5 % during 5 years, so in total there is a contractual RWT of 25 %. This is an extreme situation, but it's interesting for pedagogical reasons. In the case of reduced hourly wages, the effect is cumulative : each year, there are new jobs. In the first year, there are 47 000 extra jobs w.r.t. the base projection, while in the fifth year there is a surplus of 251 000 jobs;
One can make some objections regarding the results of all the Maribel-simulations, which are as follows :

- Within a macro-economic model such as Maribel, without sectoral subdivisions, it's impossible to distinguish between large and small firms, low and high productivity firms, although, the size of the firm and the productivity level have an influence on the creation of employment. Small firms, with less people doing the same job, have more difficulties for creating a new job. These are rather disposed to make the employees work

longer (i.e. overtime work) and will not recruite new workers (Késenne S. (1984),17 pp.). Whilst this distinction is not made in Maribel, the employment effect will be overestimated as a result.

- In the planned employment function of Maribel, real wages are not a significant factor. In reality, there are quasi-fixed labour costs, e.g., recruitment costs, vocational training costs, certain social allowances, clothes, canteen, payments for days not worked etc. Hart (Hart R., (1984), p. 19) estimates the ratio between quasi-fixed non-wage labour costs and total variable labour costs (i.e., per man hour costs) at about 20 % in the U.S.A. and the U.K. during the late 70's - beginning 80's. So, these costs bring the total labour costs to a higher level.
- The Maribel-model does not take a sufficiently high technological change into consideration, only an increase of 0.5 % per year has been supposed. Maribel contains a homogenous production model and not a vintage production model where technical progress can be estimated endogenously. Because of innovations and reorganisations, firms do increase hourly labour productivity per employee, and therefore need less people. There is an increase of labour productivity in the Maribel simulations, but this might be underestimated (cfr. supra, table 9). Also this reason makes one believe that the simulated creation of jobs will be exagerated.
- Probably, there is also an overestimation of the employment effect due to the increase of informal and illegal work. Because of the RWT, people are doing some work at home themselves, instead of demanding it at the market. There is probably also a rise in illegal work because of the fall in wages and the higher costs of overtime work.

In what follows, some comparisons are made with other studies concerning RWT in Belgium.

4.2. A comparison with other Belgian investigations concerning RWT

4.2.1. A simulation study of the Belgian Ministry of Economic Affairs.

E. Pollefliet, a member of the Ministry of Economic Affairs, has also simulated the effect of RWT (Ministry of Economic Affairs (1985)). His own macroeconomic model, Smobe (Short time Model for the Belgian Economy) is used. As is clear out of the name, this is a short run model for the Belgian Economy. The main hypotheses of the base projection are summarized in table 10.

Table 10 : The Smobe-model, hypotheses of the base projection. Growth rates. - Belgium

	1984	1985	1986
gross national product	2.2	1.5	1.5
employment private sector	-0.3	-0.2	-0.1
unemployment, % active population	0.7	1.3	1.1
labour productivity	2.32	2.03	2.05
real wage cost/hour	-0.26	1.04	1.74
gross real wage/employee	-0.45	0.14	0.77
profit rate	1.50	1.55	1.68

Source : Ministry of Economic Affairs, (1985), appendix.

We don't investigate all the simulations executed, just the one that makes a comparison with the Maribel model possible.

In that study, only the short run effects (1984-'86) of a 10 % RWT are investigated, but no distinction is made between contractual and actual working time.
Simulation 2 of the Smobe model can be compared with simulation 2 of Maribel. In both cases, the wage per year per employee is kept constant.
Table 11 gives some points of comparison between these two simulations.

It's remarkable that the development of the variables goes always in the same direction, but that the size can differ so much. The difference is considerable especially concerning unemployment. This is due in a great part to deviations in the labour productivity, which is much higher in Smobe, probably caused by the vintage character of this model since scrapping is explicitly taken into account. More than half of the initial employment effect (namely 48 700 jobs) is cancelled after 3 years. Only when the growth of labour productivity is very high, there will be no further scrapping.Calculations by the Smobe-model predict that the labour productivity must increase with 12 % in the first year and 8 % in the second. If not, labour will be replaced by capital and employment will decrease. Of course, these requirements are very difficult to achieve.

Table 11 : RWT of 10 %, yearly wage per employee is kept constant; a comparison of Maribel with Smobe for the short term (percentage deviations from the reference simulation).

	1984 - 1986 MARIBEL	1984 - 1986 SMOBE
RWT	- 10	- 10
employment	+ 4	+ 2
unemployment (10^3)	-108.4	- 42.2
inflation	+ 2.9	+ 3.9
hourly wage cost	+ 8.4	+ 10.5
production	- 2.7	- 2.0
labour productivity	+ 1.1	+ 6.3
imports	+ 0.8	+ 1.0
exports	- 0.9	- 3.2

Source : Maribel-simulations and Smobe-simulations

Moreover, if it was achieved, there would be high production and the resulting problem of selling the products. There is no doubt about it : the Smobe-simulation study is more pessimistic when looking at the employment effects of RWT.

We prefer the Maribel simulations, even taking into account the objections noted earlier. The growth rate of labour productivity might be too low in Maribel but seems much too high in Smobe.

4.2.2. Drèze's investigation of RWT

J. Drèze (1980) takes as point of departure the situation of a small open economy with underemployment and a negative balance of payments.
The impact of RWT on employment is investigated with the help of elasticities. The determining factors are a) the measure of wage cut (α) and b) the proportion of production loss (β). Drèze recognizes the role of a changing productivity as well, but he does not use it.

The next table shows how the total effect of RWT on employment is composed. It computes the opposite of the "employment elasticity of working time", given the nonnegative balances of trades.

Table 12 : The effects of a RWT by means of elasticities according to Drèze (1980).

	weight (1)	direct effect (2)	indirect effects: production loss (3)	indirect effects: increase of wages (4)	total effect (1) x (2+3+4)
production loss	β	0	$-\eta_{N\bar{Y}\mid B}$	$(1-\alpha)\eta_{NW\mid B}$	$\beta[-\eta_{N\bar{Y}\mid B} + (1-\alpha)\eta_{NW\mid B}]$
no production loss	$1-\beta$	η_{NY}	0	$(1-\alpha)\eta_{NW\mid B}\cdot\eta_{NY}$	$+\ \dfrac{(1-\beta)[\eta_{NY}+(1-\alpha)\eta_{NW\mid B}\cdot\eta_{NY}]}{= -\eta_{NT\mid B}}$

Source : J. Drèze (1980), p. 13; the symbols are given in (17).

In table 12 :

N = employment
Y = production
$\bar{Y}$ = production capacity (17)
W = real wages
T = working time
M = imports of goods and services
X = exports of goods and services
η_{NW} = elasticity of N w.r.t. W
$\eta_{NW\mid B}$ = conditional elasticity of N w.r.t. W, given the balance of trades restriction.

The employment elasticity of a RWT has the following outlook (sum of total effects) :

$$-\eta_{NT\mid B} = (1-\beta)\eta_{NY} - \beta\eta_{N\bar{Y}\mid B} + (1-\alpha)\eta_{NW\mid B}\,[\beta+(1-\beta)\eta_{NY}], \tag{18}$$

$$\text{where } \eta_{N\bar{Y}\mid B} := \frac{\eta_{X\bar{Y}}\,(1-\eta_{MX}) - \eta_{M\bar{Y}}}{\eta_{MY}}\,\eta_{NY}\,, \tag{19}$$

with η_{MX} = the import elasticity of exports.

The total effect of a RWT on employment ($-\eta_{NT|B}$) depends on the relative part of (firms with) production loss (β), in comparison with the cases without any spare production ($1-\beta$). A fall of production will take place especially in those firms that have just one shift : reducing working time reduces production time and, hence, production itself if there is no extra productivity increase. In that case, there will be no extra employment. Drèze also takes into account the indirect impact of RWT on employment by decreasing the production capacity ($\bar{Y}$) and a rise of real wage costs (W). The (opposite) employment elasticity according to (18) is computed now for various subperiods of the postwar Belgian economy. In table 13, point estimates of the elasticities are given for the short run (Drèze's data, short run SR), for the period 1966-'76 (Drèze's data, medium run MR), for the period 1973-'83 (Mirabel data, medium run MR), and for the period 1953-'83 (Mirabel data, long run LR).

Table 13 : Elasticities by Drèze and Mirabel

	Drèze (manufacturing sector)		Mirabel (private sector)	
	SR	MR '66-'76	MR '73-'83	LR '53-'83
η_{NY}	0.3	0.9	0.135	0.162
$\eta_{NW\|B}$	-0.2	-1.8	-4.688	-0.036
$\eta_{X\bar{Y}}$	0.77	0.77	1.961	1.820
η_{MX}	0.4	0.4	0.83	0.950
η_{MY}	1.53	1.24	1.837	1.940
$\eta_{M\bar{Y}}$	-0.29	-0.29	2.044	1.729
$\eta_{N\bar{Y}\|B}$	0.15	0.54	-0.126	-0.137

Source : - Drèze (1980)
- own calculations with the Mirabel databank

Interpreting these elasticities, it is noticed that the underlying sample periods are different. Moreover, Drèze's calculations are made only for the manufacturing sector, while the Mirabel computations contain the whole private sector.

There are some remarkable differences between the medium run elasticities by Drèze and Mirabel. The most important deviation concerns the elasticity of imports w.r.t. production capacity ($\eta_{M\bar{Y}}$). Even the sign is different. Drèze supposes that imports decrease when production capacity increases, because of a substitution of imported goods by home-produced goods (substitution-effect). Out of the Mirabel databank, one notes that imports increase more proportionally than an expansion of production would suggest. This can be explained by the increasing importing needs of primary and intermediary products. This deviation of $\eta_{M\bar{Y}}$ has also an impact on $\eta_{N\bar{Y}|B}$, which uses this elasticity.
The long run elasticities follow in the same directions, although they can be larger or smaller. The most important difference is in $\eta_{NW|B}$. A change in real wages, given the balance of payments restriction, has a very small effect on employment when averaging over 20 years.

For alternative values of α(wage decrease) and β(production loss), the size of the employment elasticity of RWT is calculated. The advantage of this approach is that it makes clear what size of wage decrease is necessary to have a positive impact on employment of a RWT.
Table 14 gives a synopsis of the values of $-\eta_{NT|B}$, for Drèze and for Mirabel, for various values of α and β.

Table 14 : The employment elasticity of RWT for Belgium, by Drèze and Mirabel.

$-\eta_{NT\|B}$	Drèze SR			Drèze MR('66-'76)			Mirabel MR('73-'83)			Mirabel LR('53-'83)		
β \ α	0	1/2	1	0	1/2	1	0	1/2	1	0	1/2	1
0	0.24	0.27	0.30	-0.72	0.09	0.90	-0.498	-0.181	0.135	0.156	0.159	0.162
1/4	0.09	0.14	0.19	-1.12	-0.29	0.54	-1.521	-0.697	0.126	0.142	0.149	0.156
1/2	-0.05	0.01	0.08	-1.53	-0.67	0.18	-2.543	-1.213	0.117	0.129	0.139	0.150

Source : - Drèze (1980), p. 19
- calculations with Mirabel

From these calculations, one can conclude that a reduction of real wages has a very small impact on employment in the short run.[1] In the medium run, it's clear that a fall of real wages is indispensable to have a positive employment effect. If the increase of costs must be carried by the employers, the medium run employment effect is negative. This is also true for the medium run Mirabel version, even with half of the wage increase at the employees' burden. In the long run, all values of $-\eta_{NT|B}$ are almost equal. Neither the fall in wages nor the loss of production seem to have much impact on employment in the long run.

Drèze's theory (only positive employment effect of RWT when real wage cut) remains for the medium run only, when applied on more recent Belgian data, although there exist considerable differences in underlying elasticities. In the long run, the effects are almost vanishing, which is not in accordance with the Maribel-simulations discussed (see, e.g., sim. 1).

5. The effects of a RWT for the employers

In section 4 of this paper, we investigated the impact of a RWT on (un)employment and the financial position of employees. In this section, we try to point out the changing position of the firms as a consequence of the RWT. We investigate the evolution of gross wage costs and labour productivity, already mentioned in paragraph 4. Investments, production and production capacity might change also. As a consequence, profits may alter. Last but not least, we look at the competitive position of the Belgian firms w.r.t. the world market.
Table 15 summarizes the impact of RWT upon hourly labour costs and hourly labour productivity per employee, which is shown in growth rates. The third column of table 15 gives the growth rates of real output.

It is clear that the hourly wage cost and the hourly labour productivity increase the most in simulations 3 and 4. One notices that the expected high hourly labour productivity per employee is not realized in the first year as the reorganisation of labour takes some time. Therefore, the growth rates for 1985 are almost the same for all simulations. It's only in the period 1986-'89 that there is a considerable difference among the

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[1] This observation is coincident with the zero real wage partial elasticity of employment in the employment demand equation of the Maribel model.

Table 15 : Growth rates of nominal hourly labour costs, hourly labour productivity and real output by a conventional RWT of 10 % in 1985, private sector, in Belgium.

var. / sim.	nominal labour costs/hour				labour productivity/hour				real output			
	'85	'84-'86	'86-'89	'84-'89	'85	'84-'86	'86-'89	'84-'89	'85	'84-'86	'86-'89	'84-'89
base	3.4	6.2	24.0	31.6	3.1	6.8	10.7	18.2	1.9	3.6	8.3	12.2
sim 1	4.1	7.7	25.5	35.2	3.4	7.5	11.7	20.1	1.1	2.0	7.8	10.0
sim 2	10.0	14.6	26.6	45.0	3.5	7.9	12.3	21.1	0.7	0.9	7.0	8.0
sim 3	9.9	18.3	32.8	57.2	3.5	8.0	13.1	22.1	0.7	0.7	5.6	6.3
sim 4	11.1	18.9	32.4	57.5	3.5	7.9	12.9	21.8	0.7	1.1	5.7	6.8
sim 5	7.5	12.1	28.3	43.8	0.0	5.0	13.7	19.4	0.4	0.6	7.1	7.8
sim 6	7.1	11.1	26.1	40.1	3.3	7.7	12.0	20.7	0.8	1.4	7.5	9.0
sim 7	4.2	7.8	25.7	35.5	3.3	7.6	11.8	20.3	1.0	1.9	7.8	9.8
sim 8	4.1	7.6	25.5	35.1	3.3	7.5	11.7	20.1	1.1	2.1	7.8	10.1

Source : Maribel-simulations

simulations. Hence, firms seem to respond only slowly to an increase in the wage costs.

Another important consequence of RWT is the decline of real production, as can be seen in table 15. The growth rate is always smaller than without RWT, but it is even smaller in the simulations with a wage increase. Table 16 shows the real value of production and production capacity, and the ratio between these two variables, which is the degree of utilization of production capacity.

Table 16 : Production and production capacity in the private sector, in billion constant BF of 1975; degree of utilization of production capacity (%); due to conventional RWT of 10 % in 1985 - Belgium.

	production			production capacity			degree of utilization of production capacity (%)		
	'84	'85	'89	'84	'85	'89	'84	'85	'89
base	1954.4	1991.5	2192.1	2424.3	2491.0	2808.7	80.6	79.9	78.0
sim 1	1954.4	1975.4	2149.0	2424.3	2409.6	2705.4	80.6	81.9	79.4
sim 2	1954.4	1967.6	2111.1	2424.3	2408.5	2683.5	80.6	81.6	78.6
sim 3	1954.4	1967.7	2077.0	2424.3	2408.5	2669.4	80.6	81.7	77.8
sim 4	1954.4	1968.8	2087.8	2424.3	2408.6	2675.5	80.6	81.7	78.0
sim 5	1954.4	1962.9	2105.9	2424.3	2407.8	2680.4	80.6	81.5	78.5
sim 6	1954.4	1969.7	2129.9	2424.3	2408.8	2694.6	80.6	81.8	79.0
sim 7	1954.4	1973.3	2145.4	2424.3	2402.1	2696.5	80.6	82.1	79.5
sim 8	1954.4	1976.5	2151.3	2424.3	2413.8	2710.7	80.6	81.8	79.3

Source : Maribel-simulations

Production decreases in all simulations w.r.t. the base projection, especially in those, where real labour costs increase. The same conclusion is possible for production capacity. The use of production capacity is higher in all the simulations, except in sim 3. The capacity utilization is generally higher the lower the labour costs.

One remarks that, although in the base projection the degree of utilization decreases during the forecast period, the same is not entirely true for the

simulations. In the year of the introduction of the RWT, there is a higher rate in all the simulations w.r.t. 1984. The production capacity is computed from the production function, by replacing the actual employment by the potential labour input, since capital services are approximated by the capital stock in the production function (see also 2.2.3. for the production capacity). Hence, the underutilization of production capacity is proportional to the underutilization of the labour input.

Table 17 : Quantity and potential quantity of labour input in private sector, 10^6 hours per year; degree of utilization of potential quantity of labour; by a conventional RWT of 10 % in 1985 - Belgium.

	quantity of labour input			quantity of potential labour input			degree of utilization of potential quantity of labour		
	'84	'85	'89	'84	'85	'89	'84	'85	'89
base	4330.2	4280.3	4109.0	6082.6	6083.5	6106.3	71.2	70.4	67.3
sim 1	4330.2	4234.5	3964.2	6082.6	5473.8	5494.3	71.2	77.4	72.2
sim 2	4330.2	4212.7	3860.5	6082.6	5473.8	5494.3	71.2	77.0	70.3
sim 3	4330.2	4212.6	3769.0	6082.6	5473.8	5494.3	71.2	77.0	68.6
sim 4	4330.2	4215.0	3797.9	6082.6	5473.8	5494.3	71.2	77.0	69.1
sim 5	4330.2	4344.8	3907.5	6082.6	5473.8	5494.3	71.2	79.4	71.1
sim 6	4330.2	4218.6	3910.7	6082.6	5473.8	5494.3	71.2	77.1	71.2
sim 7	4330.2	4228.5	3952.2	6082.6	5420.9	5441.9	71.2	78.0	72.6
sim 8	4330.2	4237.3	3969.5	6082.6	5503.9	5524.0	71.2	77.0	71.9

Source : Maribel-simulations

Potential labour input diminishes w.r.t. the base projection because of the RWT and the non-complete reallocation. Real labour input decreases less than potential labour input. The decrease of the latter is due to the RWT. The reduction of real labour input is lower the smaller the rise in wages : when wages increase, labour is substituted by capital.

When production is declining, private consumption develops in the same direction, as can be seen in table 18. To be complete, the evolution of public consumption is also shown in this table.

Table 18 : Volume of the private and the public consumption, by a contractual RWT of 10 % in 1985, billion BF '75 prices, Belgium.

	Private consumption			Public consumption		
	'84	'85	'89	'84	'85	'89
base	1651.876	1639.245	1687.709	460.094	468.825	465.278
sim 1	1651.876	1629.385	1659.300	460.094	468.737	465.254
sim 2	1651.876	1641.370	1661.753	460.094	468.723	465.286
sim 3	1651.876	1641.139	1670.966	460.094	468.716	465.337
sim 4	1651.876	1636.903	1666.798	460.094	468.685	465.342
sim 5	1651.876	1639.018	1658.584	460.094	468.646	465.291
sim 6	1651.876	1632.662	1660.150	460.094	468.686	465.264
sim 7	1651.876	1626.946	1655.625	460.094	468.711	465.250
sim 8	1651.876	1630.302	1661.033	460.094	468.735	465.252

Source : Maribel-simulations

In this table, private consumption of employed and unemployed is given. This explains why in 1989, total consumption is smaller than in the base projection, also in simulation 3. In that simulation, only a growth of the purchasing power of workers is supposed.
The decrease in sales creates a problem for the firms. Looking at their profit rates, the problem becomes even worse. As shown in table 19, profits reduce in all the simulations of RWT w.r.t. the base simulation, but enormously in the simulations without wage cut. The investments are following this evolution (cfr. table 20, where also public investments and investments in houses are included), although not so spectacularly. The fall in profits oppresses the future !

So far, we investigated the impact of a RWT on the aggregate firms, without any distinction w.r.t. size, turnover, sector etc. Such a distinction is impossible by the Maribel-model, but has to be taken into consideration evaluating the possibilities of a RWT and the competitive position of a specific firm.

Table 19 : Profits as % of GNP, by a contractual RWT of 10 % in 1985 - Belgium.

	'85	'84-'86	'86-'89	'84-'89
base	11.3	30.6	-6.2	22.5
sim 1	10.8	30.4	-7.7	20.4
sim 2	-18.3	1.3	-11.7	-10.5
sim 3	-17.7	-15.3	-39.0	-48.3
sim 4	-13.9	-10.4	-35.9	-42.6
sim 5	-25.2	-1.3	-12.9	-14.0
sim 6	-20.6	16.4	-10.1	4.7
sim 7	12.5	32.1	-7.6	22.0
sim 8	10.7	30.3	-6.0	20.3

Source : Maribel-simulations

Table 20 : Volumes of private and public investments, investments in housing sector, billion BF constant 75 prices, by a contractual RWT of 10 % in 1985, Belgium.

	Private investments			Public investments			Housing sector		
	'84	'85	'89	'84	'85	'89	'84	'85	'89
base	288.0	304.1	352.8	79.9	78.5	78.5	87.8	93.3	99.8
sim 1	288.0	301.0	346.8	79.9	77.8	77.9	87.8	93.2	103.0
sim 2	288.0	299.5	336.3	79.9	76.5	76.5	87.8	93.4	104.0
sim 3	288.0	299.5	326.9	79.9	76.5	76.5	87.8	93.4	107.9
sim 4	288.0	299.6	329.6	79.9	75.9	76.0	87.8	93.3	108.2
sim 5	288.0	298.5	335.2	79.9	76.2	76.2	87.8	93.3	104.0
sim 6	288.0	299.9	341.7	79.9	77.1	77.1	87.8	93.2	103.7
sim 7	288.0	300.6	346.4	79.9	77.8	77.8	87.8	93.2	103.4
sim 8	288.0	301.2	347.1	79.9	77.8	77.8	87.8	93.2	102.8

Source : Maribel-simulations

In what follows, we investigate the competitive position of the Belgian economy, resulting in the development of the balance of trades.
Table 21 outlines the imports and the exports of goods and services in quantities. One immediately notices that the balance of trades remains positive in all the simulations, with or without a RWT.

Table 21 : Volume of imports and exports of goods and services and balance of trades, billion real BF, 75-prices, by a contractual RWT of 10 % in 1985, Belgium.

	IMPORTS			EXPORTS			BALANCE OF TRADES		
	1984	1985	1989	1984	1985	1989	1984	1985	1989
base	1599.8	1670.2	2000.9	1789.4	1885.5	2347.5	189.6	215.3	346.6
sim 1	1599.8	1669.6	2017.9	1789.4	1884.2	2345.1	189.6	214.6	327.2
sim 2	1599.8	1673.7	2032.4	1789.4	1872.0	2327.5	189.6	198.3	295.1
sim 3	1599.8	1673.5	2049.7	1789.4	1872.2	2306.9	189.6	198.7	257.2
sim 4	1599.8	1671.0	2041.1	1789.4	1875.3	2311.6	189.6	204.3	270.5
sim 5	1599.8	1671.5	2031.3	1789.4	1869.3	2325.6	189.6	197.8	294.3
sim 6	1599.8	1670.0	2025.1	1789.4	1877.9	2336.2	189.6	207.9	311.1
sim 7	1599.8	1668.7	2018.4	1789.4	1884.2	2345.1	189.6	215.5	326.7
sim 8	1599.8	1669.9	2017.5	1789.4	1884.2	2345.1	189.6	214.3	327.6

Source : Maribel-simulations

Nevertheless, the balance of trades worsens w.r.t. the base-projection in all the simulations of RWT. Imports increase heavily (also in the base simulation !) over time. The exports side of the balance of trades is worsening too : in all the simulations, exports are smaller than in the base projection. In total, the balance of trades is best in the simulations with wage cut, but is always worse than in the base projection.
As a kind of a summary of this paragraph, the final demands are shown in table 22. Final demands are defined here as the sum of consumption, investments and exports minus imports. This variable too is worse in the simulations without wage cut than in these with reduced wages. The situation is in all simulations worse than in the base projection.

Table 22 : Volumes of final demands, billion BF in '75 prices, by a contractual RWT of 10 % in 1985 - Belgium.

	1984	1985	1986	1987	1988	1989
Base	2761.2	2808.8	2843.6	2904.8	2974.5	3043.5
Sim 1	2761.2	2790.9	2810.0	2866.1	2931.1	2995.6
Sim 2	2761.2	2782.2	2786.1	2835.4	2894.6	2953.4
Sim 3	2761.2	2782.4	2781.2	2818.5	2866.8	2915.5
Sim 4	2761.2	2783.5	2790.2	2829.2	2877.2	2927.5
Sim 5	2761.2	2776.9	2780.0	2831.3	2889.9	2947.7
Sim 6	2761.2	2784.5	2797.3	2850.9	2912.9	2974.4
Sim 7	2761.2	2788.4	2806.7	2862.8	2927.4	2991.5
Sim 8	2761.2	2792.0	2811.8	2868.1	2933.4	2998.1

Source : Maribel-simulations

The conclusions of this section can be formulated as follows. Production and production capacity decrease by RWT, while the degree of utilization of capital increases. The total demand of labour is smaller, especially when wages rise. Labour productivity increases most in the simulations with rising wages, but this increase is delayed over time. Also in the simulations with endogenous wage formation, hourly labour productivity is higher w.r.t. the base projection.

The profits are decreasing, especially in the case of higher purchasing power. This leads to decreasing investments. In the same time, consumption is lower, and there are more imports and less exports. The final demands decrease w.r.t. the base projection.

The increase of the wage costs may be underestimated, because of social welfare costs, recruiting and training costs, and all other non-wage labour costs, which are associated with an employee and not with the working time. This phenomenon can make the situation worse, also in the simulation with constant yearly wages per employee.

There is not known a lot about these extra costs of labour (see Hart R., 1984, for more explanation of non-wage labour costs). It's impossible to incalculate those costs within a macro-economic model as Maribel, because these costs are almost unknown and very different for several kinds of firms. One has to keep in mind that the employment effects are generally overestimated and the wage costs underestimated.

6. The effects of a RWT for the government

A RWT has an impact on the governmental budget. In tables 23 until 25, the development of taxes (direct and indirect) and the transfers of unemployment are pointed out. The taxes of households are supposed to rise, and unemployment benefits to decrease, because of the RWT.

Table 23 : Direct taxes of families and firms, billion current BF, by a contractual RWT of 10 % in 1985, Belgium.

	direct taxes of families			direct taxes of firms		
	1984	1985	1989	1984	1985	1989
base	660.0	704.5	986.2	119.1	136.5	182.0
sim 1	660.0	704.5	985.1	119.1	136.3	180.6
sim 2	660.0	732.6	1007.9	119.1	125.1	165.8
sim 3	660.0	732.1	1045.9	119.1	125.4	142.3
sim 4	660.0	738.2	1054.6	119.1	127.3	147.2
sim 5	660.0	737.0	1009.0	119.1	121.8	163.9
sim 6	660.0	717.7	996.4	119.1	130.7	173.6
sim 7	660.0	702.6	983.4	119.1	136.8	181.2
sim 8	660.0	704.6	985.2	119.1	136.3	180.6

Source : Maribel-simulations

DirexT tax income of the central government increases when the pay of employees rises. If the yearly wage per employee decreases, the taxes remain. This is due to the more people employed, who have to pay now taxes either[1)]. Part of the rise of tax income is due to the higher inflation in the simulations w.r.t. the base projection and to the indexation of tax rates.

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1) Meanwhile, fiscal laws on tax reduction have been voted in parliament, so that future direct tax income could be overestimated.

Direct taxes of firms are lower (up to 22 % in the case of purchasing power of employees increasing) w.r.t. the base projection. The fall is very small in the simulations with hourly wage costs almost constant. The decrease of direct taxes of firms depends on the lower profit rates.
Table 24 gives the values of indirect taxes, which are also a part of the governmental income.

Table 24 : Indirect taxes of central government, billion current BF, by a contractual RWT of 10 % in 1985 - Belgium.

	1984	1985	1989
base	519.5	566.8	690.4
sim 1	519.5	567.4	692.4
sim 2	519.5	555.4	678.4
sim 3	519.5	555.3	691.4
sim 4	519.5	610.9	770.8
sim 5	519.5	555.4	678.4
sim 6	519.5	552.1	674.2
sim 7	519.5	549.7	669.6
sim 8	519.5	550.2	669.7

Source : Maribel-simulations

It's clear that indirect taxes are on a lower level in the simulations than in the reference projection, except in simulation 4.

In simulation 4, indirect taxes are higher because of the Maribel-operation. The lower level of indirect taxes in the other simulations might be surprising, especially in those cases where the purchasing power per employee increases. But one already knows that the private consumption falls as a consequence of RWT, so indirect taxes (above all : value added taxes), develop in the same direction.
Roughly, tax-income is higher in the simulations with wage-rise and almost equal to the base projection in simulations without wage-increase.
On the expenditures' side of the governmental account, it's clear that the unemployment benefits are changing as a consequence of RWT because of the more people employed.

Table 25 : Social security transfers to wage earners : unemployment, billion current BF, by a contractual RWT of 10 % in 1985 - Belgium.

	1984	1985	1989
base	165.6	172.2	212.3
sim 1	165.6	151.8	198.3
sim 2	165.6	153.7	201.6
sim 3	165.6	153.7	213.3
sim 4	165.6	154.8	211.4
sim 5	165.6	136.2	196.8
sim 6	165.6	142.3	195.6
sim 7	165.6	147.3	186.1
sim 8	165.6	154.4	191.3

Source : Maribel-simulations

As expected, transfers to unemployed diminish due to the fall of unemployment rates. The benefits to unemployed people are higher the more the unemployment rate increases. This rate increases when wages increase.
Most people assume that the fall in benefits, together with an increase of taxes, lead unconditionally to an improvement of the financing shortage of the government.
Table 26 summarizes the net financing shortage of the government. This variable is worsening in the simulations with wage reduction w.r.t. the base simulation, in contrast to what's often supposed (C. de Neubourg, L. Kok, 1984, p. 27). In contrary, the shortage is smaller in the cases of wage-rise. Naturally, this is a consequence of RWT without wage-cut that cannot be neglected. In 1985, the shortage is in all simulations lower than in the base projection. In 1989, the shortage is 404 billion BF in the simulations with growing purchasing power. The financial position of the government is the best (or : the less bad) when the purchasing power is the higher and the employment effect the smaller. This is an important management implication : for the government, RWT without wage reduction is more interesting for its budget.

The simulations with the best impact on employment, deteriorate the financing shortage. So, the government is confronted with a dilemma : what is the most important to achieve, reducing unemployment or ameliorating the financial position of the state ?

Table 26 : Net financing shortage of the government in billion current BF and as % of GDP (between brackets), by a contractual RWT of 10 % in 1985 - Belgium.

	1984	1985	1986	1987	1988	1989
Basis	-505.34	-510.82	-510.78	-494.30	-457.04	-410.68
	(-11.21)	(-10.70)	(-10.22)	(-9.40)	(-8.20)	(-6.93)
Sim 1	-505.34	-498.93	-507.25	-492.47	-458.86	-417.40
	(-11.21)	(-10.43)	(-10.12)	(-9.34)	(-8.22)	(-7.05)
Sim 2	-505.34	-451.41	-472.92	-463.55	-436.46	-404.10
	(-11.21)	(-9.40)	(-9.39)	(-8.76)	(-7.81)	(-6.83)
Sim 3	-505.34	-452.11	-444.59	-429.04	-401.25	-372.61
	(-11.21)	(-9.41)	(-8.80)	(-8.07)	(-7.14)	(-6.28)
Sim 4	-505.34	-453.25	-428.88	-408.96	-378.39	-344.30
	(-11.21)	(-9.33)	(-8.37)	(-7.58)	(-6.64)	(-5.72)
Sim 5	-505.34	-424.21	-458.93	-450.34	-429.94	-394.16
	(-11.21)	(-8.84)	(-9.11)	(-8.51)	(-7.60)	(-6.66)
Sim 6	-505.34	-464.41	-486.27	-475.74	-446.12	-409.32
	(-11.21)	(-9.70)	(-9.68)	(-9.01)	(-7.98)	(-6.92)
Sim 7	-505.34	-498.68	-508.67	-493.83	-460.60	-419.53
	(-11.21)	(-10.43)	(-10.15)	(-9.37)	(-8.25)	(-7.09)
Sim 8	-505.34	-500.34	-507.59	-492.46	-458.63	-416.84
	(-11.21)	(-10.46)	(-10.13)	(-9.34)	(-8 22)	(-7 04)

Source : Maribel -projections

7. RWT-comparisons with other (OECD) economies

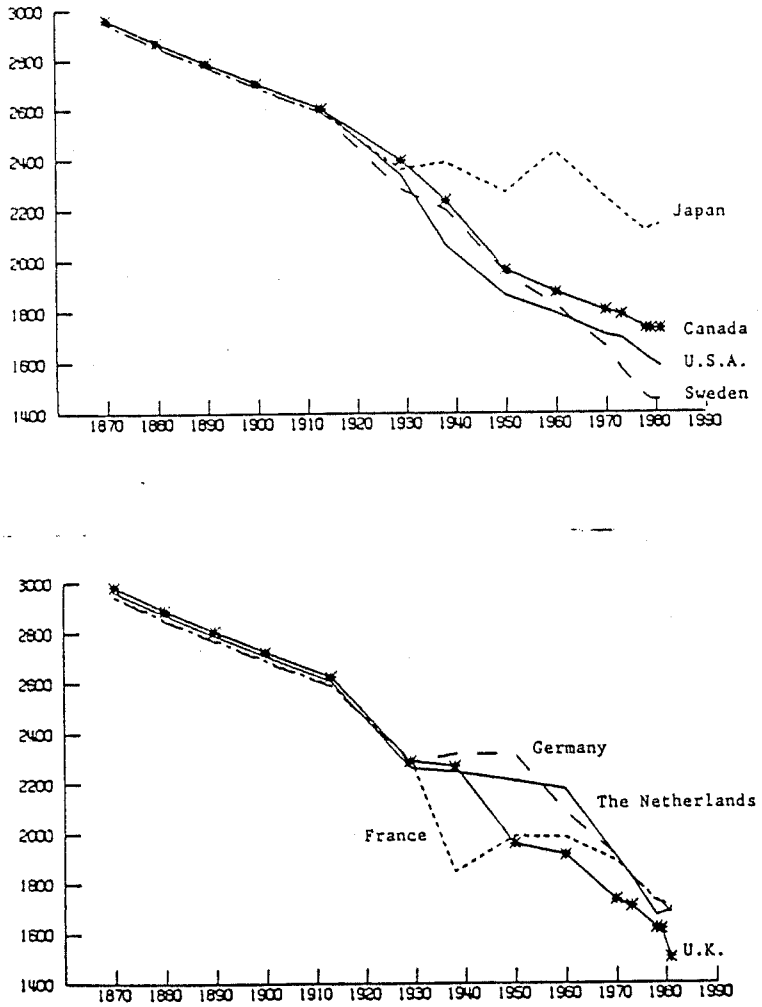
In a large number of OECD-member countries, the RWT is primarily linked to the long run improvement of welfare; in particular, RWT is generally not a part of an employment- or job-creating policy. This can be verified from the following table and figure about the average number of hours worked per employee per year.

Table 27 : Average annual number of hours worked per employee in the total economy : period 1890 - 1979

	1890	1913	1929	1950	1970	1979	1982
Austria	2 760	2 580	2 281	1 976	1 848	1 660	-----
Belgium	2 789	2 605	2 272	2 283	1 986	1 747	1 502
Canada	2 789	2 605	2 399	1 967	1 805	1 730	1 720
France	2 770	2 588	2 297	1 989	1 888	1 727	1 700
Germany	2 765	2 584	2 284	2 316	1 907	1 719	1 640
Italy	2 714	2 536	2 228	1 997	1 768	-	1 650
Japan	2 770	2 588	2 364	2 272	2 252	2 129	2 080
Sweden	2 770	2 588	2 283	1 951	1 660	1 451	1 430
United Kingdom	2 807	2 624	2 286	1 958	1 735	1 617	1 625
United States	2 789	2 605	2 342	1 867	1 707	1 607	1 610

Sources : Austria, Canada, Sweden and 1970-figure for all countries : A. Maddison (1982) and Belgium, France, Germany, Italy, Japan, U.K. and U.S.A. : A. Maddison (1983); 1982 : Commissariat Général du Plan (1985), p. 75

Figure 7 : Average annual number of hours worked per employee 1870 - 1981



Sources : Same as table 27 plus Netherlands : A. Maddison (1983).

The substantial drop in labour input per employee over the last century becomes clear from the above table and figure, showing that the average number of hours worked per employee in 1970 amounted to only about 60 % of that in 1870. This downward trend was even more pronounced during the post-war decades in most European countries (except Belgium and France for the 2nd world war).

The average reduction in annual hours worked per employee during the seventies largely exceeded previous decade averages (except for Canada, where annual hours worked changed less during the seventies than during the fifties and the sixties, and for Germany and the U.K., where the reduction progressed at the same (high) rate throughout the post-war period). This becomes clear from table 28, showing the average percentage annual changes in hours worked per employee during the period 1960 - 1981 :

Table 28 : Average annual changes of hours worked per person in the employment of the total economy (%).

	1960-'70	1970-'73	1973-'76	1976-'79	1979-'81
Belgium	-0.9	-2.2	-3.1	-0.8	-2.0
Canada	-0.8	-0.5	-0.7	-0.6	-0.6
Finland	-0.4	-1.1	-0.6	-0.3	-1.1
France	-0.5	-1.0	-1.1	-0.8	-0.2
Germany	-0.9	-1.5	-0.8	-1.2	-1.2
Japan	-0.8	-1.8	-1.6	0.3	-0.3
Italy	-0.6	-2.2	-0.8	-0.1	-0.1
Netherlands	-1.4	-2.0	-1.7	-1.9	-0.9
Norway	-1.1	-2.4	-1.1	-1.5	-0.6
Sweden	-0.9	-1.7	-0.7	-1.6	-0.7
United Kingdom	-0.1	-0.3	-1.1	-0.9	-2.9
United States	-0.5	-0.2	-1.1	-0.2	-0.6

Source : OECD (1983)

It follows from table 28 that the above mentioned OECD-countries showed an average annual RWT of 0.3 % during the 1950's, 0.7 % during the 1960's, 1.1 % during the 1970's and 0.5 % during 1979-'81. However, there were substantial differences between countries, and the variations between countries and between periods reflected short-term structural and cyclical changes and increases in part-time female employment in addition to long-term trends towards shorter standard hours, e.g., the shortest working year in Sweden which has already been the case for a long time (introduction of parents' holidays during the 50's, considerable part-time female employment and 3 % unemployment in 1980).

It should be stressed, however, that some OECD-member countries have taken the view that a policy of RWT is a powerful and effective weapon in the fight against unemployment (e.g. Sweden, ...). In general, employers are against a RWT for any purpose other than furthering the long-term improvement of welfare. They fear its effect on production costs, on their competitive position and, consequently, on employment itself. On the other hand, they often favour adjustments aimed at improving flexible working arrangements (part time work, working time savings, ...).
Unions, on the contrary, are generally determined to press on with claims for RWT, and, sometimes, their demands are substantial and insistent.

Since, in general, there is a considerable uncertainty as to the actual impact of RWT on employment and unemployment, on consumption, investment, production growth, balance of payments, inflation, governmental financing shortage, etc. ..., it is instructive to compare some recent European national econometric models on their various impacts of a RWT-policy. The studies of W. van Ginneken (1984), C. de Neubourg (1984) and C. de Neubourg and L. Kok (1984) will be very helpful in this respect.

In general, an analysis of a RWT with the help of macro-economic models permits the study of as well direct as indirect effects of a RWT on various interesting aggregate economic variables, but it should be stressed that, since (almost) all large econometric models have been estimated under the assumption of a constant (parameter) structure, the behavioural relationships represent a somewhat "average behaviour" during a sample period, and not (in principal) during a period of recession, for which RWT-policies will mainly be simulated.

The macro-economic models utilized for this RWT-simulation comparison are :

MARIBEL for Belgium (Planning Office (1984) and this study (1986));
DMS for France (Oudiz, a.o. (1979));
HENIZE for the Federal Republic of Germany (Henize (1981)),
VINTAF II and FREIA for the Netherlands (Central Planning Bureau (1979) and (1983)) and
TREASURY for the United Kingdom (Allen (1980)).

In table 29 the impact of a RWT on employment (measured by the "employment elasticity", i.e., the (opposite of the) percentage change of the actual number of employees owing to a 1 % RWT), on the (absolute) change of the unemployment percentage $\tilde{u}n$, on the (relative) change of private consumption C^P and private output growth Y^P, on the real hourly labour costs in the private sector $(\frac{w^P}{p_c})$, on consumer prices p_c, on the balance of payments (as a percentage of net national income NNI) and on the government budget (also as a percentage of net national income) is summarized for the various above-called econometric models. This impact has been measured for the starting year (of introduction of RWT) and the final year of the simulation forecasting period. Distinction is made according to the requirement of a strict proportional per capita wage reduction or to the case of a full wage compensation and to the case of reduction of productive capacity (decrease of the number of machine-operating hours, being proportional to the RWT) or to capacity maintenance.

It should be noted that the Dutch VINTAF II-model is only for the market sector (hence, the government sector is excluded), that the French DMS-model is concentrated only on the private non-agricultural and non-financial enterprises and that the HENIZE-, FREIA-, MARIBEL- and TREASURY-models treat the aggregate economy (private + public sector). Hence, by "the impact on employment" is meant the impact on employment in the correspondingly treated part of the economy, e.g., for FREIA, the impact on the total number of Dutch employees. It should be noted, however, that the Maribel-simulations discussed in this paragraph only concern the private sector.

Table 29 : Percentage changes w.r.t. the reference simulation

Model	Hypotheses	Year of impact	Empl. elast. $-\eta_{NT}$	$\Delta \tilde{un}$ (as % of the act. pop.)	ΔC^p (vol.)	ΔY^p (vol.)	$\Delta\left(\frac{w^p}{p_c}\right)$	Real income per empl. (purchasing power)	Δp^c	Balance of payments (as % of NNI)	Government deficit (as % of NNI)
MARIBEL (1985)	(i) proportional wage reduction; no assumption about production capacity (sim 1)	1985	0.423	-2.3	-0.06	-0.81(1)	0.05	-4.09	0.68	0(2)	-0.27(2)
(10 % RWT : once in 1985)		1989	0.539	-2.8	-1.68	-1.97(1)	0.32	0.11	-0.00	-0.46(2)	0.12(2)
	(ii) full wage compensation; no assumption about production capacity (sim 3)	1985	0.401	-2.2	-0.01	-1.19(1)	4.79	0.05	1.41	-0.62(2)	-1.29(2)
		1989	0.201	-1.1	-1.00	-5.25(1)	1.28	0.72	0.29	-3.36(2)	-0.65(2)
DMS (1979)	(i) proportional wage reduction, unchanged capacity	1986	0.582	-2.2	-1.5	-0.2	0.2	-1.6	-0.2(3)	2.7(4)	-1.8(4)
(2.5 % RWT per year, trendreduction, 1982-1986)	(ii) full wage compensation, unchanged capacity	1986	0.633	-2.0	-0.1	-0.3	1.8	-0.4	1.7(3)	2.0(4)	-1.2(4)
HENIZE (1981)	(i) proportional wage reduction; no assumpt. reg. capacity	1981	0.680	-	-	-	-	-	-	-	-
(5 % RWT : once, plus 1 % trend reduction)	(ii) full wage compensation, (tax reduction) no assumpt. reg. capacity	1981	0.840	-	-	-	-	-	-	-	-
VINTAF II (1979)	(i) proportional wage reduction, reduction of capacity	1983	0.067	-0.4	-1.8	-1.9	0.1	-2.0	0.9	1.6	0.0
(2.5 % RWT per year, 1979-1983)		1988	0.168	-1.1	-1.2	-1.1	-0.2	-1.3	0.4	2.0	-1.0
	(ii) full wage compensation, reduction of capacity	1983	-0.135	1.0	-0.8	-2.3	0.9	-0.5	1.9	-0.7	1.5
		1988	-0.193	1.2	-0.6	-1.5	0.2	-0.5	1.1	-1.4	2.6
	(iii) proportional wage reduction, unchanged capacity	1983	0.118	-0.8	-1.7	-1.7	0.2	-2.0	0.7	1.5	0.0
		1988	0.193	-1.2	-1.1	-1.0	-0.1	-1.3	0.4	2.1	0.9
	(iv) full wage compensation, unchanged capacity	1983	-0.084	0.6	-0.7	-2.1	1.0	-0.5	1.8	-0.8	1.5
		1988	-0.177	1.1	-0.6	-1.4	0.2	-0.4	1.0	-1.4	2.8
FREIA (1983)	(i) proportional wage reduction, reduction of capacity	1986	0.125	-0.8	-1.0	-1.5	0.5	-1.5	1.5	0.7	-0.3
(2.5 % RWT per year, 1983-1986)	(ii) proportional wage reduction, unchanged capacity	1986	0.488	-4.0	-0.7	-0.5	0.7	-0.5	0.0	1.0	-0.5
TREASURY (1981)	(i) proportional wage reduction, accomodative monetary policy	1981	0.280	-1.0	-	0.3	-	-0.4	-0.3	-0.1(4)	-0.1(4)
(5 % RWT : once)	(ii) full wage compensation, accommodative monetary policy	1981	0.160	-0.6	-	-0.3	-	0.9	2.6	0.1(4)	0.4(4)

(1) Gross domestic product at factor cost of the private enterprises.

(2) In percentage of gross national product.

(3) Production price.

(4) In percentage of gross domestic product.

Table 29 implies widely differing effects of RWT, sometimes with opposite signs, among macro-econometric models of the various countries. Three main reasons for these observed differences are :

(i) the varying model hypotheses regarding the anticipated capacity - and productivity effects;

(ii) the strongly differing specification of the macro-econometric models (e.g. linear vs. non-linear);

(iii) the varying sampling periods and spatial situations of the underlying models.

In the sequel we'll discuss the impact of a RWT on (un)employment, the volumes of private consumption and output, real gross hourly wage cost, real income per employee (purchasing power), inflation (measured by the percentage price change of private consumption goods), current balance of payments and governmental deficit (as percentage of NNI) from the results in table 29.

7.1. RWT-effects on employment

- A RWT raises employment almost everywhere (except for the full-wage compensation scenario in the Dutch Vintaf-model[1]) and the "employment elasticity" is always less than one, so that the percentage increase in jobs is less than the percentage decrease in the number of working hours.

- Immediately striking, indeed, are the negative employment effects from a substantial RWT (12.5 % in 5 years) under full-wage compensation in the Dutch Vintaf II model : a scrapping condition in real wages only for this clay-clay model leads to the "crowding out" of labour.

- Wage compensation tends to reduce the employment effects, although the 2 models that introduce wage compensation by means of a tax reduction (the French DMS-model and the German HENIZE-model) yield better results compared to the situation where wages are reduced proportionally to the RWT.

- Employment effects of a RWT differ widely : the most pessimistic (positive) estimate of the employment elasticity is obtained in the Vintaf II-variant in the short run : 1 % RWT raises employment with only 0.067 % during

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[1] Remark that in the Vintaf clay-clay model, the sole production cost is labour cost, such that wage increases are very desadvantageous here.

the "initial year" 1983 (and even negative impact when full-wage compensation); the most optimistic result is obtained by the German HENIZE-model : 1 % RWT raises employment by 0.84 %.

- Assuming no loss of productive capacity nor a raise in labour productivity produce the largest employment effect, but it should be stressed that, generally, some of the excess capacity will be left unused due to the RWT (principally in the smaller firms).

- The Belgian Maribel-model ranks at the third place regarding to the employment effects of a RWT (after the German HENIZE-model and the French DMS-model and just before the Dutch FREIA-model; remark that the full-wage compensation variant of Maribel (our simulation 3) entails low medium run employment effects, while the medium run employment effects of the proportional wage reduction variant of this model (our simulation 1) are larger than the short run effects. The RWT-impact on the unemployment percentage is considerable in Belgium and in the Dutch FREIA-model.

7.2. RWT-effects on the volumes of private consumption and output

- The volumes of private consumption and (private) output decrease in nearly all the cases, though with different percentages. In general, private consumption decreases less under full wage consumption (because of the higher private income) than under proportional wage reduction, while the reverse is true for the volume of output.

- The growth of the private goods value added volume or of GDP is slower under RWT than in the base simulation, especially for Maribel (larger negative medium run effects !) and Vintaf II (considerable negative short run effects). The estimates of the French and British models are less pessimistic, but nearly all models stress the fact that it is necessary to sacrifice some economic growth for new employment under a RWT.

7.3. RWT-effects on the real hourly labour costs

- Real hourly wages tend to increase more under RWT than without RWT (base simulation); obviously, these increases become more important when the salaries can be maintained (wage compensation). Maintenance of production capacity does not seem to play any role.

- Remark the large increase of real hourly wages in the full-wage compensation variant of Maribel, (+ 4.8 % in the short run, + 1.3 % in the medium run) which is accompanied by an increasing purchasing power per wage-earner.

7.4. RWT-effects on the real income per employee

- The way of determination of income is very different from model to model.

- The per capita real income is generally lower than in the base simulation, if full-wage compensation occurs, except for the full-wage compensation variants of the Belgian Maribel-model and the British Treasury-model.

7.5. RWT-effects on inflation

- Almost all models show an important increase in inflation under RWT, principally under wage compensation.

- The inflation has also the tendency to grow under the hypothesis of production capacity reduction, since unit capital costs are growing then.

7.6. RWT-effects on the current account balance of payments

- The current account balance of payments-position is ameliorated by a RWT in most models except for Maribel and Vintaf II.

- The maintenance of salaries tends to stimulate private domestic expenses to the disadvantage of exports. But the balance of payments (trades) may keep positive because of the decrease of imports. The deterioration of the current account balance of payments in the full-wage compensation variants of the Belgian Maribel-model and the Dutch Vintaf-model originates from the large elasticity of imports w.r.t. (Belgian and Dutch) income (leading to a loss of competitive position).

- Notice that a RWT leads to a deterioration of the Belgian balance of trades w.r.t. that of the base simulation in Maribel (which has, however, a positive value of 1.06 % of GNP in '85 and of 4.59 % of GNP in '89).

7.7. RWT-effects on the governmental budget

- The government deficit is lowered when the RWT-policy is accompanied by a proportional wage cut, because it produces a significant unemployment decrease and, hence, a decrease of social security allowances then. There is only one notable exception, i.e., the Belgian 1989-deficit is estimated somewhat higher than the corresponding base simulation deficit of Maribel (deficit of 410.7 billion BF in '89 or 6.9 % of GNP in the base simulation vs. 417.4 billion BF or 7.1 % of GNP in simulation 1).

- Under full wage compensation, a RWT entails a lower governmental deficit for the Belgian Maribel-model (our simulation 3) and the French DMS-model, than in the reference simulation and a larger public deficit for the Dutch Vintaf II-model and the British Treasury-model.

8. General conclusions

In this paper, we have investigated the effect of a reduction of working time (RWT) on macro-economic aggregates. A single once-and-for-all contractual RWT of 10 %, in the private sector in Belgium, in 1985, has been simulated for various accomodating policies. This is done with the help of the Maribel-model, being the official forecasting model of the Belgian Planning Office. The reference simulations are part of the May 1985-predictions of the Planning Office.

1) The actual RWT is always smaller than the contractual RWT. A 10 % reduction of contractual working time, w.r.t. the base projection (= without RWT) in 1985, leads to a 4.3 % actual extra RWT in that same year (also compared to the base projection), when hourly wages remain constant. If real hourly wages increase because of the RWT (sim 2), the actual RWT is 4.6 % more than in the base projection for 1985.
2) The 10 % surplus contractual and 4.3 % extra actual RWT, creates 4.4 % more jobs in the private sector in 1985 w.r.t. 1984, or 4.2 % more jobs than in the base simulation, all the other exogenous variables hold constant. This appears if the RWT is accompanied by a real constant hourly wage rate, which means that the real yearly wage per employee decreases with the amount of the RWT. In 1989, the increase in private jobs is 3.8 % w.r.t. 1984, which means 5.4 % more jobs compared to the base projection. This results in a decline of the unemployment rates. Without any extra RWT, unemployment, as a percentage of the active population, increases from 12.4 % in 1984 over 13.0 % in 1985 to 14.7 % in 1989. The introduction of the RWT as mentioned here, leads to an unemployment rate of 10.7 % in 1985 and 11.9 % in 1989.
3) When the RWT is accompanied by a 5 % real hourly wage increase w.r.t. the base simulation in 1985, the impact on job-creation in the private sector is smaller (sim 2). In 1985, the increase is of 4.1 % w.r.t. 1984 and of 4.0 % compared to the base simulation. In 1989, 2.0 % more jobs than in 1984 remain, which means 3.5 % more jobs than in the base projection. The impact is larger w.r.t. the base simulation than w.r.t. 1984 because of the underlying employment shrinkage in the base projection. The unemployment rate is 10.8 % in 1985 and 12.8 % in 1989 in simulation 2.

4) Increasing real hourly wages per employee in the private sector by the amount of the actual RWT each year, leads to an at least constant labour income per private wage earner per year. The creation of jobs is smaller in this simulation (sim 3). Compared to 1984, there are 4.1 % more jobs in 1985 but only 0.5 % more people employed in the private sector in 1989. This means 4.0 extra jobs w.r.t. the base simulation in 1985 and 2.0 % in 1989. Hence, the RWT does not create many jobs over the forecast period but rather stops the decrease in private employment appearing without the RWT. There is nc full reallocation of potential jobs at all under this income policy. There are 10.8 % people of the active population unemployed in 1985 and 13.6 % in 1989.
5) As can be concluded, the employment effect is smaller the more the real wage income increases. The effect is larger in the short run than in the medium run. The decline in jobs in the medium run is larger when real wages increase. Compared to the situation without a RWT-policy, there is less decline in private jobs.
6) An exogenous contractual level of recruitment leads to more jobs only in the short run; in the medium run the effect almost disappears.
7) A reduction of wage costs, by reducing the social security contributions of employers and simultaneously a compensating increase in value added taxes (a simplified 'Maribel-operation'), creates significantly more jobs only in the medium term.
8) An extra supply of labour (20 % of extra employment), due to the RWT, leads to more employment and a larger actual RWT per employee : there are 4.5 % extra jobs compared to the base projection in 1985, or a surplus of 0.2 % compared to simulation 1.
9) The level of employment increases more when the purchasing power declines. One can imagine a situation with constant buying power over the simulation period (but a decrease during the first year), which lies between simulations 1 and 2. The employment effect will be some weighted mean of the results of simulations 1 and 2.
Simulation 3 (actual RWT = increase in real hourly wage) seems unrealistic in the actual situation : it leads to an increasing purchasing power per employee (+ 6.5 % in 6 years).

10) In all the situations of a RWT, the total labour cost is at a higher level than without any RWT. The larger these costs, the more profits and investments are decreasing.

11) The gross value added of the private sector is declining in all the simulations, especially when the RWT is accompanied by an hourly real wage increase. Hourly labour productivity per employee increases more in that case, what explains the low reallocation of potential jobs. The hourly per capita labour productivity increase is larger than in the base projection in all RWT-simulations, but is the largest in sim 3. While consumption and production decrease, and labour productivity increases, the potential working time is not completely reallocated.

12) The competitive position of the Belgian economy worsens due to the RWT, especially when accompanied by a real hourly wage increase. The imports are larger, and the exports smaller. The balance of trades is less good, although remaining positive, compared to the base projection. While the balance of trades is 4.59 % of GNP in 1989 in the base projection, it is 4.13 % in simulation 1 and only 1.23 % in simulation 3.

13) The Belgian governmental budget deficit worsens w.r.t. the base projection, if the RWT is accompanied by a declining purchasing power per private wage earner. The deficit is declining over time and w.r.t. the base projection, when the RWT is introduced with an hourly real wage increase. The Belgian government seems to be confronted with a dillemma. Either she is opting for an employment policy, or she chooses to lead a public deficit recovery policy. In the first case, the extra employment is accompanied by real lower wages per wage earner. For reducing the public deficit, purchasing power has to increase, meaning a smaller employment effect.

14) Although there is frequent reference in the literature to the so-called "discouraged worker effect", it may also be the case that unemployment discourages some workers (especially married women) from quitting jobs which they would otherwise have given up temporarily; at the same time, unemployment may induce others to register as job seekers, even though they might otherwise have postponed entry in the labour force. In this way unemployment becomes subject to selfperpetuation (cfr. J. Drèze (1985), p. 12).

15) The short run elasticity of employment w.r.t. working hours is probably small (but not so small in the Maribel simulations : -0.4 % in '85; -0.5 % in '89 with wage cut). We know not much about the long-run elasticity : in our case, the partial long run elasticity should be -1 owing to the assumed labour input in the production technology (total number of working hours).

16) A (short run) employment elasticity of real wages equal to zero is typical for a recession period.
As J. Drèze (1985, p. 15) also puts it, wages will in many firms exceed the marginal value product of labour (or, $w > p \frac{\delta Q}{\delta L}$) during a recession. These firms are said to practice "labour hoarding". It is an immediate implication of the (labour contract) theory that such firms will not hire new workers, even at wages lower than those they currently pay; new hirings will start only at wages lower than the marginal value product of labour (with all employees under contract working full hours). For these firms (which could well be a majority during a deep recession), the elasticity of employment w.r.t. wage decreases is zero (as in the Maribel model). This statement applies to new hirings. Note that the retention rate of workers under contract will be enhanced by wage cuts in firms being bankrupt; again these firms can be numerous in a deep recession.
The marginal value product of labour should not fall below the reservation wage of the workers - but should fall that much (on, or above the market clearing wage, where all unemployment becomes voluntary).

17) Although the short run employment elasticity of real wages is found to be zero, the long run partial employment elasticity of real wages is equal to -1 for a Cobb Douglas production technology under perfect competition (as explicitly assumed by the Maribel model). Other production technologies (as, e.g., CES, ...) imply varying factor shares, and hence, varying employment elasticities over time.

18) When comparing the Maribel simulations with simulations of macro economic models of other OECD-economies, we observed that there are no exceptional effects of a RWT in the Maribel model.
The strength of the simulations based on these country econometric models however is somewhat limited because these simulations do not consider the effects of a similar RWT-policy measure taken in an other (OECD) country. For this purpose, an integrated multi-country econometric model (e.g., Comet and Hermes for the EEC) should be necessary.

19) We should warn for too general conclusions : RWT is often accompanied by a contemporary growth of the parallel (including "black") circuit; by a growth of overtime work owing to the importance of non-wage labour costs ($\pm$ 35 %), by an increased technological progress, and, moreover, the model computations are based on long sample periods with booms and depressions. Further, firms operating one or two working shifts for a conventional number of hours, RWT is apt to result simply in reduced plant utilization and output, with no effect on employment (e.g., automobile plants with 2 shifts). It is very often the case that only for firms on a (nearly) continuous base (with 5 or 6 shifts), RWT implies an almost proportional increase of employment, provided that there is no labour hoarding. Hence, there is a large need for a micro-economic analysis, which we would like to perform in a near future.

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