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Citation

Caminada, C. L. J., & Goudswaard, K. P. (2001). Does a Flat Rate Personal Income Tax Reduce Tax Progressivity?: A Simulation for the Netherlands. *Public Finance And Management*, 1(4), 471-500. doi:10.1177/152397210100100401

Version: Publisher's Version
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Note: To cite this publication please use the final published version (if applicable).

DOES A FLAT RATE INDIVIDUAL INCOME TAX REDUCE TAX PROGRESSIVITY? A SIMULATION FOR THE NETHERLANDS

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Abstract

Throughout the last couple of decades the individual income tax systems of most industrialized countries have been (repeatedly) the subject of considerable reform efforts. Although the reform packages vary to a wide extent across countries, the direction of change is roughly similar. Most tax reforms are characterized by base broadening, reduction of tax rates, flattening of the rate structure, and lower tax to GDP-ratios. Implementing a flat rate individual income tax seems to be in line with these reforms, although several steps further along.

In this paper, we construct a flat rate/broad base individual income tax system and we compare the distribution of the current personal income tax in the Netherlands to the distribution of the simulated flat rate tax. Using extended data, the effects are simulated of eliminating deductions in exchange for a reduction in tax rates, sufficient to keep personal income tax revenue constant. Our simulations indicate that:

- *After drastic base broadening, a proportional rate of 27.7% balances the budget (ex ante). Such a flat rate causes only relatively small changes in average tax ratios.*
- *Overall tax progressivity is mainly caused by the fixed personal exemption, which we maintained in the simulated flat rate tax. We calculated only a 6 percent lower income elasticity in the flat rate system; the concentration (Gini) index of taxes indicates a modest 4 percent decline in progressivity.*

JEL-classification H22, H24

Keywords flat tax, deductions, progressivity, distribution of the tax burden

Introduction

Throughout the last couple of decades, the individual income tax systems of most industrialized countries have been (repeatedly) the subject of considerable reform efforts. Many OECD countries have implemented tax reforms characterized by base broadening, reduction of tax rates, and flattening of the rate structure (Cnossen and Messere, 1990). Recently, the focus has also been on lower tax-to-GDP-ratios. For example, the German government carried out a major tax reform in 2000; the package implies a tax reduction amounting to EUR 25 billion annually in 2005. The Netherlands has just implemented a major reform. The new Income Tax Act 2001 creates a system with a broader base and lower rates, introduces tax credits and makes a fundamental change in capital taxation.

Remarkably enough, when the plans for this reform were discussed (and enacted) in the parliament, members of parliament were already expressing interest in a new tax reform. Specifically, they asked the government to investigate the possibilities (or impossibilities) of a flat rate individual income tax. Various proposals for a flat tax have been made in other countries, especially in the United States.¹ The meaning of a “flat tax” is somewhat ambiguous in political debates and in the economic literature, but generally, a flat rate tax system has two key features: a very broad tax base and one fixed rate. Implementing a flat rate individual income tax in the Netherlands seems to be in line with earlier reforms, and could be seen as a major - final? - tax reform.

In this paper, we simulate a very simple flat rate individual income tax system for the Netherlands and compare the distribution of the current individual income tax (including social contributions) to the distribution of the simulated flat rate tax. Essentially, the effects are simulated of eliminating deductions in exchange for a reduction in tax rates, sufficient to keep individual income tax revenue constant at the initial level and to leave unchanged the distribution of pre-tax incomes. Under 'our' flat tax, a uniform proportional rate is levied on a very broad personal income base, while only fixed personal exemptions are deductible from pre-tax incomes (i.e. a tax credit).

The paper does not deal with questions relating to the nature of the tax base in the flat rate system (which is a rather hybrid concept, just as in the current system), nor questions regarding either timing difficulties, capitalization problems or economic and behavioral effects of such a drastic reform.² Instead, we only focus on the question whether drastic base broadening in exchange for a low flat rate would lead to a shift in the tax burden from high to low income earners, i.e. lowering tax progressivity.

For our analysis we use an extensive income panel survey of Statistics Netherlands, which covers 217,000 income recipients. Sample data have been combined with data from the tax administration. As a result, the survey contains the personal distribution of incomes (pre-tax, taxable and after-tax), the distribution of tax liabilities and almost all deductions for the following socio-economic groups: self-employed, civil servants, employees in the private sector, social security beneficiaries (unemployed and disabled), pension earners (old-age and early retirees), and social welfare recipients. Since very detailed data about deductions are available, we are able to construct a very broad tax base (computed as current taxable income plus all applied deductions to be eliminated under such a flat tax). We simulate the combined effect of the elimination of deductions and the lower uniform tax rate on the distribution of individual taxpayers liabilities.

The paper is organized as follows. The second section evaluates pros and cons of implementing a flat rate individual income tax. The third section discusses the measurement of overall tax progressivity. In the next section the individual income tax system in

the Netherlands is described. The fifth section presents the characteristics of the simulated broad base/flat rate individual income tax. The simulated income effects of such a tax reform are presented in the following section. Finally, we draw some conclusions.

Do We Need A Flat Tax?

Proponents argue that a broad base/flat rate tax system generates fewer complexities than most current individual income tax systems, which cause high administrative costs (*cf.* McLure, 1996). Administrative and compliance costs of the current income tax and social contributions in the Netherlands, for example, appear to be 4.8% of corresponding revenues.³ The elimination of deductions - base broadening - could decrease these cost significantly.

Secondly, an obvious reason for lower rates is the distortionary effects of high marginal tax rates on, e.g., labor supply and savings (Frederiksen, 1996). However, according to the OECD Jobs Study (1994) on tax reforms in the 1980s, the positive effects of lower tax rates on labor supply seem rather small and in particular the effects on the male labor supply seem to be very low.

Thirdly, a flat rate tax system with a very broad base would both alleviate distortion, and reduce the quantity of tax arbitrage options open to taxpayers in the current system. Under current Netherlands income tax law capital income is taxed on average much less than labor income. This is the result of political interests (owner-occupied property), social considerations (pension contributions), and economic reasons (capital flight). The lower tax burden is visible in the most important forms of capital income: the rental value of owner-occupied property is taxed negatively, pension savings are taxed at a deferred basis, investment income of pension funds is exempt and retained profits are taxed proportionally.⁴ Also, the portfolio allocation of savings and risk-taking is influenced by the tax rules. Individual savings for pension schemes or contributions for life insurance are deductible from pre-tax income, while other savings are (in general) not. The effective tax rate on investment can therefore range from minus 52% to 69% in the Netherlands.⁵ By allowing the size of the tax wedge to vary widely, current taxation violates one of the most fundamental rules of the market, which is that economic considerations instead of tax motives should determine choices regarding the organization, financing and location of activities (Cnossen, 1995). Complexities encourage, and offer, taxpayers a rich menu of possibilities to avoid or to diminish the tax intended by the legislator (tax arbitrage). However, in some cases deductions are meant to encourage a change in behavior, that is, to attain other policy objectives. Such tax expenditures do have an

important disadvantage compared to government expenditures, i.e. no representation of their budgetary impact. Therefore the budget making process is less transparent.

Opponents of the flat tax proposal reject the idea on the basis of equity considerations: higher income groups would pay less tax in a flat rate system than in a progressive tax system. Low and high income earners will be taxed at the same marginal rate. On the basis of the ability-to-pay principle, one could argue in favor of a progressive rate structure (Van Herwaarden De Kam, 1983). Moreover, some deductions seem to be fair when the ability-to-pay principle is employed: for example, if there are high expenses for sickness, the ability to pay will be lower. A deduction therefore seems logical.

Secondly, the elimination of all deductions and allowances conflicts with the taxable income concept mainly because costs of earning income should be deductible from pre-tax income (Stevens, 1996).

Thirdly, drastic base broadening can have substantial adverse economic effects. For example, elimination of the deduction for pension contributions would no doubt affect savings, and the elimination of the deduction of mortgage interest payments would disturb the housing market. Timing and capitalization problems are also relevant here. Thus, a drastic reform as envisaged in our analysis, would in any case require a rather long transition period.

The flat tax to be elaborated for the Netherlands differs to a wide extent from several recent proposals in the USA.⁶ Usually, the focus is on a proportional tax rate on labor income, allowing a fixed personal exemption: capital income remains untaxed (the Hall-Rabuska type of flat tax exempts the normal return on capital). Under strict conditions, such a proportional wage tax is equivalent to a proportional spending tax or consumption-based tax (*cf.* Pechman, 1990). Therefore, one could argue that these proposals are 'America-inspired' (Feld, 1995), since they offer an alternative for both the current income tax and for the value added tax (there is no VAT in the USA).

A flat tax is distinct from a 'dual income tax' as implemented in several Scandinavian countries (see Sørensen, 1994), and as

proposed by Cnossen (1995) for the Netherlands. The dual income tax is mainly advocated for efficiency considerations (fewer distortions, less tax arbitrage). It disregards the principle of ability to pay, that is that all sources of income should be taxed equivalently (*cf.* Stevens, 1996). Furthermore, a dual income tax system encourages high income earners *cf.* self-employed to present wage income fiscally as capital income (see Sørensen, 1994: pp.73-76).

We simulate a flat individual income tax, which includes labor income as well as capital income in the same tax base (as under current Dutch income tax law). In order to make comparisons we will present some features of the current system (below).

Measuring Overall Tax Progressivity

The degree of tax progression is often ambiguous. The ambiguity - identified in the well-known article of Musgrave and Tun Thin (1948) - stems from different perceptions and definitions employed in empirical research. In modern analysis, there are two distinct measures of tax progression: liability progression measures and residual progression measures. Liability progression quantifies the departure from proportional taxation, while residual progression measures focus on income-equalizing or the redistributive effect of taxes. Moreover, various *local or point* and *global or overall* measures of the degree of progression are compatible with a progressive tax system.⁷

The crucial distinction between liability and residual measures of global progression is the way they treat differences in the size of taxes relative to income, *i.e.* tax height. For example, given a progressive tax, doubling the tax burden of each person leaves liability progression unchanged, because only the relative distribution of the tax burden is considered, but residual progression rises due the higher average tax rate.

However, when tax height is constant, global measures of liability and residual progression tell qualitatively the same story about changes in progression, *i.e.* they never conflict as to the direction of change (see Formby *et al*, 1990). This is a useful tool for our simulation in the fifth and sixth sections (tax height will be kept constant).

As a measure for the degree of progression of the tax system, we employ several *global* indices of liability progressivity.⁸ We calculate e.g. the concentration index of taxes⁹ and the income elasticity of the tax system.¹⁰ A concentration index above zero and an elasticity above unity indicates a progressive tax system. Since tax progressivity is determined by both the rate structure and the tax base, changes in the degree of progression will result from changes in either the base or the rate. The income tax elasticity increases by income-inelastic deductions, but will decline when deductions are very income-elastic. The intuitive reasoning is quite simple. If deductions are income-elastic, pre-tax income growth causes a smaller increase in taxable income compared to the case when deductions are income-inelastic. Income-inelastic deductions, such as personal exemptions, imply a higher liability progression (Caminada and Goudswaard, 1996).

Netherlands Tax Reform

Dutch personal income taxes have been subjected to considerable reform efforts lately; a major revision took place in 1990 and another reform came into effect on 1 January 2001. In both cases the tax reforms are characterized by base broadening, reduction of tax rates, and flattening of the rate structure. Implementing a flat rate individual income tax seems to be in line with these reforms, although several steps further along.

Key Figures of the former Tax System

On January 1st, 1990, a major revision of the personal income tax based on the proposals of the Oort Commission became effective in the Netherlands. The main changes in the new legislation were as follows (*cf.* De Kam, 1993):

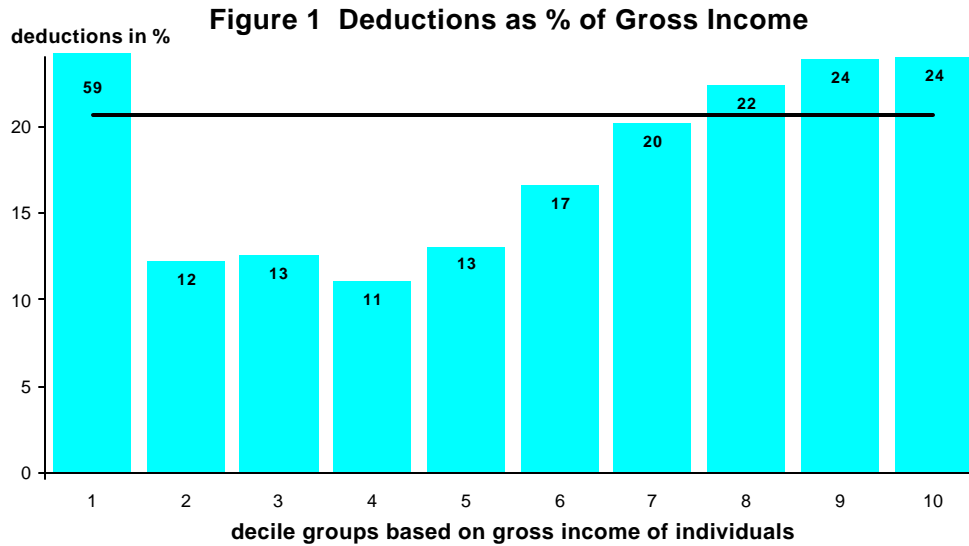
- The personal wage and income tax was fully integrated with the general social security contributions, with a combined rate and uniform base.
- The number of tax brackets was reduced from nine to three. The new top rate of 60% is much lower than the top rate of 72% in the old system. The rate structure has thus been made less progressive.

- The tax base was broadened by Dfl 97 billion or by 63%, mainly by eliminating the deductibility of general social security contributions (Dfl 50 billion) and by lowering personal exemptions (Dfl 39 billion).
- Although the proposals of the Oort Commission were revenue neutral, the actual reform package implied a tax reduction amounting to 0.8% of GDP.

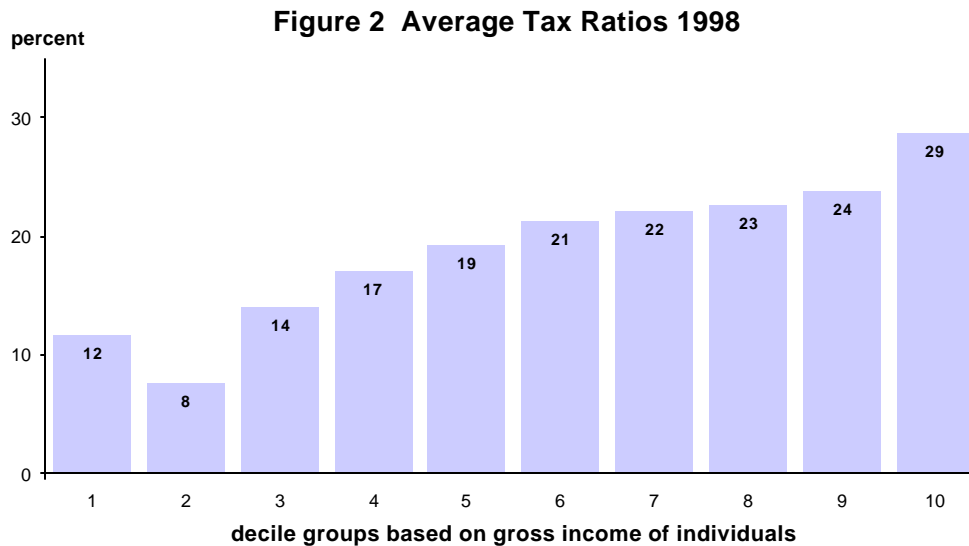
The reform did have strong redistributive effects. In earlier research we showed a sharp drop in progressivity, as measured by the elasticity of the Dutch wage and income tax (-17%), due to the tax reform in 1990 (Caminada and Goudswaard, 1996).

Nowadays, the distribution of average tax ratios under current tax law still depends on both the rate structure, and the distribution of deductions. Figure 1 shows the distribution of deductions (aggregated by income class) that has been applied for in 1998. Deductions seem to be rather income-elastic; the deduction ratio grows sharply with gross income, although it levels off at very high incomes.¹¹ Furthermore, the fiscal advantage of deductions will be even more income-elastic, because deductions are valued by the marginal tax rate of taxpayers. Accordingly, the distribution of the average tax ratios, appears to be more equally distributed as suggested by the rate structure (see figure 2).

This is also expressed in the overall progressivity of the system; see table 1. Using the sample data, we calculated (cross-sectional) an income tax revenue elasticity of 1.43 for the current system; the concentration index of current tax system C is 0.53, while the Gini index of pre-tax incomes G equals 0.44; so, the concurrent Kakwani index P yields 0.09 ($P=C-G$).



source: See table 2 for the specification of the deductions; aggregated data are taken from the Treasury (1997); data to distribute these items to income classes are taken from Dutch Personal Income Distribution 1997 (Statistics Netherlands, 2000); and own calculations.



source: Dutch Personal Income Distribution 1997 (Statistics Netherlands, 2000); and own calculations.

Table 1 Dutch Personal Income Tax: Global Measures of Inequality

	<i>pre-tax income</i>	<i>tax base</i>	<i>personal income tax</i>
Amount x billion Dfl *	504.9	415.3	121.4
Global measures of income (tax) inequality			
Robin Hood index	0.30	0.30	0.39
Gini index	0.41	0.42	0.53
Theil index	0.28	0.29	0.48
Atkinson index ($\alpha=0.5$)	0.16	0.17	0.25
Income tax elasticity	1.00	1.01	1.43
Kakwani index	-	-	0.09

* 1 Euro = 2.20371 Dfl

source: Dutch Personal Income Distribution 1997 (Statistics Netherlands, 2000); and own calculations.

Income Tax Act 2001

In September 1999 draft legislation for the new Income Tax Act 2001 was submitted to the Lower House of the parliament together with draft legislation on its implementation. These bills represent the core of a major revision of the Netherlands tax system known as the Revision of Taxation 2001. Both bills were accepted by the Lower House of the parliament on 3 February 2000 and are ratified by the Upper House. The new Income Tax Act 2001 came into effect on 1 January 2001.

The Income Tax Act 2001 creates a system with a broader base and lower rates. In order to stimulate the economy and employment opportunity, the basic rates of taxation are to be lowered. Work is to be made more attractive by the introduction of an employment rebate (fixed tax credit). The reduction in the tax on labor is to be financed by reductions in total public expenditure and by increases in indirect

taxes, such as VAT and environmental levies (amounting to EUR 3.6 billion or 1% of GDP). The reform package results in a tax reduction of EUR 2.7 billion (0.8% of GDP).

The system should ensure more stable tax revenues. Under the current system, it is possible to convert some taxable income, for example interests and dividends, into non-taxable capital gains. The new system will restrict the scope and effect of such conversions.

The former income tax system was based on one aggregated taxable income from several sources. Various deductions could be applied. Under the new system, personal allowances are replaced by a levy rebate in the form of a uniform individualized tax credit. Three taxable incomes are distinguished, each of which falls into a box. Income is taxed in one box only (no double taxation). Negative income in one box can not be set off against positive income of other boxes. Each box has its own rate structure:

- Box 1: Taxable income from work and home ownership, to be taxed at progressive rates rising from 32.35% to 52%;
- Box 2: Taxable income from a substantial (business) interest, to be taxed at one fixed rate of 25%; and
- Box 3: Taxable income from savings and investments, to be taxed at one fixed rate of 30%. The new investment yield tax is levied on capital and assets minus outstanding debts in any one year. Capital and assets include shares and savings deposits, land and property (other than the principal residence), and other (moveable) property not in personal use. To derive the 'yield assessment base' a fixed fictitious yield of 4% per year will be employed. This fictitious yield is taxed at the rate of 30%.

Almost all taxpayers are subject to taxation in box 1. Box 1 is expected to produce over 95% of individual income tax revenues (including general social security contributions). In 2001 the first income bracket (EUR 14,870) is to be taxed at 32.35%, i.e. a combination of taxes and social contributions. In the second income bracket - the next EUR 12,139 - tax rate is set at 37.6%, also including general social security contributions. In the third income bracket - the next EUR 19,300 - the tax rate is set at 42%; taxable income above EUR 46,309 is taxed at 52%. Senior citizens are taxed at a lower rate in the first and the second income brackets (14.45% and 19.7% respectively), because those over 64 pay less in social contributions.

The new Income Tax Act 2001 became effective on 1 January 2001. However, further reforms are called for. A vast majority of the Lower House of the Parliament asked the Ministry of Finance to investigate the possibilities and impossibilities of a flat rate individual income tax.

The Simulated Flat Tax

The flat individual income tax base is simulated by using data from an Income Survey of Statistics Netherlands. Unfortunately, cross-section data have a time lag of several years. We have therefore used the survey data of the fiscal year 1997, while making some small adjustments to simulate the situation for the year 1998.¹²

Under 'our' flat tax, a uniform proportional rate is levied on a broad individual income base, whereby only fixed personal exemptions are deductible from pre-tax incomes. This is essentially a Bentham system. To derive the 'new' broad tax base, we have eliminated almost all deductions for all taxpayers in the sample data. See table 2. Some deductions, e.g. pension insurance contributions paid by employees and employers and early pension insurance paid by employees, are not included in the Income Panel Survey data. Therefore we distribute these contributions to the relevant socio economic groups using relevant computation rules.¹³

Table 2 summarizes such a broad tax base for 1998 (upper-right part of the table). Since detailed data about the distribution of deductions are available, we are able to construct the new tax base for various income levels.

Table 2
From Taxable Income to Tax Base Flat Tax: Magnitude of Deductions

Tax Base 1998 x billion NLG *		Simulated Base Flat Tax x billion NLG	
1 taxable income	417.9	taxable income flat rate tax (1+4)	526.3
2 personal exemptions	100.8	personal exemptions (tax credit)	100.8
tax base (1-2)	317.1	tax base flat rate tax (1+4-2)	425.5
3 income tax revenue	118.0	revenue neutral (ex ante)	118.0
4 deductions / base-broadening	108.4		
pension insurance contribution	26.0		
mortgage interest -/-			
fiscal rents home-owners	23.3		
work-related expenses	18.8		
Insurance contributions for sickness and unemployment employees	6.5		
contributions for life insurance	5.9		
deduction for self-employed	5.4		
deduction for senior citizens (over 65 years)	5.2		
savings incentive for workers (<i>snaarloon</i>)	4.0		
basic exemption for interest and dividends	3.2		
deduction for exceptional (medical) costs	2.7		
interest on consumer loans	2.6		
deduction for non-workers	2.3		
early retirement scheme contributions employees	1.5		
deductible losses	1.0		
average rate: 3/(1-2)	37.2 %	flat rate: 3/(1+4-2)	27.7%

* 1 Euro = 2.20371 Dfl

source: Almost all figures in the left part of the table are taken from the Treasury (White Paper on Tax Reform 2001: *Kabinetsverkenning Belastingen in de 21e eeuw*, p.19 and p.37); exceptions are early retirement contributions (source: Statistics Netherlands Yearbook) and an update figure for the (difference in the) deduction for mortgage interest - i.e. cost of owner-occupied dwellings - and fictitious taxable fiscal rents for home-owners (source: Caminada, 1999).

As a result of the simulated base broadening, taxable income increases by 25.9%. This is the total of all deductions in the left part of Table 2 under point 4. Two thirds of this increase is caused by only three large items: pension insurance contributions paid by employees and employers, mortgage interest payments and work-related expenses. As a result of the (extreme) broadening of the tax base the uniform tax rate can be set very low. With a flat rate of 27.7%, the same amount of revenue is generated as in the current system (ex ante). This flat rate is substantially lower compared to the statutory rate in the first bracket (36.35% in 1998; to be lowered to 32.35% in 2001).

It should be mentioned that there are some problems with the concept we have used. The tax base we have constructed is a rather hybrid concept, which is, for example, far from the Haig-Simons definition of income (1938).¹⁴ However, the paper focuses on real-world tax reform, so we prefer to take actual taxable income as starting point of our analysis, rather than a theoretical income concept.

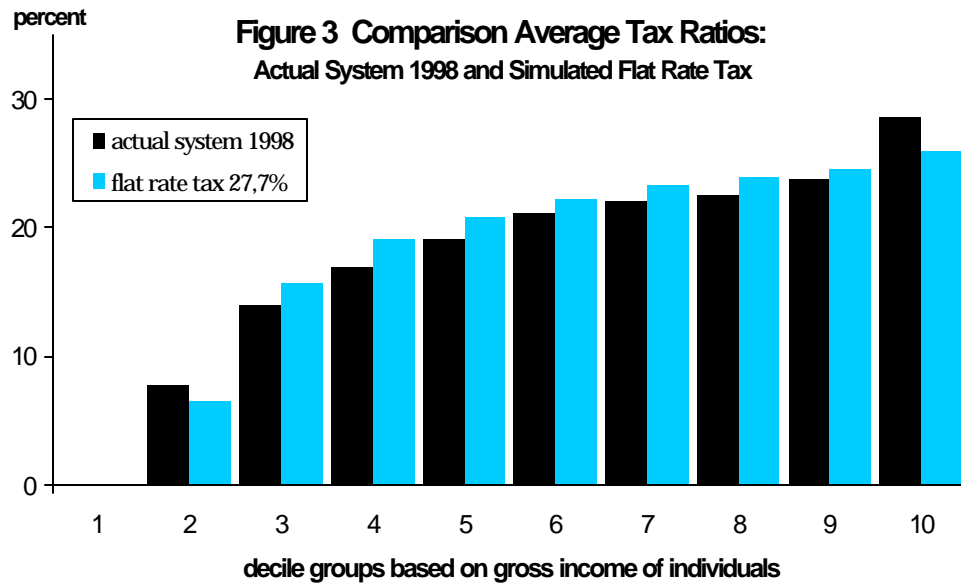
Also, one could argue that the system taxes twice in several ways. For example, pension benefits remain taxable, while the deductibility of pension contributions from gross earnings is eliminated. This is a price to be paid for a low flat rate. Moreover, there are already several examples of two-fold taxes in the present system.

Another complication is that we do not include the corporate tax in our simulations. If the tax regime for the self-employed were to be altered, one could argue that this would also require changes in the corporation tax in order to prevent tax arbitrage. On the other hand, the level of the flat individual tax rate would be closer to the actual corporate tax rate. In general, tax rates on labor and capital would converge. This would substantially reduce the incentives for tax arbitrage. Relative prices rather than tax motives would determine economic behavior, with clear welfare gains.

Finally, it should be noted that some deductions are designed as special provisions under tax law, because more or less the same result as direct expenditures can be achieved at lower administrative costs. If a flat rate tax will be enacted and if government spending through tax expenditures will be replaced by direct spending, then government direct expenditures would have to rise. In that case, our assumption of revenue neutrality is violated. Consequently, the rate of tax under the flat tax would have to be higher or the level of personal exemptions would have to be lower in order to maintain government spending at the same level. Such additional changes will have redistributive effects (neglected in the next section).

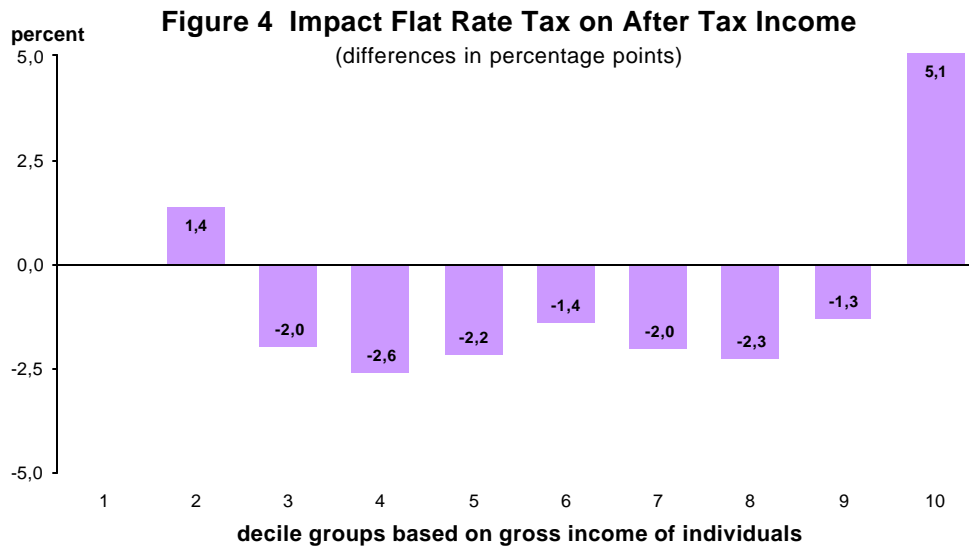
Distributional Effects

Figure 3 shows the effect of the tax reform on the distribution of average tax ratios. The black blocks illustrate the simulated flat rate tax, while the distribution of average tax ratios under the current system is represented by blue blocks. In both cases average tax liability by income class is related to the broadly elaborated tax base: gross income (computed as current taxable income plus all applied deductions to be eliminated under a flat tax).



source: See table 2 for the specification of current taxable income and the current deductions (to be eliminated in the simulated broad base flat rate tax); aggregated data are taken from the Treasury (1997); data to distribute these items to income classes are taken from Dutch Personal Income Distribution 1997 (Statistics Netherlands, 2000); and own calculations.¹⁵

Changes in tax liabilities caused by the flat tax can also be illustrated as percentage of after-tax income before the tax reform. Figure 4 presents the income effects of the flat tax.



several sources: See below figure 3.

Very low income earners are the winners.¹⁶ The income effects around the minimum wage income level (EUR 10,435 after tax for a sole earner) are negligible. A broad range of middle income earners are the losers: after-tax incomes decline 1.4% to 2.6% on average for the income classes between EUR 11,345 and EUR 38,570. These losses for middle income groups could be problematic from a political point of view, but the magnitude of the losses is limited in view of the radical reform. Very high income earners win. The positive income effect around EUR 38,570 after-tax income is estimated to be 5.1%.

Surprisingly, for the vast majority of the taxpayers, effects on after-tax income are within a range of approximately 5%. The range of approximately 5% for income effects was also used as a reference by two committees making proposals on earlier Netherlands tax reforms, and were considered “acceptable”. The dramatic “reform” would not involve dramatic changes in after-tax income. It appears that for most taxpayers the loss of deductions is more or less compensated by the lower rate (see above).¹⁷

Although eight decile groups lose out and only two decile groups win, the tax reform is revenue neutral (ex ante). The explanation is rather straightforward: very high income groups contribute heavily to the income tax. The share of the upper 10 % in

total tax revenue amounted to 37% in 1998. This would decline substantially to 34 % under the flat rate tax.

At this point we should, however, stress that we derived averages by income class. The effect on after-tax income for individuals will undoubtedly show variations around these averages. Unfortunately, we are not able to show this diversity because regulations on privacy do not allow Statistics Netherlands to deliver more detailed data on deductions. When individual taxpayers make relatively more (or less) use of deductions compared to the average of an income class, income effects will be less negative or more positive, respectively.

The income effects also vary by socio-economic group. Main losers are those over 64 (-11.7%), because senior citizens are no longer taxed at a lower rate. The income effects for working people are, on average, small. Civil servants (-2.2%) will face a modest loss. On the other hand employees in the private sector will face a modest gain (+1.3%). Civil servants lose compared to employees, due to their higher deductions for pension contributions. The negative effect of losing deductions on after-tax income seems – on average - to be of greater value for civil servants compared to the lower tax rate. For the self-employed both effects approximately set each other off (-0.7%). Apparent winners are those receiving unemployment (+3.7%), early retirement (+7.2%) or disability benefits (+4.3%). Their average use of deductions is relatively low (there are other reasons as well).

Table 3 summarizes the effects by socio-economic group.

Table 3
Effect of Flat Rate Tax: Averages Social Groups 1998

individuals with pre-tax income x 1.000	level		percentage change				
	tax ratio actual	tax ratio flat tax	tax base	tax liability	tax share	after- tax income	
self-employed	745	23.8	24.3	47.4	2.0	0.2	-0.7
employees (a)	5.065	24.9	24.1	28.5	-3.0	-1.8	1.3
civil servants	592	24.2	25.4	39.4	5.1	0.5	-2.2
social welfare and unemployed	618	22.2	19.4	9.5	-12.7	-0.4	3.7
disabled	460	24.1	21.2	10.7	-12.1	-0.4	4.3
old-age pensioners	1.872	12.4	21.3	15.5	71.6	4.7	-11.7
early retirees (b)	395	28.4	23.7	8.9	-16.5	-0.8	7.2
part of year income (c)	1.261	20.6	4.0	15.5	-80.4	-1.8	21.4
total / average (d)	11.202	23.2	23.2	26.0	0.0	0.0	0.0

(a) including chief executives of firms (*directeuren NV/BV*).

(b) individuals with early retirement income benefits who are younger than 65 years of age.

(c) including individuals with gross income earned in a less than 52 weeks; bias occurs (very positive income effects), see note 16.

(d) including otherwise.

several sources: See below figure 3.

Finally, we calculated global measures for the degree of tax progression. The computed income elasticity for the current tax system is 1.43 (cross-sectional), while the income elasticity of the flat individual income tax still would be 1.34. Current income tax progression (0.43) is mainly caused by the fixed personal exemptions

(0.34)¹⁸ - which are maintained in the simulated flat rate tax. The overall drop of 0.09 or 6% is relatively modest compared to the change in income elasticity due to the tax reform in 1990 (-17%; see the fourth section). Also the concentration index of taxes indicates a modest decline in progressivity (from 0.53 to 0.51).¹⁹ Table 4 summarizes the minor effects on several global measures of income (tax) inequality.

Table 4
Effect Flat Rate Tax 1998: Global Measures of Inequality

	<i>income</i>	<i>tax base</i>		<i>personal income tax system</i>	
	<i>pre-tax income</i>	<i>actual system</i>	<i>simulated flat rate</i>	<i>actual system with personal exemptions</i>	<i>flat rate tax: with personal exemptions</i>
Robin Hood index	0.30	0.30	0.32	0.39	0.37
Gini index	0.41	0.42	0.44	0.53	0.51
Theil index	0.28	0.29	0.32	0.48	0.45
Atkinson index ($\alpha=0.5$)	0.16	0.17	0.17	0.25	0.26
Income tax elasticity	1.00	1.01	1.08	1.43	1.34
Kakwani index	-	-	-	0.09	0.07

several sources: See below figure 3.

One could argue that discussions of the tax base should be kept separate from discussions of the rate structure. The simplicity gains from a flat rate tax do not result from one single rate; base broadening and the reduction of tax arbitrage (lower rates) are much

more important (see section 2). It is possible to construct a scheme with multiple rates that leaves the distribution of tax burdens by income groups unaffected.²⁰ Moreover, it should be noted that the simulated flat rate individual income tax is revenue neutral (ex-ante). Compared to the Revision of Taxation 2001 there would be some budgetary room – amounting to 1.8 % of GDP (see the fourth section) – to redress major distributional effects of the income tax reform.

The implementation of higher VAT-rates and environmental levies, combined with the reform package (tax reduction), would generate an additional 4.3% in terms of after tax income to make tax payers better off. These increases in value added taxes and environmental tax as legislated will have small regressive redistributional effects.²¹ So, one could e.g. ask for an even lower flat rate or tax credits to be targeted at specific groups. In this context, one could easily realize the same distributional effects as the Income Tax Act 2001 (see Caminada, Goudswaard, and Vording 2000).

Conclusions

Throughout the last couple of decades personal income tax systems of most industrialized countries have been subjected to considerable reform efforts. Although the reform packages vary to a wide extent across countries, the direction of change is roughly similar. Most tax reforms are characterized by base broadening, reduction of tax rates, flattening of the rate structure, and lower tax to GDP-ratios. Implementing a flat rate individual income tax seems to be in line with these reforms, and could be seen as a major, and final, tax reform. Indeed, Dutch Parliament asked the government to investigate the (im)possibilities of a flat rate individual income tax.

In this paper, we simulate a simple broad base/flat rate individual income tax system and we compare the distribution of the current individual income tax including social contributions in the Netherlands to the distribution of the simulated flat rate tax. Using extensive income panel data, we simulated the effects on personal incomes of an elimination of almost all deductions in exchange for a reduction in tax rates, sufficient to keep personal income tax revenue constant at the initial level and distribution of pre-tax incomes. In the system we constructed, a uniform proportional rate is levied on a very broad personal income base, where only fixed personal

exemptions are deductible from pre-tax income. Our simulations indicate that:

- The redistributive effect of the current rate structure of Dutch tax system is substantially diminished by deductions. Deductions appear to be income-elastic: the deduction ratio grows sharply with gross income.
- After the simulated base broadening, a proportional rate of 27.7% balances the budget (*ex ante*). Such a flat rate causes only relatively small changes in the distribution of average tax ratios. For the majority of the taxpayers, the effect on after-tax income lie within a range of approximately 5%.
- Liability progression is mainly caused by the fixed personal exemption, which was maintained in the simulated flat rate tax. We calculated an income elasticity of 1.43 for the current tax system, while the income elasticity of the simulated flat personal income tax still would be 1.34 (-6%). Also the concentration index of taxes indicates a modest decline in tax progressivity (from 0.53 to 0.51; -4%).

We should, however, mention some limitations of the analysis:

- The tax base we constructed is simply derived by drastic broadening of the tax base of the current system. It does not have any theoretical foundation.
- The elimination of large deductions will probably have serious economic consequences associated with behavioral responses, for instance with regard to savings.
- Some deductions (tax expenditures) could be replaced by direct expenditures at higher administrative cost, for example in case of the deduction for exceptional medical cost.
- A drastic reform such as envisaged would involve a rather long transition period, partly because of timing and capitalization problems.

In addition to these limitations, one could argue that discussions of the tax base should be kept separate from discussions

of the rate structure. A comprehensive tax base does not imply that a flat rate should be chosen. This is of course true, but we merged these issues just to show that a radical tax reform does not necessarily entail large distributional effects, not even when a flat rate is introduced.

We conclude that the income effects of the broad base/flat rate individual income tax would be relatively small given the scope of the operation. From a distributional point of view, the idea of a flat tax can be taken seriously in (further) debates on tax reform.

Authors' note

Extended data from the 1997 income panel survey (Personal Income Distribution 1997) have been made available by Statistics Netherlands, and are used with permission. An earlier version of this paper has been presented at the Seminar "Taxreform 2001: Politics and Science in debate", December 10th, 1999 Rotterdam). In an earlier stage of our research project we have benefited from discussions with, and helpful comments from Wouter Bos, Sybren Cnossen, Casper van Ewijk, Flip De Kam, Satya Poddar, Peter B. Sørensen, Henk Vording, and participants at the 53rd Congress of the International Institute of Public Finance, August 25-28th 1997, Kyoto, Japan. We thank two anonymous referees for valuable comments on an earlier draft of this paper. The views expressed as well as any remaining shortcomings are, of course, our own responsibility.

Notes

1. See e.g. The Economist January 13th, 1996 and <http://www.house.gov/jec/tax.htm>. Earlier proposals for the USA can be found in Hall and Rabushka (1985), Feld (1995), Atkinson (1995). See also European proposals from Frederiksen (1994 and 1996) and Ruiz-Huerta et al (1996).
2. See e.g. Atkinson (1995) and Frederiksen (1994 and 1996) for behavioral effects, such as changes in labor supply.
3. That is, costs of private households (filing tax return), cost of business (withholding), and cost of the Treasury (administration). See Allers (1994).

4. Further details can be found in Cnossen (1995, p. 299).
5. Distributed profits are taxed highest (69%) as a result of the so-called 'classical' double tax, while the effective tax rate of capital gains will be -52% in case the investment is financed by foreign capital.
6. See proposals by the Joint Economic Committee <http://www.house.gov/jec/tax.htm>.
7. See Kiefer (1984), Formby, Smith and Thistle (1990), Silber (1994), Caminada (1996), Bishop *et al* (1997, pp. 179-182), and Decoster and Van Camp (2001) for details.
8. See Annex A for details; to be found at <http://ruljis.leidenuniv.nl/group/jfof/www/caminada1.htm>.
9. Kakwani (1977) generalized the concept of the Lorenz curve to study relationships among the distribution of different economic variables, e.g. the concentration index of taxes or the Gini index of taxes (C). In this paper, we employ the formula for C , whereby C equals half the mean difference between tax liability pairs divided by the mean tax liability of N individual incomes (*cf.* Lambert, 1993, p. 44).
10. Global income tax elasticity is defined as the aggregate weighted average of all individual income elasticity's (weighted by their share in total tax liability). The aggregation method employed in securing a global estimate is a useful tool in our analysis because an attractive formula for liability progression can be used to identify relevant determinants. See Caminada and Goudswaard (1996) for details.
11. A broad and comparable income concept - gross income - is defined as a proxy for a non-eroded tax base. Gross income is used as scale-variable for tax ratios and deduction ratios.
12. The personal exemption of 1998 is applied (in Dfl 1997), because this basic allowance increased in real terms. We assume the distribution of taxpayers by tariffgroups fixed. Secondly, we assume no significant alteration in the distributions of taxable income, after-tax income, deductions, and average tax ratios. This implies an equiproportionate

growth of all incomes (for 1997-1998). Such 'an equiproportionate growth' is an usual assumption in analyses of global progressivity, because the income distribution will not change by such an income growth (cf. Lambert, 1993). We do not expect bias in our results due to these assumptions, because global tax progressivity is rather low in the Netherlands (Caminada, 1996). Accordingly, it seems unlikely that the neglected change in tax progressivity 1997-1998 significantly affects the results.

13. See Annex B for details; to be found at <http://ruljis.leidenuniv.nl/group/jfof/www/caminada1.htm>.
14. Income is defined as the amount an individual can consume in an given period of time without any reduction in wealth.
15. See Annex B for details; to be found at <http://ruljis.leidenuniv.nl/group/jfof/www/caminada1.htm>.
16. Bias occurs (very positive effects) for income classes with a relatively high frequency of individuals with only part of the year income (low income earners). In practice, the personal exemption is partly deducted from pre-tax income by withholding the wage tax, i.e. concurrent to period of working. When personal exemptions are not fully used (tax liability is higher than duty), individual taxpayers generally will ask restitution. In that case the restitution will take place in the next fiscal year. However, in our analysis of the flat tax, we simulate the full personal exemptions (whole year).
17. One could argue that the personal exemptions should be eliminated as well in order to create further simplicity in the tax system. We did an additional simulation to show the effects. As a result of the additional base broadening, a rate of 22.4% would balance the budget (ex ante). However, the effects on after-tax income would be substantial and would exceed the range of approximately 5% for the majority of taxpayers. The main losers are very low income earners, while very high income earners would gain the most (even more compared to the Bentham variant of the flat tax).

18. As in many other OECD countries. Following Owens (1997, p. 11): 'Most of the progressivity of the income tax derives from the fact that the first slice of income is free of tax'.
19. Kakwani (1977, p. 723) showed how a change in the tax schedule, holding pre-tax income distribution fixed, affects the redistributive effect of taxation: 'If there are two tax functions yielding the same average tax rate, the tax function with the uniformly higher tax elasticity will give the post-tax income distribution more equal than the tax function with lower tax elasticity'. This theorem can *not* be applied for the different socio-economic groups, although the flat tax reform is revenue neutral as a whole.
20. All distributional effects of the income tax reform can be redressed. However, as can be seen from figure 4, this does not result in a progressive rate structure. Due to the flat tax, middle income groups lose more than the lowest income group. So, a regressive rate structure would redress such income losses; at the upper end of the income distribution a progressive rate structure could redress large positive income effects. An income-equalizing multiple rate structure generates an awkward rate structure with 8 brackets and 9 rates (resp. 29.6; 23.0; 25.2; 26.5; 28.2; 25.4; 25.2; 29.1; and a top rate of 34.9 percent).
21. Forecast by CPB Netherlands Bureau for Economic Policy Analysis (1999).

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