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## **Housing subsidisation in the Netherlands:**

Measuring its distortionary and distributional effects

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The responsibility for the contents of this CPB Discussion Paper remains with the author(s)

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## **Abstract**

This paper measures the distortionary and distributional effects of housing subsidies. The results are discussed in the light of the main justifications for subsidising housing, i.e. the merit-good argument, external effects and the distribution motive. Our measurements reveal some patterns of subsidisation that seem difficult to justify on these grounds. This applies especially to the differences between subsidisation of rental and owner-occupied housing, the differences between mortgage- and equity-financed ownership and the increase of relative subsidisation above a certain income level.

JEL-codes: D61, D63

Keywords: housing subsidisation, price distortions, distributional effects



## 1 Introduction

This paper measures and analyses the subsidies on rental and owner-occupied housing in the Netherlands. It also explores the effects on the resident's cost and those on the income distribution. We will measure three effects that the subsidies have on the costs of housing: the effect on the relative price between rental- and owner-occupied housing, on the difference between mortgage- and equity-financed ownership and on the price reduction of housing relative to other goods and services. Another effect that we will explore is the impact of the subsidies on the income distribution. These effects are discussed in the light of policy goals, which include the stimulation of housing quality and the protection of purchasing power of lower income groups.

Housing is subsidised in various ways. In the owner-occupied sector it takes place through the tax system which reduces the owner's costs of housing relative to other kinds of investment. Rental housing is subsidised by allowances that decrease with household income and increase with the rent level. In addition, rental housing may be subsidised at the supply side. By this we mean that rents may be lower than competitive market levels. Although 'objectsubsidies' have been abolished in the Netherlands since 1995, there could still be a structural element of subsidisation in present rent levels, due to accumulated subsidies of the past, which have not been fully passed on to renters. This has created financial room to set present rents below market levels. Moreover, housing corporations, as well as private landlords, have experienced enormous increases in the value of their housing stock. This adds to the gap between market rents and actual rents, the latter rising smoothly due to rental contracts and regulation. The fluctuations in house prices, however, make it hard to isolate the structural component of this form of subsidisation. Our analysis will also deal with these 'supply-side benefits' to the renter. They will be referred to as rent regulation benefits. We will regard them as 'subsidies' provided by the owner.

Several other studies in the Netherlands have dealt with the subsidisation of housing.<sup>2</sup> This paper comprehensively takes account of many subsidies and taxes in the owner-occupied and rental sector. In this way we compare the attractiveness of both forms of housing. We also extend the analysis to the effects on the income distribution. Because the subsidies on both forms of housing depend strongly on the resident's income, the calculations are performed over a wide range of income levels. However, our measurement will not take account of the subsidy's effects on house prices and other general equilibrium effects that may result from the subsidies. A sensitivity analysis in this paper will indicate that this omission does not affect our main conclusions.

<sup>2</sup> These studies are briefly discussed in section 3.5. That section compares this paper's methodology of measuring subsidies to that in other studies.

The rest of the paper is structured as follows. Section 2 briefly discusses the justification of housing subsidisation and its distortionary and distributional effects. It also discusses aspects of the housing market that are not taken into account in this paper. Section 3 deals with the methodology of measuring the subsidies. It shows how owner-occupied housing is subsidised through the tax system and how the renters' costs of housing are also reduced in various ways. In the renters' case we will define two subsidy concepts. The first definition will be close to the traditional meaning of the term subsidy. It is meant to capture the part of the housing costs that is paid for by the government. The second definition is broader. This definition includes all rent regulation benefits, including those not directly paid by the government. In sections 4 and 5 we will determine the subsidies on both forms of housing by applying the methodology to a large household survey for 1998. Section 4 discusses the government's subsidies under both the old and the new tax system, which was implemented in 2001. The change in the tax system affects the results because the subsidy on owner-occupied housing strongly depends on personal income taxation. Section 5 discusses the broader subsidy concept. In section 6, the outcomes are analysed for their sensitivity to some important underlying assumptions. Section 7 concludes.



## **2 Housing subsidies; brief discussion of its justification and effects**

Subsection 2.1 briefly discusses the justification of housing subsidisation, the various distortions it brings about and its distributional effects. Due to market conditions on the Dutch housing market, our measurements need to be qualified to some extent. This is dealt with in subsections 2.2 and 2.3.

### **2.1 Justification and effects**

#### **The justification for housing subsidies**

Housing subsidies reduce the cost of housing relative to the cost of other goods and services and thereby stimulate housing demand. The subsidies are often justified by the merit-good argument (see SER, 1989). It is based on the paternalistic view that citizens underestimate the importance of decent housing for themselves. In recent years, this argument has been questioned. Moreover, studies of the housing market do not reveal such a significant underestimation of the importance of (good) housing (see Tweede Kamer, 1988, part 5).

Other justifications stem from positive external effects attributed to good housing (SER, 1989 and Rosen, 1984). Good housing is assumed to raise the quality of the environment in which people live and the standard of their neighbourhood. This has a positive influence on health and well-being and contributes to a favourable investment climate. In this way, subsidisation of housing may also reduce the risks of segregation and the formation of slums. However, SER (1989) concludes that it is difficult to establish the effectiveness of the subsidies on the basis of the external effects argument. Only subsidies that are specifically aimed at influencing the location of dwellings are considered effective. These specific subsidies are small and not included in this paper. Rosen (1984) concludes that 'the empirical evidence for the existence of quantitatively significant spillovers is weak'.

A further justification lies in the distribution of income. We will show how the subsidies affect purchasing power over a wide range of income levels. Differences in purchasing power effects imply that subsidisation has a distributional effect. The distributional effects are quite substantial, as we shall see in section 4. In many circumstances, achieving a redistribution of income is not a sound justification for subsidisation as a unearmarked transfer would be a more efficient way of serving this purpose. However, 'neediness' may not always be indicated in the most reliable way by a low income, due to its multitude of aspects and the possibility of fraud in reporting income. Therefore alleviating poverty by working along several lines, among which a housing subsidy, may deliver the most desired outcome.

### **The price distortion on the choice between rental and owner-occupied housing**

The way subsidies are organised in the Netherlands - with a sharp distinction between owner-occupied and rental housing- has important implications for the relative price between these two forms of housing. This distorts the choice between the two forms of housing provision, both having pros and cons.

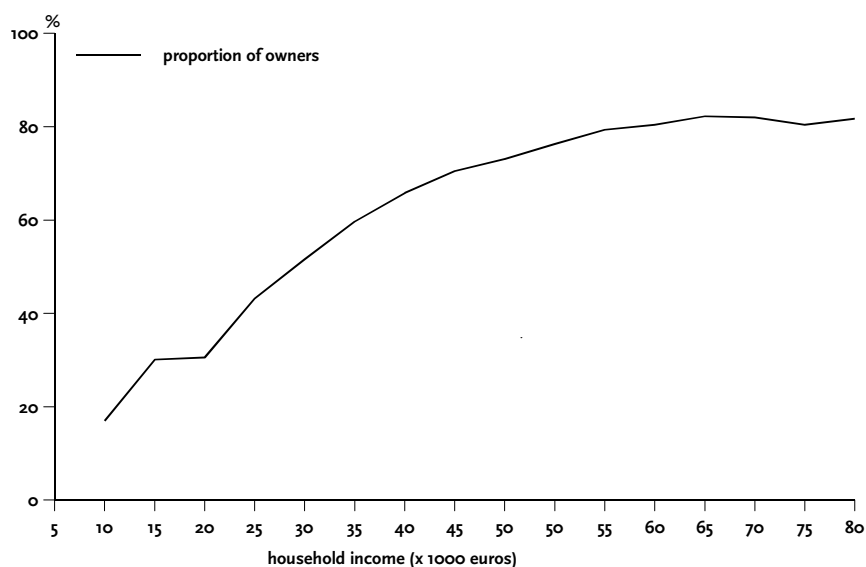
Renting is preferable for those households that expect to move within a short period of time due to the lower transaction costs. Even without taking account of the transfer tax (see hereafter), moving within the owner-occupied sector involves higher costs (on brokers and notaries and other costs of the transaction) than moving between two rental houses. Another advantage of renting is that it is less risky. Rent levels increase in a smooth way. One can avoid the risk of a loss of wealth due a drop in house prices. The same applies to the risk involved in higher financing costs due to a rise of interest rates. For households with low incomes renting can be the only possible form of housing. In these cases, banks may not provide a mortgage because of high agency costs in the form of moral hazard and adverse selection problems.

The other form of housing provision, ownership, internalizes the costs of neglect and inflicting damage. The same applies to the costs and benefits of maintenance, refurbishment and rebuilding. This leads to more efficient decision-making and to living conditions that are more in line with needs and tastes. For some individuals, owning a house may constitute a value of its own.

In a world without distortions between renting and owning, the tenure choice would purely be based on these considerations. However, as we shall see in sections 4 and 5, renting subsidies are typically aimed at the low income groups whereas high-income earners in particular benefit from the subsidisation of ownership. As a result, low income earners are driven into rental housing and high-income earners are driven into ownership. This is the pattern that we find in the Netherlands today. Without the price distortions the market would yield a more efficient allocation given the individual preferences and the relevant cost structures. Figure 2.1 shows that among the households with an income up to 20,000 euros less than 30% owns its residence. This percentage increases for higher income households. It reaches a level of 65% for those households with an income around 40,000 euros and 80% for households with a taxable income of 80,000 euros. Figure 2.1 may even underestimate the relation between income and tenure choice because of lags in housing adjustment. The current overall share of ownership in the Netherlands is 51%. Table 2.1 compares the share of ownership and that of the private and social rental sector to that in other countries.<sup>3</sup> It shows that the Netherlands has a relatively large social rental sector and a relatively small private rental sector.

<sup>3</sup> These data are derived from Boelhouwer (1996).

**Figure 2.1 Relation between income and ownership**



**Table 2.1 Share of forms of tenure in the beginning of the 1990's (in %)**

sector	Owner-occupied sector	Private rental sector	Social rental	other
Netherlands	46	13	40	1
United States	67	32	1	-
Great Britain	68	10	22	-
Denmark	56	19	21	5
Germany	40	40	20	-
France	56	21	17	6
Sweden	43	17	22	18

**The price distortion between mortgage- and equity-financed ownership**

An allocative inefficiency may be introduced by asymmetries in the tax treatment of mortgage debt and financial assets. For many households the tax rate at which the interest on mortgage debt can be deducted is higher than the tax rate levied on income from financial assets. Such differences provide an incentive for households with financial assets to finance their house with a mortgage and not to use their assets. This leads to a purely tax-induced increase of financial liabilities as well as of assets in their portfolio and thereby to a volume of financial intermediation that is larger than its efficient size. This forms a deadweight loss to society.

A second unfavourable effect of the tax-induced change of composition is that it may distort the risk profile of the household's portfolio. This occurs when the risk profile of the (additional) assets differs from that of the mortgage, and is especially relevant for households that choose to invest the additional funds in shares. This 'micro-economic' risk can also have destabilising macro-economic consequences. A fall in asset values would lead to a larger decline in the net wealth of households and may therefore have more severe effects on aggregate spending. An increase in asset values may have a larger upward effect on spending which could contribute to inflation.

#### **Other efficiency effects**

The existence of a transfer tax on transferring a house from one owner to another (see section 3), involves a distortion of moving behaviour and thereby on labour mobility (see Oswald, 1999). Barriers to moving may also yield inefficiently high commuting volumes and contribute to road congestion. These effects, however, are not further explored in this paper.

#### **Horizontal equity**

Differences in subsidisation that are not justified on any ground can be characterised as discriminatory. This seems to apply to the difference between mortgage- and equity-financed ownership and perhaps also to the difference in subsidies between renting and owning. Such a difference affects horizontal equity.

## **2.2 Qualification: the effects of inelastic supply conditions**

The measure for subsidisation that is developed in section 3 is conceived as the resident's cost reduction relative to total housing costs, where total housing costs depend on the current level of house prices, among other factors. This measure does not take account of the fact that house prices depend on the subsidies. Inelastic supply conditions on the housing market conditions in the Netherlands account for this. This is primarily due to restrictive government spatial policies which limit the supply of land allocated to housing.<sup>4</sup> The effect of inelasticity on house prices could be significant.<sup>5</sup> Therefore, we will perform a sensitivity analysis that intends to correct for this subsidy-eroding effect. This sensitivity analysis also serves to explore the effect of a possible temporary component ('bubble') in present house prices. The recent surge in house prices, however, is largely due to a growing demand for land on which residential building is allowed.

<sup>4</sup> See CPB (1999a and 1999b).

<sup>5</sup> The more inelastic supply is, the larger this effect on house prices. Relevant is also the market valuation of future subsidisation. The more one trusts housing subsidisation to be permanent, the more one is willing to take it into account when bidding for the house.

Causes for the increased demand are demographic trends, high economic growth and a less restrictive provision of mortgages by banks.<sup>6</sup> The subsidy has functioned as a magnifying instrument.

The inelastic supply of housing in the Netherlands entails that subsidisation has only a limited effect on promoting housing quality. Its main effect may be that it raises house prices and thereby results in a substantial redistribution of wealth between generations. Reducing or abolishing the subsidy would lead to lower house prices and benefit starters on the housing market at the expense of present owners. It would (partly) undo the intergenerational redistribution that took place as a result of the recent explosion of house prices.

## 2.3 Other Qualifications

### **The effect of rent controls**

In a large part of the rental sector rents are set below their market level. This is due to the existence of rent regulations and the social task of housing corporations.<sup>7</sup> Our 'broad' definition of rental subsidisation (see section 3.3) includes this benefit to the renter. These low rents may lead, however, to a limited supply of rental housing entailing that only the 'insiders' (the present renters) benefit from it. The subsidy should therefore not be interpreted as a price reduction from which 'outsiders' can benefit as well. Indeed, if the supply of rental housing is to some extent elastic, outsiders may even have a disadvantage from the rent controls because they limit supply in this section of the housing market. As a result, some regions show long waiting lists for rental housing.

### **Risk associated with different assets**

One of the main topics addressed in this paper is the effect of the tax system on the cost of owner-occupied housing. In order to do this, it is necessary to include the opportunity costs of the equity invested in the house (see section 3.2) and, therefore, to take account of the differences between the taxation of residential property and the taxation of alternative assets. These alternatives may be associated with different risks. Shares for example commonly yield a higher risk premium than bonds. However, our methodology assumes that shares and bonds yield an equal before tax return (4% in real terms). Our calculations will thus ignore potential differences in risk premiums. This enables us to focus on the effect of tax subsidisation.

<sup>6</sup> See DNB (2000).

<sup>7</sup> Rent regulation mainly takes place in two forms. First, the government restricts the annual rent increase to a maximum and second, a renter can legally request a rent reduction if his rent exceeds a certain level specified by the House Rating System (in Dutch: Woning Waardering Stelsel, WWS). See Staatsblad (1999).

For similar reasons we abstract from the risk differentials between owning and renting a house. Renting is considered a much safer option than owning, in the short run in particular. We also refrain from assigning a money value to this risk difference.

### 3 The methodology of measuring subsidies

In section 3.1 we will first define the total costs of housing. If there were no subsidies these costs would coincide with the costs observed by the resident. Then we will turn to how the occupier's costs are reduced in several ways. Section 3.2 deals with the methodology of measuring the subsidy on owner-occupied housing. This will be defined as the difference between total costs and the costs borne by the resident. Section 3.3 does the same for the subsidy on rental housing. Section 3.4 discusses the measures that we will apply to express the price distortions and the effects on the income distribution. Section 3.5 compares our methodology with that of other studies.

This paper applies a broad and a narrow concept of subsidisation. The narrow concept includes only those elements that affect the government budget. It includes the ways in which the government, either by an expenditure or through the tax system, reduces the occupier's cost of housing relative to the total costs of housing. This includes the favourable tax treatment of housing relative to other (alternative) investments.

However, the narrow concept is not the correct indicator for the distortion of incentives for the occupier's allocative decisions. For this purpose we introduce a broader concept. This concept includes all elements that reduce the occupiers cost of housing and is defined as the part of the costs of housing that is not borne by the occupier. It also includes benefits to the occupier that do not have a budgetary consequences for the government. The meaning of the two concepts will be explained in more detail hereafter.

#### 3.1 The total costs of housing

We will define housing costs on an annual basis and express them as a ratio to the value of the house. Algebraically, the total annual costs in real terms ( $c_{tot}$ ) as a percentage of the house price are defined as follows:

$$c_{tot} = a + mnt + d + i - p \quad (1)$$

The first term of the right hand side ( $a$ ) represents administrative costs. The second term ( $mnt$ ) represents maintenance costs. The third term ( $d$ ) denotes the average depreciation rate over a long period of time. We ignore short term price fluctuations as our aim is to measure the structural subsidisation of housing.

The fourth term ( $i$ ) is the nominal interest rate. Finally,  $p$  adjusts for inflation.<sup>8</sup> In this equation ( $i - p$ ) stands for the real cost of capital. In case of a mortgage-financed investment it represents the cost of the interest payment on the debt. If the investment is financed by equity it represents the cost involved with the foregone yield on an alternative investment. The cost of capital is defined in real terms in order to adjust for the loss of real value due to inflation. Expression (1) applies to both owner-occupied housing and rental housing. Appendix 1 will elaborate on which numbers were used for these cost components.

### 3.2 The methodology of measuring the subsidy on owner-occupied housing

Owner-occupied housing is subsidised through the tax system. Sections 4 and 5 will show that the tax system pushes the costs of owner-occupied housing below the total cost and thereby creates a subsidy. This section will focus on the methodology of measuring the subsidy. This will be done both for the old tax system, which we will measure for 2000, and for the new tax system, that has been in effect since the tax reform of 2001.

#### The subsidy under the old tax system

The costs of owner-occupied housing are affected by the tax system in several ways. Nominal interest payments on mortgage debts are fully deductible from the personal income tax. The marginal tax rate, denoted by  $m_r$ , ranges from 36.4% to 60%. An imputed rent on owner-occupied housing is subject to income tax at the same tax rate. This imputed rent, which we denote by  $hwf$ , equals 1.25% of the value of the property. In general, this is much lower than the rate of return on alternative investments. Furthermore, owner-occupied dwellings are treated favourably under wealth taxation because the tax rate (of 0.7%) applies to only 60% of the value.<sup>9</sup> In contrast, other (read: alternative) assets are taxed at full market value. Moreover, mortgage debt is fully deductible from a household's wealth. Wealth taxation features a tax exemption (of 88,000 euros for singles and 110,000 euros for married couples). We correct the cost reducing effect of the wealth tax rate for the proportion of households that is not affected by wealth taxation. This net effect is denoted by  $w_{ef}$ .

However, owner-occupiers do face a local property tax, which is denoted by  $t_p$ . This tax, which depends on the local jurisdiction, averages around 0.3% of the value of the property. For

<sup>8</sup> In the literature it is more common for  $p$  to denote the increase of house prices. Our approach however, differs from this by defining financing costs and 'house-related' costs in real terms. This provides a better insight in their (relative) significance. This approach entails also that  $d$  is defined differently. Whereas commonly a 'technical' depreciation rate is used, our definition deducts from this the real appreciation of house prices. Both differences in definition cancel out. The value of total costs ( $C_{tot}$ ) is thus not affected.

<sup>9</sup> This represents the value in occupied state.



the three taxes that are based on the value of the house (the imputed rent, the wealth tax and the local property tax), the estimated market price applies to 1995, which is lower than its current level. This latter effect is captured by multiplying these tax rates by a factor denoted by  $p_d$ . Another tax is levied on the transfer of ownership of real estate. This tax equals 6% of the transfer sum. We will assume an average moving behaviour (once every 15 years). The corresponding effective tax rate will be denoted by  $tt_{ef}$ .<sup>10</sup> In the Netherlands, capital gains on housing go untaxed.

We will ignore the value-added tax (of 17.5% in the old tax system and 19% in the new tax system) that is due when the first owner buys a house from the building company. We do this because it does not affect the measured subsidy relative to rental housing as the same tax is due when house-letting companies such as housing corporations buy the house from the construction company. For the same reason, the value-added tax does not distort the price of housing relative to other goods and services that are taxed at this rate.

Taking account of taxation, the (real) costs to the owner-occupier of mortgage-financed housing, as a percentage of the house price ( $c_o$ ), become:

$$c_o = a + mnt + d + m_r p_d hwf + 0.6 p_d w_{ef} + p_d t_p + tt_{ef} + i (1 - m) - w_{ef} - p \quad (2)$$

The first three terms in the right-hand side of equation (2) coincide with those in (1). These costs are not subsidised. The next four terms are taxes on houses. The fourth term stands for the additional personal income tax liability due to the imputed rent. The fifth term stands for the personal wealth tax on the value of the house. The sixth term ( $p_d t_p$ ) denotes the local property tax and the seventh term ( $tt_{ef}$ ) indicates the average tax on house transfers. The last three terms represent the (real) financing costs. In the case of a mortgage-financed unit of investment, the  $m$  in the eighth term  $m$  stands for the tax rate at which the interest payments on the mortgage can be deducted. In the Netherlands,  $m$  equals  $m_r$ . The ninth term accounts for the full deductibility of mortgage debt with respect to personal wealth taxation and the final term adjusts for the loss of the real value of the mortgage due to inflation.

If the investment is financed by equity, the last three terms stand for the opportunity costs. In this case, the eighth term is the foregone after-tax nominal yield, whereas the ninth and final term account for the avoided wealth tax and the loss of real value due to inflation respectively.  $m$  in the eighth term may take different values. We distinguish three forms of investing in debt claims. In these three forms, households generally face an income tax rate ( $m$ ) on the alternative investment that is lower than  $m_r$ . Some households would choose to invest directly in debt claims. We will refer to this form as the traditional way of saving. These households have an

<sup>10</sup> Appendix 2 provides a detailed description and explanation of all tax parameters.

alternative tax rate  $m$  that is lower than  $m_r$  because, on average, a part of their alternative interest income will fall within their tax exemption.

Other households, especially those with high incomes would face high tax rates on the traditional form of saving. Therefore, they tend to invest in relatively tax-sheltered ways. Their alternative tax rate  $m$  is lower than the one observed for the traditional household. One group of non-traditional investors has its interest income accrue in capital growth funds, in which they own shares. These funds in fact transform interest income into capital gains, which are not taxed at the personal level. However, capital growth funds are subject to the corporate tax rate. Therefore, the households that invest in this innovative form, reduce their effective income tax rate from the personal tax rate to the corporate tax rate, which is 35%. The third form of investing in debt claims that we distinguish is the capital insurance. Capital insurances are fully exempt from both income and wealth taxation. This means that  $m$  and  $w_{ef}$  equal zero.<sup>11</sup> This form of saving can be combined with a mortgage (see below).

We will also distinguish a fourth alternative form of investment, namely shares. In this case  $m$  stands for the wedge that is formed by the taxation at the corporate level and at the personal level. This calculation requires the incorporation of the effects of fiscal depreciation rules, which generally reduce the effective rate of corporate taxation. Appendix 2 explains how the value of  $m$  is derived in this case.

Because we intend to measure the *present* cost of housing, the value of equity equals the present market value of the house that is not financed by a mortgage. It is *not* the equity-financed part at the time when the house was bought. A rise in house prices will therefore lead to higher costs to the owner because his alternative yield increases. This definition provides a suitable measure for establishing the incentives for the allocation of investments. The cost concept should be distinguished from actual expenditure. The latter concept ignores the foregone yield on alternative investments.

By subtracting (2) from (1) for the mortgage case, we arrive at equation (3a). This is the annual tax-induced cost reduction to mortgage-financed housing. This can readily be interpreted as a subsidy because it involves a government participation in the cost of housing. The first term captures subsidisation through the personal income tax code. The benefit from deductibility of interest payments ( $m_r, i$ ) is generally much larger than the cost of the imputed income ( $m, p_d, hws$ ). The second term accounts for the net benefits from personal wealth taxation. It arises because houses are valued at only 60% of their (low) 1995 value, while mortgage debt is fully

<sup>11</sup> However, the capital insurance form also has drawbacks. The premium includes the additional payments that are necessary to cover the operating costs of the insurance company and the costs of possibly undesired additional insurances. Furthermore, the capital insurance involves various restrictions with respect to the terms and duration of the contract.

deductible. The subsidy is mitigated by the local property tax and the transfer tax (the last two terms).

$$suo_m = m_r (i - p_d hwf) + (1 - 0.6 p_d) w_{ef} - p_d t_p - tt_{ef} \quad (3a)$$

Equations (3b) results from subtracting (2) from (1) in the case of equity-financed housing. It represents the subsidisation of a unit of equity-financed housing. In the equity-financed cases the subsidy is not as explicit as in the mortgage-financed case. Here, it has the form of a tax differential. This is the extent to which the tax treatment of housing is more favourable than the tax treatment of alternative uses of equity.<sup>12</sup> The first term reveals this tax differential for income taxation. As we shall see in section 4, the  $m_i$  is generally larger than  $m_r p_d hwf$ , implying a subsidy. The second term accounts for the fact that houses are only taxed at 60% of their (low) 1995 value, whereas alternative investments are taxed at full market value.<sup>13</sup>

$$suo_e = (m_i - m_r p_d hwf) + (1 - 0.6 p_d) w_{ef} - p_d t_p - tt_{ef} \quad (3b)$$

#### **The combination of a capital insurance and a mortgage ('spaarhypotheek')**

A common form to finance the purchase of a house involves the combination of a capital insurance and a mortgage. Generally, the insurance payments are set at such a level that, in combination with the returns on capital, they lead to a savings fund that is exactly sufficient to redeem the mortgage. In many cases the construction is designed so that this redemption takes place after a period of thirty years.<sup>14</sup> The total periodic payment consists of the capital insurance premium and the (tax deductible) interest payments on the mortgage. The capital insurance can be an attractive form of saving because the returns on the accumulated premiums are not taxed at all.

Under the old tax system however, engaging in a capital insurance was not restricted to the purchase of a house. The decision to save in this way, and how much, could be taken independently from the future purpose (redeeming the mortgage or otherwise) and be based on its own merits. It was simply one of the possible ways of tax-favoured saving (see above).<sup>15</sup> Therefore, we consider houses financed through this construction fully mortgage-financed.

<sup>12</sup> Both in the mortgage- and equity-financed case, the subsidy originates from the low taxation on housing. This interpretation follows from considering houses as an investment. This approach is in line with SCP (1994).

<sup>13</sup> An exception is capital insurances which are untaxed.

<sup>14</sup> Using the capital insurance to redeem the mortgage, however, is not mandatory. Moreover, tax law also allows for a lower or higher sum than the mortgage with the restriction that it doesn't exceed the ceilings that apply to life insurance payments.

<sup>15</sup> The reason for combining the life insurance and the mortgage is that it generally involves more favourable interest rate conditions.

The tax reform of 2001 has introduced a different treatment of capital insurances. This is explained hereafter.

### **The subsidy in the new tax system**

The most important elements of the new tax system that was implemented in 2001 are the introduction of a schedular approach to the personal income tax and the elimination of the wealth tax. This schedular approach involves the separation of income into three boxes, which are taxed separately.

Box I roughly covers income from labour, pensions and owner-occupied housing. As in the old system the latter item involves the balance of the imputed rent and the interest payments on the mortgage. Deductibility of interest payments is now restricted to a period of 30 years.<sup>16</sup> The imputed rent on owner-occupied housing  $hwf$  is reduced to 0.8% and now applies to the market value of houses in 1999.<sup>17</sup> The sum of these incomes is still taxed at progressive rates. Most of these tax rates are lower than under the old tax system. A recently introduced subsidy for low income earners on the purchase of a house is not included in our calculations.

Box II covers the income of manager and shareholders of corporations. This box will be ignored in the remainder of this paper because it does not affect housing.

Box III covers personal income from capital that does not qualify for boxes I and II. This box consists of income from financial assets. They are taxed at a proportional rate of 30% imposed on a presumptive return of 4%. This effectively corresponds to a wealth tax of 1.2%. Some progressivity is introduced through a tax exemption of 17,000 euros for singles and 34,000 euros for married couples. Adjusted for this tax exemption the average rate of households is somewhat lower than 1.2%. This effective rate is denoted  $t_{ew}$ . As stated above, capital insurances that are not combined with a mortgage were tax exempt under the old system. Under the new system they will be subject to this effective wealth tax. In order to qualify for the tax exemption, the capital insurance must now be combined with a mortgage and be used for its redemption.<sup>18</sup>

The reform involves systematic changes in the tax system, which require an alteration of the expressions for housing costs and subsidies. After the tax reform the annual costs of a unit of housing in the mortgage- and equity-financed cases, denoted as  $cof_m$  and  $cof_e$  respectively, become:<sup>19</sup>

<sup>16</sup> After these 30 years mortgage debt is transferred to box III.

<sup>17</sup> These changes in imputed rent were introduced in 2001 but do not form part of the tax reform.

<sup>18</sup> To qualify for the tax exemption, the capital insurance must satisfy several conditions with respect to the timing of the premium. Moreover, the tax exemption is maximised at 121,500 euros for a single and 243,000 euros for a couple.

<sup>19</sup> We will assume in these calculations that mortgages are fully redeemed within thirty years.

$$cof_m = a + mnt + d + m_i p_d hwf + p_d t_p + tt_{ef} + i(i - m_i) - p \quad (4a)$$

$$cof_e = a + mnt + d + m_i p_d hwf + p_d t_p + tt_{ef} + i - t_{ef} - p \quad (4b)$$

Here  $m_i$  in (4a) denotes the income tax rate in box I. The  $t_{ef}$  in (4b) represents the tax wedge on the alternative investment. It equals  $t_{ew}$  in case the alternative would be a debt claim and  $t_{ew}$  plus the effective corporate tax rate in case of shares. For a mortgage unit that is combined with a capital insurance, the owner's annual cost is derived by adding the tax saving involved in the capital insurance to equation (4a). This tax saving is equal to the avoided tax because the savings accrued under this financial construction are tax exempt.<sup>20</sup> It therefore equals the product of the effective tax rate of box III ( $t_{ew}$ ) and the fraction of accumulated assets per mortgage unit in this financial construction.<sup>21</sup> Denoting this fraction by  $ppacc$ , the owner's annual costs per mortgage unit with attached capital insurance ( $cof_s$ ) become:

$$cof_s = a + mnt + d + m_i p_d hwf + p_d t_p + tt_{ef} + i(i - m_i) - p - t_{ew} ppacc \quad (4c)$$

This results in the following expressions for the subsidies in the mortgage-financed case ( $suof_m$ ), the equity-financed case ( $suof_e$ ) and the case for the combined mortgage/capital insurance ( $suof_s$ ):

$$suof_m = m_i (i - p_d hwf) - p_d t_p - tt_{ef} \quad (5a)$$

$$suof_e = t_{ef} - m_i p_d hwf - p_d t_p - tt_{ef} \quad (5b)$$

$$suof_s = m_i (i - p_d hwf) - p_d t_p - tt_{ef} + t_{ew} ppacc \quad (5c)$$

*How does the new tax system affect subsidisation?*

The tax reform brings about many changes in subsidisation. In the first place it reduces the subsidy on mortgage-financed housing due to the lower tax rates that apply to mortgage interest

<sup>20</sup> We will abstract from the drawbacks of capital insurances and include only the effect of the tax advantage.

<sup>21</sup> A complication is introduced by the transition of the old to the new tax system. Owners with an existing capital insurance might choose not to attach it to the mortgage in the new system in order to avoid the mandatory redemption. Especially owners who are close to redemption may benefit more from the prolonged tax deduction of interest payments than from the avoidance of the effective wealth tax over a limited period of time. This choice may, in the short term, result in a decreased participation in this financial construction. However, as we are aiming at presenting the structural subsidisation we will ignore this temporary influence and use the present weights as our best guess.

payments.  $m_t$  in equation (5a) is lower than the  $m_t$  in equation (3a). However, in the cases that a capital insurance is attached to the mortgage this reduction of subsidy is counteracted by the fact that capital insurances are now only exempt from taxation if they form part of this financial construction. The benefit of this exclusiveness is considered a subsidy. Its effect is captured by the last term of equation (5c).

Secondly, the subsidy on equity-financed housing also changes. If the alternative investment were a debt claim the subsidy would generally decrease, because for most people  $t_{ef}$ , in equation (5b) is lower than  $m$  times  $i$  in equation (3b). This applies to both the traditional and the innovative form. On the other hand, if the alternative is shares the reform will generally involve a higher subsidisation because shares are now more heavily taxed.<sup>22</sup> The same applies to capital insurances that are not attached to mortgages because these now lose their tax-favoured treatment. Thirdly, the abolition of the wealth tax eliminates the favourable treatment of housing under the old wealth taxation. This effect was captured by the second term in equations (3a) and (3b). The abolition reduces the subsidy. Table 3.1 provides an overview of these changes.

**Table 3.1 Comparison of subsidisation in old and new tax system**

old system	new system	increase of subsidy (+)
<b>Forms of mortgages</b>		
mortgage	mortgage-plain	-
mortgage	mortgage+capital insurance	-/+
<b>Forms of equity</b>		
traditional	non-shares	-
innovative	non-shares	-
capital insurance	non-shares	+
shares	shares	+
Abolishment of wealth taxation		-

The tax reform fully changes the role of the capital insurance. In the old system it was an extremely favourable form of investment and therefore was a lucrative alternative to investing equity in a house. It thus reduced the tax-favoured position of equity-financed housing, or its (implicit) subsidisation. In the new tax system it loses this role. Moreover, because it is now restricted to an investment in housing, ownership has become more beneficial. The capital insurance thus *increases* subsidisation of ownership in the new system.

<sup>22</sup> This is explained in detail in Bovenberg and Ter Rele (1998).

### **The weights**

The expressions for subsidisation, which we derived above, apply to pure cases. For many individual owner-occupiers however, the subsidy of their housing will be a weighted average of these pure forms. In the course of time, the individual's fraction of equity will mostly increase because of the rise of house prices and the redemption of mortgages. In the new system, there is also a second shift of weights for owners who engaged in a combined mortgage/capital insurance. The subsidy increases due to the accumulation of tax sheltered assets. Moreover, it has to be noted that the imputed value for the transfer tax ( $tt_{ef}$ ) assumes average moving behaviour.

The weights we employ to establish the weighted averages of subsidisation at the various income levels are based on current aggregates. The weight of the mortgage-financed part of housing is calculated as the share of outstanding mortgage debt in the market value of houses. Its complement is the weight attributed to equity-financed housing. The equity-financed part is further divided into its components. These weights are presented in appendix 2.

### **Average or marginal**

Our methodology measures average subsidies for each household income level. This is relevant for an assessment of the aggregate effects on public finances. It is also the relevant measure for a household's decision between rental and owner-occupied housing because this involves a discrete choice. Choosing between ways to finance one's house, however, is essentially a marginal decision.<sup>23</sup> This decision should be based on marginal rates and hence our measurement do not exactly capture the distortionary effects on the financial side. However, the average subsidy and the subsidy over the marginal euro only differ for the households with a taxable income that is near the top of an income tax bracket.

## **3.3 The methodology of measuring the subsidy on rental housing**

Rental housing in the Netherlands is subsidised in several ways as well. We will successively treat the housing subsidies to renters. In this section we will present them in money terms (i.e. not divided by total housing costs).

<sup>23</sup> The weights discussed in the prior paragraph should actually be based on the marginal impact of a specific way of financing. Such impacts are hard to construct. Therefore we base our weights on the 'shares in total housing investment', although this is conceptually less appropriate.

### Housing allowances

Low-income renters in the Netherlands can apply for housing allowances (in Dutch: Huursubsidie). This subsidy has a wide coverage of nearly 1.0 mln renters (31% of all renters in 1997). Presently, it costs the government around 1.5 bln euros annually. However, some of the households that would qualify do not apply for the subsidy. The rent rebates decrease with taxable household income ( $YT$ ). Up to a maximum the subsidy increases with the rent level ( $RE$ ). Other determining factors include household composition. We will capture such factors by their average effect and thus ignore the further distinctions they bring about. The housing allowances per year ( $SURIR$ ) can be expressed in the following stylized way:

$$SURIR = f(YT, RE) \quad \partial SURIR / \partial YT < 0, \partial SURIR / \partial RE > 0 \quad (6a)$$

$SURIR$  has a minimum of zero and a maximum of about 3500 euros annually.

### The subsidy arising from the equity of housing corporations

In appendix 3 we estimate that the total debt of housing corporations amounts to only 26% of the estimated market value of their housing stock. This implies that housing corporations own an equity of 74% of the market value of the stock. Before going into how the equity affects subsidisation, we shall first discuss the origins of the equity. We can identify three sources:

- 1) Until the end of 1994 the housing corporations benefited from subsidies that were intended to reduce costs for renters. In that year these subsidies (in Dutch: *objectsubsidies*) reached a level of 2.3 bln euros. In 1995 the housing corporations became more independent. The government redeemed its future commitment through the one-off transfer of 16.7 bln euros.<sup>24</sup>
- 2) In the past housing corporations had set rents above their own cost covering level. In other words, they did not pass on all subsidies to the renters.
- 3) The rise of house prices in the past contributed substantially to the present level of equity.<sup>25</sup>

The equity (denoted by  $EQhc$ ) enables the corporations to set rent levels below the total costs, as defined in equation (1). No individual or institution demands a return on the corporations' equity or reaps the benefits from it. The corporations' cost of capital thus consists only of paying interest on their debt. Theoretically therefore, the full (real) cost savings due to the equity, which equals  $(i - p) \cdot EQhc$ , could be passed on to the renters. If not all cost savings are passed on, this may entail additional equity formation, thereby creating room for further cost reductions for future renters. However, it may also result in the inefficient use of resources or unprofitable investments.

<sup>24</sup> This sum was intended to match the present value of the future stream of these subsidies.

<sup>25</sup> Often this is not shown in the official balance sheets of a part of the corporations, which tend to value the assets at historic cost prices.



Whether the full ‘equity room’ is passed on to the renters is not explored in this paper. Here we focus on the rent reduction to present renters. This paper distinguishes two definitions of this form of subsidy: a narrow one and a broad one. The narrow definition, denoted by *SURCON*, only takes account of transfers that involve government expenditures and or tax payments. According to this definition, only benefits derived from the first source of corporations’ equity qualify as a subsidy. The second source of the equity results from the corporations’ behaviour and the third one is a windfall. Because the government is not involved in them, the second and the third source do not qualify as subsidies under the narrow definition.

However, our broad definition of subsidisation, *SURCOB*, does take the second and third sources into account. It is the combined effect of total equity that explains the difference between market rents and actual rents. *SURCOB* thus includes all rent regulation benefits. It measures the difference between (present) net rent revenues (*REhc*) and the total housing costs faced by the corporations:<sup>26</sup>

$$SURCOB = REhc - (a + mnt + d + i - p) \cdot HShc \quad (6b)$$

Here *HShc* is the current market value of the corporations’ housing stock. This means that in order to determine *SURCOB* we need an estimate of the current market prices of rental houses. It is difficult to observe this price because not many rental houses are for sale. Estimates of *HShc* will therefore be subject to a relatively wide margin of error, which will be reflected in estimates of *SURCOB*. The narrow definition is less prone to estimation errors. It can be calculated as the product of the one-off transfer times the real interest rate:

$$SURCON = (i - p) \cdot 16.7 \text{ bln euros} \quad (6c)$$

This narrow definition is a relevant concept because it focusses on transfers controlled by the government. This conforms to the more traditional meaning of the word subsidy. Results of the narrow definition will be discussed in section 4. The broad definition takes account of the full cost reduction. It includes all rent regulation benefits.<sup>27</sup> It measures *all* deviations from total housing costs. It is more appropriate for a comparison between the costs borne by renters and those borne by owner-occupiers. We will discuss this broad measure in section 5.

The existence of equity does not result in an equal relative rent reduction on all the homes of housing corporations. One of the reasons why corporations were founded was to provide

<sup>26</sup> In the Netherlands a part of the local property taxes are levied on the owner of a house. We subtract this tax from the rent revenues to obtain *REhc*, which we call ‘net rent revenues’.

<sup>27</sup> The first source of equity, which is included in both subsidy concepts, also gives rise to rent regulation benefits. However, the other two sources of equity are much more important in this respect.

housing for the poor. Therefore they tend to reduce rents relatively more at the cheaper end of their stock. This paper ignores this form of cross subsidisation because the relevant data are unavailable.

#### **Regulation in the non-corporation sector**

In the non-corporation sector we will also distinguish a narrow and a broad definition. In this sector rent levels are strongly regulated. They are in many cases set by law at a level that is lower than the rent that would be required to cover full costs as expressed in equation (1). The gap between actual and estimated market rent is not included in the narrow definition of a subsidy, *i.e.* the government subsidy, as it does not involve a transfer in any form from the government to the renter.

However, the gap is relevant in order to be able to determine allocative effects, such as the choice between renting and owning. We will therefore, in line with our approach in the corporation sector, include rent regulation benefits in our broad definition of subsidisation. As stated in section 2.3, this applies to the insiders (present renters) in particular, as a limited supply may restrict outsiders to reap the benefit of the broadly defined subsidy.

Though regulations reduce the rents of private housing, this does not mean that private landlords make a loss on rental housing investments. As a result of market forces, houses under rental contracts are commonly sold at substantial discounts. This compensates private investors for the lower rent. However, we derive for rental houses essentially from estimations by Statistics Netherlands. They were explicitly aimed at disclosing the value of rental houses as if they were unoccupied (see Van Leeuwen, 1998 and Blom-Van Son and Van Leeuwen, 1998).

#### **Other subsidies and taxes**

There are some other relatively small subsidies for corporations. However, they will be ignored because they are not permanent. Including them would lead to a mismeasurement of structural subsidisation. Finally, similar to owner-occupied housing, rental housing faces a local property tax ( $T_{LP}$ ), which roughly averages a value of 0.2% of the value of the house.

#### **The total subsidy**

There is also a broad and a narrow definition for the subsidy for total renting subsidisation, which are respectively denoted by  $SURB$  and  $SURN$ . They are defined as:

$$SURB = SURIR + SURCOB - T_{LP} \quad (7a)$$

$$SURN = SURIR + SURCON - T_{LP} \quad (7b)$$

### 3.4 The measures for the distortionary and distributional effects

#### The measure for the price distortion

To express the distortionary effect of the subsidies on prices we will use the ratio of the subsidy to total housing costs. This concept will be used to measure the price distortion between housing and other goods and the price distortion between renting and ownership. The concept demonstrates the magnitude of the cost reduction due to the subsidy and therefore offers the best indication of its distortionary significance on the housing market and between housing and other goods. Apart from these distortions, the budgetary cost of subsidisation may necessitate higher tax rate levels which can have detrimental effects on the functioning of the labour and capital markets.

The subsidies on owner-occupied housing, as defined by equations (3a) and (3b) and (5a) to (5c), will be expressed as shares of total annual housing costs, as defined in equation (1). The expressions for rental housing, as defined by equations (7a) and (7b), are expressed in money terms. Therefore, they must be divided by total annual housing costs in money terms.

Both the subsidy on owner-occupied housing and the subsidy on rental housing depend on the income of the beneficiary. We shall therefore calculate and compare both subsidies over a range of (before-tax) income levels.

We will also determine the average subsidisation of housing per income category. We do this by calculating the weighted average of the subsidy on both forms of housing. The weights that we use are the shares of renters and owner-occupiers in the income classes at issue.

#### The measure for the effect on income distribution

The effect that the subsidies have on purchasing power will be measured as the ratio of the subsidy to net household income.<sup>28</sup> To determine the impact on the income distribution we calculate the effect on purchasing power over a wide range of household income levels. A positive correlation between this overall measure and income indicates that the subsidy raises purchasing power differences in relative terms. A negative correlation indicates the opposite. These calculations will be performed for both rental- and owner-occupied housing. Finally, our aim is also to establish the *overall* effect of housing subsidies on the income distribution, i.e. the weighted average of the subsidies on both forms of housing.

<sup>28</sup> Net household income is corrected for (i.e. does not contain) the subsidy itself.

## 3.5 Comparing the methodology with that of other studies

### Studies for the Netherlands

In comparison to other studies on housing subsidisation in the Netherlands this paper provides a more comprehensive analysis. Jurriëns *et al.* (1992), Rouwendal *et al.* (1994), Conijn (1995), Nahuis and Van Schaaik (1997), Elsinga and Conijn (1998) and Elsinga, *et al.* (2001) measure costs of owner-occupied housing. However, Rouwendal *et al.* and Nahuis and Van Schaaik do not measure costs of rental housing. Moreover, none of the references mentioned measures the effects on purchasing power, which precludes an analysis of distributional consequences.

In addition, this paper takes account of the difference between the tax rate at which mortgage interest payments can be deducted and the tax rate that applies to financial assets. This leads to differences in subsidisation between equity- and mortgage-financed ownership. The other papers do not make this distinction. Finally, this paper includes a measurement of housing subsidisation in the tax reform that was introduced in 2001.

Some of the other papers do, however, present a number of concepts of housing costs that are not included in this paper. Apart from presenting a user cost concept, Elsinga (1995) and Haffner (1999) present the 'actual expenditure on housing'. This latter approach corresponds to a Dutch tradition. This concept deviates from the housing costs by excluding the opportunity costs and increase of the value of the house and by including mortgage redemptions.

### Studies for other countries

In other countries most studies concentrate on particular aspects of housing subsidisation. Hendershott and Shilling (1982), King (1980) and Rosen and Rosen (1980) focus on the tenure choice by comparing the costs of renting and owning a house. The last two of these papers then estimate the effect of observed cost differences on the share of ownership.

Poterba (1984) calculates the cost of owner-occupied housing in order to derive housing demand and hence housing construction. Hills (1991) focuses on the distributional effects of the system of housing subsidies in the United Kingdom.

King (1981) analyses the effects of housing subsidisation in the United Kingdom in a comprehensive way. He assesses the efficiency as well as the distributional consequences of the tax treatment of housing. Rosen (1985) provides an overview of many studies on housing subsidisation.

Berkovec and Fullerton (1992) analyse the housing market in the context of a general equilibrium model. Their approach deviates from that in other studies by endogenizing the household's housing consumption as well as housing investment. Households maximize their utility choosing the optimal portfolio and form of tenure. These calculations are carried out for a wide spectrum of income levels.

The results of these studies on other countries are not presented in a way that enables a comparison with the results for the Netherlands, which we will present in sections 4 and 5.



## 4 Measuring the government subsidies

This section employs the methodology described in the previous section to measure the subsidies according to the narrow definition. As discussed in section 3, our narrow definition concentrates on financial streams influenced by the government. To measure the subsidies we need empirical data. We will describe them in section 4.1. Section 4.2 presents the results for the old tax system and analyses them. The calculations here apply to 2000. Section 4.3 continues with the results for the new tax system, which apply to 2001. Section 4.4 reveals what the subsidisation amounts to in aggregate terms.

### 4.1 The data

Our aim is to compute the measures of subsidisation for different income groups. We therefore need specific information on the characteristics of Dutch households. An important source of information for our research is the Housing Needs Survey (WBO, 1998; in Dutch: WoningbehoefteOnderzoek). This survey is organised once every 4 years. We will use the edition that was held in 1998, which covered more than 60,000 households. They are meant to be representative for all households in the country. On top of WBO (1998) we employ a model called MIMOS (see Wiggers, 1997). This model is used to make forecasts about the development of incomes and purchasing power. MIMOS itself is based on WBO (1998). It incorporates detailed information about income taxation and the latest insights about expected economic growth. However, self-employed persons are excluded from MIMOS. They are therefore not taken into account in our research. Apart from households that are excluded by MIMOS, we exclude households with extremely low or negative incomes. We also exclude households with implausibly cheap housing (a house cheaper than 22,700 euros or a monthly rent below 68 euros). These data may be unreliable. In total, the exclusions eliminate 6.3% of the households.

WBO (1998) contains sufficiently reliable information about the incomes of household members. The rents paid by renters are also recorded quite well. The same applies to the value of the owner-occupied housing stock. Unfortunately, not all the information contained in WBO is reliable. A notorious example of under-reporting is the wealth owned by households. Therefore, we refrain from using WBO (1998) for this kind of information. Instead we use compiled data from Terra-Pillaar and Waaijers (2001). Their results were used to impute information regarding the wealth of the household into MIMOS.

Other necessary information is not recorded in WBO (1998) at all. For instance, the value of the renters' houses is unknown. Nevertheless this information is crucial for our calculations. From other sources we derive an indication of the aggregate value of houses in the rental sector. However, we do not have reliable information about the individual houses. Therefore, we have

to use a proxy to obtain the individual value of a rental house. The best indicator within WBO (1998) for the value of the house is the rent paid. This is rather problematic because the rent reduction is the difference between the market-based rent and the rent actually paid. Because the largest part of the market based rent depends on the value of the house, we implicitly assume that relative rent reductions are the same everywhere. We can differentiate between corporation-owned and privately owned rental houses, because WBO gives specific indications about the average rents paid in these sub-sectors. Appendix 3 shows how the value of the different parts of the housing stock are estimated for the year 2000 and 2001.

## 4.2 Government subsidisation under the old tax system

This subsection discusses the magnitude of government subsidisation in 2000. We cover both the owner-occupied and the rental sector. After that we analyse the components of the owner's subsidies. A decomposition of rental subsidisation will be deferred to section 5.

### **The order of magnitude of government subsidisation in both sectors**

Figures 4.1 and 4.2 display housing subsidies and compare both sectors. Figure 4.1 shows that the government subsidisation for owner occupiers increases with income. Owners earning low incomes receive a modest government subsidy of 10%. This percentage increases to approximately 22% for owner-occupiers that earn 35,000 euros. For the highest incomes the owner's housing costs are subsidised by nearly 25%. In the renters' case we see a different pattern. Low income renters earning 10,000 euros obtain average government subsidies of 21%. This government subsidy decreases sharply with the renter's income. For households with incomes above 15,000 euros, owner-occupied housing is subsidised more by the government. For renters earning 20,000 euros government subsidies are virtually zero. Renters earning more than that are effectively taxed by the government. The average cost reduction by the government in the owner-occupied sector is 21%. In the rental sector this is 7%.

Figure 4.1 also contains a line that represents the average of renters and owners. This line is dominated by low-income renters and by high-income owners. This is because tenure choice is highly correlated with income (see also the box in section 5). Households earning around 20,000 euros are therefore the least government-subsidised income category.



Figure 4.1 Government subsidies: effects on housing costs in 2000

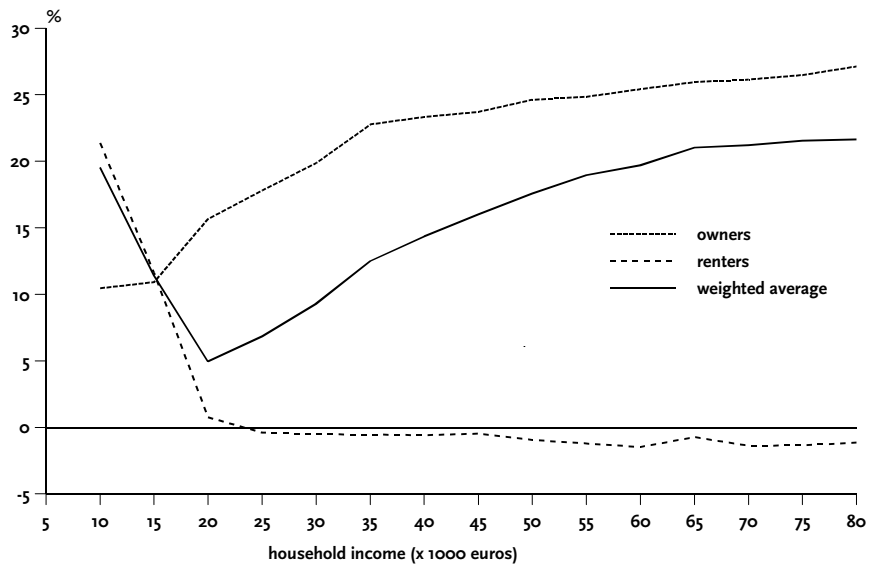
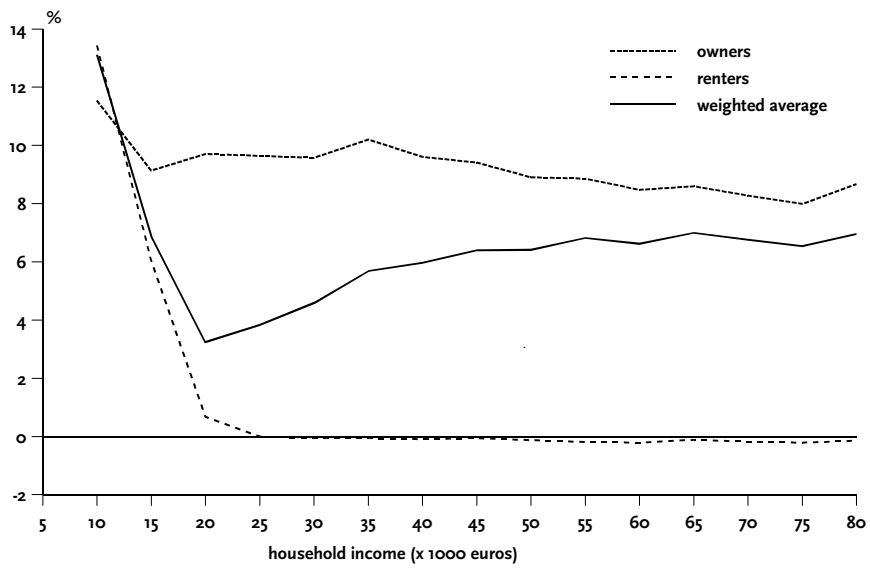


Figure 4.2 Government subsidies: effects on purchasing power in 2000



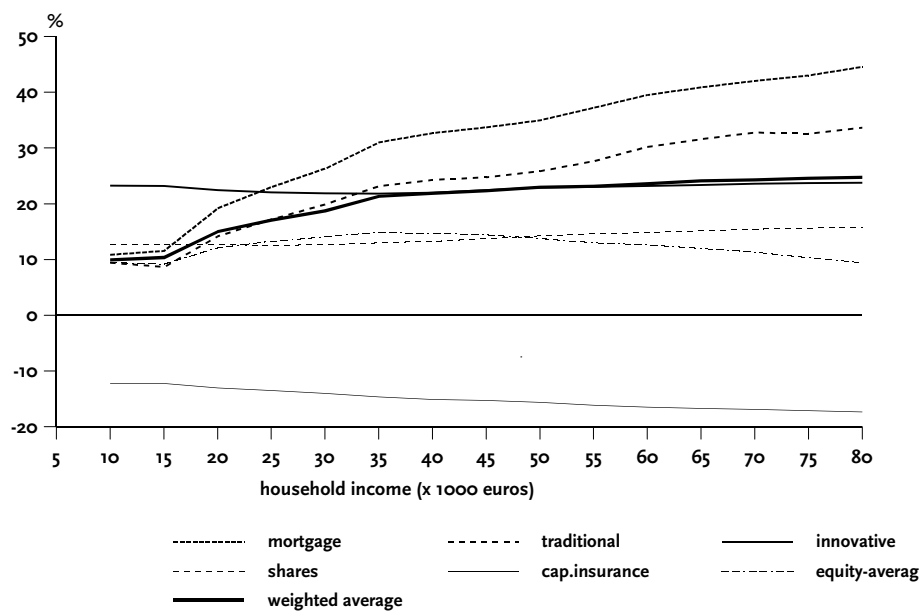
The effects on purchasing power (see figure 4.2) follow a somewhat different pattern. For owner-occupiers it shows a small and relatively gradual decline from around 10% at low-income levels to 8% at high-income levels.<sup>29</sup> The reason for this deviating pattern is that the ratio of house prices to purchasing power declines with income.

On average the purchasing power effects are 9% in the owner-occupied sector and 4% in the rental sector. The weighted average shows that, among low income households, the government subsidies reduce relative differences in purchasing power. However, among higher income households they increase differences.

#### Components of subsidisation in the owner-occupied sector

Owner-occupied housing can be financed in various forms (see section 3.2). Figures 4.1 and 4.2 present the subsidisation of owner-occupied housing as a weighted average of those various possible forms. Figure 4.3 displays the government subsidisation of these various forms separately.

**Figure 4.3 Subsidies to owner-occupied housing for various forms of financing in 2000**



<sup>29</sup> This finding contrasts with Caminada (1999), who concludes that the owner-occupier's benefit increases with income. The main reason for this difference is methodological. Caminada's conclusion is based on the distribution of the benefit in absolute terms whereas our conclusion is based on the distribution of the absolute benefit as a percentage of purchasing power. Moreover, Caminada's definition of the owner-occupier's benefit does not include the implicit subsidy on equity-financed ownership.

It turns out that the differences between the alternatives are large, especially among high income earners. The subsidy on mortgage-financed housing continuously increases with income. This is due to the rising tax rate,  $m$ , in equation (3a), at which interest payments can be deducted.

Figure 4.3 also contains the subsidisation of equity-financed housing, which itself is a weighted average of four different forms of financing. As explained in section 3.2, we view the difference in taxation between housing investment and a household's relevant alternatives as a housing subsidy. High-income earners tend to invest a larger share of their wealth in low-taxed alternatives, such as capital insurances and shares. This explains why the subsidisation of equity-financed housing decreases with income for those households earning more than 35,000 euros. Within equity-financed housing one can also observe large differences. Households that have traditional debt as their alternative are highly subsidised, because the taxation of debt investments is relatively severe. Contrarily, the capital insurance gives rise to a negative subsidy on housing because this alternative is not taxed at all. We find 'innovative investments' and shares in between these two extremes.

**Figure 4.4 Components of the housing cost subsidy to owners in 2000**

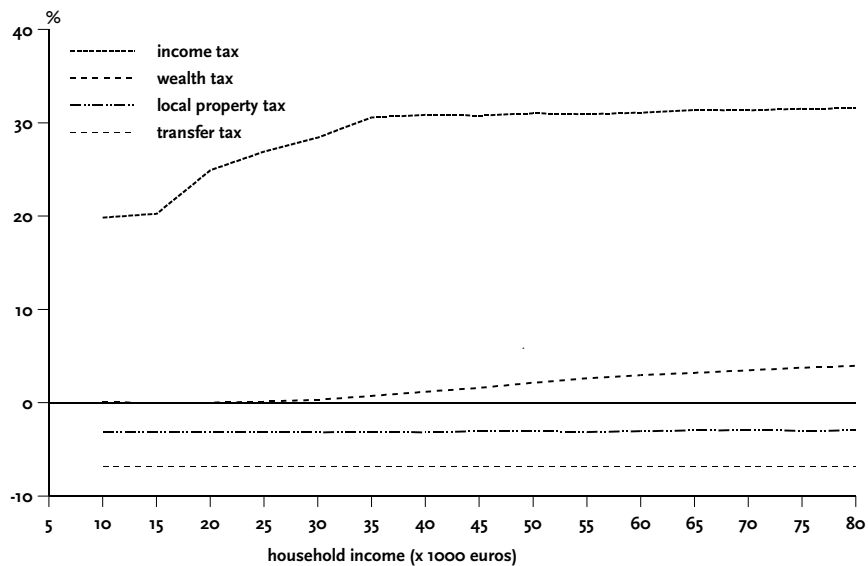


Figure 4.4 shows a breakdown of total subsidisation. It shows that the major part of subsidisation results from the income tax scheme. Wealth taxation contributes modestly. Total subsidisation is reduced by the local property tax and the transfer tax. The latter has a mixed effect on economic incentives. It hampers labour mobility by forming a barrier to moving from one house to another and thereby reduces economic efficiency. On the other hand it might

increase economic efficiency as a neutralizing factor by mitigating the overall subsidisation of owner-occupied housing.

### 4.3 Government subsidisation after the tax reform

In this subsection, we measure subsidisation in 2001. Most changes relative to the year 2000 are due to the tax reform, although the continuing rise of house prices also plays a modest role. Figures 4.5 and 4.6 compare the government subsidisation of renters and owners under the new tax system.

Figure 4.5 shows the government subsidies as a percentage of housing costs. Figure 4.6 gives a similar overview in terms of purchasing power. Both graphs yield a pattern comparable to what we found under the old tax system. The average effect of the rental subsidy in terms of housing costs is 7%, the same as in 2000. The owner's subsidy now becomes approximately 4%-points lower than under the old system. Now, it averages around 17%. The average purchasing power effect for owner-occupied housing decreases slightly to 8%. In the rental sector it remains 4%.

Due to the decline in the renters' subsidy, overall subsidisation decreases sharply for low income levels. There is still an increase with income for higher income households. This can again be attributed to the gradually rising marginal income tax rates. However, the rise in subsidy is less pronounced because the owner's subsidy turns out slightly lower under the new tax system.

Figure 4.5 Government subsidies: effects on housing costs in 2001

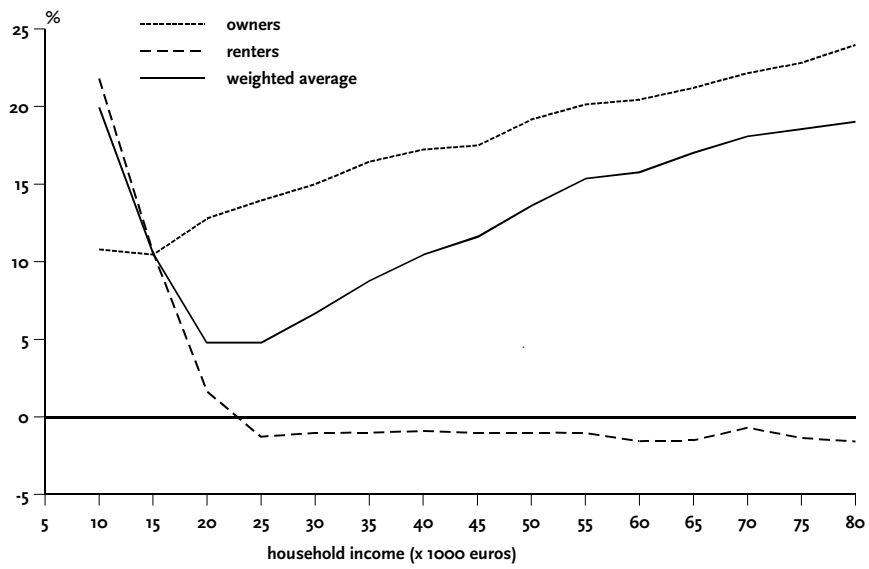


Figure 4.6 Government subsidies: effects on purchasing power in 2001

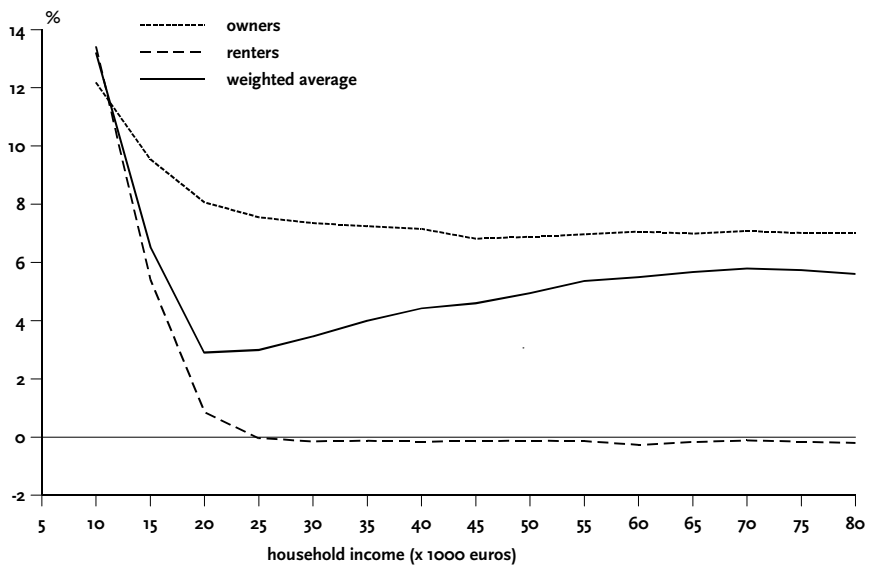
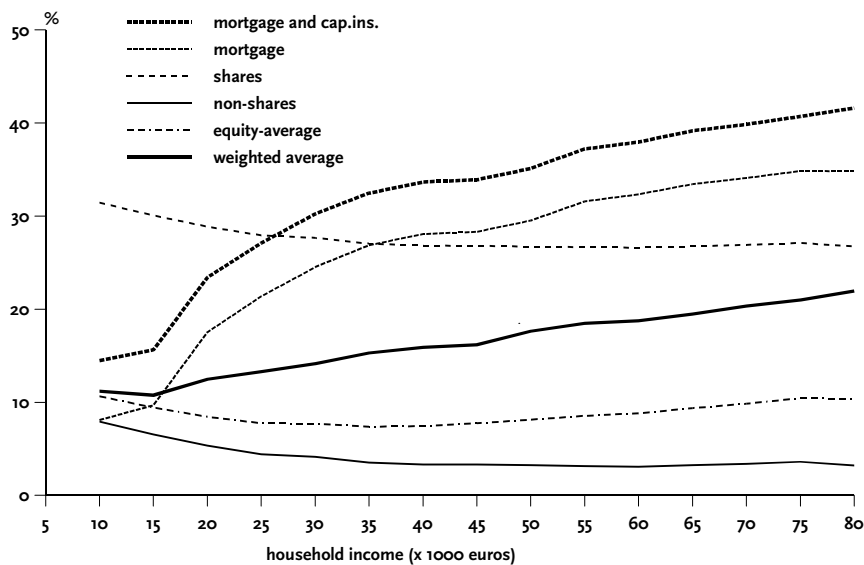


Figure 4.7 displays the differences in subsidisation between the various forms of financing owner-occupied housing. It turns out that mortgage financing is now subsidised less than under the old tax system. This is due to the lower marginal tax rates in box I. However, mortgage financing combined with a capital insurance is now subsidised more than a ‘plain’ mortgage (as explained in section 3.2). This mitigates the effect of the tax rate reduction. Under the new system only two alternative forms of investing are distinguished with respect to taxation: shares and non-shares. Therefore, only these two forms are distinguished here to measure equity-financed subsidisation. In the ‘non-share’ case the subsidy is relatively small now because the alternative is also taxed in a relatively mild way (in box III). As a result, investing in one’s own house, is now taxed slightly lower only. The subsidies on non-shares are thus less subsidised under the new system. The ‘shares’ case shows a increase in subsidy because the personal income tax now gives shares a less favourable treatment. Under the old system the main fiscal burden borne by shareholders was the corporate taxation. The personal income tax only had a small impact. On average, the subsidy of equity-financed housing is relatively constant around 10% across income levels.

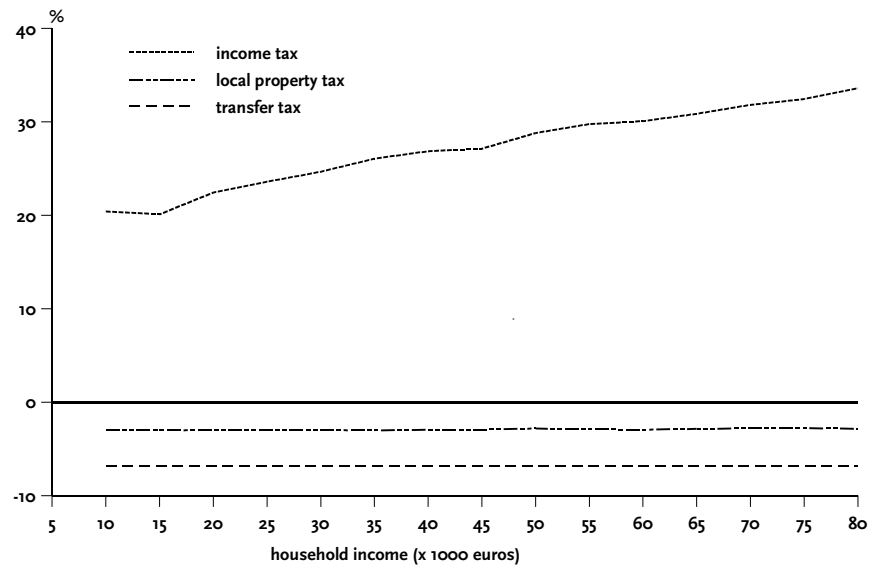
**Figure 4.7 Subsidies to owner-occupied housing for various forms of financing in 2001**



The difference in subsidy between mortgage- and equity-financing roughly remains unchanged and thus also the incentive for households to increase both the asset and the liability side of their portfolio. The detrimental effects of inefficient additional costs of financial intermediaries and the distortion of risk profiles therefore remains present.

Figure 4.8 decomposes the owner's subsidy. The income tax has more impact now, whereas the subsidy through wealth taxation has been abolished. A decomposition of rental subsidisation will be presented in section 5.

Figure 4.8 Components of the housing cost subsidy to owners in 2001







## 5 Including the rent regulation benefits

In this section will discuss measurements of our broad subsidy concept for the rental sector. This subsidy definition takes account of the full cost difference between the total housing costs as defined in equation (1) and the costs borne by the resident. The broad concept extends the narrow definition because the latter does not include all the rent regulation benefits.

The broad definition turns out to be highly dependent on the house price levels. The reason is that (alternative) capital costs, which depend on house prices, are an important component of total housing costs. Contrarily, the costs actually borne by renters are dominated by the rents actually paid, which are much less dependent on fluctuations of house prices. This is because the government restricts rent increases to an annual maximum. The broad subsidy concept is therefore highly correlated with house price rises.

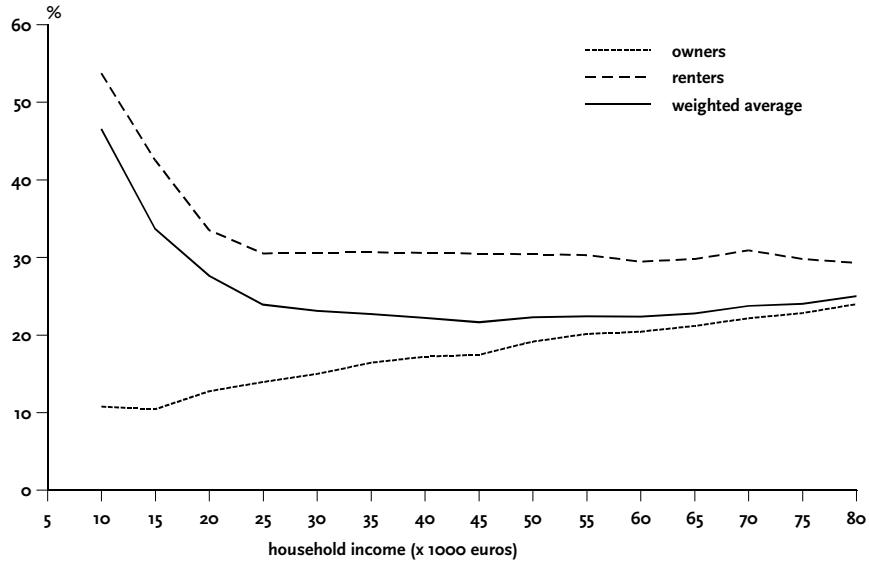
### 5.1 Rent regulation benefits under two price assumptions

The broad subsidy concept will be presented for the new tax system only. This is because the fiscal changes have hardly influenced the magnitude of the broad rental subsidies. House prices, however, do have an important impact on the subsidies. In 1999 and 2000 they increased by 16% and 20% respectively. For 2001 a 9% house price increase is forecast. This means that the accumulated increase over these three years will probably more than 50%. Historically, this is unprecedented. House prices may now be above their structural level. This leads us to present the results for the broadly defined rental subsidy in two variants. A first variant uses currently observed house prices including the forecast for 2001. A second variant is more cautious and assumes 25 % lower house prices. This corresponds to ignoring about 75% of the price rise over the last three years.

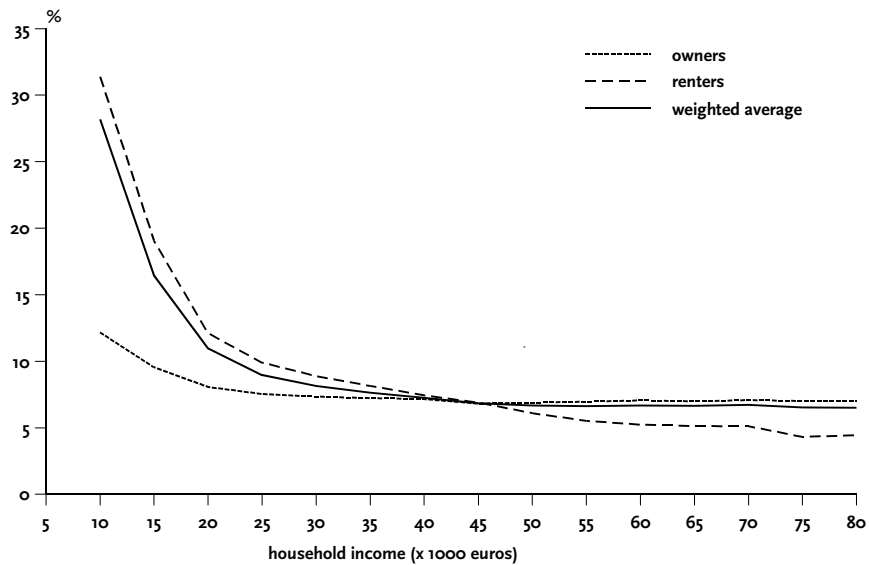
Figure 5.1 shows the price reduction according to the broad definition, taking full account of the recent surge in house prices. This figure also displays the owner-occupiers' subsidy, which was discussed in section 4. The figure makes clear that a significant part of housing costs is not borne by the resident. This applies to both the rental and the owner-occupied sector. The renters' subsidy turns out to decline sharply with income. This is mainly due to the housing allowances, which can be obtained by low income households only. The renters' subsidy according to the broad definition is roughly 50% of total housing costs for the lowest incomes categories. It declines to approximately 31% for households earning around 25,000 euros. Above this income level the decline with income is small. For high-income renters the subsidy mainly

consists of rent regulation benefits, which still account for more than 30% of total housing costs (see also figure 5.5).<sup>30</sup>

**Figure 5.1 Broad subsidies: effects on housing costs in 2001, assuming current house prices**



**Figure 5.2 Broad subsidies: effects on purchasing power in 2001, assuming current house prices**



<sup>30</sup> It has to be noted that there are many insiders among the rich renters who reap rent regulation benefits. They must have had low incomes when they acquired their rental contract. Due to regulation, most outsiders have to resort to the owner-occupied sector.

Owner-occupied subsidisation increases with household income. For incomes around 40,000 euros, the subsidy amounts to approximately 17%. This income level roughly coincides with the average Dutch household's labour income in 2001. The increase with income results from the rising marginal tax rate. On average, the total housing cost reductions in the rental and the owner-occupied sector are 39% and 17% respectively.

At low levels of household income the subsidy is significantly higher for renters than for owners. For higher income levels the difference gradually decreases to around 14%-points at 40,000 euros. The eventual difference is 5%-points for households earning 80,000 euros. The average of renters and owners is roughly 47% for households earning 10,000 euros. For households earning around 25,000 euros it decreases to 24%. It remains around at that level for higher incomes.

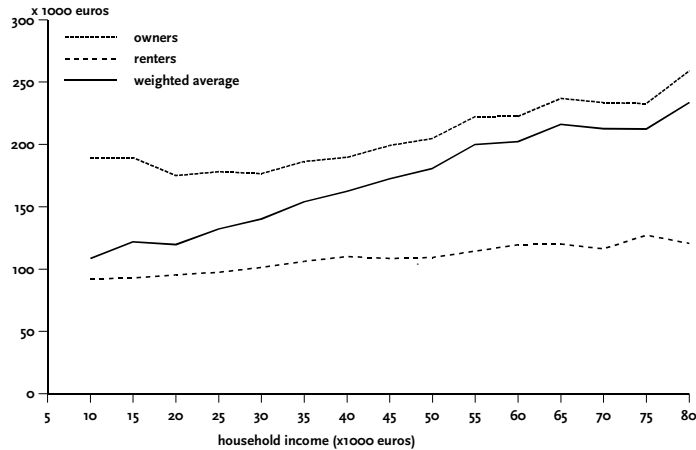
The pattern of subsidisation raises justification issues that were discussed in section 2. A difference in subsidies between the rental sector and the owner-occupied sector may lead to an inefficient tenure choice. It also affects horizontal equity. The rise of subsidisation with income in the owner-occupied sector also seems difficult to justify.

Figure 5.2 displays the effects of the subsidy on the households' purchasing power. For owners there is a small and relatively gradual decline from around 10% at low income levels to 7% at high income levels. The pattern of these effects differs markedly from figure 5.1, because the ratio of house prices to purchasing power declines with income. The purchasing power effect of rental subsidisation also falls with income. It even becomes smaller than the owner-occupiers' effect. The pattern deviates because renters with high incomes live in relatively cheap housing. The box on the next page displays how house prices of owners and renters vary with income. On average, the effects on purchasing power in the rental and owner-occupied sector are 16% and 8% respectively. The overall effect of housing subsidisation on purchasing power decreases with household income, especially for low income households. The broadly defined housing subsidies thus effectively reduce relative differences in purchasing power.

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### Household income and house values

The figure shows the relationship between average before-tax household income and the average value of the house for owners and renters. Within both groups house prices turn out to rise only slightly with household income. Consumption smoothing due to life cycle considerations may be partially responsible for this relation. However, the overall relation with income, which takes account of the increasing share of ownership with income, shows a more pronounced rise.



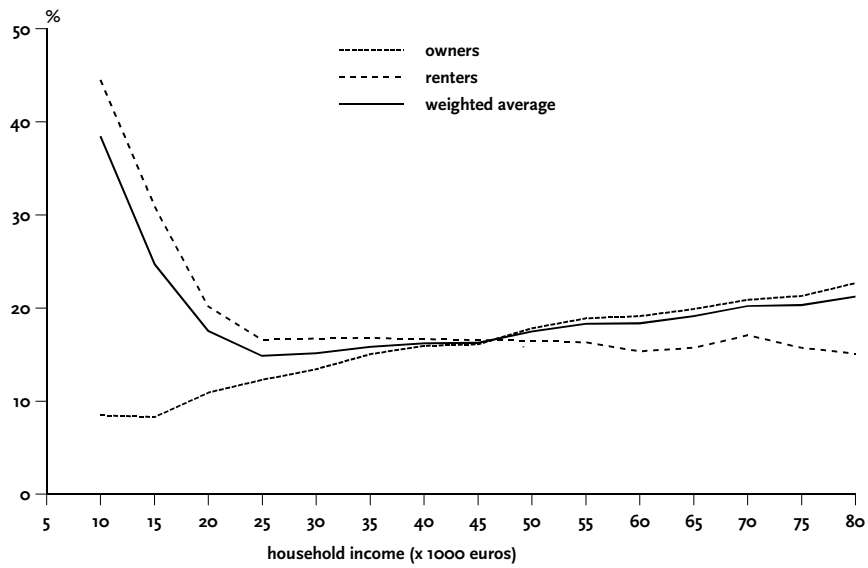
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Figure 5.1. shows that renting a house is presently more favourable than owning it. This finding holds for the whole range of income levels. However, this result needs to be qualified. First, we have assumed that market rents are more or less proportional to the actual rents for all houses. This means that the whole range of incomes benefits equally from the broad subsidy concept. One might object to this that housing corporations tend to subsidise low income households more than high income households.<sup>31</sup> Due to a lack of information in WBO (1998) we cannot test whether and to which extent this hypothesis is valid.

Another major qualification is that current house prices may be above their structural level. As explained earlier this may lead to an overestimation in our broad subsidy concept. To show the potential impact of this effect we now present the measurements for the broad subsidy based on 25% lower house prices.

<sup>31</sup> On the other hand, many formerly poor households, fail to leave their cheap housing once they become richer.

**Figure 5.3 Broad subsidies: effects on housing costs in 2001, assuming 25% lower house prices**



**Figure 5.4 Broad subsidies: effects on purchasing power in 2001, assuming 25% lower house prices**

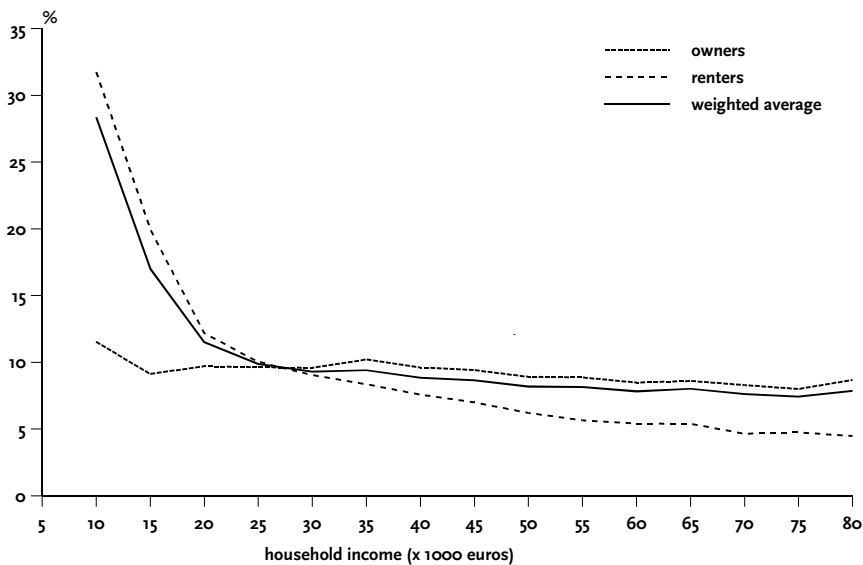


Figure 5.3 reveals that lower house prices do indeed have a large impact on the broadly defined renter's subsidy. The 25% lower house prices reduce the average subsidy by around 13%-points to 26%. The owner's subsidy as a percentage of total housing cost changes only slightly. It decreases from 17% to 16%, because lower house prices hardly affect the subsidy expressed as a percentage of total housing costs. Nevertheless, on average the costs of renting a house remain lower than the costs of owning it.

Lower house prices have a significant impact on tenure choice. Under the assumption of current house prices the total housing cost reduction is larger for renters than for owners over the whole range of income levels. Under the assumption that house prices are 25% lower, which may represent a more structural price level, we find that owners are treated more favourably for incomes above 45,000 euros. The recent rise of house prices thus significantly influences tenure choice in favour of renting. This means that the results displayed in figures 5.1 and 5.2 are of a very recent nature. They may not reflect the structural situation. This helps us explain why high-income households generally own their house (see figure 2.1).<sup>32</sup>

The above analysis shows that the weighted average of the pattern of housing cost reduction has also changed markedly since the past few years. Figures 5.1 and 5.2 show a more or less constant level of overall subsidisation for incomes above 25,000 euros. The variant with lower house prices shows an increase in subsidies for the households above this income level. Figure 5.4 shows that above a relatively low income level the effect on purchasing power is larger for owners than for renters.

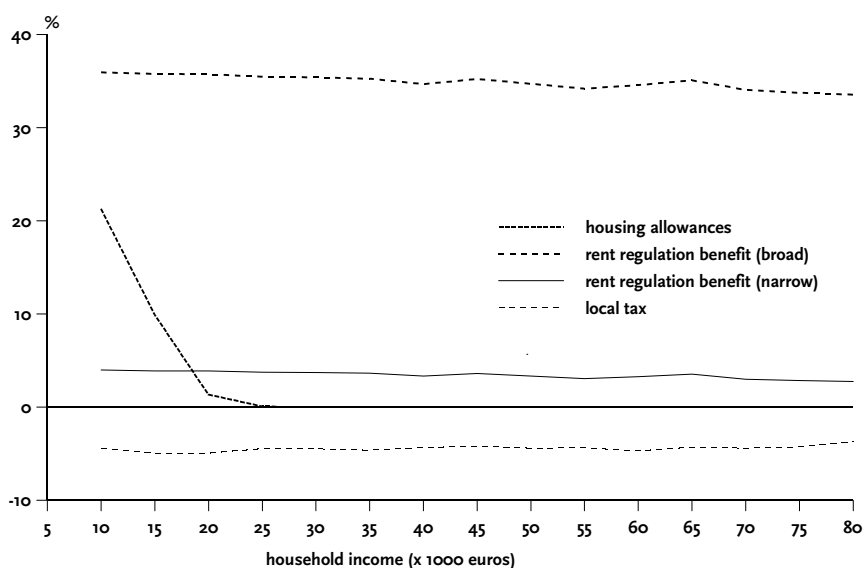
Contrary to our conclusion, Elsinga and Conijn (2001) find that renting a house is more expensive than owning it. One reason for this difference is that their measurements apply to 1998, when house prices were substantially lower than in 2001. A further reason may be that the new tax system, on which our result is based, favours owners less than the former tax system. Furthermore, it may be crucial to their calculations that Elsinga and Conijn employ the House Rating System (Woning Waardering Stelsel, or Puntienstelsel), which was specifically developed to value housing consumption in the rental sector (see Staatsblad, 1999). Elsinga and Conijn extend the use of this rating system to the owner-occupied sector.

#### **Decomposing the broad rental subsidies**

Figure 5.5 provides a breakdown of the effect that rental subsidisation has on housing costs. It shows that there is a large difference in the two definitions of the renters' subsidy. The government subsidies (according to the narrow definition) only contribute modestly to the housing cost reduction, whereas the broad concept turns out to be the major determinant of it, over the whole range of incomes. Even at low income levels the rent regulation benefits outweigh the housing allowances. The small decline in the rent reduction with income is a result of the fall in the share of social renters. The local tax reduces subsidisation by approximately 5% of total housing costs.

<sup>32</sup> Another reason is that rental subsidisation for high income earners is effectively restricted to insiders.

**Figure 5.5 Components of subsidy to renters as a percentage of housing costs in 2000**



## 5.2 Subsidisation in aggregate terms

Sections 4.2, 4.3 and 5.1 express subsidisation in terms of average housing cost reductions and in terms of the effect on purchasing power. Table 5.1 reveals the significance in aggregate terms as well as the composition of the subsidy. The aggregate subsidy in the owner-occupied sector in 2000 was around 9 bln euros. In 2001 it is reduced to 8 bln euros due to the introduction of the new tax system.<sup>33</sup> The renters subsidy in both years is 2 bln euros, according to the narrow definition, which has been discussed in this section. The overall level of housing subsidisation is 11 bln euros in 2000 and 10 bln euros in 2001. This corresponds to 2.7% and 2.2% of GDP respectively.

According to the broad definition the rental subsidy amounts to 7 bln euros in 2000 and to 8 bln euros in 2001. The overall subsidy is 16 bln euros in both years, corresponding to 4% of GDP in 2000 and 3.7% of GDP in 2001.

These results, however, do not take account of any house price rises that are caused by the subsidy itself. Therefore the numbers presented here tend to overestimate the total effect of the subsidisation on the reduction of the occupiers net housing costs. When 25% lower house prices are assumed, broad subsidisation is reduced to 4 bln euros in the rental sector and 6 bln euros in the owner-occupied sector. This totals 10 bln euros or 2.3% of GDP.

<sup>33</sup> This figure of 8 bln euros differs from the one published by Ministry of Finance (2000), which estimates the total subsidies for owner-occupied housing around 2 bln euros. The difference is mainly methodological. Their subsidy concept does not include any benefits from tax-sheltered investments of equity in a house.

**Table 5.1 Subsidisation in aggregate terms (in bln euros)**

	2000	2001	2001
	current	current	25% lower
	house prices	house prices	house prices
<b>Owner-occupied sector</b>			
Tax saving from deductibility of mortgage interest payments	8	7	5
Tax saving from investing equity in house (the avoided taxation on alternative investments)	5	6	5
Wealth tax	1	-	-
Tax on imputed rent (-)	-2	-2	-2
Local property tax and transfer tax (-)	<u>-3</u>	<u>-3</u>	<u>-2</u>
Total owner-occupied	9	8	6
<b>Rental sector</b>			
Housing allowances	2	2	2
Local tax (-)	-1	-1	-1
Rent regulation benefits (narrow definition)	1	1	1
Rent regulation benefits (broad definition)	5	6	3
Total rental (narrow definition)	2	2	2
Total rental (broad definition)	7	8	4
Total of both sectors (narrow definition)	11	10	8
Total of both sectors (broad definitions)	16	16	10



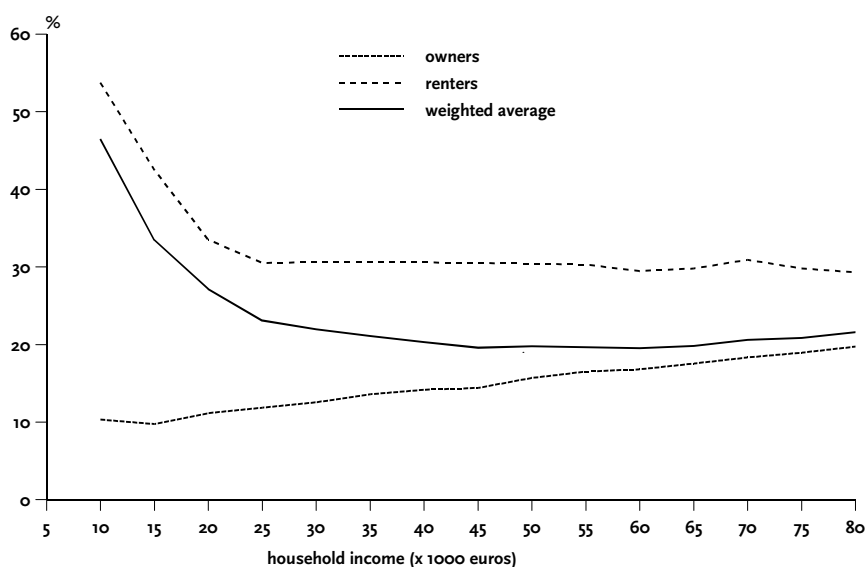
## 6 Sensitivity analysis

This section shows how the pattern of subsidisation changes for the two sectors and their weighted average if two of the assumptions that underlie the results so far, are changed. The analysis focuses on the effects of the housing cost subsidy according to the broad definition. The calculations are carried out for 2001 and thus apply to the present (new) tax system. The results should therefore be compared to those in figure 5.1.

### A 1% lower inflation rate.

Figure 6.1 shows the price reduction for occupiers in the assumption of a 1% lower inflation rate. The real interest rate is assumed unchanged, implying that the nominal interest rate decreases by 1% as well. The renter's subsidy in this variant does not change because none of the relevant variables changes. This applies to rents paid, housing allowances and, due to the unchanged real interest rate, also to total housing costs ( $c_{tot}$ ). The owner's subsidy, however, decreases slightly. This is mainly caused by lower tax savings from deductible interest payments on mortgages.

Figure 6.1 Broad subsidies: effects on housing costs under a 1% lower inflation

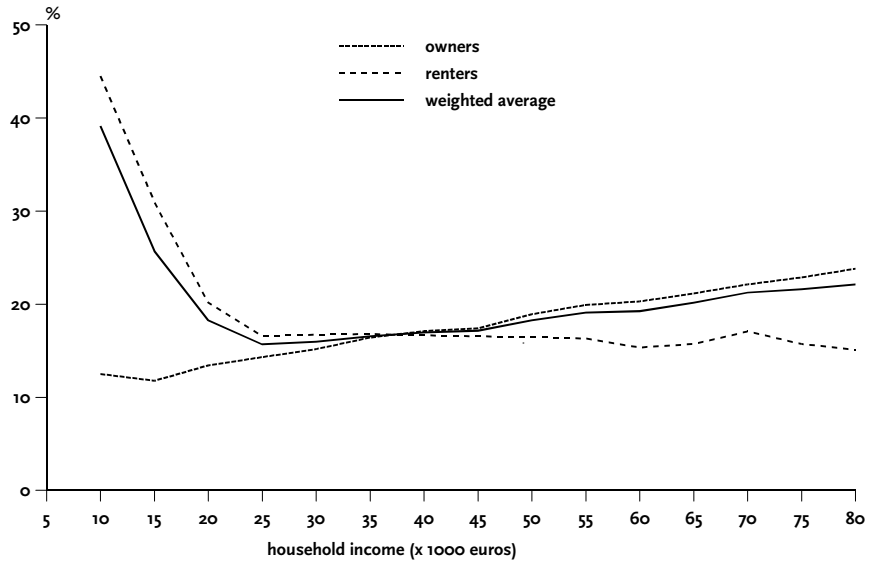


### A 1% lower interest rate.

A 1% lower interest rate leads to a reduction of the renter's subsidy by approximately 13%-points. It averages around 26% (see figure 6.2) now, while it is 39% in the base case scenario. The reason for this substantial sensitivity is that total housing costs decrease by 17% approximately. The costs borne by the renters remains unchanged. Under the base case assumptions the

residents covers around 61% of total housing costs. The reduction of the latter by 17% means that in this variant they have to cover  $61/83 = 74\%$ . The changes in the owner's subsidy are extremely small. This is roughly the net result of two small opposing influences.

**Figure 6.2 Broad subsidies: effects on housing costs under a 1% lower interest rate**



## Conclusions

Housing is subsidised in various ways. In the owner-occupied sector the subsidy originates from the low tax on residential property. In case the house is financed by a mortgage the deductibility of mortgage interest payments on balance results in a tax restitution. Also in case equity is used this form of property is subsidised in the form of the low taxation of housing relative to that of an alternative investment.

In the rental sector we distinguish between a broad and a narrow concept of subsidisation. The narrow definition captures those benefits to renters that are provided by the government and mainly consists of housing allowances. The broad definition of rental subsidisation also includes the benefit that renters have from the fact that rents are below their estimated free market level. The broad concept thus also includes the benefit that is provided, because of rent regulation, by housing corporations and private landlords. The benefit consists of two components: (i) the low rent that is made possible by the accumulation of subsidies in the past and enables the corporations to perform their duty of social housing provision and (ii) the effect of the surge in house prices, which drives up the market level of rents. The latter component may partly be temporary as the combined result of rent smoothing and a 'bubble' in house prices.

Our measurements show that housing is subsidised substantially. In 2001, the average reduction of the costs of housing amounts to around 17% for owner-occupiers. It has an average effect on their purchasing power of 8%, or 8 bln euros. In terms of our narrow definition, the rental subsidy involves an average cost reduction of 7% which is smaller than the owner-occupier's subsidy. Its effect on the renter's purchasing power averages 4% or 2 bln euros. The average housing cost subsidy to renters according to the broad definition is even around 39% with an effect on purchasing power of 16%, or 8 bln euros. For most households, renting a house in 2001 turns out to be cheaper than owning it. Yet, the full subsidy to rental housing is available to insiders only. Total housing subsidisation (rental plus owner-occupied) is 16 bln (3.7% of GDP), if broadly defined. Narrowly defined, it is 10 bln euros (2.2% of GDP).

In 2000, before the recent tax reform, the subsidy in the owner-occupied sector was somewhat higher. Its average reduction of housing costs was 21% and its income effect 9%. Rental subsidies almost equalled the levels of 2001.

These numbers, however, tend to overestimate the total effect of subsidisation on the reduction of the occupier's costs of housing. The reason lies in the conditions on the housing market. These feature a situation of inelastic supply which brings about that the subsidy pushes up house prices. Our measurements do not take account of these effects on house prices.

The inelastic supply of housing in the Netherlands entails that subsidisation has only a limited effect on promoting housing quality. Its main effect may be that it raises house prices

and results in a substantial redistribution of wealth between generations. Reducing or abolishing the subsidy would therefore lead to lower house prices and benefit starters on the housing market at the expense of present owners. It would (partly) undo the intergenerational redistribution that took place as a result of the recent explosion of house prices.

A remarkable finding is that at present, renting leads to lower housing costs than owning for most households. The broadly defined subsidy on rental housing is much higher than that on owner-occupied housing (39% versus 17%). A sensitivity analysis, which assumes 25% lower house prices, points out that this large difference is of a very recent nature. The explosion of house prices in the last few years has led to sharply higher housing costs for owners while rents have shown a more gradual increase, due to rent setting regulations. However, even if one assumes 25% lower house prices the average difference is still 10%-points in favour of renters (26% versus 16%). It is also remarkable that the subsidy for owners, in terms of relative price reduction, rises with household income.

Another finding is that the financial portfolio of households is likely to be influenced by the markedly higher level of subsidisation of mortgage-financed housing relative to that of equity-financed housing. This raises the incentive for households to hold high levels of mortgage debts and financial assets in their portfolios, thereby inefficiently raising the volume of financial intermediation and, in many cases, distorting the risk profile of the portfolio.

Apart from their negative effect on efficiency, the differences in subsidisation between renting and owning a house and between mortgage- and equity-financed ownership may also affect horizontal equity.

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## Appendix 1 The costs of housing

### Administration costs

Equation (1) in Section 3 defines the total costs of housing as the sum of the administration costs ( $a$ ), maintenance ( $mnt$ ), depreciation ( $d$ ) and the real interest cost, which is defined as the nominal interest rate ( $i$ ) minus inflation ( $p$ ). In our benchmark calculations the first term has been derived from the administration costs for housing corporations. According to their annual account (see De Kruik and Ramaker, 1998) they were equal to 645 million euros (€1.419 billion) in 1996. Assuming a 3% annual increase this translates into a level of 737 million euros in 2000. In 2000 the housing stock of the corporations consisted of approximately 2.4 million houses and their average value was approximately 97000 euros. The total value of the housing stock belonging to a corporation was thus nearly 233 bln euros. Therefore the administration costs per unit of housing investment were equal to 0.32%.

It is hard to obtain comparable estimates for private housing. We assume that the costs faced by these agents as a percentage of the value of the housing stock are equal to the costs faced by housing corporations. This includes the costs for real estate agents when the house is transferred.

### Depreciation

The value of depreciation  $d$  that we use is derived from estimates provided by Conijn (1995). He reports a depreciation rate in the owner-occupied sector of 0.85%. However, Conijn's notion of depreciation is a more technical one. It measures the loss of value due to ageing of the house. Our depreciation rate differs from Conijn's measure because it measures the loss of *market* value in real terms. It thus includes the real appreciation of the house, which is not present in Conijn's depreciation rate. The two notions lead to different results because the general inflation is lower than the inflation of house prices. This can be attributed to lower productivity increases in the construction sector. In the period from 1970 to 1998 the general inflation was on average 4.01%. The average increase in the price of investments in dwellings was 4.66%. Our measure adjusts the depreciation rate that Conijn reports by subtracting this extra inflationary effect. Our depreciation rate thus becomes  $0.85\% - 0.65\% = 0.20\%$ .<sup>34</sup> For the rental sector Conijn reports a

<sup>34</sup> Despite his different depreciation rate, Conijn's measure of the cost of housing coincides with ours. Conijn uses a higher rate of inflation in his housing cost equation, which balances the larger depreciation rate that he employs. His inflation measure is the *nominal* increase of house prices, which includes the *real* appreciation of houses. We deduct the latter from the depreciation effect.

depreciation rate that is 0.06% higher<sup>35</sup>. We follow him by imputing a depreciation rate of 0.26%.<sup>36</sup>

#### **Maintenance costs**

Conijn further argues that depreciation costs occur in spite of attempts to avoid them through maintenance. He constructs a conceptual model, in which depreciation would be 3.2% per year, *if no maintenance were performed at all*. Taking account of Conijn's 'technical' depreciation rate of 0.85%, this leads us to the conclusion that maintenance equals  $3.2\% - 0.85\% = 2.35\%$  for owner-occupied housing. We assume that this percentage applies to 1995. This figure is *not* extrapolated to 2000 because house prices have shown a much steeper rise than the average price increase of services in the economy. House prices rose by 96% between January 1st 1995 and July 1st 2000. The price of services increased by 3% per annum. This amounts to 17.6% in 5.5 years. We assume that this is a proper indication of the rise of maintenance costs. Using this number for maintenance costs implies an accumulated rise of only 17.6%. Adjusting for this we imputed a value for *mnt* in 2000 of 1.41%. In 2001 it decreases further to 1.33.

#### **The interest rate and inflation**

An inflation rate  $p$  was 2.0% is assumed. The nominal interest rate on mortgages  $i$  is assumed 6.0%. This is also assumed for the nominal before-tax returns to equity.

<sup>35</sup> Conijn makes a distinction between ageing and depreciation. We assume that these notions coincide.

<sup>36</sup> The difference may be related to the fact that owners have more reason to internalize the costs of neglect.

## Appendix 2 Tax and other parameters values

This appendix deals with the parameters that underlie the calculations in our research. First we discuss the parameters that differ between the old and the new tax system. Then we discuss the parameters that remain unchanged.

### Income taxation in the old tax system

The marginal income tax rate  $m_r$ , which applies to mortgage interest payments, is based on the WBO survey from Statistics Netherlands. It is the tax rate of the most earning partner of the household. The  $m_r$  is defined as the average rate at which the interest payments are deducted. The average rate is more relevant than the rate that applies to the last (marginal) guilder because we compare the *full* subsidy on a owner-occupied house with that on a rented house. The former concept affects the (discrete) choice between the two forms and measures their income effects and measures the effect on purchasing power<sup>37</sup>.

The marginal income tax  $m$ , which is relevant for equity-financed housing, is lower than  $m_r$  because part of the yield of an alternative investment would fall within the tax exemption. The total exemption for interest income amounts to 455 euros for a single and 910 euros for couples. Data from Statistics Netherlands enable us to calculate the 'unused' tax exemption on interest income for every household in Mimos (see Wiggers, 1997). Denoting 'unused' interest income by  $uri$  and the average equity share that is invested in the house by the particular household income level by  $EQ_0$ ,  $m$  can be derived as follows:

$$m = [1 - uri / i \times EQ_0] \times m_r$$

This is the  $m$  that applies to the traditional form of saving.

### Wealth taxation in the old tax system

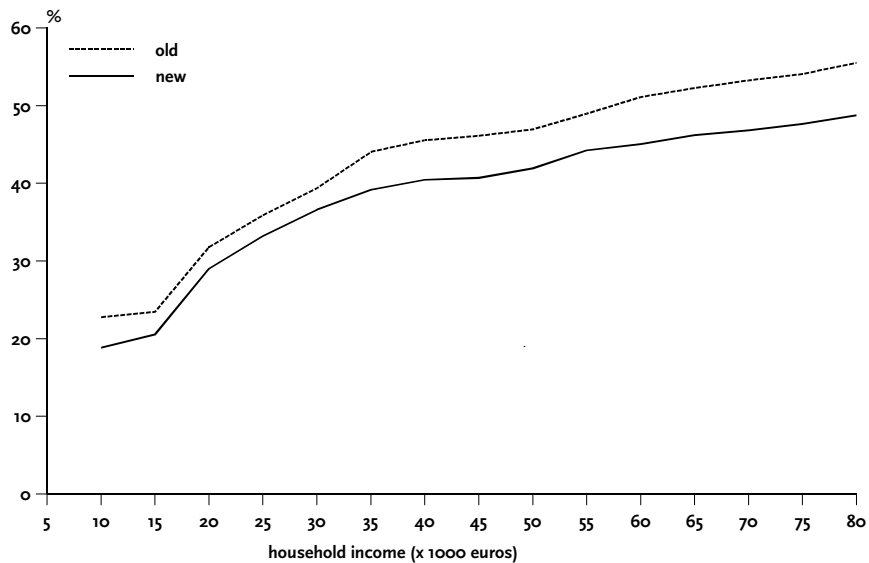
The variable  $w_{ef}$  the effective wealth tax rate, is calculated by taking account of the exemption in the property tax scheme. The statutory wealth tax rate (0.7%) applies only to the excess of wealth over the exemption.

<sup>37</sup> However, for the purpose of cost comparing with other goods the marginal subsidy seems to be the more appropriate concept because household choices between the amount of spending on housing and that on alternative goods are generally not 'lumpy'.

### Income taxation in the new tax system

Income tax rates in box I are generally lower than the tax rates in the old tax system. This difference becomes especially marked in the third and fourth tax bracket. These respectively fall from 50% to 42% and from 60% to 52%. Figure 7.1 presents how this works out for the household's average marginal tax rates that apply to mortgage interest payments.

Figure 7.1 Tax rates that apply to mortgage interest payments



The effective wealth tax  $t_{ew}$  is derived in a way that is similar to how we derived  $m$ , the effective tax on interest income in the old system. The variable  $ppacc$  is estimated at 33%.

### Accounting for the transfer tax

The calculations above ignore the taxation of the transfer of a house between two owners (in Dutch: *overdrachtsbelasting*). The first transfer, i.e. the one between the builder and the first owner, is exempt. The tax rate is 6% of the transfer sum and will remain so after the tax reform. We will assume that the average owner moves once every 15 years. This corresponds to an annual cost of 0.4% of the market value.

### The taxation of corporate profits in the old system

The wedge that is driven between before-tax corporate profits and the net-yield from it to the shareholder is derived by elaborating on the expressions as presented in Bovenberg and ter Rele (1998). Before-tax profits are assumed to be equal to the interest rate. It turns out that the effective rate of corporate taxation is lower than the statutory rate of 35% due to favourable tax

rules for fiscal depreciation. The effective corporate tax rate was calculated at 22.9%. Bovenberg and ter Rele explain that the personal income tax rate of the shareholder is only relevant for the case of equity-financed investments, which is 10% of total equity-financed investments. Implementing this notion leads to a value for  $m$  in the old tax system that is calculated as:

$$m = 0.9 \times 0.229 + 0.1 \times [1 - (1 - 0.229)(1 - m_p)]$$

The variable  $m_p$  represents the personal income tax rate. In case of  $m_p = 50\%$ , this leads to an  $m$  of 26.7%.

#### **The taxation of corporate profits in the new system**

In the new tax system personal taxation  $t_{ew}$ , which is effectively a wealth tax, applies to investments that are financed by equity as well as retained earnings. The expression for  $t_{ef}$  then becomes:

$$t_{ef} = 0.229 \times i + t_{ew}$$

#### **The financing mix of owner-occupied housing**

The weight of mortgage-financed housing is calculated as the share of outstanding mortgage debt in the present market value of houses. From the Ministry of Finance (2001) we know that 50% of the mortgages has a capital insurance attached to it. This fraction is used to determine the share of this financial construction in all mortgages, which is relevant in the new tax system. The complement of the share of mortgage-financed housing is the weight of equity-financed housing. Within equity-financed housing the weights we use are mainly derived from Terra-Pilaar and Waaijers (2001). Table A.1 displays the weights we employed:

**Table 7.1      Table A.1      Weights for financing forms in %**

**Old system**

household income (in euros)	Mortgage		Equity		Capital insurance	shares	Total
		traditional	innovative				
20000	29	37	15		9	9	100
40000	44	20	16		10	10	100
60000	46	10	17		13	13	100
80000	50	4	16		15	15	100

**New system**

household income	Mortgage		Equity		shares	Total
	plain	with cap.ins	non-shares			
20000	15	15	61		9	100
40000	22	22	46		10	100
60000	23	25	41		13	100
80000	25	25	37		13	100

## Appendix 3 Estimating the present value of the housing stock

### The value of the housing stock

According to Blom- van Son and Van Leeuwen (1998) and Van Leeuwen (1998) the stock of the Dutch real estate was worth 1,577 billion guilders, or 716 bln euros, on January 1st 1995. The housing stock part of it was valued at 501 bln euros. On January 1st 1995 there were 6.196 million houses. Between this date and July 1st 1998 the Kadaster published an average house price rise from 89,100 euros to 125,800 euros, or by 41.1%. The number of houses at that date is estimated at 6.481 million (the average of the published numbers on January 1<sup>st</sup> 1998 and January 1<sup>st</sup> 1999). This implies an increase of 4.6%. It means that the total value of the house stock at that time equaled approximately  $1.046 \times 1.411 \times 501 = 739$  billion euros.

Information from the CBS (2000) tells us that 50.83% of the houses is owner-occupied and thus that 49.17% is rented. This is respectively 3.294 million and 3.187 million. A large household survey ('Woningbehoefteonderzoek') renders an average house price of owner-occupiers on July 1<sup>st</sup> 1998 of 154,100 euros. Because this survey maximizes house prices at 455,000 euros, we correct this average house price to a level of 156,800 euros. The total value of houses in the owner-occupied sector therefore was around  $3.294 \times 156,800 = 516.4$  billion. This leaves 222.6 billion for the rental sector, implying 69,900 euros per house in this sector.

Average house prices in the owner-occupied sector have risen between 1998 and 2000 by respectively 15.8% and 20.1%, totalling 39%. We assume that this price increase also applies to the rental sector. The value of the average owner-occupied house is therefore estimated at  $1.39 \times 156,800 = 218,000$  euros, and the value of the average rental house at  $1.39 \times 69,900 = 97,000$  euros.

The total value of owner-occupied houses on July 1<sup>st</sup> 2000 can accordingly be estimated at  $1.39 \times 516.4 \text{ bln} = 718 \text{ bln}$  euros and that of rental houses at  $1.39 \times 222.7 = 309 \text{ bln}$  euros. For 2001 we assume a price rise of 9.3% (in line with information from the Kadaster), which leads to an average price of 238,000 euros in the owner-occupied sector and 106,000 euros in the rental sector.

### The equity of housing corporations

2.4 Million rental houses in the Netherlands are owned by housing corporations. We assume that their average value was 97,000 euros in 2000. This means that the total value of the houses owned by the corporations was approximately 232 bln euros. However, CFV (2001) shows an aggregate balance sheet for all corporations, which values these assets at approximately 68 bln euros in the beginning of the year 2000. The difference  $232 - 68 = 164$  bln euros can be interpreted as silent equity. According to CFV (2001) non-silent equity was about bln euros.

Hence, total equity was 173 bln euros, around the first of January 2000. This implies that the equity makes up 74% of the market value of houses.