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LABOUR MARKET EFFECTS OF THE SOCIAL SECURITY SYSTEM IN THE NETHERLANDS

A COMPARISON OF EQUILIBRIUM WITH DISEQUILIBRIUM SIMULATION MODELS

BY

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1 INTRODUCTION

As compared to other industrial countries The Netherlands has a highly developed social security system. Social security contributions amount to almost 25% of national income, whilst transfers to households add up to a total of more than 30% of national income. The parallel rise of social security payments and unemployment in the last decades has led to the suggestion that the malfunctioning of the labour market, and hence the growth of unemployment, can in some way be associated with the high degree of social security. However, most empirical studies, both on a macroeconomic and on a microeconomic level, show rather small labour market effects of social security (see *e.g.* Atkinson, 1981; Springer *et al.*, 1988). This is particularly true for simulations by means of macroeconomic models that are typically used for policy analysis in The Netherlands.

This conclusion is, however, conditional on the specification of the policy models. Dutch macroeconomic policy models, as well as many models in the Tinbergen tradition for other countries, can be characterized as disequilibrium models and have their counterparts in the theoretical literature under the heading of the neo-classical Keynesian synthesis. Equilibrium models are the antipodes of these disequilibrium models. Minford's (1983) model for the labour market is a well known example of these equilibrium models. An interesting aspect of the Minford model is that it indeed shows a large impact of social security on the labour market (in the case of the United Kingdom and Germany; for the latter country see Davis and Minford, 1989).

Against this background the present article compares the working of a Minfordian type of equilibrium model with the working of the traditional

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Dutch disequilibrium policy models. The article investigates to what extent the measured effects of the social security system on the labour market depend on the way of modelling the social security system. To that end we consider the working of three models for the interaction between the labour market, the goods market and the foreign exchange market in alternating equilibrium and disequilibrium conditions. Special attention is paid to the modelling of social security influences, *viz.* replacement ratios (benefit wage ratios) and social security contributions. The first model is an equilibrium model, and inspired by Minford, though quite different in elaboration. In the other two models we consecutively replace the specifications of the model equations which are typical of the equilibrium model by specifications which stem from the traditional Dutch policy models. Therefore, the last model can be considered as a stylized representation of the Dutch policy models. The working of the models is analyzed by means of impulse simulations and by sensitivity analysis.

The next section briefly reviews the equilibrium model and the way we have adapted it for The Netherlands. It goes on to describe the consecutive replacement of equilibrium conditions by disequilibrium conditions in the models. Moreover, this section gives a brief impression of the various equations contained in the models. Sections 3-5 illustrate the differences in the working of the models. Finally, section 6 summarizes the results and gives some conclusions.

2 EQUILIBRIUM AND DISEQUILIBRIUM: THREE POLICY MODELS

This section summarizes the characteristics of the models used for the impulse simulations. All models are specified on the basis of quarterly data. The models, called M1 to M3, have a great deal in common, but differentiate in one important respect at a time. Switching from the one model to the other we replace an equilibrium condition by a price-setting function for a particular market. Minor modifications go with it. For a formal listing of the equations contained in the models we refer to the annex.

Starting point is Minford's model for labour market equilibrium in an open economy. This model boils down to an extended version of the classical model. However, nominal prices are absent in the model and no consideration is given to the money market. The goods market is implicitly assumed to be in equilibrium. The real exchange rate, as a measure of competitiveness vis-a-vis foreign countries, takes care of equilibrium on the current account and the real wage rate is the equilibrating value on the labour market.

Minford introduces two main new features in the submodel for the labour market. Firstly, he distinguishes between a union and a non-union sector. Wages in the non-union sector are equilibrium values and union wages are determined by a variable mark-up on non-union wages. Secondly, the supply of labour is dependent upon the wage level and the benefit level, both real net values. When benefits are high relative to wages, implying a replacement ratio close to one, the *effective* labour supply is small and elastic. In the high wage

level range the effective labour supply is inelastic and approaching the registered working age population.

Because the union scene in Great Britain is quite unique and seems to have little relevance for The Netherlands, we dismissed the distinction between a union and a non-union sector. The remaining model of the labour market retains the Minfordian flavour as to social security but diverges from it in analytical treatment.

Our equilibrium model M1 differs from Minford's orginal formulation in some other respects as well. Unlike Minford, we assume the nominal exchange rate to be exogenously determined, so that equilibrium on the current account is not guaranteed. For The Netherlands this assumption of exogenous exchange rates is more realistic than that of flexible exchange rates, as the Dutch central bank wants to maintain exchange rate stability between the Dutch guilder and the German Mark.

Furthermore, the goods market, modelled along Keynesian lines, is incorporated into the model. Goods market equilibrium is secured by the flexibility of the general price level, represented by the price index of demand. The equilibrating forces on this market operate mainly through the real exchange rate. Nominal price fluctuations, coupled with a fixed nominal exchange rate, cause the real exchange rate to fluctuate. In case of excess demand the domestic price level rises, hence the real exchange rate of the own currency in terms of foreign currency rises. The induced fall in exports and rise in imports brings about a reduction in excess demand which continues until equilibrium is restored. Notwithstanding the exogenous exchange rate, M1 is rather close to Minford's original model. The main characteristics of this Minfordian model are labour market equilibrium and goods market equilibrium.

In M2 we no longer have labour market equilibrium. Real wages do not attain their equilibrium values because nominal wages have some rigidity due to the wage setting processes. We do not want to dwell on the character of these processes, which are assumed to be part of labour market behaviour and which are extensively described by new-Keynesian macroeconomics. We are, however, interested in their implications. The goods market is still considered to be an equilibrium market, while the nominal exchange rate is exogenous as in the previous model and remains so in the last model.

In M3 we assume disequilibrium on the goods market as well as on the labour market. In this model there is no implicit pricing through an equilibrium condition but explicit pricing through a price-setting function. M3 is closest to the models actually used in Dutch policy analysis. Our main aim is, therefore, to compare the working of this disequilibrium model M3 with that of the equilibrium model M1. The sole purpose of the intermediate model M2 is to illustrate how these differences in working between M1 and M3 can be ascribed to the consecutive dropping of the assumptions of labour market and goods market equilibria.

The specifications of the equations of the models and the selected values of

their coefficients are, for a major part, based on the empirical literature. In this selection process the outcomes of the Dutch policy models have played a prominent part (see Den Butter, 1987). For the parameter values of the labour demand and the labour supply equations we have also used our own preliminary estimates of the Minford model for The Netherlands. As far as these parameter values are of importance for measuring the effects of social security policy, we have performed a sensitivity analysis. For the purpose of this article, most coefficients are deliberately not determined by estimation. Our procedure aims at exploiting as much as possible the empirical knowledge on the Dutch economy obtained in the course of time. Of course, it is rather arbitrary to select specifications of equations and values of coefficients from the literature. Yet, in our opinion such a compilation of empirical knowledge exploits much more information than a mere re-specification and re-estimation of behavioural relationships that have been extensively studied before. Moreover, experience shows that a re-estimation of traditional macroeconomic behavioural equations always needs to look at other empirical evidence in order to obtain plausible estimates.

After the selection of the specifications of the equations and the values of the coefficients, the performance of the models in describing the past is tested by a dynamic simulation over the period 1973: I–1986: IV. The results of these dynamic simulations appear to be satisfactory, albeit that the labour supply shows rather large *ex post* prediction errors. It is obvious that with respect to the specification of our labour supply equation more empirical effort is needed in order to come to versions of the models which are better calibrated to reality.

We continue with a comment on the individual equations and start with *labour demand*. In the models with equilibrium on the goods market (M1 and M2), labour demand equals full capacity labour demand. With profit maximization and a Cobb-Douglas production function labour demand can be explained by a real wage variable, the capital stock and a time trend. The specification of this equation is as follows (for the list of symbols see the annex).

$$ln\, a = const - 0.4\, ln[w_r(1+t_q)x^{-m_q}] + 0.0\, ln\, k + 0.0025\, T + 0.5\, ln\, q_k \quad (1)$$

Equilibrium in the labour market is brought about by w_r, the real wage rate, earnings divided by the price index of demand. Relevant to labour demand is real labour cost, reason why we correct the real wage rate for social security contributions of employers and terms-of-trade losses. For the time being the capital stock has a zero coefficient. However, steady capital growth is expressed by the time trend, which also incorporates technical progress.

When the possibility of disequilibrium on the goods market arises in M3, a term for the effects of the under-utilization of capital on labour demand should be added to the aforementioned specification. With full utilization of capital ($q_k = 1$) the influence of this term vanishes. In view of the actual labour market situation in The Netherlands in the 1970s and 1980s we have assumed no supply

constraints in our modelling of labour demand in the disequilibrium models and hence not used Kooiman's (1984) more sophisticated approach, according to which in disequilibrium actual employment is a weighted sum of effective labour supply and demand.

After having explained labour demand we can determine the *supply of goods* or *productive capacity* with the production function.

$$ln\, y^{nb} = const + 1.0(ln\, a - 0.5\ ln\, q_k) + (1 - 1.0)\, ln\, k + 0.01\ T \tag{2a}$$

This is a regular Cobb-Douglas production function, in which full capacity labour demand is used as labour input variable. In order to define utilization of capital in the case of disequilibrium on the goods market and in order to link productive capacity of enterprises with total demand, we need the following definition equations.

$$y^{nt} = (y/y_{bn})\, y^{nb} \tag{2b}$$

$$y^{n} = 0.975\ y^{nt} \tag{2c}$$

$$q_k = y/y^{n} \tag{2d}$$

As mentioned before, in the case of a goods market equilibrium, production always takes place at full capacity.

$$q_k = 1 \tag{2e}$$

Next we turn to the *supply of labour*. This labour supply equation mirrors our interpretation of the Minford model. In M1 with equilibrium on the labour market we assume that the *effective* labour supply ($\hat{a}_a$) is less than the measured labour supply (a_a), the difference being determined by the height of net real wages and the replacement ratio.

$$\hat{a}_a = a_a(1 - const/\{[w_r(1 - t_a)]^{2.0}[1 - w_u/w]^{3.0}\}) \tag{3a}$$

The willingness to work increases with rising wages and a falling replacement ratio. The curvilinear specification is derived from constrained utility maximization with a CES utility function in income and leisure. The total income of the supplier of labour is made up of wages earned by working and the (lower) benefits 'earned' by not-working. The supposition that the worker who voluntarily chooses not to work is eligible for unemployment benefits, is a simplification. Effective labour supply is not registered but should, in equilibrium, be equal to labour demand.

In the models with *disequilibrium* on the labour market (M2 and M3) *measured* labour supply instead of effective labour supply is thought to be

dependent upon real net wages and the replacement ratio. The decision to enter the labour market is at stake here. In so far as this decision is influenced by replacement ratios, these should be seen as indications of benefits other than on account of unemployment, *e.g.* old age, disablement, and poor relief. It is supposed that not more than $62\frac{1}{2}\%$ of the working age population (a_p) will partake in the labour force. Contrary to model M1 where unemployment is voluntary, unemployment is involuntary in models M2 and M3. In order to have the models with disequilibrium on the labour market conform as much as possible to the equilibrium models, we have specified the disequilibrium labour supply equation analogous to equilibrium equation (3a) above.

$$a_a = 0.625\ a_p(1 - const/\{[w_r(1-t_a)]^{2.0}[1 - w_u/w]^{3.0}\}) \tag{3b}$$

However, it should be realized that not necessarily the same mechanism is at work here. Moreover, the replacement ratio may not be the proper variable to represent the influence of participation decisions in the disequilibrium context.

The following definition equations for unemployment, utilization rate of labour and labour productivity respectively, complete the disequilibrium modelling of the labour market.

$$U = a_a - a - a_{ov} \tag{3c}$$

$$q_L = 1 - U/a_a \tag{3d}$$

$$a_g = a_{g-1}\left\{1 + \tfrac{1}{4}\left[\frac{y/(a+a_{ov}) - y_{-4}/(a+a_{ov})_{-4}}{y_{-4}/(a+a_{ov})_{-4}}\right]\right\} \tag{3e}$$

In the equations for the volume of *exports and imports* (all three models) we have both a scale variable and a relative price variable as explanatory variables. The scale variable, world trade for exports and national product for imports, has an elasticity of one. The relative price variable, expressed by the real exchange rate, has a long-run elasticity of -2 towards exports and a long-run elasticity of 0.75 towards imports. Moreover, the volume of imports increases with the utilization rate of capacity. The specification of these equations is rather familiar.

$$ln\ b = const + 0.6\ ln\ b_{-1} + 1.0(ln\ m_w - 0.6\ ln\ m_{w-1}) + 0.8\ ln\ 1/x \tag{4a}$$

$$ln\ m = const + 0.6\ ln\ m_{-1} + 1.0(ln\ y - 0.6\ ln\ y_{-1}) - 0.3\ ln\ 1/x + 0.4\ ln\ q_k \tag{4b}$$

The specifications of the other *expenditure* equations are borrowed from the familiar Keynesian demand models as well and kept as simple as possible.

$$ln\, c = const + 0.2\, ln\, c_{-1} + 0.64\, ln\, y_b - 0.3\, ln\{(r+100)/(\dot{p}^e+100)\}_{-1} + 0.12\, ln\, m2 \tag{5a}$$

$$ln\, i = const + 0.2\, ln\, i_{-1} + 0.8\, ln\, y - 1.2\, ln\{(r+100)/(\dot{p}^e+100)\}_{-1} + 0.12\, ln\, m2 + 0.4\, ln\, q_k \tag{5b}$$

$$i_{gem} = \tfrac{1}{4} \sum_{j=0}^{3} i_{-j} \tag{5c}$$

$$i_{wo} = (i_{gem}/i_{gem-1})\, i_{wo-1} \tag{5d}$$

$$n = 0.005\, y \tag{5e}$$

$$y = c + i + i_{wo} + g + b - m + n + y_{aut} \tag{5f}$$

$$y_b = w_r(1-t_a)(a+a_{ov}) \times 10 \tag{5g}$$

The volume of consumption is dependent upon disposable wage income, the real rate of interest and the money stock. The explanatory variables for the volume of fixed investments are the volume of national product, the real rate of interest, the money stock and the utilization rate of capital. The real money stock as explanatory variable in the consumption and investment functions represents direct money transmission and can be regarded as a proxy for real wealth and/or the availability of credit. Inventory formation is a fixed proportion of national income. National product is total expenditure minus imports. Finally, equation (5g) defines disposable income.

Wage formation is either implicit through the labour market equilibrium (in M1);

$$w_r = f(a - \hat{a}_a = 0) \tag{6a}$$

with

$$w = w_r p_v (1 + t_q) \tag{6b}$$

or explicit through wage setting (in M2 and M3).

$$ln\, w = const + 0.5\, ln\, w_{-1} + 0.5\, ln\, p_v + 0.25\, ln\, q_L + 0.5\, ln\, a_g + 0.125\, ln(1+t_a) + 0.425\, ln(1+t_q) \tag{6c}$$

with

$$w_r = w/\{(1+t_q)\, p_v\} \tag{6d}$$

In the disequilibrium case, the union and the firm bargain over the wage and the firms decide on employment in conformity with the 'right to manage'

model. The variables that determine the outcome of wage negotiations are first of all the price index of demand and labour productivity. Furthermore, the wage level is linked with the utilization rate of labour (a kind of Phillips-curve effect) and the tax and social premiums rates.

Price formation is somewhat analogous to wage formation. Prices are determined either by equilibrium on the goods market (in M1 and M2);

$$p_v = f(y - y^n = 0) \tag{7a}$$

or by price setting (in M3).

$$\begin{aligned} ln\, p = const &+ 0.8\ ln\, p_{-1} + 0.12\ ln\, w + 0.05\ ln\, q_k \\ &- 0.16\ ln\, a_g + 0.1\ ln(1+t) + 0.08\ ln\, p_m \end{aligned} \tag{7b}$$

with

$$ln\, p_v = \{1/(1+m_q)\}\, ln\, p + \{m_q/(1+m_q)\}\, ln\, p_m \tag{7c}$$

Price setters take account of labour costs, labour productivity, taxes, the utilization rate of capital and import prices. This last variable has a dual role: that of cost component and of competitive price. Through a definition the price index of national product and the price index of demand are related to each other (equation 7c). The nominal exchange rate and through it import prices measured in the domestic currency are exogenous. The real exchange rate is defined as the price index of demand, relative to the index of import prices.

$$x = p_v/p_m \tag{7d}$$

3 THE EFFECTS OF A REDUCTION IN EMPLOYERS' CONTRIBUTIONS TO SOCIAL SECURITY

We will illustrate the differences in the working of the models by means of impulse simulations, representing exogenous shocks to the economy. These shocks are simulated by means of a permanent and autonomous change in the respective exogenous variables over a period of 24 quarters (6 years). The baseline projection is based on the values of the exogenous variables in the fourth quarter of 1986. The shocks are presumed to occur in the first quarter of the simulation period. The effects of the impulses are measured as differences from the baseline projections. In each behavioural equation the constant term is set equal to its mean value in the reference period, given the selected values of the coefficients. This procedure implies that the baseline projections are not identical for all models. However, the influence of the differences between baseline projections on the computation of the impulse response effects appears to be small.

This section investigates how, according to the models, the economy reacts

to a permanent reduction by 5 percentage-points in the incidence of social security contributions paid by employers. The increase of the public sector deficit induced by this reduction is assumed to be financed on the capital market, but does not affect the interest rate due to the openness of the Dutch economy. As the simulation results in Table 1 show, the reaction on the reduction of social security contributions varies from model to model.

In the Minfordian equilibrium model (M1) the simulated reduction of the employers' social security contributions results in an increase in national product and employment of less than 1%. Equilibrium on the labour market is maintained by a rise in the real wage rate (*i.e.* earnings) so that the advantage of the lower contributions is partly passed on to the workers. In order to maintain equilibrium on the goods market the price level, and through it the real exchange rate, show a slight decline as compared to the baseline level.

In model M2 with wage setting on the labour market and equilibrium prices on the goods market, a reduction in social premiums paid by employers leads in the long run to a more moderate rise of the real wage rate than in the equilibrium labour market model. On the other hand, the increase in real wages in the first quarter is much higher in M2 than in M1. As in the equilibrium model, the fall of real labour costs increases the demand for labour and the supply of goods, which now leads to long-run effects of just over 1%. Thus, in conformity with the Minfordian model, lowering social security premiums paid by employers has, under the assumption of labour market disequilibrium combined with goods market equilibrium, a positive effect on the national product and employment.

In M3 the possibility of disequilibrium on the goods market is introduced. In fact, we have under-utilization of capital during the simulation period. Al-

TABLE 1 - THE EFFECTS OF A REDUCTION IN THE EMPLOYERS' WAGE TAXATION RATE BY 5-PERCENTAGE POINTS
(in % of the baseline projection, unless stated otherwise)

	according to	M1			M2			M3		
	labour market is in	equilibrium			disequilibrium			disequilibrium		
	goods market is in	equilibrium			equilibrium			disequilibrium		
effects on	effects after	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr
Volume of income (y)		0.8	0.9	0.8	0.7	1.1	1.1	0.8	1.2	2.7
Volume of exports (b)		0.6	0.4	0.4	−0.1	0.6	0.7	0.1	0.9	3.9
Volume of imports (m)		0.7	0.6	0.7	0.7	0.7	0.8	0.8	1.0	3.9
Expenditure price level (p_v)		−0.9	−0.2	−0.3	0.1	−0.4	−0.3	−0.1	−0.7	−1.9
Real wage level (w_r)		1.4	1.8	1.9	2.4	1.3	1.2	2.5	1.4	2.6
Real exchange rate (x)		−0.9	−0.2	−0.3	0.1	−0.4	−0.3	−0.1	−0.7	−1.9
Demand for labour (a)		0.9	0.8	0.8	0.7	1.0	1.1	0.7	1.0	1.5
Unemployment (U) (in labour years × 1000)		-	-	-	−8	−29	−34	−3	−27	−40

though M3 shows only slightly stronger employment effects than M2, it does have much more favourable long-run effects in terms of national product and real wages. In M3 the price fall due to lower labour costs is sharper than in M2 at the end of the simulation period. Consequently, the demand for goods rises relative to their supply and the utilization rate of capital increases. In accordance with Okun's law the increase in national product will surpass the increase in employment.

Summarizing Table 1, it appears that the stronger the disequilibrium character of the model, the more we can rely on the positive effects of reducing employers' contributions to social security. The results of a sensitivity analysis not reported here reveal that this conclusion is somewhat dependent on the real wage elasticity of labour demand, which, in the central variant, is set to a value of −0.4 (see equation 1). The equilibrium model appears to be much more sensitive to a change in the wage elasticity of labour demand than the disequilibrium model. Therefore, the differences in effects between the equilibrium and disequilibrium model become more marked in the case of low wage elasticities of labour demand.

4 THE EFFECTS OF A REDUCTION IN EMPLOYEES' CONTRIBUTIONS TO SOCIAL SECURITY

This section analyses the effects of a once and for all reduction of wage taxes and employees' contributions to social security (hereafter wage taxation rate) by 5 percentage-points. The results are shown in Table 2. We again make the implicit assumption of capital market financing of the increased public sector deficit.

TABLE 2 - THE EFFECTS OF A REDUCTION IN THE EMPLOYEES' WAGE TAXATION RATE BY 5 PERCENTAGE-POINTS
(in % of the baseline projection, unless stated otherwise)

	according to	M1			M2			M3		
	labour market is in	equilibrium			disequilibrium			disequilibrium		
	goods market is in	equilibrium			equilibrium			disequilibrium		
effects on	effects after	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr
Volume of income (y)		1.4	1.5	1.4	0.9	0.6	0.5	1.7	2.2	2.8
Volume of exports (b)		1.2	0.6	0.7	−1.2	−2.3	−2.4	0.0	0.3	1.6
Volume of imports (m)		1.0	1.1	1.2	1.2	1.5	1.6	2.3	3.8	5.5
Expenditure price level (p_v)		−1.5	−0.2	−0.5	1.6	1.2	1.2	−0.1	−0.3	−0.8
Real wage level (w_r)		−4.4	−3.7	−3.7	−1.2	−0.9	−0.8	−0.4	0.0	1.0
Real exchange rate (x)		−1.5	−0.2	−0.5	1.6	1.2	1.2	−0.1	−0.3	−0.8
Demand for labour (a)		1.5	1.5	1.4	0.8	0.7	0.6	0.9	1.0	1.1
Unemployment (U) (in labour years × 1000)		-	-	-	6	14	4	23	15	−3

In the equilibrium model M1 a reduction in the wage taxation rate stimulates the effective labour supply. This supply shift forces the real wage rate down and evokes an increase of labour demand and hence of employment and national product. These effects are rather substantial and amount to 1.4%. The transmission of this impulse is somewhat complicated. The reduction in the wage taxation rate is not fully translated into an equal decrease of (gross) real wages and therefore causes a rise in disposable income, which forces up demand. However, as this rise in demand is still smaller than the resulting rise in supply, the assumption of equilibrium on the goods market leads to lower prices and hence to a fall in the real exchange rate. Therefore the volume of exports increases, whilst the volume of imports also increases due to the rise in demand.

In the models with disequilibrium on the labour market a reduction in the wage taxation rate increases the registered labour supply instead of the effective labour supply. Because of the assumption of equilibrium on the goods market in M2, the same mechanism with respect to the price level and foreign trade is at work as in M1, although we see contrary effects. Because real wages in this model are no longer instrumental in clearing the labour market, they now only show a modest decline in response to a reduction in the wage taxation rate. Hence, the resulting rise in disposable income and demand is much larger in M2 than in M1. In M2 the rise in demand is not matched by an equal rise in supply, so that domestic prices, which clear the goods market, increase. That is why, according to this simulation, the real exchange rate increases and why the volume of exports falls. For that reason the positive effects of a reduction in the wage taxation rate on national product and employment are much more moderate in M2 than in M1.

Relaxation of the assumption of equilibrium on the goods market leads, like in M1, to a decline in the domestic price level and hence to an equal enhancement of the competitive position. This is illustrated by the simulation results for M3 in Table 2. The resulting rise in exports, combined with the demand push due to the fact that the reduction in the wage taxation rate is now fully translated into more disposable income, leads to a considerable increase of the national product as compared to the models with equilibrium on the goods market. Because labour supply rises along with labour demand in models M2 and M3, the change in unemployment is relatively small as compared to that in employment.

The value of the wage coefficient of labour supply in the central variant is set at 2 (see equations 3a and 3b), amounting to an elasticity of about 0.4. Sensitivity analysis tells us that varying this coefficient value affects the working of the Minfordian equilibrium model M1 quite substantially. On the other hand, the change in effect in the disequilibrium model M3 is negligible. Hence a good measurement of the wage elasticity of the labour supply is essential for equilibrium models but far less so for the usual Dutch policy models which assume disequilibrium on the labour and goods markets.

A more feasible policy measure than a simple reduction in the employers' or employees' contributions to social security would be a 'balanced budget' substitution of the employers' contributions to employees' contributions (or *vice versa*). In that case no implicit assumptions on public debt financing are needed. Table 3 shows the effects of such a combined impulse, entailing a shift from the one category to the other with 5 percentage-points. As the models appear to be almost linear in this respect, this impulse can be interpreted as the outcomes of Table 1 subtracted from those of Table 2. Our simulations indicate that shifting social security contributions from employers to employees is unfavourable for employment and national income according to the equilibrium model. With respect to (un)employment the models with disequilibrium on the labour market, on the contrary, show favourable long-run effects. However, these effects are not very substantial and largely depend upon the wage elasticities of the labour supply and demand in our models, and upon the incidence of the respective social security contributions.

5 THE EFFECTS OF A CHANGE IN THE BENEFIT WAGE RATIO

In this section we compare the different models as to their reaction to a reduction in the benefit wage ratio by 5 percentage-points. The results in Table 4 show that in the equilibrium model M1 the effects on national product and employment are very substantial. The curtailment of benefits increases the effective labour supply. The real wage rate falls in order to secure labour market equilibrium. Consequently, employment and national product end up at a higher level. Moreover, the clearing prices on the goods market are much below

TABLE 3 - THE EFFECTS OF A SHIFT FROM THE EMPLOYERS' WAGE TAXATION RATE TO THAT OF THE EXPLOYEES' BY 5 PERCENTAGE-POINTS
(in % of the baseline projection, unless stated otherwise)

	according to	M1			M2			M3		
	labour market is in	equilibrium			disequilibrium			disequilibrium		
	goods market is in	equilibrium			equilibrium			disequilibrium		
effects on	effects after	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr
Volume of income (y)		−0.7	−0.7	−0.7	−0.2	0.3	0.3	−1.0	−1.1	−0.2
Volume of exports (b)		−0.6	−0.3	−0.4	1.3	2.9	3.0	0.1	0.5	2.1
Volume of imports (m)		−0.4	−0.7	−0.5	−0.7	−0.7	−0.6	−1.5	−3.0	−2.2
Expenditure price level (p_v)		0.7	0.3	0.2	−1.5	−1.7	−1.5	−0.1	−0.3	−1.1
Real wage level (w_r)		6.5	6.1	6.1	3.7	2.3	2.2	2.9	1.4	1.2
Real exchange rate (x)		0.7	0.3	0.2	−1.5	−1.7	−1.5	−0.1	−0.3	−1.1
Demand for labour (a)		−0.7	−0.7	−0.7	−0.2	0.3	0.4	−0.3	−0.1	0.3
Unemployment (U) (in labour years × 1000)		-	-	-	−19	−52	−39	−35	−50	−46

the baseline level, so that the enhanced competitive position leads to a strong growth of the export volume.

Contrary to what we noticed in the two previous sections, in this section the disequilibrium models M2 and M3 show much smaller effects than the equilibrium model. In the disequilibrium labour market models a negative benefits impulse is also transmitted via the labour market. A reduction of the benefit wage ratio increases the registered labour supply. The falling utilization rate of labour exerts a downward pressure on the real wage rate (Phillips-curve effect), which is insufficient to eliminate the labour market imbalance. Because of this wage rigidity the disequilibrium labour market models are far less responsive to a benefit wage reduction than the equilibrium model. The resulting rise in national product and employment appears to be relatively small. As the increase in the labour supply is much larger than that in labour demand, the reduction of the benefit wage ratio leads, according to the disequilibrium models, to a considerable rise in registered unemployment. We note, however, that the magnitude of this rise in unemployment may be exaggerated, due to the fact that we have used similar labour supply specifications in the equilibrium and disequilibrium models. Finally, Table 4 shows that with respect to this impulse the differences in working between the disequilibrium models are remarkably small.

We do not present the results of the sensitivity analysis with regard to the coefficient of one minus the replacement ratio in the labour supply equation (equations 3a and 3b), which is given the value of 3 in the central variant, but report the main conclusion drawn from it. The outcomes of the impulse simulations appear to depend upon the value of this coefficient only in the equilibrium model. Hence, in case this type of model is to be used in policy analysis, some empirical attention must be paid to obtaining good estimates of this

TABLE 4 - THE EFFECTS OF A REDUCTION IN THE BENEFIT WAGE RATIO BY 5 PERCENTAGE-POINTS
(in % of the baseline projection, unless stated otherwise)

according to	M1			M2			M3		
labour market is in	equilibrium			disequilibrium			disequilibrium		
goods market is in	equilibrium			equilibrium			disequilibrium		
effects on effects after	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr	1 qu	1 yr	6 yr
Volume of income (y)	5.4	6.0	5.9	0.1	0.3	0.2	−0.1	−0.0	0.5
Volume of exports (b)	12.7	12.7	11.0	0.3	1.0	0.7	0.1	0.4	1.2
Volume of imports (m)	0.9	1.3	1.9	−0.0	−0.0	0.0	−0.3	−0.8	0.2
Expenditure price level (p_v)	−13.9	−5.6	−5.0	−0.4	−0.6	−0.3	−0.1	−0.3	−0.6
Real wage level (w_r)	−19.7	−16.3	−15.9	−0.5	−1.2	−0.7	−0.9	−1.6	−0.8
Real exchange rate (x)	−13.9	−5.6	−5.0	−0.4	−0.6	−0.3	−0.1	−0.3	−0.6
Demand for labour (a)	5.5	5.9	5.9	0.1	0.3	0.2	0.1	0.2	0.3
Unemployment (U) (in labour years × 1000)	-	-	-	161	152	99	212	181	106

parameter. Reliable estimates of this parameter are absent until now, at least in The Netherlands. Yet the simulations of this section show that, if the viability of a policy of reducing the replacement ratio in order to increase employment is at stake, the question whether equilibrium or disequilibrium modelling is appropriate carries much more weight than a good measurement of the influence of the replacement ratio on labour supply.

6 CONCLUSIONS

The aim of this article is twofold. Firstly, it investigates the influence of alternative policy measures with respect to social security on economic activity and on the labour market, using stylized empirical macroeconomic models for The Netherlands. Secondly, it analyses the consequences of disequilibrium versus equilibrium modelling of the labour and goods markets for the working of the models.

The main conclusion from our exercises are as follows:

1. In the equilibrium model, the policy effects depend to a large extent on the wage elasticity of the labour supply.
2. Reduction of the incidence of taxes and social security contributions is about equally effective, according to both the equilibrium and the disequilibrium models. However, in case of an inelastic labour supply this policy is very ineffective according to the equilibrium model, whereas its effectiveness does not alter very much according to the disequilibrium models.
3. Reduction of the replacement ratio is much more effective according to the equilibrium model than according to the disequilibrium models.

Hence the question of the effectiveness of social security policy in increasing economic activity and employment appears to be closely related to the way in which the labour market and the goods market are modelled. Where an equilibrium model is appropriate, a reduction in the replacement ratio is most effective; whereas in case the labour and goods markets are supposed to be in disequilibrium, a reduction in social security contributions is to be preferred. Unfortunately, the poor informational content of macroeconomic data will never allow us to discriminate between equilibrium and disequilibrium models using econometric methodology. Therefore the choice between equilibrium and disequilibrium models has to be based partly on judgement and on theoretical considerations. Empirical microeconomics and institutional knowledge may be helpful in assessing such judgement. In The Netherlands there are indications of serious labour market rigidities, so that from that point of view disequilibrium modelling seems relevant. Moreover, modern microeconomic theory can explain the existence of labour market rigidities very well. For that reason theoretical arguments no longer automatically lead to a preference for equilibrium models from a normative point of view.

ANNEX

A MODELS

M1: (1) + (2a) + (2b) + (2c) + (2e) + (3a) + (4) + (5) + (6a) + (6b) + (7a) + (7d)
(equilibrium model)

M2: (1) + (2a) + (2b) + (2c) + (2e) + (3b) + (3c) + (3d) + (3e) + (4) + (5) + (6c) + (6d) + (7a) + (7d)
(intermediate model: disequilibrium on labour market, equilibrium on goods market)

M3: (1) + (2a) + (2b) + (2c) + (2d) + (3b) + (3c) + (3d) + (3e) + (4) + (5) + (6c) + (6d) + (7b) + (7c) + (7d)
(disequilibrium on labour and goods market)

B LIST OF SYMBOLS

a	labour demand by enterprises
a_a	measured labour supply
$\hat{a}_a$	effective labour supply
a_g	labour productivity
a_{ov}	labour demand by government (#)
a_p	working age population (#)
b	volume of exports
c	volume of private consumption
g	volume of government expenditure (#)
i	volume of gross fixed investments (enterprises)
i_{wo}	volume of gross investments in dwellings
k	volume of capital stock (#)
m	volume of imports
m_w	world trade index (1977 = 100) (#)
$m2$	volume of broadly defined money stock (#)
m_q	ratio of imports to income (#)
n	volume of stockbuilding
p	price index of gross national product (1977 = 1)
p^e	inflationary expectations (#)
p_m	index of import prices (1977 = 1) (#)
p_v	price index of demand
q_k	utilization rate of capital stock
q_L	utilization rate of labour
r	(long term) interest rate (#)
T	time trends (#)
t	burden of taxation (#)

t_a	wage taxes and employees' social security contributions (as % of earnings) (#)
t_q	employers' social security contributions (as % of earnings) (#)
U	unemployment
w	nominal wage rate (including employers' social security contributions)
w_r	real wage rate (earnings)
w_u/w	replacement ratio (#)
x	real exchange rate
y	volume of (gross) national product
y_{aut}	autonomous part of volume of (gross) national product (#)
y_b	disposable wage income
y/y_{bn}	ratio of national product and production by enterprises (#)
y^n	structural or natural level of income
y^{nb}	productive capacity of enterprises
y^{nt}	total productive capacity

Explanatory note: # indicates variables which are exogenous in all models.

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Summary

LABOUR MARKET EFFECTS OF THE SOCIAL SECURITY SYSTEM IN THE NETHERLANDS

The elements of the social security system, such as unemployment benefits, minimum wages and contributions by employers and employees, may affect both labour demand and labour supply in various ways. This article investigates to what extent the measured effects of the social security system on the labour market depend on the way of modelling the social security system. Starting

point of the analysis is the well known Minford model, modified and adapted to the Dutch situation. The model assumes equilibrium on the labour and goods markets. However, policy analysis in The Netherlands is traditionally based on disequilibrium modelling of the labour and goods markets. This article analyses the differences in the working of these models. It is shown that the assumptions that both the labour market and goods markets clear in each period, which in Minford's model implicitly determines the wage and price level, have a major influence on the model's measurement of the impact of social security policy.