Supply of social security as cause of low labour participation in the Netherlands

den Butter, F.A.G.

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SUPPLY OF SOCIAL SECURITY AS A CAUSE OF LOW LABOUR PARTICIPATION IN THE NETHERLANDS;
A cliometric analysis

F.A.G. den Butter*

Abstract

A generous supply of social security contributed to the dramatic rise of the ratio between the number of workers and those receiving government benefits in The Netherlands, from less than 0.5 in 1970 to over 0.8 in 1990. Using a macroeconomic simulation model which describes the negative spiral of extended demand for social security, increases in tax and premium pressure and low labour participation, the cliometric analysis of this paper measures the consequences of the autonomous 'supply effect' of social security on economic activity and labour market development. Due to the negative spiral the multiplier effect of the generous supply of social security appears to be much larger than its direct effect. A sensitivity analysis shows to what extent this conclusion depends upon the parameter values of the simulation model.

1. Introduction

Today's economic policy debate in The Netherlands focuses on the low labour participation of which the affluent social security is considered as a major cause. The statistic indicating the ratio between the number of people receiving benefits and the number of active workers is at the core of the discussion. Table 1 shows this statistic for 1970 and for 1992. It demonstrates that at present each active worker in The Netherlands almost completely supports another person who is entitled to a benefit, whereas in 1970 a person entitled to a benefit had his or her support payed by two active workers[1].

This paper empirically investigates the consequences of the affluent social security for labour participation and economic activity in The Netherlands, using a macro-economic simulation model according to which social security is not only determined by demand, but also partly by supply. The 'supply effect' is investigated by means of a cliometric simulation over the period 1970-1990. This period witnessed a sharp rise in the number of persons who were (or made themselves) entitled for benefits, in spite of the fact that the system of social security which was mainly built up in The

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* Applied Labour Economics Research Team (ALERT), Free University, De Boelelaan 1105, 1081 HV Amsterdam, The Netherlands. Excellent research assistance by Jaap Abbring, Martien Brander and Rob Dellink, and useful discussions with Hans Vijlbrief are gratefully acknowledged.

[1] These data refer to labour years: as the number of part time workers increased considerably during the last decade, the trend looks somewhat less dramatic when employment is measured in persons.

Netherlands in the 1950's and 1960's, was not expanded with major new provisions in the 1970's and 1980's.

Table 1Keynote figures on labour participation in The Netherlands

		1970	1992
Inactive persons (rec. benefits) as % of active persons		47	84
Earners publ. sector as % earners market sector	76	140	
Government expenditure as % of national income (data used in actual policy analysis in parentheses)	(49)	33 (63)	52 (73 in 1983)
Wedge as % of gross wage costs		39	61

This increase in entitlement of (existing) social security provisions is part of a mechanism which is sometimes referred to as the social security trap (see Van Praag and Van Beek, 1991). According to this mechanism, the demand for social security is trapped into a negative spiral and diverges further and further from equilibrium. The simulation model of the paper makes this negative spiral explicit by describing the relationships between social security, the labour market and economic activity. An expanding public sector is a major consequence of this negative spiral. Against this background Table 1 also gives the breakdown of the number of people receiving income from the public sector and from the market sector. This statistic played an important role in the policy discussions in the 1980's on the relative size of the public sector as compared to that of the market sector. The growth of the public sector and its consequences are also illustrated by the data of the lower lines of table 1 on the share of public expenditure in national income and the size of the wedge (gross wage costs minus net wage income as a percentage of gross earned wages). According to the latter statistics the relative size of the public sector appears to have increased with approximately 20 %-points during the last two decades.[2]

The next section discusses the simulation model and the selection of its parameters. The major behaviourial part of the model describes the allocation of the working age population over active workers, recipients of benefits and non-participants without benefits. The supply effect of social security is calculated as the residual of this allocation model. The first cliometric simulation of section 3 shows how labour participation and economic activity would have developed if this supply of social security had remained at its 1970 level. According to this simulation the multiplier effect of

[2] The data on the share of public expenditure are based on the data sources used in our simulation model and do not comprise, amongst other things, local authorities public expenditure. Therefore our numbers are somewhat lower than those of the policy discussions.

the supply of social security, induced by the negative spiral of the social security trap, appears to be much larger than the direct effect, viz. the residuals of the allocation model. Section 3 also considers a cliometric simulation which has the benefit accommodated in such a way that the wedge would have remained constant at its 1970 level. The sensitivity analysis of section 4 investigates to what extent the measured size of the supply effect is influenced by our selection of the parameter values of the simulation model. Section 5 concludes.

2. The model

2.1 Theoretical background

The model describes a breakdown of the total working age population into three categories, namely the active workers - participants in the terminology of the policy discussions -, non-participants receiving a benefit, and finally non-participants who do not receive a benefit. The second category includes recipients of a benefit in virtue of occupational disability (WAO), temporarily illness, unemployment, early retirement (VUT), and public assistance, incl. artist-arrangements, etc. However, it excludes the recipients of old age pensions and of benefits according to the Widows and Orphans Act (AOW and AWW) as these recipients of benefits do not belong, or are not counted as to belong, to the working age population. We note that the first two keynote figures of Table 1 include these old age pensioners and widows as inactive persons receiving benefits. Besides unemployment, which increased from 82.000 labour years in 1970 to 502.000 labour years in 1992, the major source of the boost in the number of people eligible for a benefit has been occupational disability. This increase of 188.000 in 1970 to 715.000 in 1992 is considered to be partly unemployment in disguise.

The model assumes that the allocation of the working age population to the three categories is determined by labour supply behaviour. Each individual of the working age population has the discrete choice to be in one of the three states:

S_1:Active worker
S_2:Recipient of benefits
S_3:Non-participant without benefits

Each state is associated with a certain amount of utility which is partly a function of monetary rewards and monetary costs (including opportunity costs) and which partly relates to immaterial aspects of being in that state.

The utility of being an active worker firstly depends, as in textbook labour supply models, on net earned wages, l_n (see the Appendix for a glossary of symbols). Secondly there are costs involved in finding and holding a job, which are dependent upon the ease with which jobs can be obtained and hence upon labour demand. Therefore two determinants of labour demand enter into the utility function, namely gross real labour cost per worker in the market sector, corrected for labour productivity, l_b', and economic activity corrected for labour saving technical progress and contractual working hours, A_c.

$U(S_1) = f_1 (l_n, l_b', A_v, U_1)$

Finally there is a (dis)utility U_1 connected with being an active worker, which on the one hand can be associated with foregone leisure time, but on the other hand also with opportunities for social contacts, for maintenance and upgrading of human capital ('learning by doing') or even for future eligibility for social security (albeit that the model does not explicitly account for such dynamic strategic behaviour).

The utility of being a recipient of a benefit is assumed to be a function of the replacement ratio, uv, (the ratio of net benefits and net earned wages), the ease with which social security benefits can be obtained, S_{sc}, and the (dis)utility of receiving a benefit, U_2.

$U(S_2) = f_2 (uv, S_{sc}, U_2)$

The replacement ratio as an argument in this utility function is in accordance with labour supply models of the literature (see Vijlbrief, 1992). The benefit level may also act as an argument in the utility function for the active workers representing the reservation wage. The second argument, the ease (or costs) of obtaining a benefit, relates to the main theme of this paper: the supply effect. Like in public health services (see Bikker and De Vos, 1992), the number of people obtaining a social security benefit does not solely depend upon the underlying determinants of demand, but also upon supply. We may label this the 'social climate' for social security.

A first aspect with regard to the supply effect is the well known moral hazard problem with social security. Lubbers (1990) describes this change of the social climate as the erosion of the sense of responsibility when applying for social security. On the other hand, the supply effect comprises the fact that people will become aware of their legal right to demand social security in case they have become eligible. For that reason we use the wording of social climate which does not contain a value judgement. One could also speak of a kind of increased 'rent seeking', which is yet another aspect of the supply effect. Whereas the benefit level as an instrument of the government represents so-called *price policies* in social security, the various possibilities of the government to influence the supply of social security can be regarded as examples of *volume policies*. A decrease of the supply effect can be brought about by strengthening the standards of eligibility for social security. Another way to effectuate such decrease is to call for the responsibility of the people not to abuse social security, and to provide training and the opportunity to obtain working experience rather than just giving financial compensation ('workfare' instead of 'welfare'). In The Netherlands this kind of policy is part of the so-called 'social renewal'. Obviously these underlying determinants to redress the supply effect are very uncertain and difficult to quantify.

The (dis)utility of receiving a benefit, U_2, is taken as a separate argument in the utility function above, but of course this (dis)utility is strongly connected with the social climate. In Den Butter (1993a) the variable representing the supply effect is, by way of experiment, endogenised by assuming that the disutility for the applicants of social security becomes smaller when the number of persons receiving benefits increases. As this is, of course, only one aspect of the supply effect, and because the supply

effect is autonomous in the cliometric simulations of this paper, we will not pursue this line of thought any further.

Finally we have to consider the individual of the working age population who decides to be non-participant without benefit. As this is the residual state we have

$U(S_3) = f_3(U_3)$

with U_3 the (dis)utility of being in state S_3. This (dis)utility depends upon the value of leisure time and upon the reciprocal of all arguments raised in the discussion on the utility of being in states S_1 and S_2, so that this (dis)utility can be normalised to $U_3 = 0$.

Now each individual potential supplier of labour is faced with the following simple discrete choice problem:

$$\max_{S_j} \{ U(S_1), U(S_2), U(S_3) \}_{j = 1, 2, 3}$$

On the aggregate this discrete choice problem boils down to an allocation model for the working age population with the arguments of the above utility functions as determinants. The next two subsections report on the empirical implementation of the allocation model and of the supply effect of social security at the macro level.

2.2 Specification of allocation model

Equations (1) and (2) describe the size of the working age population and the number of people receiving benefits from old age (AOW) and widows and orphans pensions (AWW). Both dependent variables are determined by demographic factors.

$$B_b = B_{b\,-1} + \pi_1 B_{j\,-1} - \pi_2 B_{b\,-1} - \pi_3 B_{b\,-1} \tag{1}$$

$$B_{aow} = B_{aow\,-1} + \pi_3 B_{b\,-1} - \pi_4 B_{aow\,-1} \tag{2}$$

The allocation model is given by equations (4 to 6). The quantity to be allocated to the three categories is total working age population minus civil servants and workers in the so-called semi-public sector (eq. 3). Thus, we assume that employment in the public sector is autonomously determined by the government and does not influence labour participation of the rest of the working age population.

$$B_b' = B_b - B_o - B_{sc} \tag{3}$$

$$B_m/B_b' = 0.5\,(B_m/B_b')_{-1} + \beta_{0m} + \beta_{1m} A_v + \beta_{2m} l_b' + \beta_{3m} wed_a' + \beta_{4m} uv + \beta_{5m} vr + S_{scm} \tag{4}$$

$$B_{ui}/B_b' = 0.5\,(B_{ui}/B_b')_{-1} + \beta_{0ui} + \beta_{1ui}A_v + \beta_{2ui}l_b' + \beta_{3ui}wed_a' + \beta_{4ui}uv + \beta_{5ui}vr + S_{scui} \quad (5)$$

$$B_{zu}/B_b' = 0.5\,(B_{zu}/B_b')_{-1} + \beta_{0zu} + \beta_{1zu}A_v + \beta_{2zu}l_b' + \beta_{3zu}wed_a' + \beta_{4zu}uv + \beta_{5zu}vr + S_{sczu} \quad (6)$$

with parameter restrictions

$\Sigma\beta_{0x} = 0.5, \quad x = m, ui, zu$

$\Sigma\beta_{ix} = 0, \quad i = 1, 2, 3, 4, 5; \quad x = m, ui, zu$

and with $S_{scm} + S_{scui} + S_{sczu} = 0$

The first determinant of the allocation model relates to the non-wage aspects of labour demand, which is mainly determined by economic activity corrected for labour saving technical progress (trend of labour productivity). Contractual working time is also relevant in this respect (eq. 7).

$$A_v = \{(y/ap)\,(1 + 0.5(100-h))\} / B_b' \quad (7)$$

An increase in employment opportunities, indicated by this labour demand variable, leads to a larger share of active workers in the market sector and, consequently, to a decrease in the share of non-participants. Real wage costs, corrected for structural increases in productivity (eq. 8), act as second determinant of employment opportunities and have an opposite effect. A rise in wage costs induces labour demand to fall and the share of non-participants to rise.

$$l_b' = l_y/(ap/ap_{1969}) \quad (8)$$

The wedge as a measure of the tax and premium burden for employees is the third determinant of the allocation model. This determinant is connected with labour supply and it combines the arguments on rewards and opportunity costs when the individual supplier of labour has to choose between being in S_1, S_2 or S_3. An increase in the wedge is associated with the discouragement of labour supply and, hence, with an increase in non-participation, so that both the share of the non-participants receiving a benefit and that of those who do not receive a benefit increases. Therefore the increased size of the wedge is an element of major concern in the policy discussions on low labour participation and the social security trap.

The wage benefit ratio or replacement ratio is the fourth determinant and acts as argument in $U(S_2)$. A rise in the benefit level also leads to less labour supply. In this case, substitution within the allocation model mainly takes place between active workers and non-participants receiving a benefit. Moreover, for technical reasons, we have included labour participation of women as a determinant of the allocation. An increase of female labour participation (which, by the way, is rather low in The Netherlands as compared to other Western industrialised countries) leads to a higher share of both the active workers and non-participants receiving a benefit.

Finally the supply effect of social security is taken as the residual of the allocation model. The previous characterisation of the supply effect indicated that this representation of the social climate has a variety of underlying causes which are difficult to quantify, so that it is not tried to describe the supply effect by specific determinants. Yet, the supply effect is assumed to have a positive influence on the share of the recipients of benefits and have a negative effect on the share of active workers. The empirical implementation of the allocation model shows this to hold true so that the residual of the model may indeed be regarded as the supply effect.

2.3 Selection of parameter values

Now we need realistic values for the parameters of the allocation model, which represent economic behaviour. Our selected parameter values for the allocation model are not based upon own empirical research, but mainly reproduce results from the literature. In this way, we conform ourselves as much as possible to the existing stock of empirical knowledge. Moreover, our specification of the supply effect prevents a full econometric estimation of all parameters of the model. Yet, the description of labour participation by means of an allocation model is a novelty of our approach and, therefore, we are bound to make a number of assumptions on the distribution of the effects over the three categories we distinguish.

The simulation model uses annual data from the reference period 1970-1990. Firstly, the allocation model assumes that the actual shares of the three distinguished categories of the total (corrected) working age population adapt to their desired shares according to a partial adjustment with a mean lag of one year.

Next we have selected parameter values for the determinants with respect to labour demand. We assume that on the long term a one percent increase in economic activity (corrected for labour saving technical progress and working hours) leads to an equal increase of one percent in the number of active workers in the market sector. Hence, the long term elasticity is set to unity. This increase in the number of active workers is supposed to stem from both other categories proportionally.

The long run labour demand elasticity of labour costs is set equal to -0.5 (see Den Butter, 1993a, for a survey of empirical evidence for The Netherlands). Again the assumption is made of a proportional distribution over both other categories.

Empirical studies of the influence of the wedge, or net wages, on labour supply indicate a long term elasticity of 0.2 (see e.g. Theeuwes, 1988). The parameter value of the wedge in the first equation of the allocation model is set in accordance to this elasticity. Here the wedge is defined as the burden of taxes and premiums for workers (the burden for employers is included in the labour costs). Again a proportional distribution over both other categories is assumed.

We assume that the long run labour supply elasticity of the benefit wage ratio is rather small, namely -0.2. We have modelled the influence of the replacement ratio in the allocation model in such a manner that a rise in this ratio only induces a shift in the shares of active workers and

non-participants receiving a benefit. We do so because there is no evidence on a possible influence of changes in the replacement ratio on the allocation of non-participants between those receiving benefits and those not receiving benefits. If these latter changes in allocation would take place it would, by the way, imply a direct form of rent seeking behaviour: it would suggest that if benefit levels go up, more people seek eligibility for benefits without the intention to participate as active worker.

Increased participation of women is equally distributed over workers in the market sector and non-participants receiving benefits. The parameter values of the allocation model are calculated in such a manner that they are, in the mean of the reference period, in accordance with the chosen values of the long term elasticities. The respective values are given in table 2.

After these parameter values were established, the constant terms of the allocation model (which should add up to 0.5 because of the distributed lag) have been determined by means of regression analysis. Finally the residuals of the allocation model representing the supply effect of social security are calculated and normalised to 1970 = 0.

Table 2Parameter values of the allocation model

expl. variable j =	β_{j1}	β_{j2}	β_{j3}
1 A_w	0.41	-0.10	-0.31
2 l_b'	$-4.0\ 10^{-6}$	$1.0\ 10^{-6}$	$3.1\ 10^{-6}$
3 wed_a'	0.065	-0.016	-0.050
4 uv	$-5.0\ 10^{-4}$	$5.0\ 10^{-4}$	0
5 vr	0.0013	0.0013	-0.0025

Explanatory note:parameter values do not exactly suffice the restrictions due to rounding errors

Figure 1 illustrates the development of the shares described by the allocation model up to 1992. The figure pictures the opposite developments of the share of active workers in the market sector and of recipients of a benefit. The share of non-participants not receiving a benefit did increase somewhat in the 1970's, but in the 1980's this share has decreased.

The shaded area in Figure 1 represents the supply effect calculated as the residual of the allocation model. The upper diagram shows that the supply effect for the recipients of benefit was rather small in the 1970's and amounted to less than 1% of the working age population, i.e. less than 100.000 labour years (see also table 3). During the 1980's the supply effect increased to 3% of the working age population. According to the second diagram of Figure 1 the supply effect for the active workers appears to be almost the mirror image of that for the recipients of benefits. It implies, as shown in the third diagram of Figure 1, that the supply effect is almost nil for non-participants without a benefit.

2.4 Rest of the model

The rest of the model, which describes the relationship between the government budget, labour participation and the goods market, is kept a simple as possible. Equations (9) and (10) describe technical relationships between the wedge, gross wage costs and net wages.

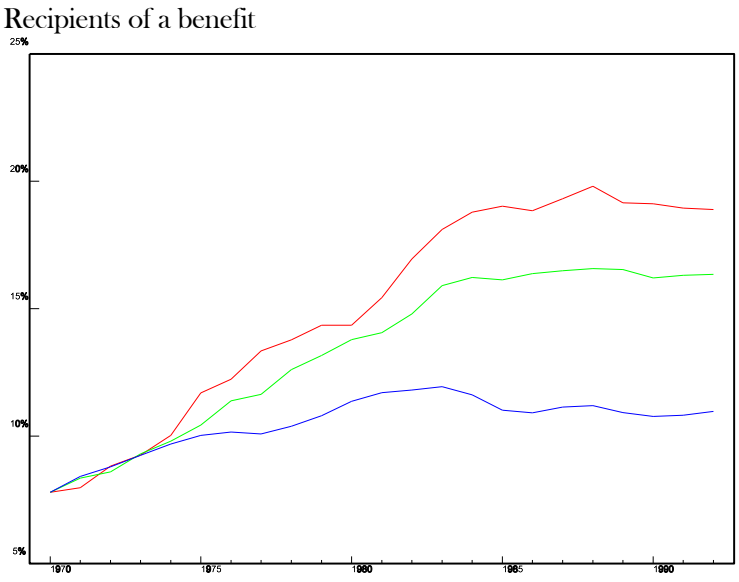
$$l_n = l_b\ (1 - wed) \tag{9}$$

$$l_{uin} = l_{uib}\ wed_a' \tag{10}$$

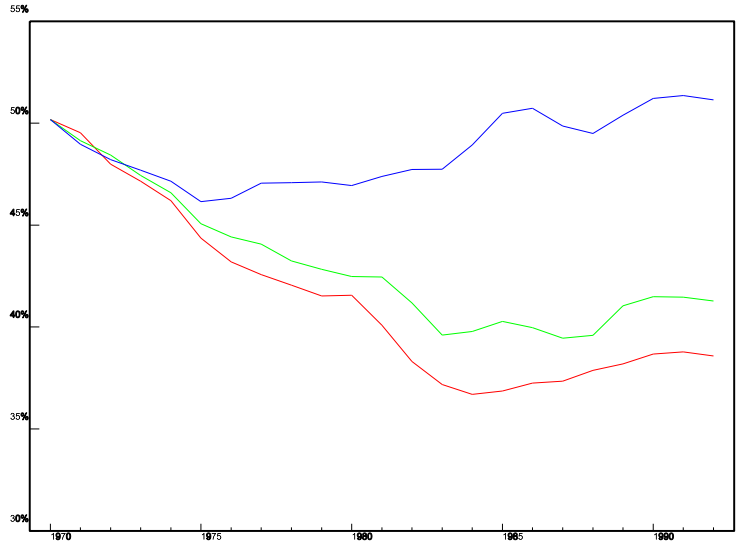
Equation (11) defines the replacement ratio:

$$uv = l_{uin} / l_n \tag{11}$$

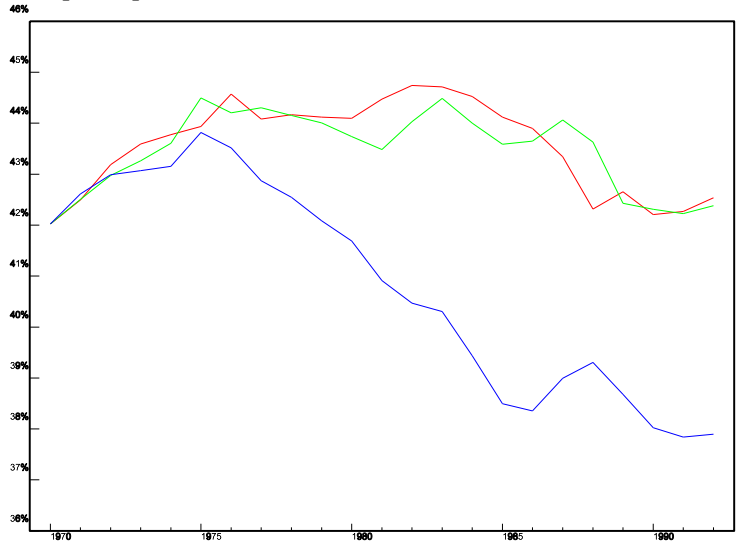
Figure 1Labour participation and the supply effect of social security (share in % of working age population excl. of civil servants and workers in the semi-public sector).



Active workers



Non-participants without a benefit



☐ actual share shaded area: supply effect
_ share according to cliometric simulation without supply effect

Gross real wage costs, salaries of civil servants and the level of benefits (both to non-participants who belong to the working age population and to old age pensioners) are considered autonomous in the basic version of the model. It implies that the wage formation process is left out of consideration in the cliometric analysis, so that differences in labour participation, in tax and premium pressure and in the stance of the goods market do not affect gross wages in the 'what if' simulation (but, of course net wages are affected). Hence the interpretation of the results of the cliometric analysis is conditional on this specific *ceteris paribus* assumption. The alternative would have been a fully

fledged modelling of the wage-price spiral, which is impossible as the model does not endogenise utilization rates[3].

The government budget confronts government expenditure with income from taxes and social security premiums. When expenditures rise, for instance because of an increase in the number of people receiving benefits, higher expenditures can be financed in two ways, namely by enlarging the government deficit or by an increase in the wedge between gross wage costs and net wages. An increase in the government deficit is not feasible in the present economic and political situation in The Netherlands. That is why a rise in the demand for social security nowadays almost automatically implies that the wedge between net wages and gross wage costs becomes larger. Moreover, this endogeneity of the wedge is also institutionally determined as social funds are financed on a balanced budget basis.

The next set of equations of the model describes the government budget. Equations (12), (13) and (14) determine government expenditures, namely for salaries and for the payment of benefits. Equation (15) is a technical equation for indirect taxes. Equation (16) calculates desired government income from direct taxes and social security premiums as a residual of the budget restriction. As argued above, the model assumes that government expenditure, given indirect taxes and the size of the government deficit, is completely financed out of taxes and social security premiums. This determines the size of the wedge (equation 17). Equations (18) and (19) are related definitions of the wedge which are used elsewhere in the model.

$$g_{sal} = l_o \, (B_o + B_{sc}) \tag{12}$$

$$g_{ui} = l_{uin} \, B_{ui} \tag{13}$$

$$g_{aow} = l_{aow} \, B_{aow} \tag{14}$$

$$op_{ov} = \tau y \tag{15}$$

$$op_{bp} = g_{sal} + g_{ui} + g_{aow} + g_{aut} - op_{ov} - op_{aut} - ft_o \tag{16}$$

$$wed = op_{bp} / \{l_b \, B_{ni} + l_o \, (B_o + B_{sc})\} \tag{17}$$

$$wed_a = [t_a / (t_a + t_q)] \, wed \tag{18}$$

$$wed_a' = (1 - wed_a) \tag{19}$$

[3] The inclusion of a conventional wage equation into the model would anyhow be questionable as unemployment does not seem to be an adequate indicator of labour market pressure in this context.

Changes in labour participation will bring about feedback mechanisms at the goods market. When more people become active in the production process economic activity will increase, not only because of the input of productive capacity which remains idle in the case of non-participation, but also because the use of this productive capacity enlarges human capital by learning by doing, while on the other hand human capital depreciates when it remains unused. Consequently, the enhanced economic activity induces higher tax receipts of the government (see eq. 15). On the other hand, a rise in the number of non-participants receiving social security benefits leads to an increase in government expenditure. The size of this increase depends, among other things, on the benefit level (see eq. 13)

Without formally modelling the goods market, equations (20) and (21) describe, in a very broad manner, the positive effect of an increase in labour participation on economic activity, due to enhanced productive capacity. Until now, not much empirical work has been done on measuring welfare gains from enhanced labour participation empirically (see Bastianen *et al.*, 1993), so that our modelling of this effect is, by necessity, somewhat surmised. Equation (20) describes actual income as the combined result of the demand on the goods market with labour participation at its average rate (y_{ex}, which is exogenous in the model), and the induced labour participation effect.

$$y = y_{ex} \, (part/part_{gem})^{\gamma} \tag{20}$$

$$\text{with } part = (B_m + B_o + B_{sc}) / B_b \tag{21}$$

and $part_{gem}$ the average participation rate over the reference period

Now the coefficient γ, indicating the labour participation effect on economic activity, should be given a plausible value. We have set γ equal to 0.5: a dynamic simulation over the reference period shows that, given the actual decrease of labour participation, the effect according to this coefficient value over the reference period has been about 10% of national income. In section 4 this coefficient value will be subject to a sensitivity analysis.

Of course, the present version of the model highly simplifies the actual social security system of The Netherlands as it adds together different social security provisions (disability, sickness, unemployment, early retirement and social assistance). Thus, the benefit level is calculated as the average level of benefits under these provisions. No simulations can be made on the dynamics of the allocation within these various provisions. Therefore, a possible extension of the model would be to add a second allocation model which describes the desaggregation of the non-participants receiving a benefit to the various provisions of social security. This is of importance in the context of actual policy discussions in The Netherlands, because a number of recipients of benefits under the disablement act should in fact be regarded as unemployed. However, as this paper only aims to demonstrate the working of the main mechanisms, we did not yet include such a nested allocation model[4].

[4] Another feasible extension of the model would be to allow for a differentiated influence of the tax pressure (marginal versus average tax rates, taxes paid by employers versus employees) on the

When the supply effect of social security is described by a simple dummy-trend with estimated coefficients, a dynamic simulation over the reference period shows that the model is quite capable to describe the past, given the selected parameter values[5]. Moreover, a joint estimation of all parameters of the allocation model does not lead to a rejection from a statistical point of view of the parameter values selected by us.

3. Cliometric simulations

This section presents the results of two cliometric simulations. Such simulations show how economic development in the past would have looked like, if some events would have occurred that in fact did not occur (or if some events would not have occurred that in fact did occur).

3.1 Supply effect at 1970 level

The first cliometric simulation has the supply effect of social security held constant at its 1970 value. This simulation pictures the situation that social security would not have become increasingly generous in the last decades. Table 3 gives the differences between this cliometric simulation and the baseline projection. The baseline projection reproduces actual developments because the supply effect is set equal to the residual of the allocation model in this projection.

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allocation mechanism. The Central Planning Bureau (1992) uses the MIMIC-model, an applied general equilibrium model, for such simulations.

[5] A dynamic simulation over the reference period with the residual of the allocation model as supply effect, of course, perfectly reproduces the realisations: this simulation is used as baseline in the cliometric simulations of the next sections.

Table 3Indicators for the relative size of the public sector in the case of the supply effect of social security had remained at its 1970 level (deviations from baseline projection)

		1975	1980	1985	1990
Economic activity	%	1.6	4.9	13.1	11.8
Employment	%	3.2	10.1	27.9	24.9
Government expenditure as a percentage of national income	%-p	-1.9	-4.3	-9.4	-9.2
Size of wedge (as a percentage of gross wage costs)	%-p	-3.3	-8.3	-21.2	-19.5
Earners in the public sector as a percentage of earners in the private sector	%-p	-7.5	-19.8	-54.9	-50.4
Inactive persons as a percentage of active persons	%-p	-4.7	-11.3	-31.2	-30.0

Explanatory note:%percentage difference from baseline projection
%-ppercentage-points difference from baseline projection

The table shows that in case social security would not have been increasingly generous economic development would have been much more favourable. The 'inactive ratio' would be 30%-points lower in the cliometric simulation as compared to its actual value and this higher labour participation would have resulted in almost 25%-points more employment in the market sector. These additional active workers do not only comprise today's unemployed but also some of those who nowadays receive benefits as 'disabled', and even some of those who are now non-participants without a benefit because they are discouraged to enter the labour market due to the high level of the wedge.

This is illustrated in Figure 1. Besides the actual shares and the supply effect this figure also pictures the shares of active workers, recipients of benefits and non-participants without benefits according to the cliometric simulation with the supply effect of social security at its 1970 level. The difference between this hypothetical share and the actual share can be regarded as the multiplier effect of the supply of social security. Due to the spiral mechanism of a high tax and premium burden and low labour participation, this multiplier effect appears to be much larger than the direct supply effect. The upper diagram of Figure 1 shows that the share of recipients of benefits would, because of the worsened situation at the labour market, also have increased in the 1970's in case of no supply effect of social security. However, this increase would have been much smaller than it has actually been. Today, the share of the recipients of benefits would, without the multiplier supply effect, be more than 8%-points lower than it actually is. This amounts to almost 800.000 labour years (see also table 4). The second diagram of figure 1 illustrates that without the multiplier effect the share of active workers, and thus labour participation, would have stopped falling after the mid of the 1970's. Here the multiplier effect amounts to more than one million full time workers at the end of the simulation period. The lower diagram of Figure 1 confirms that a less generous social security would also have induced a considerable number of non-participants without benefits to labour participation. This is a

remarkable result because, as mentioned before, the direct supply effect on this category is almost nil.

Table 4Direct and multiplier effects of supply of social security (1000 labour years).

	1975	1980	1985	1990
Recipients of benefits				
Direct effect	99	47	256	271
Multiplier effect	131	249	709	776
Active workers				
Direct effect	-55	-77	-303	-261
Multiplier effect	-140	-450	-1207	-1166
Non-participants without a benefit				
Direct effect	-44	30	47	-10
Multiplier effect	9	201	498	389

3.2 Constant wedge

Table 5 shows how the Dutch economy would have developed from 1970 onwards, if the expenditures on social security (relative to real national income) had been constant. This simulation tries to visualise the idea politicians had on the future costs of social security at the start of the consolidation stage of the system of social security at the beginning of 1970's. How would economic development have looked like if, at that time, not the benefit level, but the costs of social security had been hold constant? In order to simulate this budgeting of social security, we have respecified the model in such a manner that no longer expenditures on social security determine the wedge, but that, given the wedge, a fixed amount is available for social security expenditures. It implies that an increase in the number of persons eligible for benefits leads, *ceteris paribus*, to a reduction in the benefit level. The results of table 5 give the difference between the dynamic simulation of the past in which the value of the wedge is equal to its actual value (baseline projection, which again reproduces the historical past) and a dynamic simulation (alternative projection) in which the wedge is kept constant.

Table 5 Indicators for the relative size of the public sector in the case of a wedge held constant at the level of 1970 (deviations from baseline projection)

		1975	1980	1985	1990
Economic activity	%	4.5	6.6	13.1	12.3
Employment	%	9.1	13.5	28.0	26.1
Government expenditure as a percentage of national income	%-p	-4.8	-6.8	-8.9	-9.6
Size of wedge (as a percentage of gross wage costs)	%-p	-8.4	-12.2	-20.3	-20.4
Earners in the public sector as a percentage of earners in the private sector	%-p	-17.7	-25.8	-54.5	-52.0
Inactive persons as a percentage of active persons	%-p	-11.0	-14.9	-30.9	-31.0

Explanatory note:see table 3.

Table 5 shows that the actual increase of the wedge and the induced discouragement to participate in the labour market has had a rather large negative effect on economic activity and employment. A comparison of the results of tables 3 and 5 reveals that a policy of budgeting of social security would have had about the same effect on the economic variables of interest as a volume policy which had aimed at keeping the supply effect at its 1970 level. It indicates that we should consider price and volume policies as close substitutes although the mechanisms at work are initially quite different.

4 Sensitivity analysis

The empirical implementation of the simulation model of this paper warrants a sensitivity analysis in order to investigate to what extent the results of the cliometric simulations are influenced by the selection of the major parameter values. This section considers alternative versions of the model with no participation effect on demand at the goods market, and with doubling of 3 major coefficients of the allocation model. The results are listed in table 6.

4.1 Participation effect on goods market

As mentioned before, no much empirical evidence exists on the effects of enhanced labour participation on economic activity. In model version B (table 6) the value of the coefficient γ, which represents this supply effect at the goods market, is set equal to zero, so that income is completely demand determined and exogenous to the model. The simulation results show that the model is quite sensitive to the size of the participation effect. The multiplier effect with respect to active workers appears to be substantially reduced as compared to that of the basic version of the model. This is mainly due to the supply effect on non-participants without benefits: the encouragement for

non-participants to enter the labour market is much larger in case of a positive participation effect at the goods market than in the case that such participation effect does not exist.

4.2 Wage elasticity of labour demand

In model version C the wage elasticity of labour demand in the allocation model is changed from -0.5 to -1.0. Whereas the previous specification change of the model does not alter the measured direct supply effect of social security, this effect is enhanced according to version C as compared to the basic version of the model, because on average the reference period has been a period of wage moderation. This implies that labour demand is higher according to version C with a large demand elasticity than according to the basic version. Therefore, the (negative) residual between the calculated and the actual share of active workers has become larger. In other words, the allocation model overestimates the share of active workers still further. The larger direct supply effect of social security causes the multiplier effect, according to this version of the model, to be likewise larger than according to the basic version.

4.3 Wage elasticity of labour supply

The wage elasticity of labour supply is included in the 'wedge' variable in the allocation model. The results of version D of table 6 show that the model is not much sensitive to changes of this elasticity value. Now the direct, and hence the multiplier effect of social security supply diminish somewhat as compared to the results according to the basic version of the model. That is because a larger 'wedge' effect would have resulted in a higher discouragement of labour supply during the reference period in which the wedge increased substantially. In this case the overestimation of the share of active workers by the allocation model is somewhat less pronounced than according to the basic version of the model so that the residual, representing the direct supply effect, becomes slightly smaller.

Table 6Results of sensitivity analysis (deviations from realisations in case supply of social security remained constant at 1970 level)

1990-values	A	B	C	D	E
Supply effect on active workers (x 1000 labour years)					
Direct effect	-261	-261	-384	-172	-317
Multiplier effect	-1166	-645	-1583	-1132	-1545
Supply effect on recipients of benefits (x 1000 labour years)					
Direct effect	271	271	300	249	326
Multiplier effect	776	611	887	767	1048
Supply effect on non-participants without benefits (x 1000 labour years)					
Direct effect	-10	-10	85	-78	-10
Multiplier effect	389	34	695	364	497
Economic activity (%)	11.8	0	15.7	11.4	15.4
Inactive/active ratio (%-p)	-30.0	-20.2	-35.4	-29.5	-37.7

Explanatory note:A: Basic version of model
B: No participation effect at goods market
C: Wage elasticity of labour demand: -1
D: 'Wedge' elasticity of labour supply: 0.4
E: Elasticity of replacement ratio: -0.4

4.4 Elasticity of replacement ratio

Our final sensitivity analysis investigates how the working of the model is affected when the elasticity of the replacement ratio is set equal to -0.4 instead of -0.2 in the allocation model. For the interpretation of the results (version E of table 6) it should be noted that the replacement ratio witnessed a fall during (the end of) the simulation period. A higher sensitivity to this ratio would therefore have encouraged more people to become active workers so that the allocation model further overestimates the share of active workers in that case. Like in the case of the higher wage elasticity, both the direct supply effect of social security and the multiplier effect are larger than according to the basic version of the model. Whereas the multiplier effect is especially sizable with respect to non-participants without benefits in the case of high wage elasticity of labour demand, in

this case of a high sensitivity for the replacement ratio, it is markedly the demand for social security which would have been much smaller if the supply effect had remained at its 1970 level.

5 Conclusion

This paper finds its inspiration in the observation that the generous and extended social security system in The Netherlands may have become an obstacle for welfare by decreasing labour participation and economic activity. The cliometric simulations clearly indicate that the rise in the wedge and the increase in eligibility for social security benefits (reflected by the enhanced 'supply effect' of social security) have significantly contributed to the labour market distortions in The Netherlands during the last decades.

This is, however, only one side of the picture. An extension of social security may also enhance welfare by offering protection against financial risks to more people and by increasing equality. One can speak about a trade-off in social security between efficiency on the one hand and income redistribution and risk reduction on the other. Vijlbrief (1992) has empirically illustrated this trade-off by 'output possibilities curves', which show a negative relation between the (relative) benefit level and output.

Yet, the current level of social security in The Netherlands is most probably not in accordance with policy preferences and there is a broad consensus that the demand for social security should be reduced. Dutch policy plans to reduce this demand for social security diverge with regard to the instruments to be used. Some proposals imply price policies, i.e., a reduction of the benefit level, whereas others recommend volume policies, which seek to decrease the number of people eligible for benefits directly. The simulation results of this paper indicate that both policies can be effective in increasing economic activity and labour participation, provided that there is symmetry between the negative spiral in the past and the desired reversal of this spiral in the near future. This symmetry is more likely for price policies than for volume policies. However, the cliometric simulations with respect to the supply effect of social security show that a redress of the eligibility for social security may, through multiplier effects, have a substantial positive impact on labour participation.

Symbols

a_p Trend of labour productivity (autonomous)
A_v Determinants of labour demand besides labour costs
B_{aowz} Number of persons eligible for basic old age and widows and orphans pensions
B_b Working age population (aged 15-65)
B_j Population under 15
B_m Number of workers in the market sector
B_o Number of workers in public sector (civil servants) and in social security offices
B_w Remainder of working age non-participants eligible for benefits
B_{se} Number of workers in semi-public sector
B_{vut} Number of persons eligible for an early retirement benefit
B_u Number of unemployed with an unemployment benefit

B_{ui} Total number of working age non-participants eligible for benefits
B_{wao} Number of persons eligible for benefits under the Work Disablement Act (WAO)
B_{z} Number of persons receiving benefits because of temporary illness
B_{zu} Number of working age non-participants not eligible for social security benefits
ft_{o} Financial deficit of the government (constant prices)
g_{aow} Government expenditure on basic old age and widows and orphans pensions (constant prices)
g_{aut} Other (autonomous) government expenditure (constant prices)
g_{sal} Salaries of civil servants and workers in semi-public sector (constant prices)
g_{ui} Total government expenditure on benefits for working age non-participants (constant prices)
h Index contractual labour time
l_{aow} Benefit level for basic old age and widows and orphans pensions
l_{b} Gross real labour costs per worker in the market sector
l_{b}' Idem corrected for labour productivity
l_{n} Net real wages in the market sector
l_{o} Level of salaries of civil servants and workers in the semi-public sector at constant prices
l_{uib} Average level of gross benefits to the working age population at constant prices
l_{uin} Average level of net benefits to the working age population at constant prices
op_{aut} Other government income (constant prices)
op_{bp} Government income from wage and income taxes, and from social security premiums (constant prices)
op_{ov} Government income from other taxes (constant prices)
part Labour participation rate
$part_{gem}$ Average labour participation rate over the reference period
S_{scm} Direct supply effect of social security with respect to active workers
S_{scui} Direct supply effect of social security with respect to recipients of benefits
S_{sczu} Direct supply effect of social security with respect to non-participants without a benefit
$t_{a}/(t_{a}+t_{q})$ Share of workers' tax and premium burden in total wedge
uv Replacement ratio
vr Trend of female participation rate
wed Wedge between gross wage costs and net wages
wed_{a} Tax and premium burden for workers
y National income (constant prices)
y_{ex} Idem, at average participation rate (determined exogenously)
π_{1} Ratio of population under 15 which obtains working age
π_{2} Ratio of working age population of those who leave the working age population (by deceases, net emigration)
π_{3} Ratio of working age population of those who become eligible for an old age or widow's pension
π_{4} Ratio of number of persons eligible for an old age or widow's pension and of the number of persons leaving this category (by deceases, net emigration, remarrying)
τ Indirect tax rate

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