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Stock-flow consistent data for the Dutch economy, 1995 -2015
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Abstract

In earlier work Meijers, Muysken (and Sleijpen) have developed an open economy stock-flow consistent (SFC) macroeconomic model of the Dutch economy with an elaborated financial sector. This model has been used to analyse several stylised facts of the Dutch economy, such as the deposit financing gap, the excessive trade surplus, the impact of firms accumulating financial assets and the impact of quantitative easing. However, the stylised facts were collected in an ad hoc way and the parameters used in the model were taken from the international literature, without proper reference to Dutch data.

In the present paper we develop a stock flow consistent data set for the Dutch economy 1995 – 2015 in order to stimulate further research in the SFC tradition using actual data, and to enhance our understanding of the Dutch economy. The data set is based on data from the Central Bureau of Statistics (CBS) for most sectors – these are consistent with the AMECO data published by Eurostat. However, for the financial sector we show that the CBS-data are incomplete and also use data provided by the Dutch Central Bank (DNB). We distinguish between households, firms, government, a foreign sector and within the financial sector between a central bank, banks and pension funds. For each sector we provide a somewhat simplified balance sheet and consistent flows, which can be used in the model.

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1. Introduction

The Netherlands is a prosperous, small open economy with a large financial sector, large international capital flows and a trade balance surplus. In earlier work Meijers, Muysken (and Sleijpen) have analysed several stylised facts of the Dutch economy, such as the deposit financing gap, the impact of firm's accumulating financial assets and the impact of quantitative easing.[1] To that end an open economy stock-flow consistent (SFC) model of the Dutch economy with an elaborated financial sector was developed. However, the stylised facts were collected in an ad hoc way and the parameters used in the model were taken from the international literature, without proper reference to Dutch data.

Although there is a growing interest in developing SFC-models to analyse economic problems – see Nikiforos and Zezza (2017) for a recent survey – there is surprisingly little research based on actual data. In most cases the models are calibrated in an ad hoc way, as indicated above. We are aware of only four publications where an effort is made to estimate or implement a stock flow consistent model to actual data of an economy, see our survey of the literature presented below.

To stimulate further research in the SFC tradition using actual data and to enhance our understanding of the Dutch economy, we have collected in this paper data in a stock-flow consistent way for the period 1995 – 2015, or in some cases due to data limitations for the period 2004 – 2015.[2] We use data published by Central Bureau of Statistics (CBS) for the non-financial sectors and by both the CBS and the Dutch Central Bank (DNB) for the financial sector.

There are many complications in constructing these data. First of all data are published on financial assets and liabilities of the various sectors, but these data are collected according to type of financial paper. In the SFC tradition it is very important to know who issued that financial paper in case of assets, or who owns that paper in case of liabilities. Hence one has to look for additional information to solve this problem. Second, the data of flows (national account data) are collected independently from the data on financial assets and liabilities of the various sectors. Therefore one has to check whether these data are consistent, that is whether the change in observed stocks corresponds to the observed flow. A third problem arises because of valuation changes. In many cases it turns out that the change in the value of assets is not due to savings which are invested in these assets, but because the price of assets has changed. This has important implications for the interpretation of economic developments.[3] Thus valuation changes have to be identified too.

Before explaining the structure of the paper we first present an overview on the empirical SFC models that have been developed thus far in the literature.

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[1] See Meijers, Muysken and Sleijpen (2014, 2015, 2016) and Meijers and Muysken (2016).
[2] Annual data for earlier years are based on older versions of the national accounts and are incomplete for stock data (balance sheets). Quarterly data are available from 1999 onwards for flow data (transactions) but from 2010 only for stock data (balance sheets). The CBS data are also consistent with the AMECO data published by Eurostat.
[3] An example is the increase in consumption due to the rising house prices before the financial crisis, and the decrease in consumption afterwards – see the discussion in section 2 below.

Empirical SFC models

We are aware of only four recent publications where an effort is made to estimate or implement a stock flow consistent model to actual data of an economy.[4] All these analyses circulate as working papers.

The oldest model of these four is Papadimitriou et al. (2013) which is estimated for the Greek economy – the LIMG model.[5] An important stylised fact that the model intends to analyse is the interaction between the government deficit, the external balance and private investment minus saving. For that reason the model distinguishes between three sectors, private, government and the rest of the world. Hence there is no financial sector, nor is there a separate household and firm sector. However, the stylised facts presented distinguish between these three sectors. For instance, the assets and liabilities of the financial sector both increased to over 300 per cent of GDP in 2012, and the financial assets of firms were about 80 per cent of GDP in 2012 – with financial liabilities of about 100 per cent of GDP. There is no distinction between types of financial assets in the analysis.

The LIMG model consists of 68 equations of which only 32 accounting equations are presented explicitly. The behavioural part of the model consists mainly of an expenditure equation, where private expenditures are related to disposable income, financial assets (prices) and housing (prices). Next to that four equations are presented to explain exports and imports of goods and services separately. The model is used to simulate the impact of a fiscal stimulus and an internal devaluation. However, the authors indicate themselves that the model needs to be developed further before the results can be used for a serious policy analysis.

A somewhat similar model, but more elaborated, is estimated for the UK economy by Gudgin et al. (2015) – the UKMOD model. In that model a household and a firm sector are distinguished, although the latter is treated as a residual sector. The only stylised fact presented in the paper is the collapse of real GDP per capita in 2007 in the UK, which is also the main phenomenon the model seeks to explain. Gudgin et al. (2015, p. 4) state: "The balance between public and private debt plays a key role in our forecasts following Godley's emphasis on the observation that the current balances of the public and private sectors, together with the external balance must sum to zero. The model is also essentially monetary in that the financing of expenditure plays a key role." Given these observations it is somewhat surprising that the authors ignore the financial sector and model the rest of the world only in a rudimentary way.[6]

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[4] An interesting early empirical stock-flow consistent model is presented in Davis (1987 a,b). Nikrofos and Zezza (2017, section 3) also mention some unpublished papers in their survey, but these papers are not very informative and have not been published even as a working paper.

[5] The authors refer on several places to 'the Levy Institute US model', but don't provide any references for that model. On the website of the Levy institute for several years a strategic analysis for the US economy is provided, apparently based on this model "Underlying the main conclusions of this Strategic Analysis is an econometric model in which exports, imports, taxes, and public and private expenditures are functions of world trade, relative prices, tax rates, stocks of debt, and flows of net lending."(Papadimitriou et al., 2011, p. 12) but no reference to this model is provided.

[6] "We have abstracted from Keynes and Godley-Lavoie treatments of the financial sector and asset allocation by treating short-term interest rates as an exogenous policy variable and treating credit for house-holds as semi-exogenous."(Gudgin et al., 2015, p. 5) and "importantly Godley/Lavoie also has a separate monetary-banking sector which is not yet developed in this model"(p.6).

The UKMOD model consists of 80 econometric equations and 145 identities, which will be published on their web site, but which we could not find. The "key" equations presented in the paper are on real consumption expenditure, business investment, residential investment, exports, imports, wages, consumer prices, import prices, private sector employment and unemployment.

The analysis of Miess and Schmeltzer (2016) aims to implement a stock flow consistent model for Austria. The main contribution of the paper is a presentation of the data which are necessary for that purpose in a detailed way, consistent with the national account data (but they ignore data on the capital stock and the housing stock).[7] These data also include the financial sector and allow for various assets. Interesting observations are that the financial assets of firms increased from 30 per cent of GDP in 1995 to 100 per cent in 2015 (the comparable figures for liabilities are 100 and 165 pre cent, respectively); assets and liabilities of the financial sector were just over 300 per cent of GDP in 2015.

The paper by Burgess et al. (2016) provides the most elaborate model, which is applied to the British economy. The authors point out that "the macroeconomic policy consensus at the time [of the financial crisis] did not provide clear answers as to how policymakers should respond to either financial imbalances or the rapid growth of potentially unsustainable debt burdens, at a time when the real economy appeared to be stable."(pp.1-2) The aim of their model is to analyse these phenomena in a coherent way. They distinguish between households, firms, government, a detailed financial sector and the rest of the world. Moreover, they distinguish between various assets and also model the prices of these various assets – enabling them to include revaluation effects in their analysis. Since they do not provide detailed data for the UK economy, it is difficult to analyse to what extent they cover the relevant stylised facts. One omission which the authors identify themselves is that they assume that pension funds hold all of UK's equity claims against the rest of the world, while in reality "Many of those are held by NFCs, through foreign direct investment" (p. 15).[8] They also do not employ data on the capital stock, although they use a Cobb Douglas production function.[9] However, they employ data on the housing stock.

The model of Burgess et al. (2016) is described in a detailed way and several interesting simulations are performed.[10] These simulations show the importance of incorporating financial flows in the model. This is obvious for the two simulations which refer directly to the financial sphere: (1) a rise in bank's capital requirements of one percentage point (leading to a fall in GDP of 0.1 per cent) and (2)

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[7] In their paper Miess and Schmeltzer (2016) present a very simple model using the data in a very rudimentary way, mainly relying on fixed coefficients and exogenous variables. Therefore their analysis lacks a deeper insight in the determinants of the development of the Austrian economy.

[8] A probably related issue is that the authors adjust the proportion of firm liabilities which consist of equity in their parameter set from 0.84 to 0.10 since the first value is considered to be "unrealistically high".(p. 19)

[9] Their calculated capital-output ratio varies between 400 and 440 per cent on an annual basis (Figure 8). The authors claim that this roughly matches the UK data (p. 19), referring to Oulton and Wallis (2015). However, the latter present a capital-output ratio which is about 200 per cent – see their Chart 10.

[10] Two points which are not clear in the model are (1) while the authors state that bank equity "is assumed to be privately held and not traded by investors in the rest of the world" (pp. 10-11), they allow for "dividend paid out by the banks to their foreign shareholders"(p.11). The corresponding equation (64) is the only place where bank equity shows up; it is not included in the portfolio of the rest of the world – equation (74). (2) the central bank "doesn't pay interest on reserves"(p. 12), although banks set the interest rate on deposits "as a mark down on the rate of interest the central bank pays them on their holdings of reserves."(p. 12) – see also equation (70).

a 'sudden stop' on the current account by lowering the demand for UK bonds and equity by foreign investors by 20 per cent (leading to an increase in GDP, which the authors consider implausible). However, also for the other simulations the impact of including financial flows in the model is important: (3) an exogenous increase in investment of 10 per cent (leads to an increase in GDP of 2 per cent, but also to higher net lending by banks and an increase the current account deficit of 0.6 per cent point); (4) an increase in house prices by 10 per cent (leads to an increase of GDP of 0.6 per cent through increased consumption, but also to higher net lending by banks and an increase the current account deficit of 0.3 per cent point);[11] and (5) fiscal expansion through an increase in government spending of 10 per cent (leading to an overall increase in GDP of 2 per cent, a worsening of government debt of 1 per cent point and a higher current account deficit of 0.7 per cent point). In all these scenario's there is an important feedback of wealth effects on consumption and of net lending on the current account, which is moderated by the financial sector.

Structure of the analysis

We present the data in the format of the stock-flow consistent model for the Dutch economy of Meijers and Muysken (2017), presented as Tables 1.1 – 1.2 below. We use the balance sheet accounts of CBS ("Financial balance sheets and transactions") to identify the wealth components in the balance sheets of Table 1.1. There we distinguish within the financial sector between a central bank, banks and pension funds. Households hold their wealth in houses, deposits and participations at banks, and pension claims at pension funds. They borrow from banks in the form of mortgages. Firms hold a tangible capital stock and net foreign direct investments as financial assets. Firms borrow from banks and issue equity abroad. Government debt is financed by bonds held by pension funds, abroad, banks and the central bank. The foreign sector also holds participations issued by banks and borrows foreign reserves from the central bank. The central bank also issues deposits held by banks and the pension funds also hold participations issued by banks.

The various income flows between the sectors are summarised in the social accounting matrix presented in Table 1.2. The composition of GDP is taken from the macroeconomic sector accounts ("current transactions by sectors") published by the CBS. The relevant data is presented in section 2 and constitutes the first row and column of the social accounting matrix – following the various ways to measure GDP. These accounts together with the balance sheet accounts are also used to provide data for the sectors households, firms, government, abroad and the financial sector as we discuss in sections 3 – 7, respectively. Concluding remarks follow in section 8, where we also present some insights for the Dutch economy that can be obtained using these data.

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[11] This is consistent with the analysis of the deposit financing gap in Meijers, Muysken and Sleijpen (2015).

Table 1.1 Balance Sheets

	Households	Firms	Government	Foreign	Banks	Central Bank	Pension Fund	Total
Central Bank deposits					+ Mcb	- Mcb		0
Bank deposits	+ Mh				- Mh			0
Loans		- L			+ L			0
Bills			- B	+ Ba	+ Bb	+ Bcb	+ Bpf	0
Capital		+ p·K						+ p·K
Participations	+ Ah			+ Aa	- Ah – Apf - Aa		+Apf	0
Equities		- pe.Efa		+ pe.Efa -pe.Eapf			+ pe.Eapf	0
Net foreign direct investment		+ pe.Eaf		- pe.Eaf				0
Mortgages	- MO				+ MO			0
Houses	+ ph.HS							+ ph.HS
Pension Claims	+ Cpf						- Cpf	0
Foreign Reserves				-R		+R		0
Total (net worth)	+ Vh	+ Vf	+Vg	+Va	0	0	0	+Vt

Wealth accumulation

$\Delta Vh = Sh + \Delta ph.HS(-1)$

$\Delta Vf = Sf + \Delta pe.Eaf(-1) – \Delta pe.Efa(-1) + \Delta p.K(-1)$ $\Delta Vg = Sg$

$\Delta Va = Sa + \Delta pe.Efa(-1) – \Delta pe.Eaf(-1)$ $\Delta Vb = \Delta Vcb = \Delta Vpf=0$, valuation changes are included in profits

$\Delta Vt = S + \Delta p.K(-1) + \Delta ph.HS(-1)$

Table 1.2 Social Accounting Matrix

	Prod.	Households	Firms	Government	Foreign	Banks	Central Bank	Pension Fund	Capital Account	Total
Production		+ p·C		+ p·G	+ X - IM				+ p·ΔK +ph.ΔHS	p·Y
Households	+ WB			+ ig.Bh		+ib.Ab + i.Mh + Fb		+ Cpf + Fpf		+ Yh
Firms	+ Ft				+Daf					+ Yf
Government	+ Ti	+ Td	+ Tf				+ Fc			+ Yg
Foreign			+Dfa	+ ig.Ba		+ ib.Aa				+Ya
Banks		+ imo.MO	+ il.L	+ ig.Bb			+ icb.Mcb			+ Yfs
Central Bank				+ ig.Bcb	+ ir.R					+ Yc
Pension Fund		+ Tpf		+ ig.Bpf	+ Dapf	+ ib.Apf				+ Ypf
Capital Account		+ Sh	+ Sf	+ Sg	+ Sa	0	0	0		S
TOTAL	+ p·Y	+ Yh	+ Yf	+ Yg	+ Ya	+ Yfs	+ Yc	+ Ypf	+ p·ΔK +ph.ΔHS	

Dividend payments: $Dfa = \rho_e p_e E_{fa}$ $Daf = \rho_{ea} p_e . E_{af}$ $Dapf = \rho_{ea} p_e . E_{apf}$

2. The development and composition of GDP

The growth and the composition of GDP is taken from the macroeconomic sector accounts published by the CBS. The spending of GDP ("uses") constitutes the first row of the SAM matrix presented in Table 2 and the means of GDP ("resources") constitutes the first column. We present both below, in sections 2.3and 2.4 respectively, after presenting the growth of GDP over time in section 2.2. We conclude in section 2.5 with a discussion of the distribution of both GDP and the capital stock over the various sectors.

2.1 *The development of GDP over time*
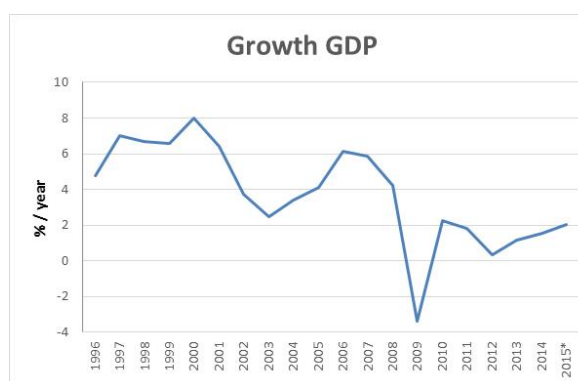
Figure 2.1   Figure 2.2
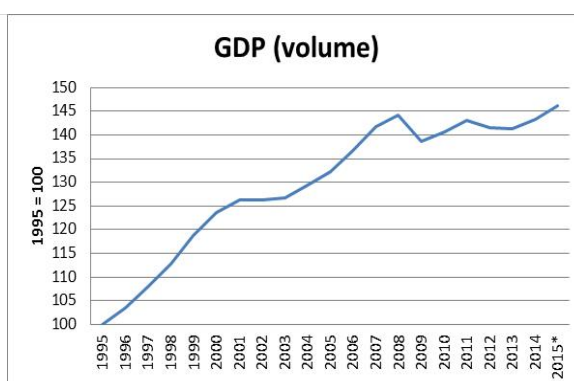
Source: CBS   Source: CBS

The growth of real GDP over time is presented in Figure 2.1 and 2.2. From both figures one sees how GDP has stagnated since the financial crisis in 2008.

In Figures 2.3 and 2.4 we present the development of GDP price over time, together with that of the price index of consumption. The increase of the latter relative to the price of GDP after 2010 can be explained by the relative increase of energy prices. From Figure 2.3 one sees that both indices show a tendency to decline since 2000. Moreover the decline in prices after 2012 initiated the concern of the ECB leading to quantitative easing.
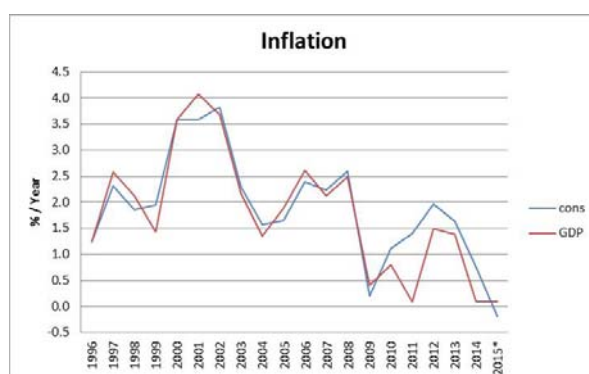
Figure 2.3   Figure 2.4

Source: CBS   Source: CBS

2.2 GDP spending (First row of SAM)

When we look at the first row of Table 2, we find the division over the expenditure categories presented in Figure 2.5. All data are in nominal terms and gross investment is used. The distribution of investment over firms, households and government is presented in Figure 2.6. An interesting observation is that the share of investment by households and government together in GDP is almost as large as that of firms. We will see the implications when discussing the composition of the capital stock in Figure 2.12 below.
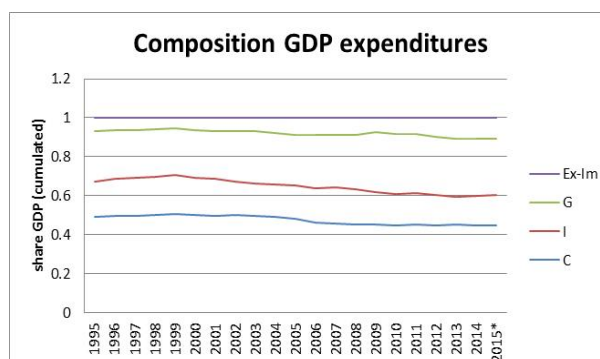
Figure 2.5   Figure 2.6
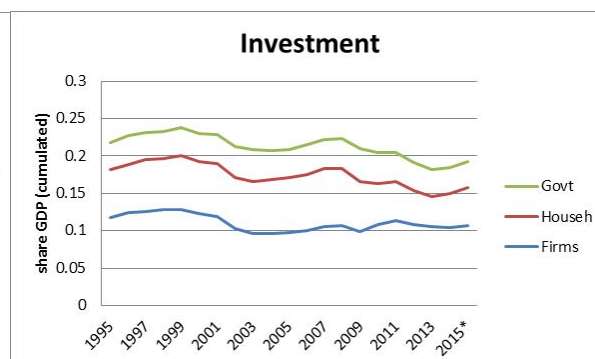
Source: CBS   Source: CBS

The decomposition of net exports into exports and imports is presented in Figure 2.7. One observes that the shares of imports and exports have increased relative to GDP, in particular in the aftermath of the financial crisis. One should also realise that depreciations, i.e. gross minus net investments, constitute a very high percentage of gross investments in firms (including financial institutions) and government, and in recent years also of households, as can be observed from Figure 2.8. This is further elaborated when discussing the depreciation rates of the capital stock in Figure 2.17 below.
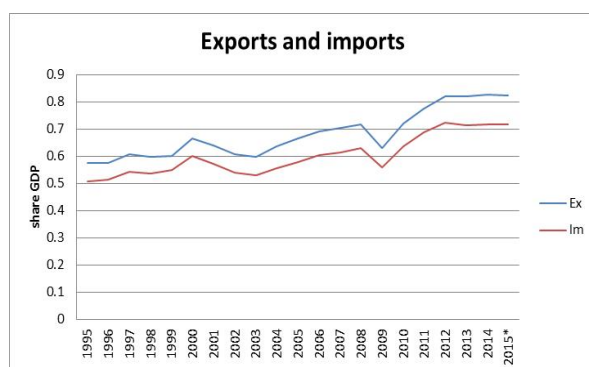
Figure 2.7   Figure 2.8
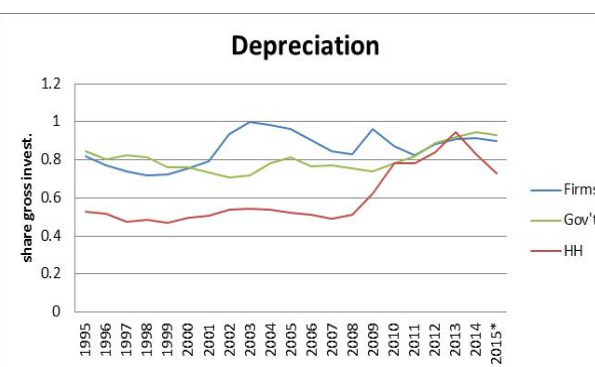
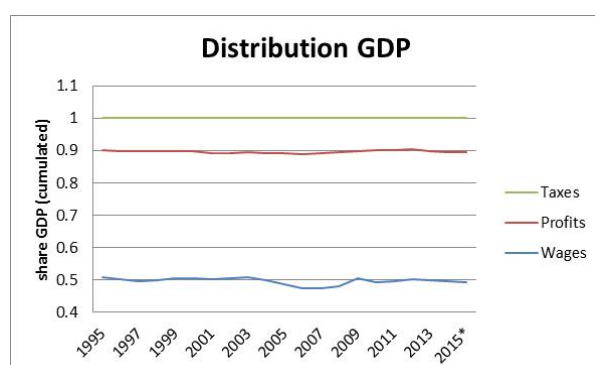Source: CBS   Source: CBS

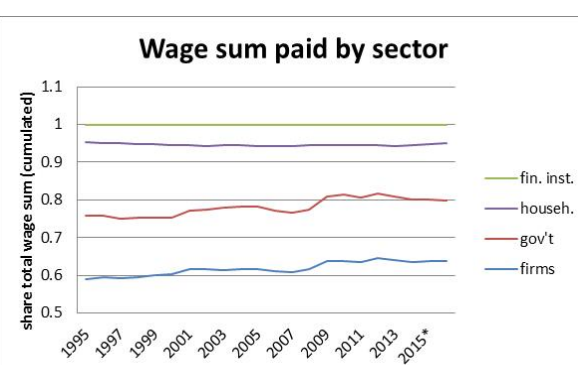### 2.3 GDP resources (First column of SAM)

The distribution of GDP over wages, profits – measured by gross operating surplus – and taxes (net of subsidies) is presented in Figure 2.9, consistent with the first column of Table 2. The shares in GDP are very stable over the whole period around 50, 40 and 10 per cent, respectively.

Figure 2.9   Figure 2.10

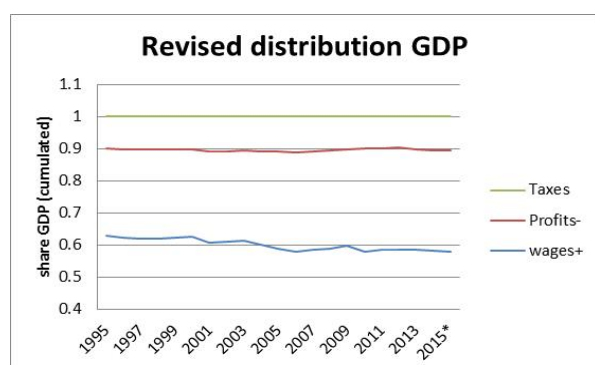Source: CBS   Source: CBS

The distribution of wages over the various sectors is presented in Figure 2.10. This refers to wages paid, since all wages are earned by households. As one might expect, the majority of wages are paid out by firms. However, government also paid about 15 per cent of the total wage sum, whereas the financial sector paid out less than 5 per cent. We also included wages of self-employed in this figure, constituting 15 – 20 per cent of the total wage sum. These wages are measured by taking the net operating surplus of households, representing the contribution of self-employed persons to household GDP. That is, we consider the income of self-employed persons as wage income, categorised under households in Figure 2.10.[12]

If we include the income of self-employed persons in wages, the distribution presented in Figure 2.9 changes slightly – see Figure 2.11 (wages+). The share of wage earners then is higher, but it decreases from around 59 per cent of GDP in 1995 towards 54 per cent in 2016. Similarly, the profit share (profits-) is lower, but increases from 30 per cent to 35 per cent over time.

Figure 2.11   Figure 2.12
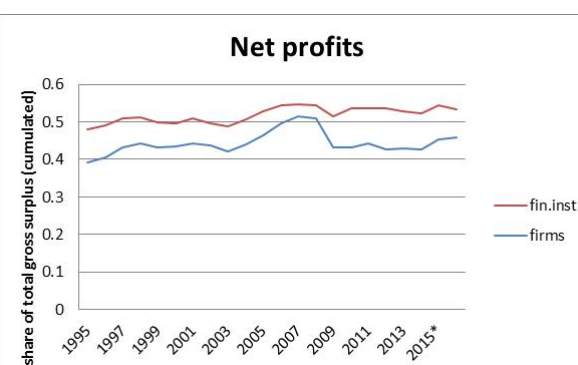
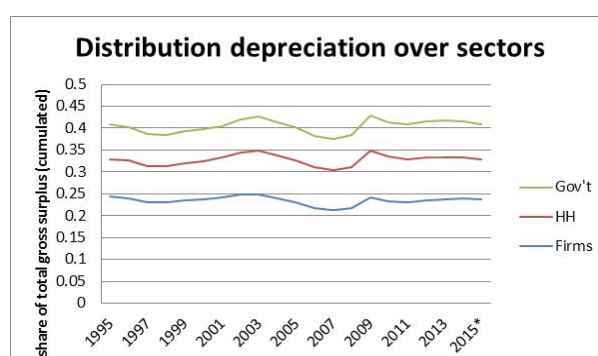Source: CBS   Source: CBS

The thus defined profit share corresponds to the gross operating surplus of all sectors, excluding the net operating surplus of households. When we deduct depreciations from this gross operating surplus, the net operating surplus of firms and the financial sector remains, since the net operating surplus of government is zero. This is presented as net profits in Figure 2.12. The majority of these profits is generated in the firm sector. One also observes from Figure 2.12 that depreciations in the various sectors constitute almost half of the gross operating surplus. The distribution of these

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[12] We elaborate this when discussing Figure 3.1 below.

depreciations over the various sectors is presented in Figure 2.13, where financial institutions are included under firms.

Underlying the above discussion is the distribution of GDP over sectors in presented in Figure 2.14. The figures do not add up to 100 per cent because the taxes on production and import, net of subsidies, are not included.[13] As one might expect firms constitute the majority of GDP – next to paying wages they also make profits as we elaborate in section 4. The contribution of households to GDP mainly lies in the contribution of self-employed persons as discussed in section 3, while government contributes by paying wages – see also section 5. The contribution of the financial sector is hard to measure but below 10 per cent of GDP – we elaborate this further in section 6. Finally all sectors contribute to GDP through depreciation, as we discussed in Figure 2.13.

Figure 2.13   Figure 2.14
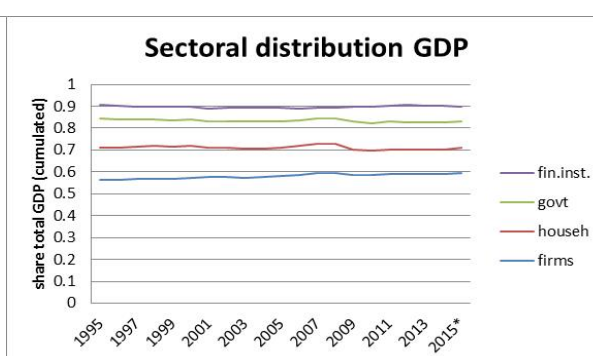
Source: CBS   Source: CBS

2.4 *The distribution of the capital stock over sectors*

The distribution of the capital stock over sectors is presented in Figure 2.15. One observes that the aggregate capital-output ratio fluctuates around 3, which corresponds to the well-known stylised fact. However, one should realise that a large part of the capital stock consists of houses owned by the household sector. Moreover government also holds about 15 per cent of the capital stock. As a consequence the capital stock of firms (including MFIs) is about 1.2 times GDP.
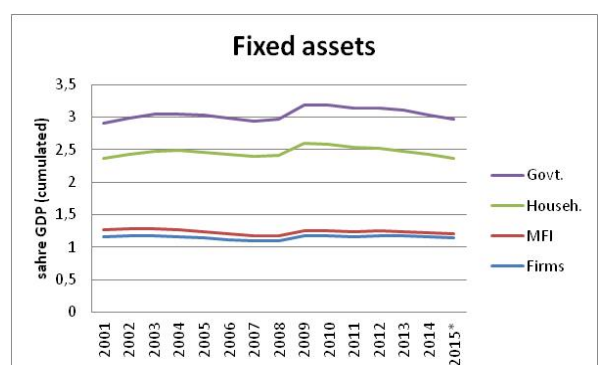
Figure 2.15   Figure 2.16
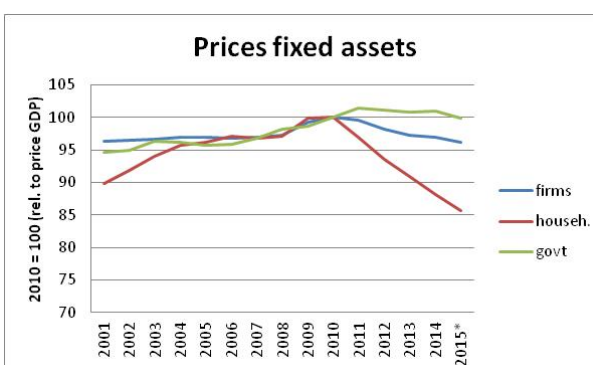
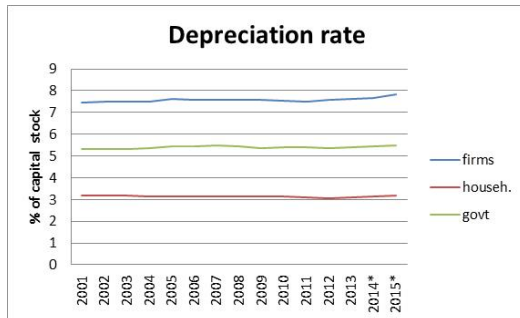Source: CBS   Source: CBS

[13] These are probably indirect taxes and constitute almost 18 per cent of value added of firms.

The development of prices of fixed assets, relative to GDP price, is presented in Figure 2.16. One observes that for firms and government the price development is quite close to that of the GDP price. However, for houses the development of prices is different. It increased relative to that of GDP prior to 2009 and decreased strongly after 2010. The current increase in house prices is not captured in these data. We discuss the development of house prices further in section 3.2.

Figure 2.17

Source: CBS

A final issue concerns the depreciation of fixed assets. The rates of depreciation are presented in Figure 2.17. The figures seem quite plausible, assuming that houses have a very long lifetime, government assets and intermediate life time and firms a shorter life time.

3. Households

The data on income and spending of households are taken from the household accounts ("current transactions by sectors") published by the CBS and are consistent with the macroeconomic sector accounts in section 2. These data are presented in section 3.1 and constitute the household row and column of the social accounting matrix (SAM) presented in Table 2. Next to that we use the balance sheet accounts ("Financial balance sheets and transactions") to identify the wealth components presented in the column of households in Table 1 – see section 3.2. As we show in section 3.3, these data sources are not fully consistent and we consider possible solutions to deal with these inconsistencies. In section 3.4 we discuss the interaction with other sectors and suggest some simplifications to make the data suitable for the model.

3.1 *Income and spending of households*

From the previous chapter one can infer that the contribution of households to GDP consists of depreciation, fluctuating between 20 and 40 per cent, wages paid to employees, about 20 per cent, and the net-operating surplus of households – the latter fluctuates between 40 and 60 per cent of the contribution of households to GDP. This net-operating surplus consists of mixed income of self-employed persons. We consider this as wage income, motivated by the strong rise of independent self-employed persons, i.e. freelancers ("zzp-ers" in Dutch), which constitute the majority of self-employed.[14]

The income of households consists of wages (incl. self employed), returns to wealth and pension benefits. For accounting reasons pension claims are also attributed to the income of households, although this income is not realised. The claims are the difference between pension benefits provided to households in a certain year and pension contributions by households – we discuss this issue further below in Figure 3.4. The various income components are presented in Figure 3.1 as a share of GDP.
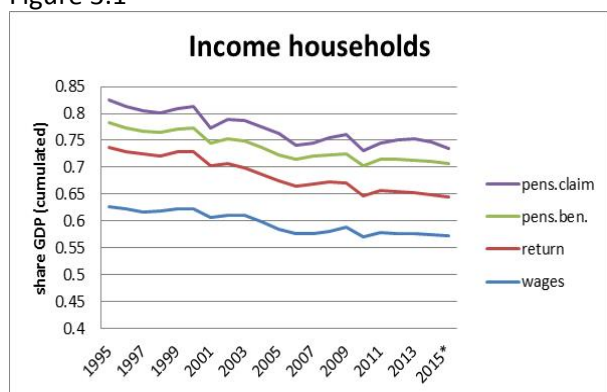
Figure 3.1   Figure 3.2
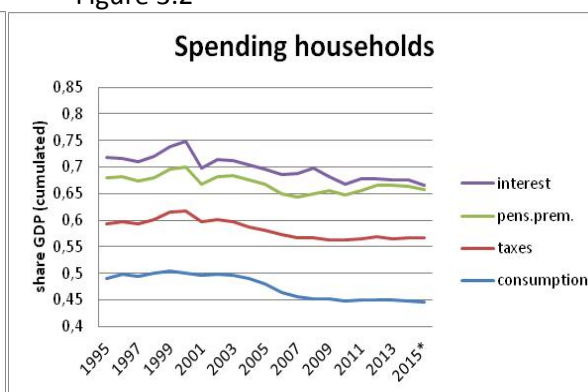
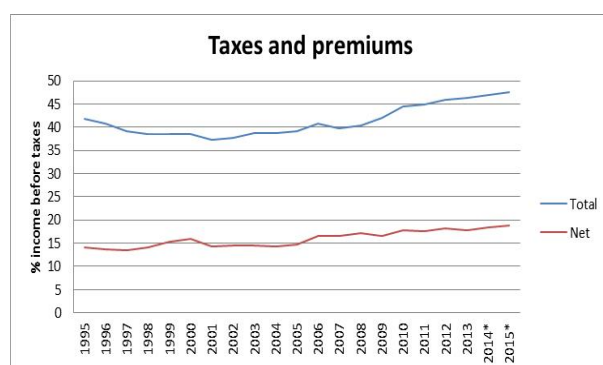Source: CBS   Source: CBS

Similarly Figure 3.2 shows how spending of households is distributed over consumption, taxes net of subsidies, pension premiums paid and interest on mortgages. Remarkable features are the decline in consumption after the financial crisis in 2007 and the decrease in interest paid on mortgages.

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[14] A similar procedure is followed by DNB (2016) to correct the data on the wage share in national income. This motivates DNB to express their concern about decreasing wage income in the Netherlands – see also Figure 3.1 (and Figure 2.11).

To evaluate taxes net of subsidies we present the total rate of taxes and premiums in Figure 3.3, relative to income before taxes.[15] This rate increased from around 40 per cent of income in 1995 to almost 48 per cent in 2015. However, relevant for our analysis is the tax and premium rate net of social security benefits.[16] This rate is much lower as can be seen from Figure 3.3 – it increased from below 15 per cent in 1995 to almost 20 per cent in 2015.[17] Finally, these rates do not include pension contributions and benefits.

Pension benefits and contributions are presented in Figure 3.4, relative to wage income. One observes that the pension contributions (premiums) paid by households exceed the benefits. The reason is that in the funded pension system the pension premium is paid to cover future benefits.[18] As a consequence households establish a claim on the pension fund by paying a premium. The difference between premiums and benefits then contributes to the total claim households hold on the pension funds. As we mentioned above, this difference is attributed to household income in the national accounts for accounting purposes, but it is not available to be spent on consumption – essentially the difference constitutes "compulsory savings", since contributions to funded pensions are obligatory. The households cannot decide how to invest these savings, but hand these over to the pension funds.[19]

Figure 3.3   Figure 3.4
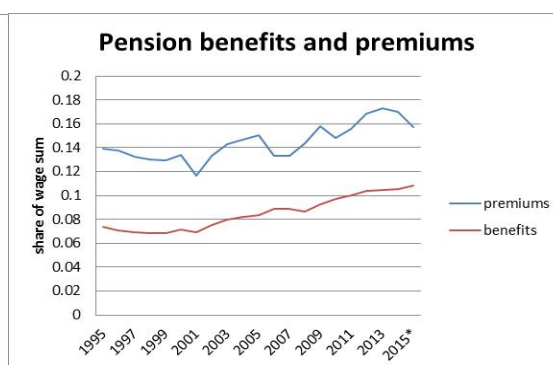
Source: CBS   Source: CBS

The difference between income and spending of households leads to savings, which are depicted in Figure 3.5, net of depreciation of houses. If we subtract the "compulsory savings" discussed in Figure 3.4, "free" net savings are negative.[20] The latter would suggest that households have no funds to buy houses and invest in financial assets, but this is where mortgages enter the story as we elaborate in Figure 3.14 below.

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[15] For simplicity the tax deduction on mortgage payments is ignored.
[16] The consumption function is not affected by using net taxes, as long as the marginal propensity to consume out of income equals the marginal propensity to consume out of benefits. This is highly implausible: the latter is probably larger than the former, but we will ignore this in our analysis.
[17] Looking at taxes on income and wealth only, these increased from 10 per cent in the mid 1990s to around 13 per cent in 2015.
[18] As we discuss in section 7.2 below, these future benefits increase when the interest rate declines.
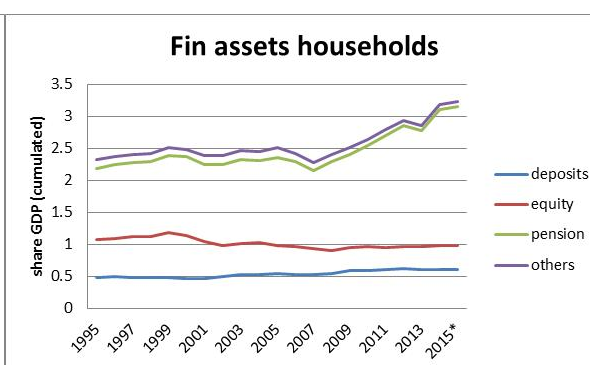[19] In the data these are indicated as "Adjustment change in pension entitlements".
[20] Next to "compulsory savings" for funded pensions, depreciation of houses is a form of compulsory savings. The latter savings are absorbed by the housing stock and are necessary to keep the housing stock at its current level.

Figure 3.5   Figure 3.6
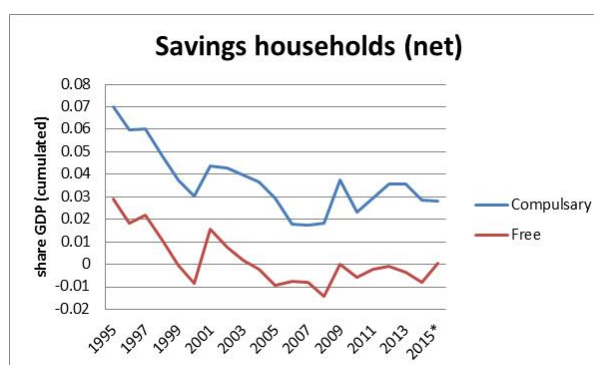

Source: CBS + own calculations   Source: CBS

3.2 *Household wealth*

The majority of financial assets of households consists of claims on pension funds – see Figure 3.6. These claims have increased dramatically after 2007 due to valuation effects as we elaborate in section 7.3. However, pension wealth is not considered by consumers as financial wealth as we argue in MMS (2016). For that reason we focus on financial assets excluding pension wealth.

As appears from Figure 3.7 the financial assets of households excluding pension wealth consist almost exclusively of deposits and equity.[21] Equity is to a large extent issued by investment funds – these have taken over the asset management of households as we discuss in section 7.3. Almost all liabilities of households consist of loans, of which the majority (roughly 80 per cent) is mortgages – see Figure 3.8. The relation between mortgages and housing stock is discussed in Figure 3.12 below.
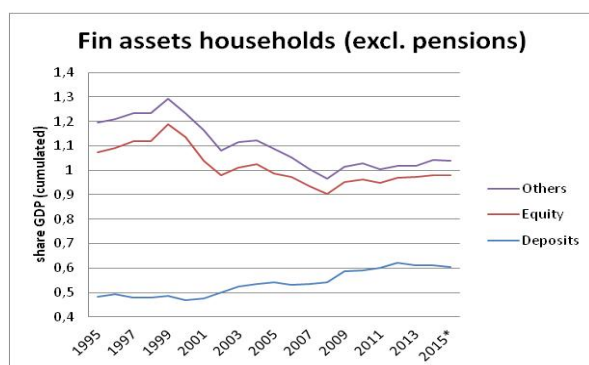
Figure 3.7   Figure 3.8
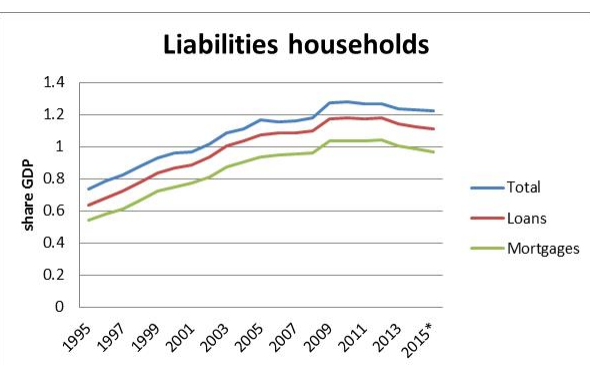
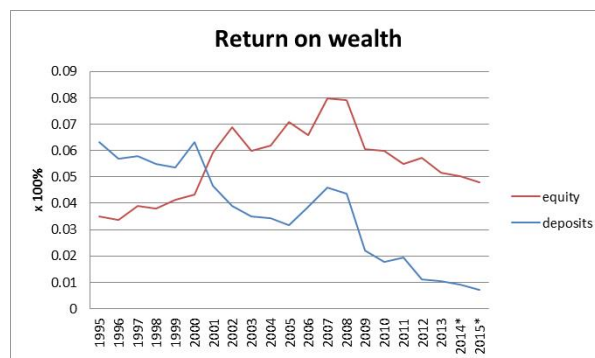Source: CBS   Source: CBS

The "return" part of income of households in Figure 3.1 consists of interest, dividends and pension returns (including life insurances). If we attribute the interest part to the deposits of households and the dividend part to the equity, we find the rates of return depicted in Figure 3.9. The development of these rates of return over time seems quite plausible.[22] Similarly we calculated the rate of interest

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[21] The amount of currency held by households decreases from 9 per cent of deposits in 1995 to 2.5 per cent in 2015. Moreover, households do not hold any significant amount of bills directly, but through institutional investors, which are part of the financial sector.

[22] The thus calculated rate of return on equity also represents fluctuations in equity price – see for instance the sharp increase in returns in 2000, which is due to the fall in equity prices after the dot-com crisis.
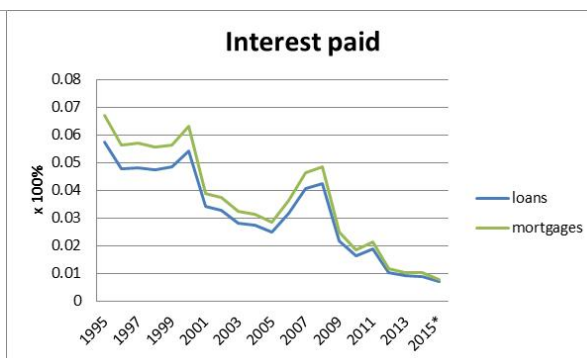
on loans by dividing the amount of interest paid in Figure 3.1 to the amount of loans. The resulting rate of interest is depicted in Figure 3.10. If we apply amount of interest paid to the mortgages, the resulting rate of interest is also depicted in Figure 3.10.

Figure 3.9   Figure 3.10



Source: CBS+own calculations   Source: CBS+own calculations

Another component of household wealth is the stock of houses. We first present the development of house prices in Figure 3.11. The line "WOZ" in that figure corresponds to the price index derived from the capital stock figures presented by the CBS and is consistent with the price index presented in Figure 2.16 above, although in the latter case the index is relative to GDP prices. Since "WOZ" is derived from administrative data used for tax purposes, it lags two years to the average selling price which is also shown in Figure 3.11. The development over time clearly shows how the housing bubble collapsed in 2008 – leading to a fall in house prices after the financial crisis of almost 20 per cent. The recent increase in the selling price, which is much more prominent in quarterly data, can be related to the quantitative easing policy of the ECB as we discuss in Meijers and Muysken (2016).
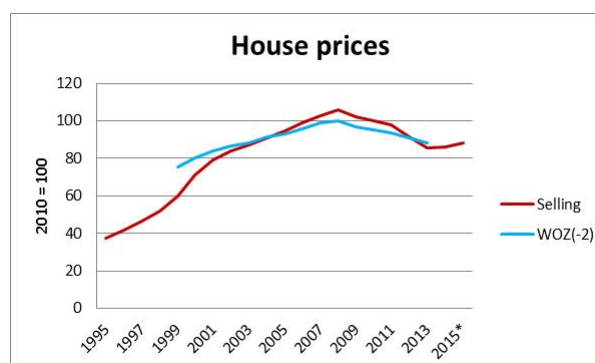
Figure 3.11   Figure 3.12
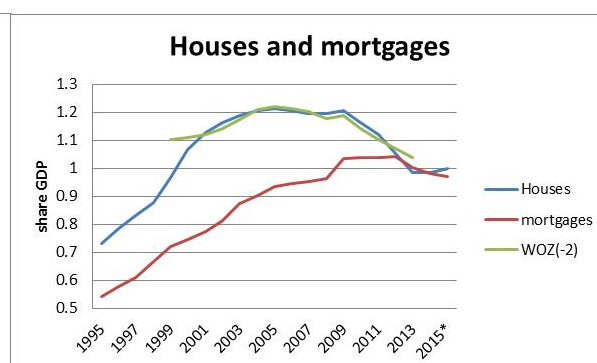
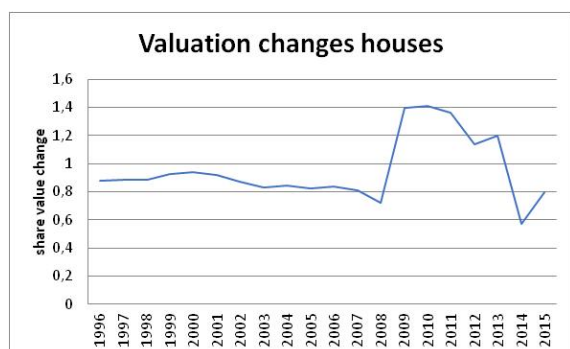Source: CBS   Source: CBS

The value of the stock of houses is presented in Figure 3.12. The WOZ(-2) line corresponds to the stock of houses – see Figure 2.15 above, where houses are shown to be part of the capital stock. These data are based on tax data and therefore lag the actual developments by about two years. The actual development of the value of houses is calculated by using data on the number of houses and multiplying these by the price. The resulting series tracks the stock of houses very close as can be seen from the figure. We also added mortgages to Figure 3.12 to illustrate how houses are to a large extent financed by mortgages: we discuss this further in the next section. Finally, the decline in the stock of houses reflects the decline in prices as appears from Figure 3.12.
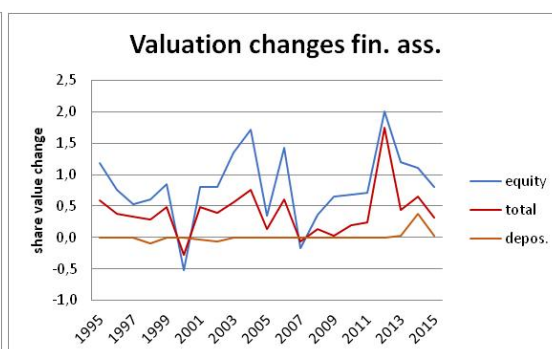
16

3.3 *Valuation changes in wealth*

From the discussion in the previous section it follows that household wealth consists of houses net of mortgages, financial assets and pension claims. Each of these wealth components, except mortgages, is subject to valuation changes.

Figure 3.13   Figure 3.14[23]

Source: CBS   Source: CBS

Valuation changes follow from the observation that assets can be traded and hence are subject to price changes. However, this does not hold for mortgages and pension claims. Mortgages are excluded since these are not traded by the holders of the mortgages and are defined in nominal terms.[24] Pension claims are not traded either, but since these are included in the national accounting system as we explained above, valuation changes result from the investments of pension funds. The CBS records all valuation changes since it provides a sub-division of the change in the value of a stock between transactions (i.e. net investment) and others (i.e. price changes and revaluations) – the latter constitutes valuation changes.

The valuation changes for houses are presented in Figure 3.13 as a share of the annual change in value of the housing stock.[25] The observation from the figure that about 80 per cent of the change in the housing stock till 2007 is due to valuation changes is consistent with the strong increase in house prices observed in Figure 3.11. The values above unity the period after 2007 appear because the very small positive net-investment in houses is overruled by a decline in house prices, leading to a decline in the value of the housing stock – see also Figure 3.12.

In a similar way the valuation changes for financial assets are presented in Figure 3.14. As might be expected, deposits have hardly any valuation changes. However, for equity on average about 80 per cent of the change in value of equity stock is due to price changes. The negative valuation change in 2000 is due to a fall in equity prices, while financial investment in equity was still positive. In 2001 a further fall in equity prices was observed, but since this coincided with a fall in the value of the equity stock, a positive value for the valuation change is recorded. The average valuation change of financial

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[23] The observation for equity in 2013 is truncated at 2, it actual value is 5.08.

[24] One might argue that the rate of inflation causes valuation changes in mortgages, but we will ignore the rate of inflation in the discussion of valuation changes in this section.

[25] We constructed this series from the selling price in Figure 3.11 and the corresponding series in Figure 3.12. Denoting value of the capital stock by p.K and net investment by I^N, we find $p.\Delta K = I^N$ and $\Delta(p.K) = I^N + (\Delta p).K_{-1}$, where $(\Delta p).K_{-1}$ represents the valuation changes. The data presented in the figure are $(\Delta p).K_{-1}/(\Delta pK)$.

assets of households was around 40 per cent, as appears from Figure 3.14. This is consistent with the observation from Figure 3.7 that households hold equity and deposits in quite similar proportions.
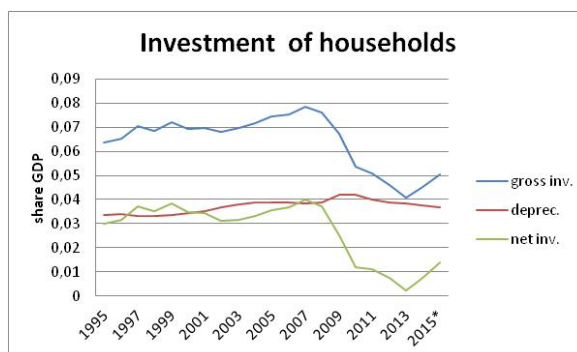
Figure 3.15[26]
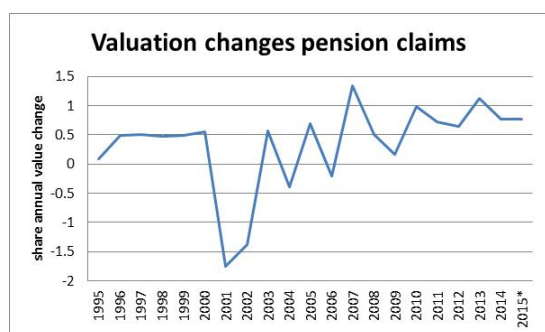
Valuation changes pension claims

Finally, the valuation changes in pension claims are presented in Figure 3.15. On average these valuation changes constitute 33 per cent of the annual changes in the value of pension claims, but 70 per cent since 2007. We elaborate these further when discussion pension funds in section 7.2.

3.4 *Stock-flow consistency and the allocation of savings*

With respect to the allocation of household savings, we distinguish between investment in houses, investment in financial assets and pension contributions. The question then is whether the flow data following from allocation of savings as identified in Figure 3.5 are consistent with the stock data in which they are assumed to accumulate.

Figure 3.16   Figure 3.17

**Investment of households**   **Housing stock and investment**
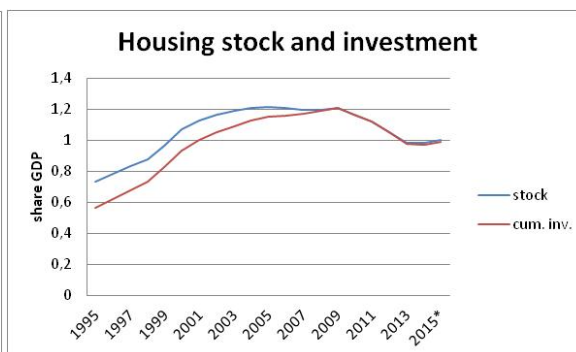
We start with investment in fixed assets of households. Although some investments of households are related to fixed assets of self-employed persons, the majority by far is investment in houses. We will therefore identify the investment in fixed assets of households as investment in houses. From Figure 3.16 one sees that investment in houses increased relative to GDP prior to the financial crisis and fell dramatically thereafter. Recently it picked up again but as we mentioned above, the recent

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[26] The observation for 2007 is truncated at −1, its actual value is − 4.15.

bubble is not identified in the investment and stock data yet.[27] When we compare the investment data to the housing stock presented in Figure 3.12, we have to take valuation changes into account – see Figure 3.13. In Figure 3.17 we present the accumulated investment together with valuation changes (2010 = 100) and compare this with the housing stock presented in Figure 3.12. Roughly speaking, the accumulated investment data seem consistent with those of the housing stock. The discrepancies might be explained by inconsistencies of the data sets used, as appears from Figures 3.11 and 3.12.

Turning to investment in financial assets, we have seen in our earlier discussion, and also in Figure 3.12, that houses are to a large extent financed by mortgages. As a consequence we should consider the increase in mortgages together with the net free private savings minus net investment as the funds which are available for investment in financial assets. From Figure 3.18 that figure one sees that around 1997 about 6 per cent of GDP was available for investment in financial assets by households. This amount decreased consistently till 2007 and became even negative from 2012 onwards. As a consequence cumulated funds available for investment in financial assets decreased consistently as a share of GDP. These funds are depicted in Figure 3.19 as "cumulated", also taking valuation changes into account – see Figure 3.14. The development of these cumulated funds then should be compared the development of equity and deposits over time in which they are invested. These assets are depicted in Figure 3.19 as "fin. assets" – see also Figure 3.7. The cumulated net savings, including valuation changes, track the development of financial assets over time quite well.
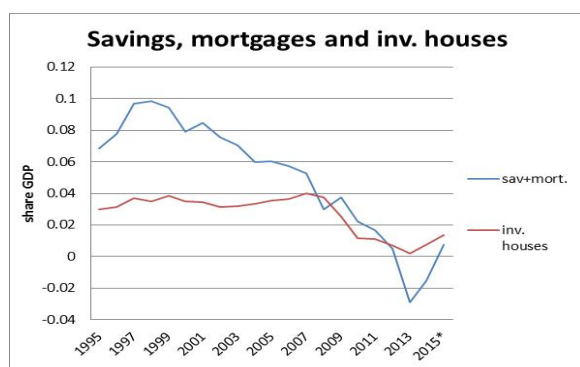
Figure 3.18   Figure 3.19
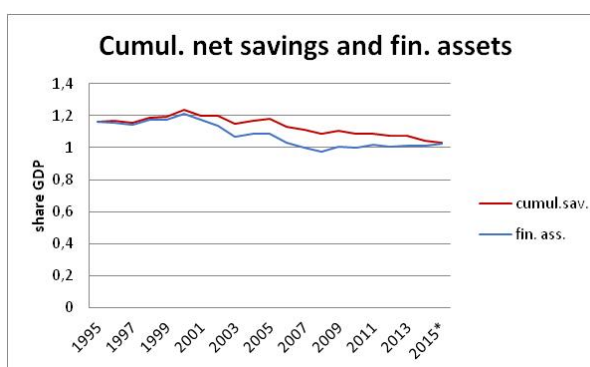
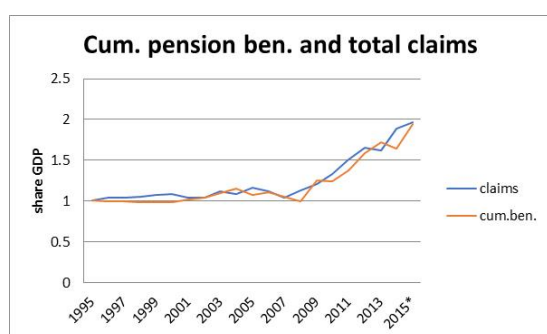Source: CBS + own calculations   Source: CBS + own calculations

Finally looking at pension contributions, we have already indicated in Figure 3.5 how pension contributions net of benefits constitute forced savings, about 4 per cent of GDP. The cumulated net contributions are presented in Figure 3.20 as a percentage of GDP, starting from the claims in 1997 of households on the pension fund as a share of in GDP, and including valuation changes. The total claims are also reproduced in Figure 3.20 – they appear in Figure 3.6 as the assets of households. From the figure one sees that both series are very close to each other, indicating a high consistency of stock and flow data.

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[27] Gross investment of households was 8.6 per cent of disposable income of households in 2007:II and fell to 3.8 per cent in 2013:I. It then gradually increased till 6.1 per cent in 2017:I, which is the most recent observation.

Figure 3.20

Source: CBS+own calculations

3.5 *Simplifying household data and the interaction with other sectors*

The data on financial assets and liabilities are presented in Figures 3.6 and 3.8. As simplifying assumptions we ignore others on the asset side and focus on mortgages on the liabilities side. The corresponding balance sheet for 2015 is presented in Table 3.1 below. The mortgages are borrowed from banks and deposits are issued by banks. Also, as we discussed above, the equity held by households is held in the form of participations in investment finds, also issued by the banking sector. Finally, the pension claims are on pension funds.

Table 3.1   Assets and liabilities of households, 2015 (share GDP)

ASSETS		LIABILITIES	
Houses	1.16	Mortgages	0.97
Deposits	0.61		
Participations	0.37		
Pension claims	2.17	Net worth	3.34

The participations and deposits have a return presented in Figure 3.9. The mortgages are provided at a rate indicated by the lower line of Figure 3.10. Finally, one should be aware that quite significant valuation changes occurred in household wealth. Of the annual change in value of houses, financial assets and pension claims on average 80, 40 and 70 per cent, respectively, is due to valuation changes.

4. Firms

The data on income and spending of firms are taken from the non-financial firms accounts ("current transactions by sectors") published by the CBS and are consistent with the macroeconomic sector accounts presented in section 2. These data are presented in section 4.1 and constitute the firm row and column of the social accounting matrix (SAM) presented in Table 2. Next to that we use the balance sheet accounts ("Financial balance sheets and transactions") to identify the wealth components presented in the column of firms in Table 1 – see section 4.2. As we show in section 4.3, these data sources are reasonably consistent. We finally discuss the interaction with other sectors in section 4.4, where we also elaborate on the role of direct investment abroad.

4.1 *Income and spending of firms*

The income of firms consists of the gross operating surplus which results from subtracting wages paid from firms' GDP – see Figure 4.1. Together with net income received from wealth (mainly invested abroad) this surplus can be identified with gross profits. The incomes on wealth received and paid out are presented in Figure 4.2 and total gross profits is presented in Figure 4.3.
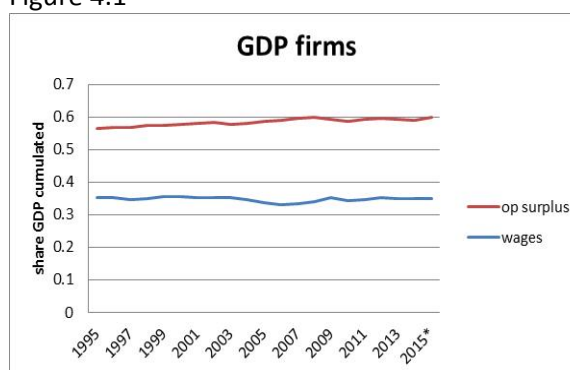
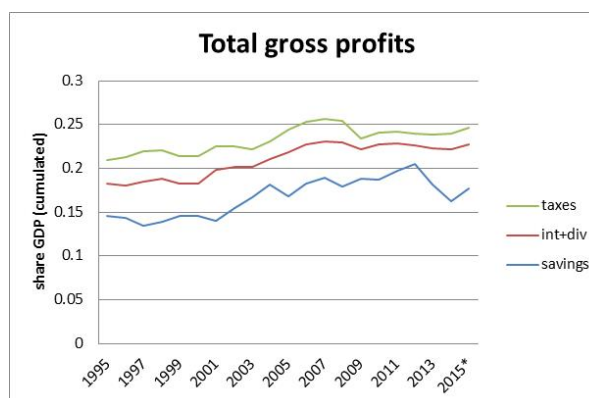Figure 4.1   Figure 4.2
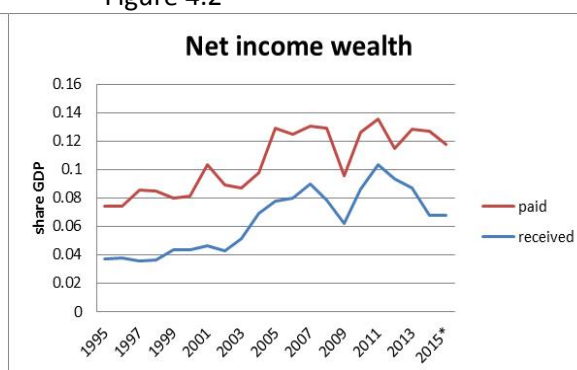
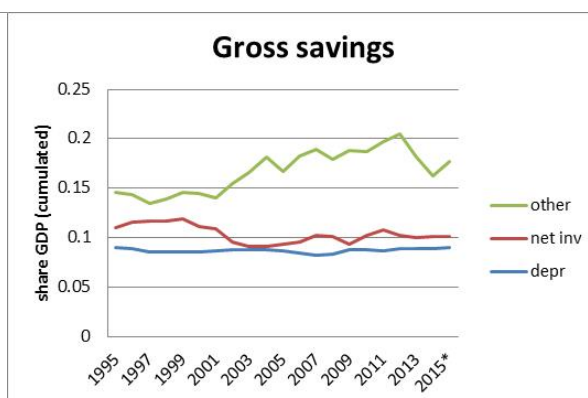Source: CBS   Source: CBS

From Figure 4.3 one sees that gross profits are used to pay interest on loans and taxes. The interest here is taken as net interest – the difference between the two series presented in Figure 4.2. Taxes net of subsidies are a minor share of gross profits, decreasing from almost 16 per cent in 1995 to around 8 per cent in 2015 – see also Figure 5.14 below. The resulting gross profits are gross savings.

Figure 4.3   Figure 4.4

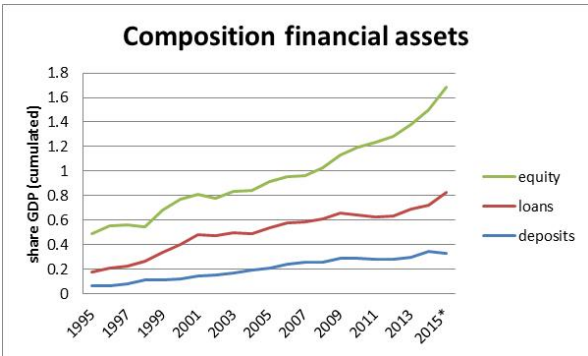Source: CBS   Source: CBS

Part of these savings is used for gross investment, i.e. net investment plus depreciation. As can be seen from Figure 4.4, depreciations are about 9 per cent of GDP and net investment is very low – we discuss this further in section 4.4. This leaves the remaining part of gross savings to be used for either dividend payments and for investment in financial assets (including take-overs). The latter is elaborated in section 4.4 where we discuss the role of direct investments.

4.2 *Firm wealth*

A widely observed phenomenon is the strong increase over time in financial assets held by firms (including participations) as presented in Figure 4.5 – see also MMS (2016). One observes from the figure that deposits, loans and equity taken together constitute almost 90 per cent of total financial assets since 2007, and prior to that year at least 80 per cent. As one might expect the majority of liabilities of firms consists of loans and equity, increasing from over 80 per cent of total liabilities in 1995 till almost 100 per cent in 2015. The share of loans is stable around 120 per cent of GDP and the share of equity fluctuates between 100 and 150 per cent – see Figure 4.6.

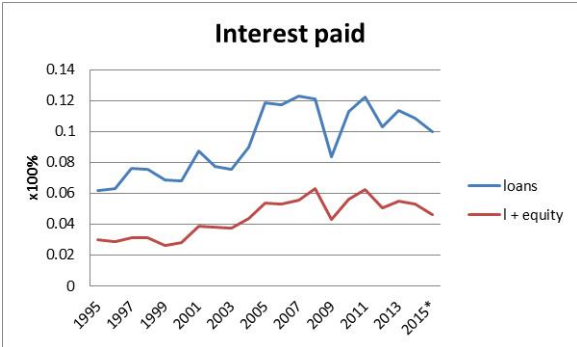Figure 4.5   Figure 4.6
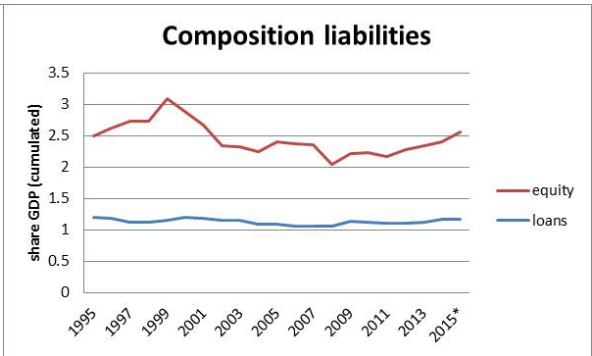
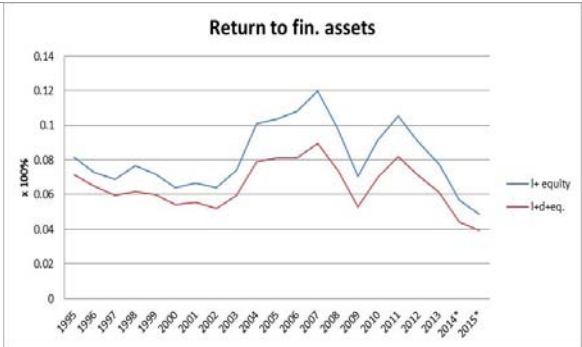Source: CBS   Source: CBS

If we attribute the interest paid out from gross profits (Figure 4.3) to the loans held by firms, we find the interest rate paid by firms presented under "loans" in Figure 4.7. However, it is very well possible that the interest paid by firms also consists of dividends on equity (the data source is not clear on this). In that case the interest rate paid by firms is presented under "l + equity" in Figure 4.7.

Figure 4.7   Figure 4.8

Source: CBS + own calculations   Source: CBS + own calculations

Similarly we attribute the interest received by firms (Figure 4.3) to the loans and equity issued by firms – this yields the interest rate "l + equity" in Figure 4.8. If we also include deposits, which

probably yield a lower interest rate, we find the interest rate received by firms under "l + d + eq." in Figure 4.8. These returns are somewhat different from the returns observed for households – see Figures 3.9 and 3.10 – but they fluctuate in the same range.

When comparing Figures 4.5 and 4.6, one observes that the financial net worth of firms is consistently negative. However, firms also have non-financial assets, i.e. the capital stock (and inventories and land). The capital stock has already been presented in Figure 2.15 and fluctuates over time very close around a share of 1.15 GDP. When we add the nominal value of the capital stock to the financial assets and compare this to the financial liabilities of firms, it turns out that till 2007 the total net worth of firms still is negative. However, in recent years it has become positive.[28]
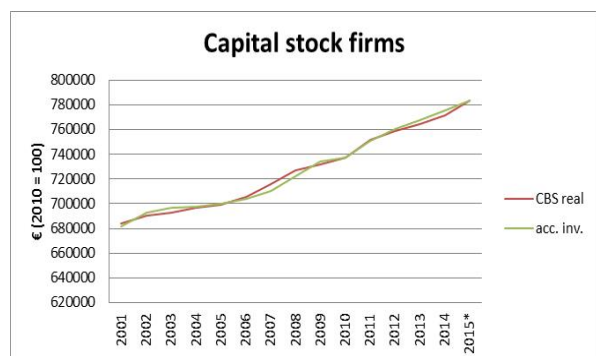
Figure 4.9
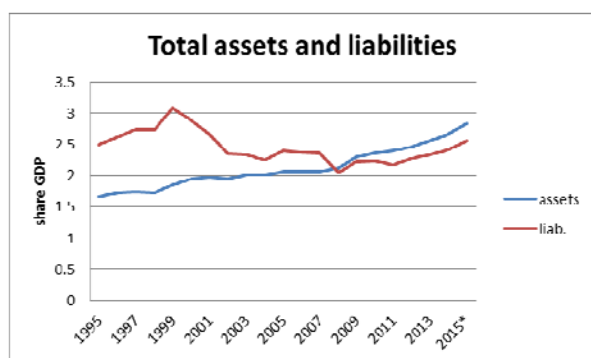
Source: CBS

When evaluating the development over time of assets and liabilities of firms, one should also consider the role of valuation changes – we evaluate these below.

### 4.3 Stock-flow consistency, the allocation of savings and valuation effects

Turning to the allocation of firm savings, see Figure 4.4 above, about 12 per cent of GDP is allocated to gross investment. Figure 4.10 shows how accumulated net investment follows the volume of the capital stock closely over the period. Hence the data on net investment are consistent with the data on the capital stock.

Figure 4.10   Figure 4.11
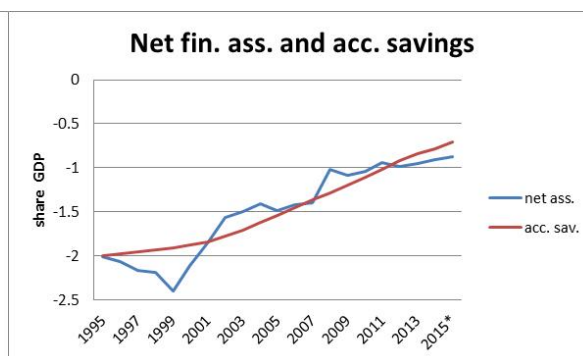

Source: CBS + own calculations   Source: CBS + own calculations

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[28] If we include inventories and land, the net worth becomes positive after 2001.

Likewise the accumulated savings net of investment are compared in Figure 4.11 to the development in net financial assets of firms.[29] From Figure 4.11 one sees that the data on savings are also consistent with the development of net financial assets except for valuation changes.

In a similar way as for households (Figure 3.14) the valuation changes for financial assets are presented in Figure 4.12. As might be expected, deposits have hardly any valuation changes hence the main changes follow from changes in equity prices. The interpretation of these changes is similar to that presented for households' financial assets. The average valuation change of financial assets of firms was around –20 per cent, as appears from Figure 4.12. This is in strong contrast to the valuation change in equity on the liabilities side as presented in Figure 4.12. The latter is on average 100 per cent of the annual change. That is, on average the increase in liabilities of firms' equity is entirely due to increases in share prices.
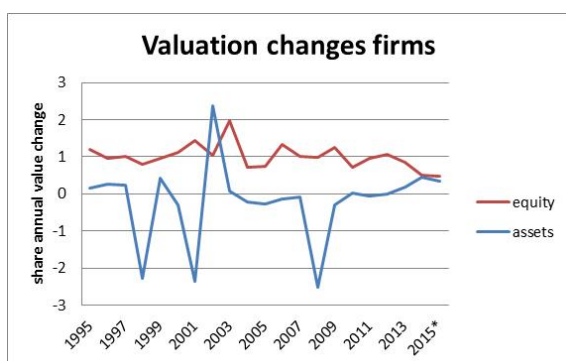
Figure 4.12   Figure 4.13
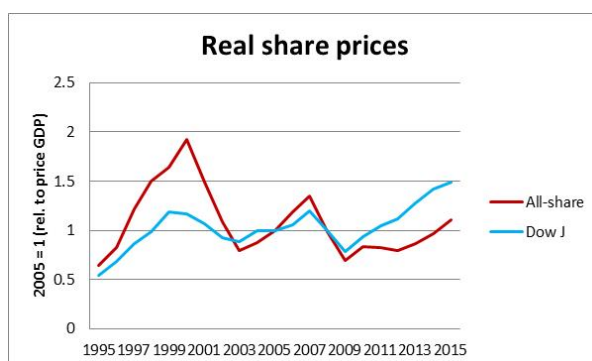
Source: CBS   Source: CBS

It is not entirely clear why these valuation effects are so different. As is illustrated in Figure 4.13, the Dutch All-share price, which is also very close to the AEX and European (Eur-100) index, is quite volatile. The Dow-Jones index shows a different pattern as appears from Figure 4.13. In both case the share prices are deflated with the GDP price index.

### 4.4 *Simplifying the firm data: the role of direct investment*

Unfortunately the CBS data do not provide information on the sectors in which the financial assets of firms are invested in or the sources from which the firms obtain their financial liabilities. However, the Dutch Central Bank (DNB) provides data on direct investments abroad, both inflow and outflow, albeit unfortunately only from 2004 onwards – we discuss these data in more detail in section 6.3 below. Comparing the DNB data to the CBS data shows that the financial assets of firms presented in Figure 4.6 above are very close to the direct investments measured by DNB – see Figure 4.14. We therefore think that it is reasonable to assume that all financial assets of firms are invested abroad and identify the total of financial assets of firms with direct investment.[30]

With respect to the financial liabilities of firms, one sees from Figure 4.6 that these consist predominantly of equity and loans. The stock of direct investment by foreigners in the Netherlands, identified by DNB is lower than the stock of equity issued by firms measured by CBS. We identify part

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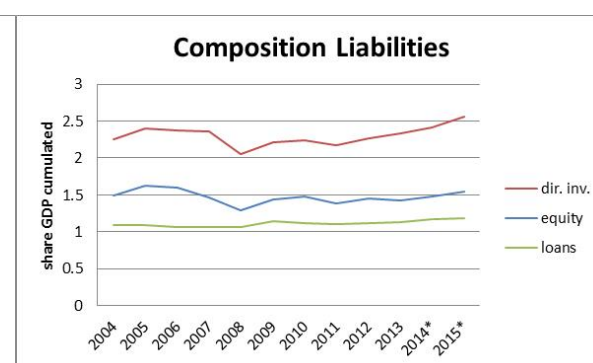[29] Savings start rather arbitrarily at – 200 per cent of GDP.
[30] This implies that we ignore that according to CBS data between 8 and 20 per cent of total financial assets of firms is held as deposits at banks – see Figure 4.6.
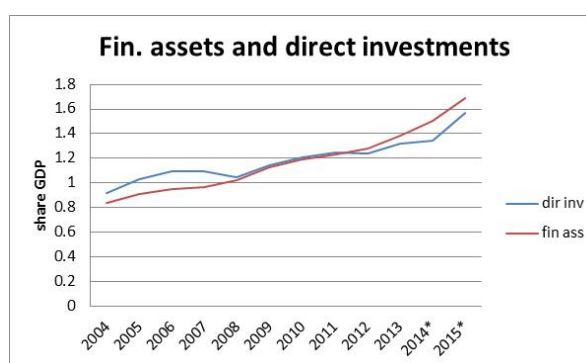
Figure 4.14   Figure 4.15

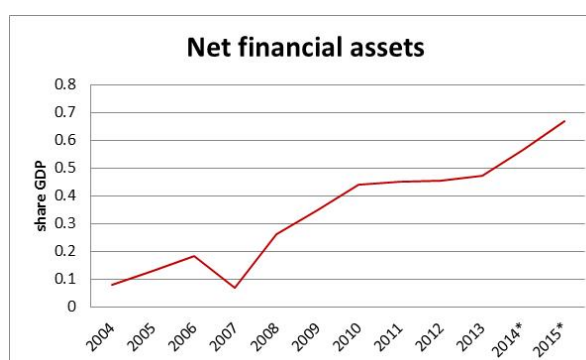Source: CBS/DNB   Source: CBS/DNB

of the latter stock as direct investment using the DNB data. This results in Figure 4.15, which is identical to Figure 4.6, except for part of the equity stock. By definition the direct investments stem from abroad. We assume that the remaining part of the equity stock is issued abroad and also part of the loans are provided from abroad as we elaborate in section 7.2 – for simplicity we also capture that part of loans under equity issued abroad. The remaining loans of firms then are provided by domestic banks.

A further simplifying assumption is that we do not want to model both direct investments abroad by Dutch firms and foreign direct investments in Dutch firms simultaneously and therefore focus on net direct investments. These net direct investments are relevant to identify the net income of wealth of firms, as discussed in Figures 4.2 and 4.3 above. Moreover they are relevant for the accumulation of net foreign debt as we discuss in section 6 below. The resulting data on net financial assets and liabilities are presented in Figures 4.16 and 4.17.

Figure 4.16   Figure 4.17
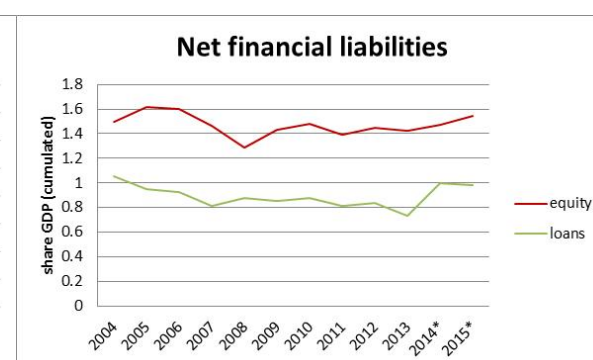
Source: CBS/DNB + own calculations   Source: CBS/DNB + own calculations

The corresponding balance sheet for 2015 is presented in Table 4.1 below.

Table 4.1   Assets and liabilities of firms, 2015 (share GDP)

ASSETS		LIABILITIES	
Net foreign dir. inv.	0.66	Loans banks	0.97
Capital	1.75	Equity abroad	0.56
		Net worth	0.87

25

The net foreign direct investments presented in Figure 4.16 are invested abroad and have a return presented by the lower line of Figure 4.8. The net liabilities consist of equity issued abroad and loans provided by banks at the cost of a rate indicated by the lower line of Figure 4.7.[31] Finally, valuation effects occur in net foreign investment and equity. The observations in Figure 4.12 suggest that valuation effects in net direct investment are much lower than those in equity – the latter are probably around 100 per cent.

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[31] This is an average rate, which still has to be differentiated for loans and equity.

5. Government

The data on income and spending of government are taken from the government accounts ("current transactions by sectors") published by the CBS and are consistent with the macroeconomic sector accounts presented in section 2. These data are presented in section 5.1 and constitute the government row and column of the social accounting matrix (SAM) presented in Table 2. Next to that we use the balance sheet accounts ("Financial balance sheets and transactions") to identify the wealth components presented in the column of government in Table 1 – see section 5.2. As we show in section 5.3, these data sources are reasonably consistent. We finally discuss the interaction with other sections in section 5.4.
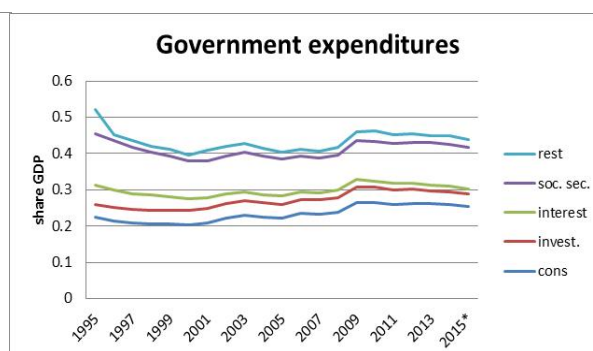
5.1 *Income and spending of government*

The income of government consists of taxes (net of subsidies), social security contributions and a relatively small component 'rest' (including the gross operating surplus which covers depreciation of the capital stock, and including income on wealth) – see Figure 5.1. The expenditures consist of consumption, investment, interest payments on government debt and social security expenditures together with a very small component 'rest' – see Figure 5.2. These figures illustrate how government expenditures, defined in a broad sense, are about 45 per cent of GDP.
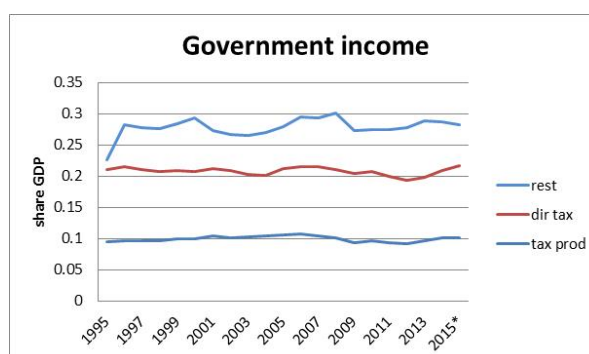
Figure 5.1   Figure 5.2
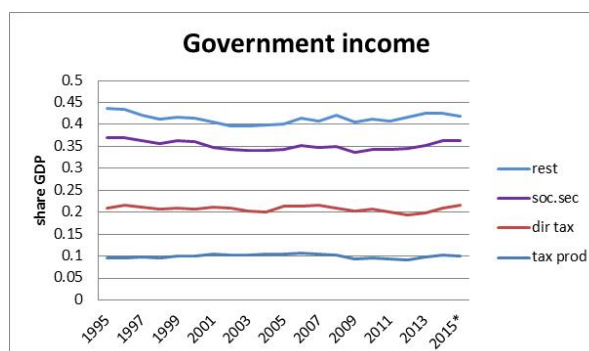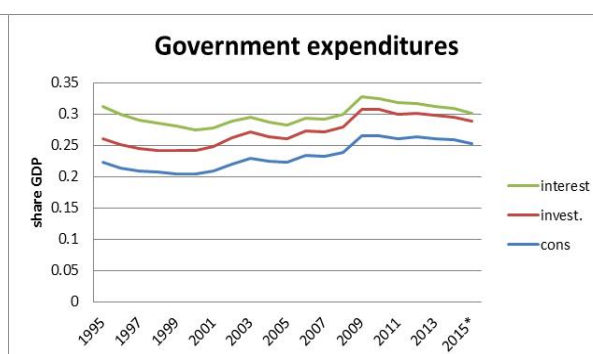

Source: CBS   Source: CBS

Figure 5.3   Figure 5.4
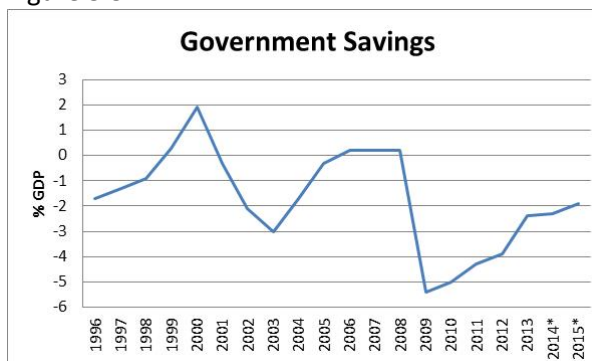

Source: CBS   Source: CBS

If we consolidate the social security contributions and expenditures together with the 'rest' components, we find the results presented in Figures 5.3 and 5.4, which are consistent with the row and column 'government' of the social accounting matrix (SAM) presented in Table 2, respectively.
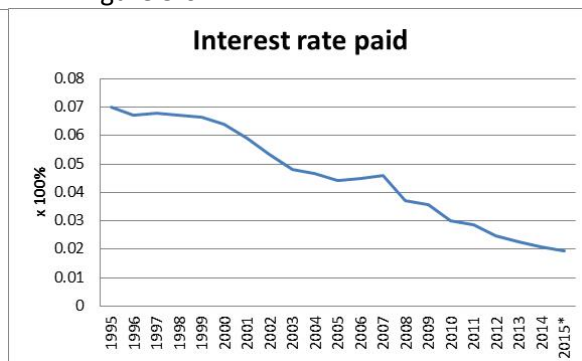
27

These figures illustrate how government expenditures in national accounts, defined in a narrow sense, are about 30 per cent of GDP. The data on investment and consumption in Figure 5.4 are consistent with Figures 2.5 and 2.6, respectively. The taxes on production and imports in Figure 5.3 are consistent with the tax data in Figure 2.9.

Figure 5.5   Figure 5.6

Source: CBS   Source: CBS + own calculations

The resulting government savings are presented in Figure 5.5 and are mainly negative because usually government expenditures exceed income.[32] The savings correspond to the so-called EMU deficit in the government budget. The strong fall in savings (increase in the deficit) in 2008-9 is because of the working of the automatic stabilisers after the financial crisis – in particular the increase in government consumption and social security expenditures, as can be seen from Figure 5.2.[33] Finally one should realise that contrary to households and firms in this case the savings are defined after investments have been made, i.e. the savings are net of investment – see also section 5.3.

If we attribute the interest paid in Figure 5.4 to the EMU-government debt, discussed in Figure 5.9, we find the interest rate displayed in Figure 5.6. The decline of this rate over time seems quite plausible.[34]

5.2 *Government wealth*

The CBS data show that government owns a substantial amount of financial assets, decreasing from 40 per cent of GDP till 25 per cent in 2006. These assets mainly consist of shares and loans – see Figure 5.7 – the "rest" part of assets consists in particular of transitory funds. The decrease in these assets probably reflects the privatisation program of the government. The sharp increase in loans in 2007 reflects the nationalisation of banks and the asset position of government increased till above 35 per cent of GDP from 2008 onwards.

The financial liabilities are presented in Figure 5.8. They decrease form 85 per cent of GDP in 1995 till 50 per cent on 2006, but increase again till 80 per cent of GDP in 2014. Not surprisingly the majority of these liabilities consists of government bonds.

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[32] We excluded the observation of a deficit of 8.5 per cent in 1995, since this is caused by a one-time telecom transaction. This transaction also causes the 1995 outliers in Figures 5.2 and 5.3.
[33] The nationalisation of banks is not included in these figures, although it is reflected in the government assets as we discuss in Figure 5.7.
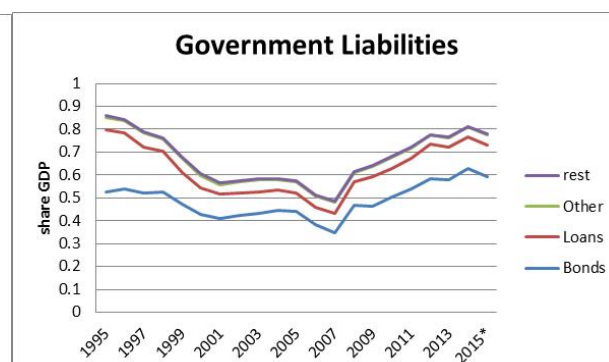[34] Applying the interest payments to total debt hardly changes the picture, given large share of EMU debt.
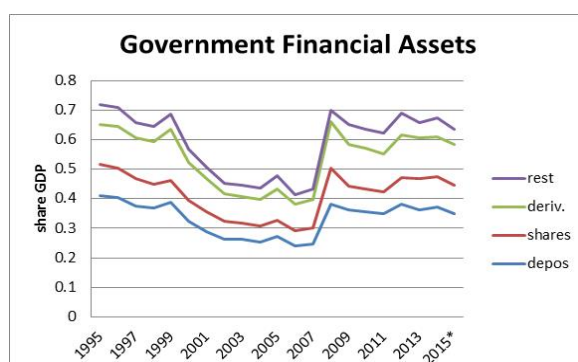
Figure 5.7   Figure 5.8

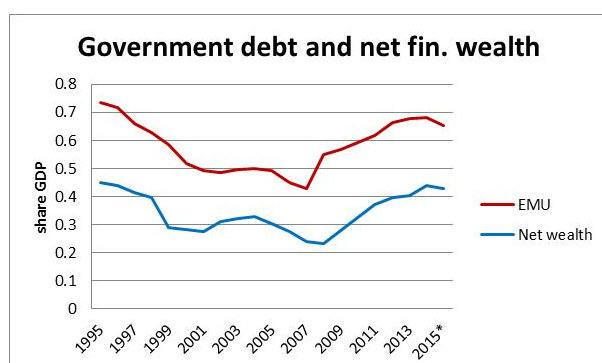Source: CBS   Source: CBS

The net-wealth resulting from Figures 5.7 and 5.8 corresponds to the outstanding net government debt. It is presented in Figure 5.9 together with the official EMU-government debt. One observes that both variables follow a similar development over time, but the EMU government debt is consistently about 20% of GDP higher. This discrepancy is due to different valuation principles of the EMU debt compared to the national accounting system.[35] However, the difference is remarkably large. Finally, there are no data available for valuation changes in EMU-debt.

Figure 5.9

Source: CBS

5.3 *Stock-flow consistency and the allocation of savings*

Since government savings are defined net of investment, see the discussion of Figure 5.5 above, the allocation of government savings should result in wealth accumulation. However, because savings are negative most of the time, wealth accumulation implies debt accumulation. One sees from Figure 5.10 that the accumulated deficit tracks EMU debt relatively close over time.[36]

A final question is how the data on investment are related to capital stock data. As can be seen from Figure 5.11, accumulated net investment follows the volume of the capital stock closely over the period. Hence the data on net investment are consistent with the data on the capital stock.

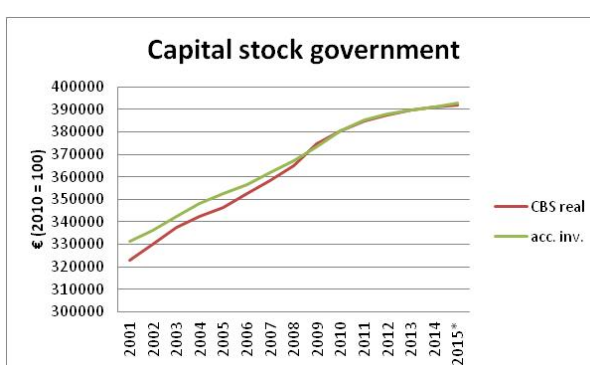[35] For instance, the national accounts use the market value of debt, whereas EMU debt is based on book value.
[36] The deviation after the financial crisis is because the nationalisation of banks is not part of the government expenditures and hence is not reflected in the deficit, although it is part of the debt.
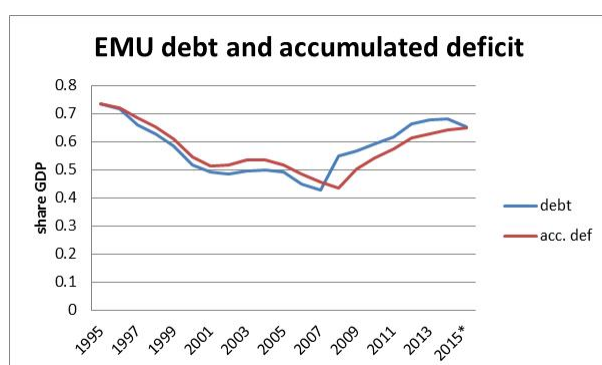
Figure 5.10   Figure 5.11


Source: CBS + own calculations   Source: CBS + own calculations

5.4 *Simplifying government data and the interaction with sectors*

For simplicity we do not recognise financial assets or non-financial assets of the government in our model and focus on the net debt. We observed in Figure 5.10 that the accumulated budget deficit tracks EMU government debt relatively close over time. For that reason we plan to focus on EMU debt as the only liability of government and ignore the assets for the moment being. The EMU debt then is supposed to correspond to the outstanding amount of bonds. The holders of government debt are presented in Figure 5.12 as a share of total debt, and in Figure 5.13 as a share of GDP.[37] One observes that the majority of government debt is held abroad and the major domestic holders of bonds are banks (including investment funds) and pension funds. The interest paid on these bonds is presented in Figure 5.6.
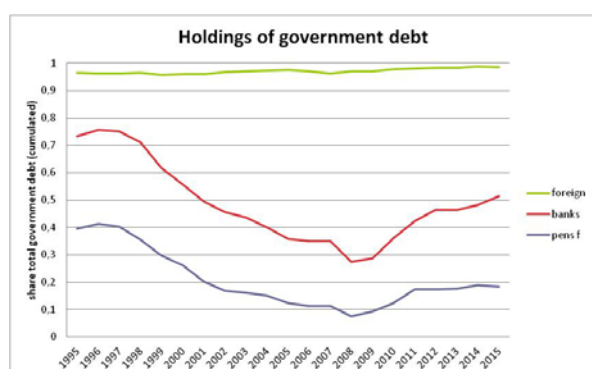
Figure 5.12   Figure 5.13
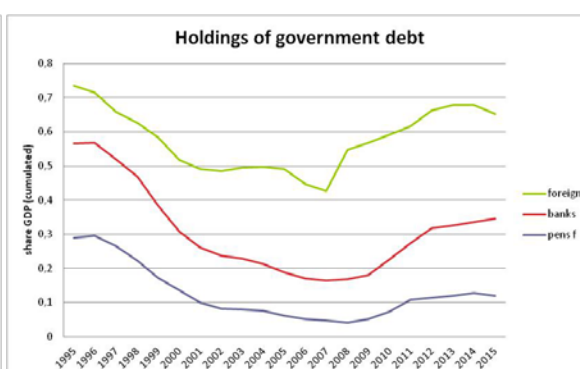
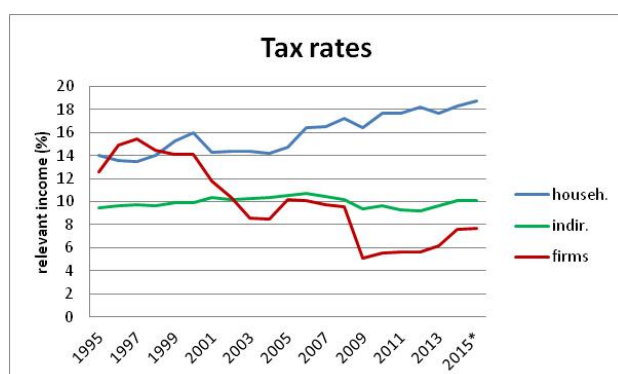Source: CBS   Source: CBS

In order to get an indication of the relevant tax rates, we reproduced in Figure 5.10 the rate of indirect taxes as a percentage of GDP, taken from Figure 2.9. Next to that we reproduced the rate of direct taxes on households as a percentage of disposable income, taken from Figure 3.3. Finally we calculated the rate of direct taxes on firms as a percentage of gross profits, taken from Figure 4.3. From Figure 5.10 one observes how the rate of indirect taxes remained stable over time, while the

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[37] In Figure 5.13 we added the bonds held by firms and households, the missing part of less than 3 per cent in Figure 5.12, to the bonds held by banks. Finally, as we explain in section 7.1, part of the banks' bonds is held by the Central Bank.

rate of taxes on households increased and that of firms decreased. In 2015 households pay about 19 per cent taxes on disposable income, while firms pay about 8 per cent on gross profits.

Figure 5.14

Source: CBS + own calculations

The government balance sheet for 2015 is presented in Table 5.1.

Table 5.1 Assets and liabilities of government 2015 (share GDP)

| ASSETS	LIABILITIES		
	Net worth (EMU debt)	– 0.65	
	Bonds held by: foreign		*0.31*
	banks		*0.16*
	Central Bank		*0.07*
	pension funds		*0.12*

6. The foreign sector

The data on income and spending of the foreign sector are taken from the foreign sector accounts ("current transactions by sectors") published by the CBS – they are consistent with the macroeconomic sector accounts presented in section 2. The data are presented in section 6.1 and constitute the foreign sector row and column of the social accounting matrix (SAM) presented in Table 2. Next to that we recognise that the balance sheet accounts ("Financial balance sheets and transactions") of the CBS are not well suited to analyse the development of foreign wealth since it does not identify the presence of Special Financial Institutions (SFIs) which constitute about half of foreign assets and liabilities. These SFIs have been created predominantly for tax reasons and provide a very strong bias when analysing the foreign wealth data. For that reason we look at the more detailed data from DNB, which traditionally provides the data on the current account and foreign wealth – both including and excluding SFIs. We compare the data of CBS and DNB in section 6.2 and show that the data on wealth are reasonably consistent with each other. The wealth data then are further analysed in section 6.3, ignoring the biases due to the presence of SFIs. In section 6.4 we present the interaction with other sectors and compare the stock and flow data.

6.1 *Income and spending of the foreign sector*

In Figure 6.1 we present net exports (trade balance), which are consistent with the exports and imports in Figure 2.7 above. The current account balance results by adding net income from abroad – i.e. net primary income and transfers – to the trade balance. From Figure 6.2 one sees how net income has fluctuated strongly due to changes in primary income, including net profits on foreign participations.[38] The net transfers include net transfers of taxes and development aid.
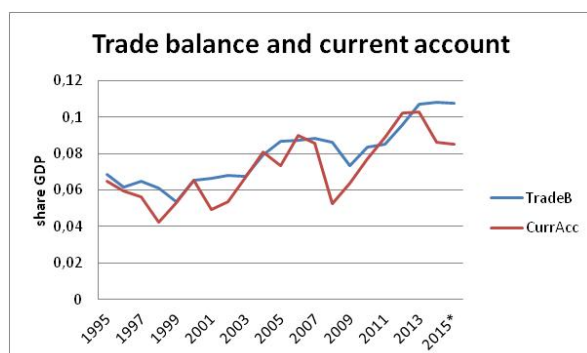
Figure 6.1   Figure 6.2
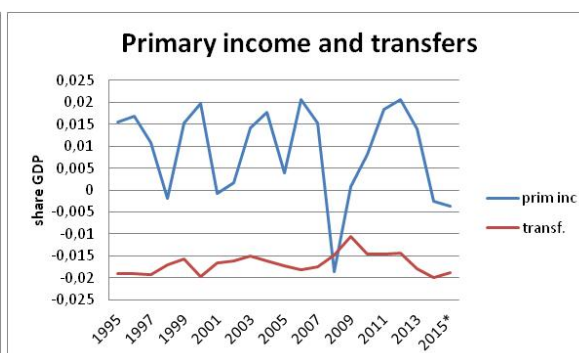
Source: CBS   Source: CBS

Net foreign debt accumulation is found by adding the capital account to the current account together with stock formation. We elaborate this in section 6.4. An important component of primary income is income out of wealth. We elaborate this also in section 6.4.

We ignore exchange rate movements in our analysis for simplicity. One argument is that a large share of our trade is within the Euro Area, where the exchange rate is fixed to unity. This is illustrated

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[38] This also explains the recent downward trend in the CA surplus, which "was driven entirely by income from financial assets."(DNB, 2016a)

in Figure 6.3 which shows that at least 50 per cent of our total exports goes to countries within the Euro Area and about 40 per cent of our total imports stems from countries within the Euro Area.[39]

With respect to the exchanges with respect to the rest of the world, one observes from Figure 6.4 that exchange rate fluctuations have not had a large impact on import prices relative to the GDP price after the introduction of the Euro in 2001. Therefore the notion of constant import and export prices relative to the GDP price seems a reasonable simplification.
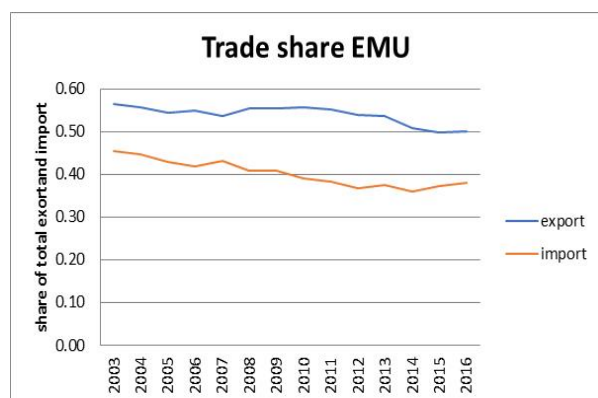
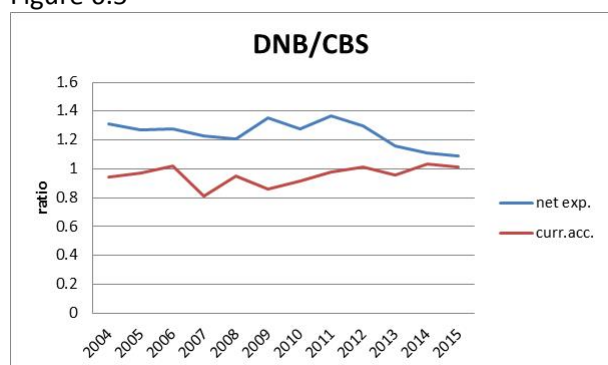Figure 6.3   Figure 6.4
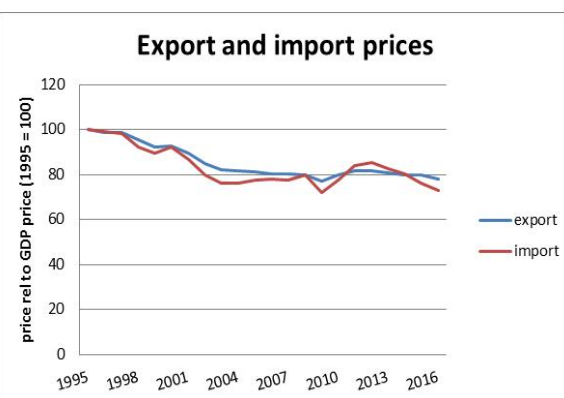
Source: CBS   Source: CBS

6.2 *Intermezzo: Inconsistencies in foreign transactions and wealth data*

Traditionally data on current account in the national accounts are taken from the central bank (DNB in the Netherlands), this also holds for data on foreign wealth. While in the past there was little synchronisation between the data published by CBS and DNB,[40] this has been taken up with considerable accuracy in recent years. The discrepancies are illustrated in Figures 6.5 and 6.6.

Figure 6.5   Figure 6.6
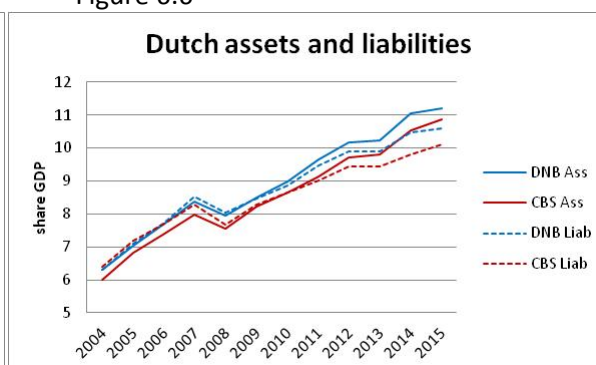
Source: CBS/DNB   Source: CBS/DNB

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[39] This implies that our export surplus within the Euro Area relatively exceeds the export surplus to the rest of the world.

[40] This is also noted in CPB (2009, Appendix A). Communication with CBS taught us that the three most important sources of inconsistencies are (1) CBS focuses on consistent time series, hence revises DNB the data more frequently than CBS does. (2) CBS uses a larger set of sources for information which are not always consistent, whereas DNB employs mostly current account balance data. (3) With respect to foreign ownership of Dutch equity CBS utilises the so-called 'residual approach', based on Dutch equity not in possession of Dutch citizens, whereas DNB uses a 'mixed' approach, based on information obtained from financial intermediaries.

From Figure 6.5 one observes that the flow data on the trade balance are quite inconsistent when we compare DNB and CBS: till recently DNB estimates a 20 per cent higher trade balance than CBS presents. However, the data on the current account are much closer. In order to maintain consistency with the national accounting system, we stick for flow data to the CBS data presented in the previous section.

With respect to wealth data it appears from Figure 6.6 that both foreign assets and liabilities are very large relative to GDP and have increased from above 5 times GDP in 2004 to over 10 times GDP in 2015. Although DNB tends to report somewhat higher assets and liabilities compared to CBS, the corresponding net wealth is remarkably close from 2008 onwards, as appears from Figure 6.7 – CBS shows a higher net wealth position in the last two years. We further analyse the development of net wealth in Figure 6.16 below.

Figure 6.7
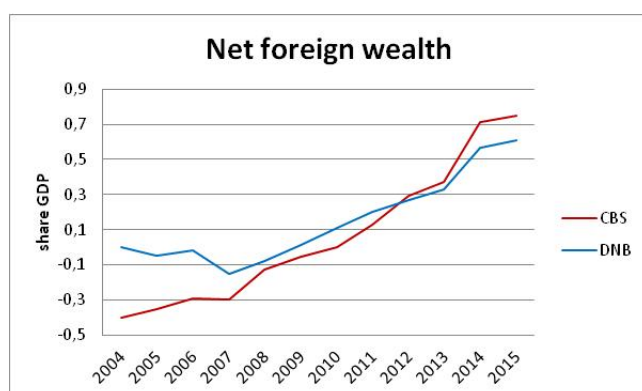
Source: CBS/DNB

6.3 *A closer look at foreign wealth and interaction with other sectors*

A specific reason for the enormous size of the Dutch foreign positions is the presence of Special Financial Institutions (SFIs), created predominantly for tax reasons.[41] However, a problem with the data presented in Figure 6.5, is that CBS does not distinguish SFI's explicitly, whereas DNB does. For that reason we analyse the DNB data closer below.

From Figure 6.8 one observes that SFIs constituted with respect to foreign positions almost 300 per cent of GDP in 2004, and increased towards 600 per cent of GDP in 2015. The huge prevalence of SFIs is consistent with the observation that the Netherlands is one of the most important conduit offshore financial centers in the world and plays "a key role in the global corporate ownership net work by allowing the transfer of capital without taxation."[42] The transfer nature of SFIs also explains

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[41] Following the definition of DNB: "Special Financial Institutions (SFIs) are resident Dutch enterprises or institutions, fully owned by foreign direct investors, that act as financial intermediary between other parts of the group to which they belong. The financial assets and liabilities of these institutions usually are related to direct investment via the Netherlands in third countries or are connected to the channeling of funds collected in the direction of the foreign investor."

[42] Garcia-Bernardo et al. (2017, p.2). The authors note that about 50 per cent of the world's assets and liabilities pass through offshore financial centers (OFCs), mainly for tax avoidance purposes. They distinguish between sink OFCs like the Virgin Islands and Bermuda, with low or zero corporate taxes, and conduit OFCs like the Netherlands and the UK, which low or zero taxes on the transfer of capital. "Conduits play a key role in the

why the stock of assets held by SFIs is almost equal to the stock of liabilities as can be seen from Figure 6.8. In order to keep the analysis manageable and because the net-contribution of SFIs to foreign wealth is very small, we will ignore the SFIs further in line with most analyses of the Dutch current account – e.g. Melles and Noordman (2009).[43] Ignoring SFIs reduces the foreign positions by almost half as is illustrated in Figure 6.9 by comparing the original claims and liabilities to the figures on 'claims-' and 'liabilities-', net of SFIs.
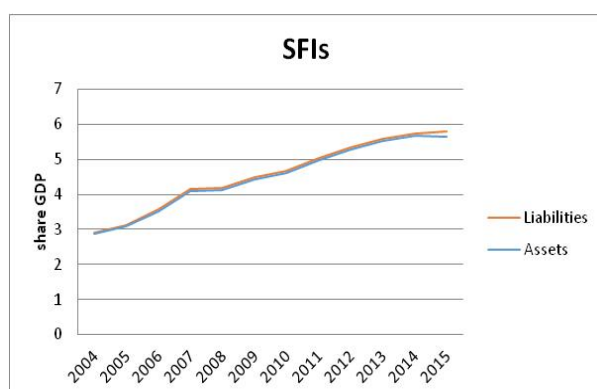
Figure 6.8   Figure 6.9
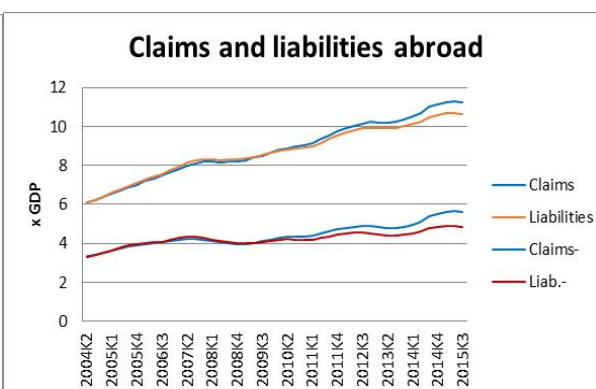
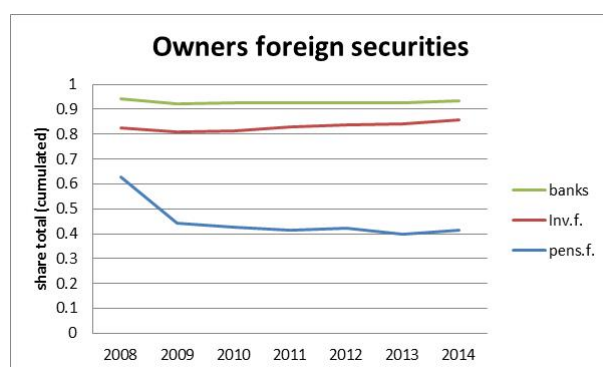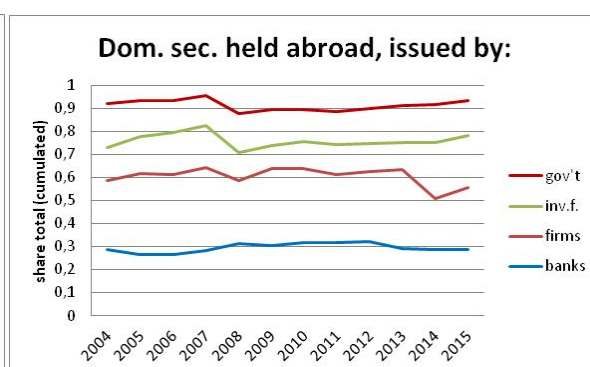Source: CBS   Source: CBS

The majority of both claims and liabilities represented by the lower part of Figure 6.9 consists of securities, direct investment and others. Securities comprise equity and debt (schuldpapier) as we elaborate in Figures 6.10 and 6.11.

Figure 6.10   Figure 6.11

Source: CBS   Source: CBS

Looking at foreign securities from a domestic perspective, we observe from Figure 6.10 that the majority is held by pension funds and investment funds. The investment funds mainly hold debt, whereas the pension funds mainly hold equity. The domestic securities held abroad are issued by various sectors, as illustrated by Figure 6.11. The majority of securities held abroad has been issued by banks and firms, and to a lesser extent by government and investment funds. Equity held abroad

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global corporate ownership network by allowing the transfer of capital without taxation. In this way, profit from one country can be re-invested in another part of the world paying no or little taxation."(p. 2)

[43] See Bezemer and Muysken (2015) and CPB (2016) for concerns on the impact of these institutions on the financial system.

is mainly issued by firms, till mid-2013, and later on also by investment funds.[44] Foreign debt held abroad is mainly issued by banks and government.

A second important component of both claims and liabilities is direct investment – this consists of holding a substantial proportion of shares in a foreign company, participations or providing credit.[45] One observes from Figure 6.12 that the stock of direct investments is quite large, fluctuating between 100 and 200 per cent relative to GDP. Moreover, the Netherlands invests considerably more abroad ("foreign") than the foreign sector invests in the Netherlands ("domestic").[46] As a consequence net direct investment is positive at a level around 40 to 50 per cent of GDP. The majority of direct investments consists of participations (abroad around 65 per cent of the total stock and in the Netherlands around 55 per cent), the remaining part consists of loans. With respect to the ownership of direct investments, these are typically owned by firms (in particular multinationals).
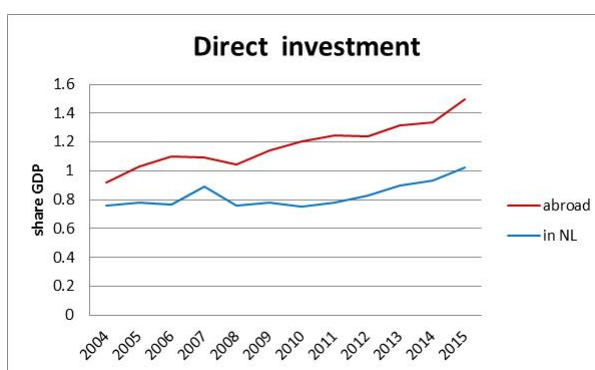
Figure 6.12   Figure 6.13
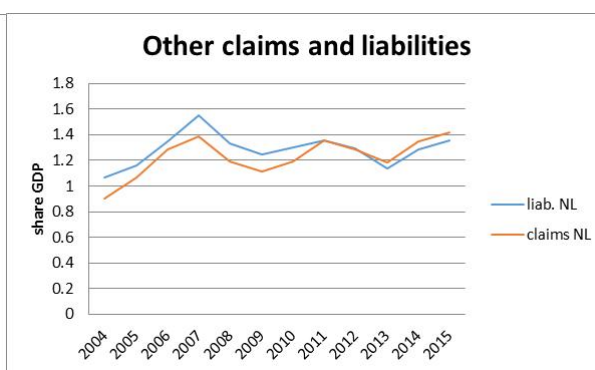
Source: CBS   Source: CBS

The final component of foreign assets is "other" claims and liabilities. One sees from Figure 6.13 that these are relatively stable over time relative to GDP at a level around 130 per cent. The claims held by the Netherlands are somewhat higher compared to its liabilities since 2010. As a consequence the net position is positive after 2010 – it increased slightly over time from a deficit of 15 per cent in 2004 to a surplus in 2015 as appears from Figure 6.13. The majority of both claims and liabilities is held by banks in the form of loans and deposits.

The information on the various components of assets and liabilities is summarised in Figures 6.14 and 6.15, respectively. In these figures we have also grouped the assets and liabilities such that they can be allocated to the relevant sectors. The direct investment presented in Figure 6.12 has been

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[44] It is not clear what happened with data collection in mid-2013: part of the equity previously issued by firms now is counted under investment funds (called by CBS "other financial institutions" or OFIs).

[45] Following the DNB definition: "Direct investment includes cross-border transactions related to changes in equity capital (so-called capital participations) among companies in a direct investment relationship. Such changes may take place through the creation, merger, acquisition, capital contribution, reinvestment of earnings, sales and capital repayment. All other financial transactions between enterprises in a direct investment relationship (intracompany loans and monies in current account) are also part of direct investment, with the exception of financial derivatives. Finally, cross-borders investment positions in real estate are part of direct investment." Direct investments are normally presented at book value – in that case retained profits and accumulated capital are added to the original costs.

[46] However, Garcia-Bernardo et al. (2017, p.2) mention that "inward FDI is systematically underreported", which indicates that net direct investment is overestimated.

allocated to firms in Figures 6.14 and 6.15 under the heading "dir. inv.". The assets under the heading "firms" in Figure 6.14 correspond to securities issued by domestic firms which are held abroad – see Figure 6.11. The securities held abroad issued by investment funds and government, presented in Figure 6.11, are also included as assets in Figure 6.14. From the latter figure one observes that the foreign sector owns government debt to about 30 to 35 per cent of GDP. Although this is only a small part of the total assets, one should note that this is about half of total outstanding government debt – see Figure 5.9.
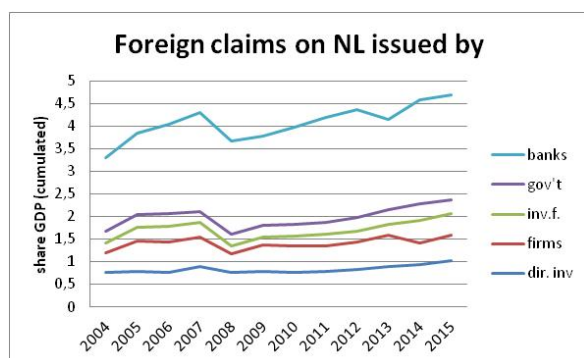
Figure 6.14   Figure 6.15
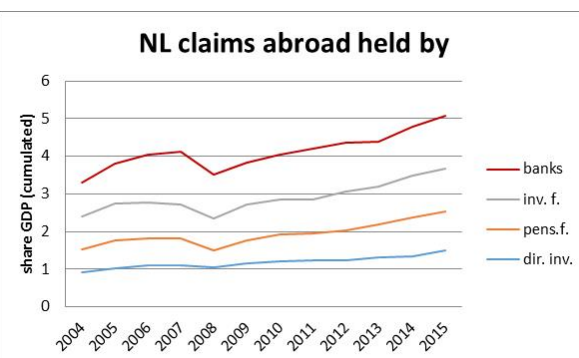
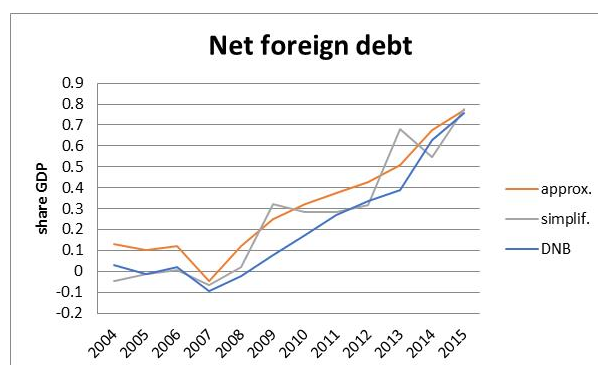Source: CBS/DNB   Source: CBS/DNB

The investment of pension funds in foreign assets abroad, presented in Figure 6.10, are included as liabilities in Figure 6.15. The same holds for the foreign assets of investment funds.

As we discussed in Figure 6.13, the banking sector holds both large claims on the foreign sector and has large liabilities. These consist mainly of loans and deposits. The claims and liabilities are very close to each other. We have included these as assets and liabilities of banks in Figures 6.14 and 6.15, respectively. However, an additional asset follows from the securities issued abroad by domestic banks – see Figure 6.11. Finally, we also added derivatives. These additional assets have also been included in Figure 6.14 as assets from banks.

Figure 6.16   Figure 6.17

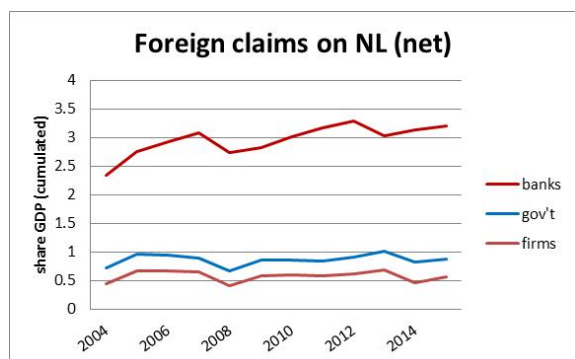Source: DNB + own calculations   Source: CBS/DNB

The net foreign debt can be calculated by subtracting total assets in Figure 6.14 from total liabilities in Figure 6.15. From Figure 6.16 one observes that the net foreign debt from this approximation (approx.) follows the net worth published by DNB – cf. Figure 6.7 – quite closely.

### 6.4 *Simplifying the foreign data and stock flow consistency*

Given the enormous amount of direct investments on both the asset and liabilities side, which are to a large extent interwoven with the financial sector, an obvious first simplification of the analysis is to consider net direct investments only, recognizing that the Netherlands is a net direct investor.

Figure 6.18   Figure 6.19
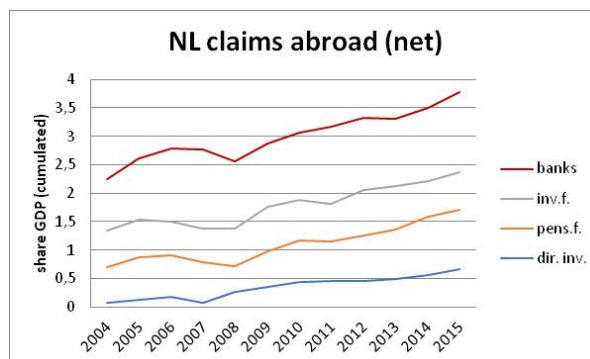
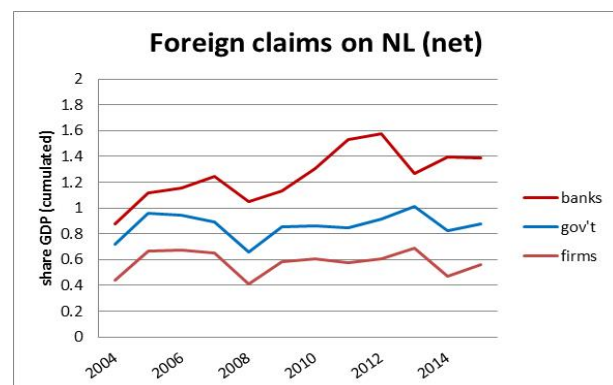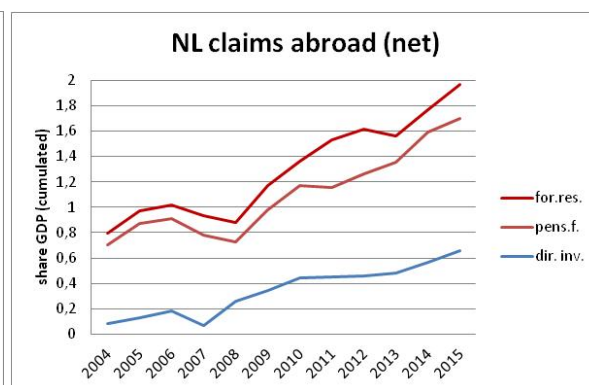Source: CBS/DNB + own calculations   Source: CBS/DNB + own calculations

A second simplification follows from our calculation of 'equity of firms' by subtracting foreign direct investments from total equity issued by firms – see Figure 4.16. We assume this remaining 'equity of firms' is also held abroad. In Figure 6.17 we compare of the thus calculated equity held abroad, using firm data, with the equity held abroad from Figure 6.14, issued by firms. One observes that the foreign data show a somewhat larger share of GDP, compared to the firm data. Since the DNB data also suggest that foreign loans are larger than when allocating all loans to firms in Figure 4.6 to domestic banks – see Figure 7.5 – we will use the upper line in Figure 6.17 for equity of firms in our simplification.

Figure 6.20   Figure 6.21

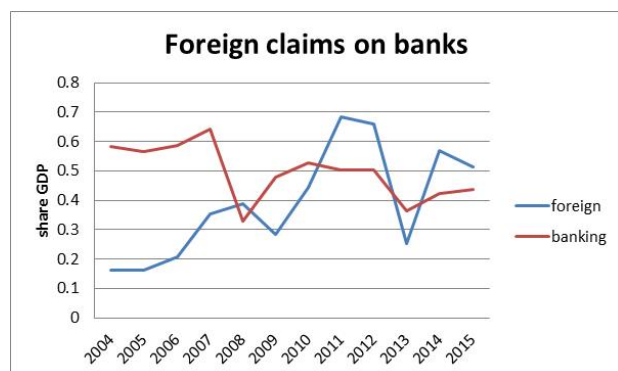Source: CBS/DNB + own calculations   Source: CBS/DNB + own calculations

A third simplification follows from the observation that participations in investment funds held abroad are relatively small – see Figure 6.14. These can also be netted out with foreign participations in investment funds. If we impute these three simplifications, Figures 6.14 and 6.15 can be simplified resulting in Figures 6.18 and 6.19, respectively. The resulting net worth still is reasonable close to the net worth observed by DNB – see Figure 6.16 (simplif.).

The loans and deposits of banks are still large on both the assets and liabilities side of Figures 6.18 and 6.19 – they consist mainly of (foreign) claims within the financial sector. For that reason we also net these out with each other, except that we still want to recognise foreign reserves held on the liabilities side of the foreign sector – these are held as assets by the central bank as we discuss in section 7.1. We also include investment funds under banks in our model, as we elaborate in section 7.2 below. When we apply these further simplifications to Figures 6.18 and 6.19, this results in Figures 6.20 and 6.21, respectively.

Figure 6.22   Figure 6.23
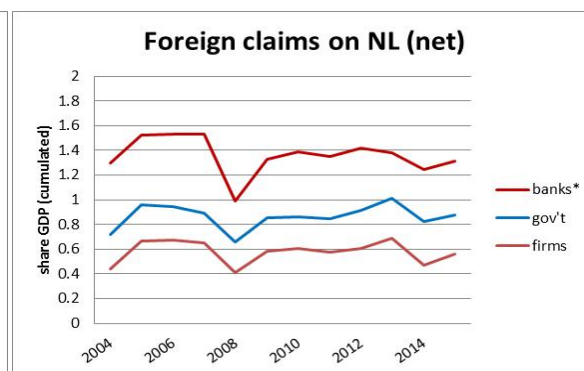
Source: CBS/DNB + own calculations   Source: CBS/DNB + own calculations

The net foreign claims on the banking sector resulting from these simplifications are represented by the upper line in Figure 6.20. These claims are reproduced in Figure 6.22 under the heading 'foreign' and suggests that the foreign exposure of banks has increased considerably after the financial crisis. We wonder whether this is really the case: One should realise that the magnitudes of these time series fall within the margins of difference between CBS data and DNB data, compare Figures 6.6 and 6.7 above.

We also derive data for the foreign exposure of banks from the banking data in section 7.4, where these banking data are used to close the model (and to impose zero profits on the banking sector). We present the resulting net claims also in Figure 6.22 under the heading 'banking'. These data show a decreased foreign exposure of banks after the financial crisis, which seems more plausible to us. For that reason we replace the foreign exposure of banks in Figure 6.20 ('banks') by the banking data, which yields Figure 6.23 ('banks*').

The simplifications implied by Figures 6.21 and 6.23 lead to a new approximation of the development of the external net wealth position of the Netherlands. This approximation is presented in Figure 6.24 ('simpl.*') together with the DNB data ('DNB') – see also Figure 6.16. One observes that after the financial crisis in 2007, the simplified series tracks the DNB data reasonably well.

Theoretically speaking, wealth accumulation should correspond to the sum of the accumulated current account and capital account. Since the latter is relatively small, we ignore the capital accont and present the wealth data together with the accumulated current account in Figure 6.25 ('acc. CA'). One observes that the accumulated current account tracks wealth accumulation reasonably well for the years after the financial crisis, although wealth accumulation fluctuates. In the few years prior to the financial crisis, wealth accumulation is much lower than one might expect. Obviously valuation changes play an important role here, as is well-documented in the Dutch literature on the
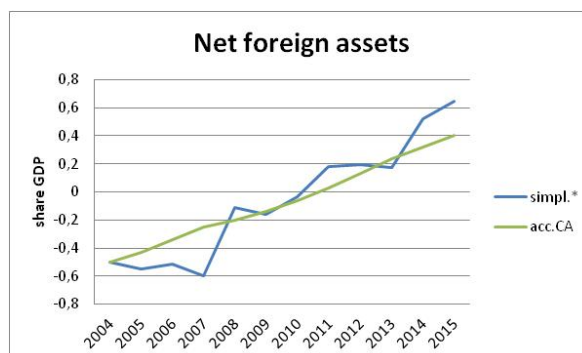
so-called 'black-hole'.[47] Unfortunately it is not possible to obtain consistent data on the impact of valuation changes.
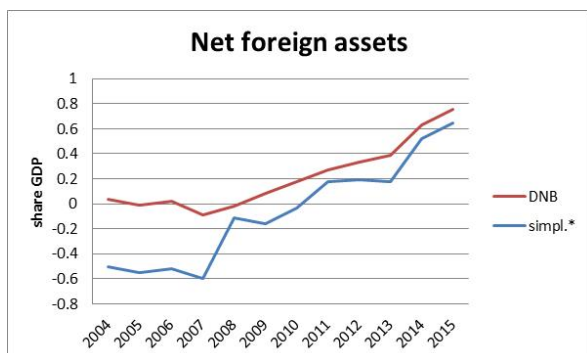
Figure 6.24   Fig. 6.25

Source: CBS/DNB + own calculations   Source: CBS/DNB + own calculations

The data on foreign financial assets and liabilities are presented in Figures 6.23 and 6.21, respectively. Foreign assets consist of equity issued by firms, bonds issued by government and net participations issued by banks. Foreign liabilities are net direct investment held by domestic firms, foreign equity held by pension funds and foreign reserves at the domestic central bank. The data for 2015 are summarized in the balance sheet presented in Table 6.1.

Table 6.1   Assets and liabilities of the foreign sector 2015 (share GDP)

| ASSETS		LIABILITIES	
Equity firms	0.56	Net foreign dir. inv.	0.66
Bonds gov't	0.31	Equity pens. funds	1.04
Net part. banks	0.44	Foreign reserves	0.26
		Net worth	− 0.66

One should be aware that the net direct investments held by domestic firms in the balance sheet are based on direct investments by domestic firms of 1.68 times GDP minus direct investments from foreign firms in The Netherlands of 1.02 times GDP. Similarly, the net participations issued by domestic banks abroad follow from participations by banks (and investment funds) issued abroad of 2.80 times GDP minus participations from abroad held by banks of 2.29 times GDP. Hence the actual foreign exposure is 527 per cent of GDP in 2015, compared to the 196 per cent of GDP suggested by the balance sheet. Finally one should realise that we ignored in our analysis the special financial institutions (SFIs) – see Figure 6.8 above.

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[47] See Boonstra (2007) for an overview.
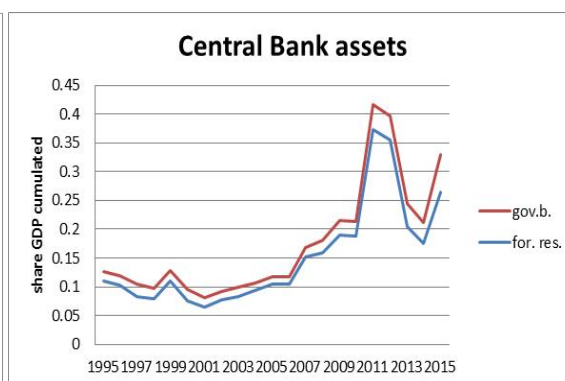
7. The financial sector

From Figure 7.1 one observes that the Netherlands has a very large financial sector compared to European standards – the assets of the Dutch financial sector are currently over 700 per cent of GDP whereas the average in the Euro Area is below 500 per cent. As is elaborated in Bezemer and Muysken (2015) this is mainly due to the presence of large pension funds (and investment funds, as we elaborate below).[48]
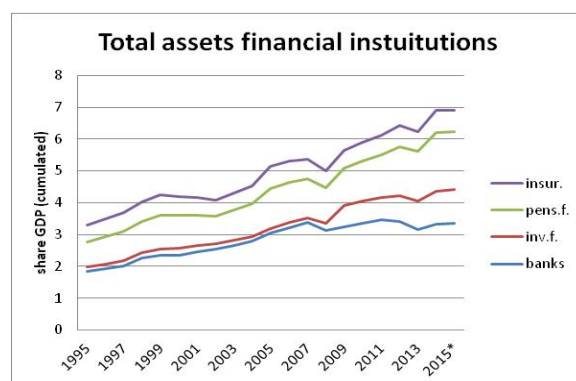
Figure 7.1   Figure 7.2

Source: CBS   Source: CBS

From the composition of the financial sector presented in Figure 7.1,[49] one observes that the size of the banking sector (banks – MFIs in statistical terms) increased relative to GDP, from below 200 per cent in 1998 till above 300 per cent in 2008. However, after the financial crisis in 2008 it has stagnated around that level. Interestingly enough, this stagnation has been compensated by the increasing importance of investment funds (OFIs in statistical terms), which took over the role of banks in asset management for pension funds and households. Together total assets of banks and funds are at a level of almost 450 per cent of GDP.

The remaining part of the financial sector consists of pension funds and insurance companies, which together have increased consistently relative to GDP, from 150 per cent of GDP in 1998 to about 250 per cent in 2015.

In this section we first we present a simplified balance sheet for the Central Bank in section 7.1. Next, we discuss the banking sector (MFIs and OFIs) and the pension funds (and insurances) in more detail in sections 7.2 and 7.3, respectively. We conclude in section 7.4 by comparing the balance sheet of the banking sector with the balance sheet of the banking sector that is implied by closing the model and present a simplified balance sheet for the banking sector. In all discussions we present the data from CBS, since these are consistent with the national accounts. For details we will also use data from DNB, which are quite consistent with the CBS data.

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[48] As we explained when discussing Figure 6.8, we ignore the so-called special financial institutions (SFI) which comprise both a large shadow banking sector and many companies ("brievenbus firma's") that are established in the Netherlands for tax reasons. The total assets (and liabilities) of these institutions vary in recent years between 500 and 600 per cent of GDP – see Bezemer and Muysken (2015) and CPB (2016) for concerns on the impact of these institutions on the financial system.

[49] The fluctuations in the various statistics are due to definition changes.

7.1 *The Central Bank*

As we explain in Meijers and Muysken (2016), we ignore in our analysis the complications which follow from the fact that the euro area, including the Netherlands, is controlled by the European Central Bank (ECB) and not by a National Central Bank – but including a central bank balance sheet is necessary for a proper modeling of the financial sector and the analysis of quantitative easing (QE). Moreover, the QE operations are mainly carried out under the responsibility of the National Central Banks (from here onwards 'central banks'). That is under QE each central bank buys bonds issued by its own government on the secondary market, according to the share of the various countries in the ECB's capital. However, the related profits (and risks) are not borne according to capital share, but accrue to the central bank. Since the revenues of the central bank are transferred to the government, the savings of the central bank are zero, as is the net worth.

In order to keep the analysis as simple as possible, we take a very simple balance sheet for the central bank (DNB) where we assume that all liabilities are held by banks as deposits at the central bank and all assets except government bonds constitute foreign reserves.[50]

Since CBS does not provide detailed data on the composition of assets and liabilities, we have taken data on total assets and government bonds held by the central bank from DNB. From Figure 7.2 one sees that total assets, which equal total liabilities, fluctuate in recent years between 20 and 40 per cent of GDP. Consequently, by assumption this applies to deposits held by banks as at the central bank too. Similarly, because government bonds are only a small proportion of central bank assets, foreign reserves also fluctuate between 20 and 40 per cent of GDP in our simplified balance sheet – to a large extent these movements are driven by fluctuations in the so-called Target-2 balances.[51] A more elaborate interpretation of the central bank balances (including the relationship to Target-2 balances) is provided Meijers and Muysken (2016).

The balance sheet following from the discussion above is presented in Table 7.1

Table 7.1　　　Assets and liabilities of the central bank 2015 (share GDP)

ASSETS		LIABILITIES	
Bonds gov't	0.07	Deposits banks	0.33
Foreign reserves	0.26		
		Net worth	0

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[50] As we explain in section 3.2 we ignore cash.

[51] The Target-2 balances increased from 11.6 per cent of total assets of DNB in 2009 to 57.2 per cent in 2011 and were still 24.5 per cent in 2015.

7.2 *The banking sector*

We first look at the banking sector in a narrow sense (MFIs), then we add the investment funds (OFIs) to the data. We will focus on balance sheets, since the flows are already covered when discussing the other sectors.

Banks (MFI's)

The assets of MFIs mainly consist of loans as appears from Figure 7.3. These loans comprise around 60 per cent of total assets in recent years and the majority is issued within the Euro Area. A relatively constant share of assets consists of deposits, held by other banks and the central bank. Finally, an increasing share of assets is also held in debt of which only a minor part is shares – the majority is bonds and financial instruments like turbo's. In Figure 7.4 the composition of liabilities is presented. The majority of liabilities consists of deposits,[52] but an increasing share is debt issued in the form of debt certificates ("schuldbewijzen"). Finally, a small share of liabilities consists of equity issued by banks.
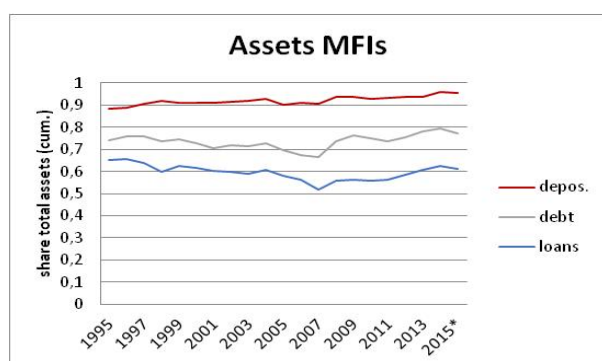
Figure 7.3   Figure 7.4
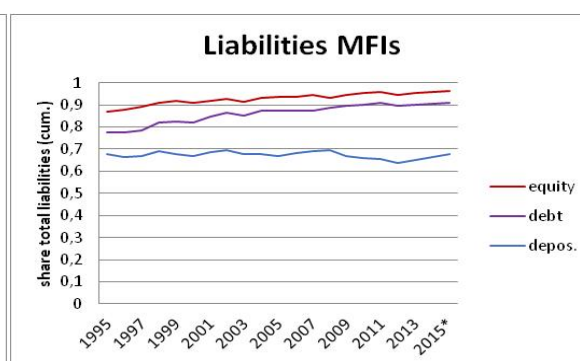
Source: CBS   Source: CBS

Looking more closely at the asset side, we observe from DNB data that between 30 and 35 per cent of loans by banks is provided to foreigners ("foreign") – see Figure 7.5.[53] About 25 per cent consists of mortgages ("househ."), while loans to firms cover almost 20 per cent ("firms"). The remaining loans are provided to other banks and financial institutions. As is elaborated in Bezemer and Muysken (2015) banks prefer to issue mortgages to households, which are considered to be safe investments. Besides, there is much discussion in the Netherlands that in particular small and medium sized firms are being discriminated against, the so-called credit squeeze. The relatively large share of loans abroad reflects the open orientation of the banking sector and the recent increase indicates capital flight from Southern Europe.

Banks also hold financial assets, partly for trading purposes, i.e. speculation, and partly related to asset management. From Figure 7.6 one might conclude that accumulating financial assets by banks

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[52] Deposits should be understood here to include savings accounts and related accounts.
[53] The distribution of loans presented in the financial stability indicators has been supplemented with SPVs.
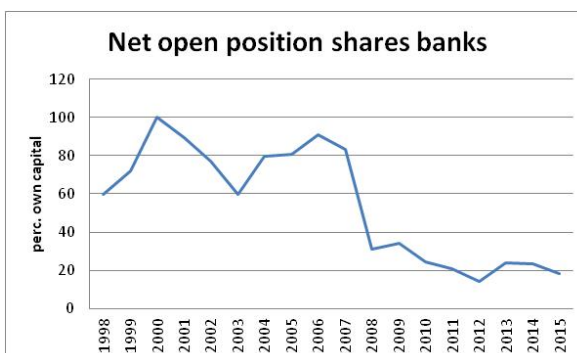
for trading purposes has decreased dramatically after the financial crisis.[54] Moreover, asset management has been taken over by investment funds as we elaborate below.

Figure 7.5   Figure 7.6

Distribution bank loans	Net open position shares banks
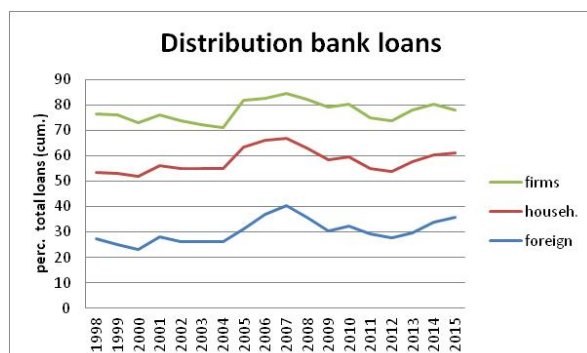
Source: DNB   Source: DNB

Turning to liabilities one observes, comparing Figures 7.3 and 7.4, that the total of outstanding loans and debt certificates is not covered by deposits. This is a manifestation of the so-called "deposit financing gap". As we elaborate in MMS (2015) this gap poses a considerable problem for banks because outstanding debt is insufficiently matched by deposits, whereas other funding possibilities of banks have increasingly been constrained. In that case banks have to resort to foreign funding, which is much more volatile and relatively expensive.

*Banks and investment funds (MFIs and OFIs) taken together*

As we saw in Figure 7.1 above, from 2008 onwards assets of investment funds (OFIs) started to grow relative to GDP while assets of banks (MFIs) stagnated. This implies that while combined assets of banks and investment funds increased from 200 per cent of GDP in 1995 to 450 per cent in 2015 – see Figure 7.7 – the increase is almost totally due to the increased assets of funds since 2008, as can be seen from Figure 7.1. The sharp increase in investment funds' assets is depicted in Figure 7.8, which shows that OFI's assets have a share of 100 per cent in GDP in 2015. This shift in composition

Figure 7.7   Figure 7.8

Total assets MFIs+OFIs	Total assets OFIs
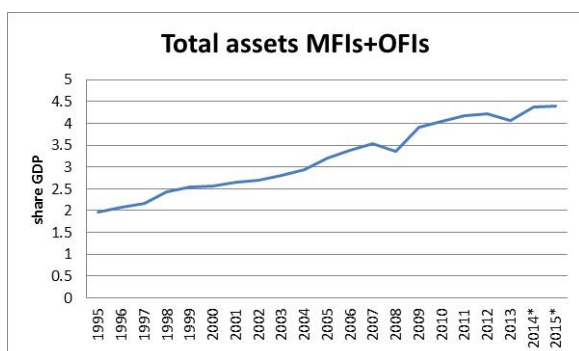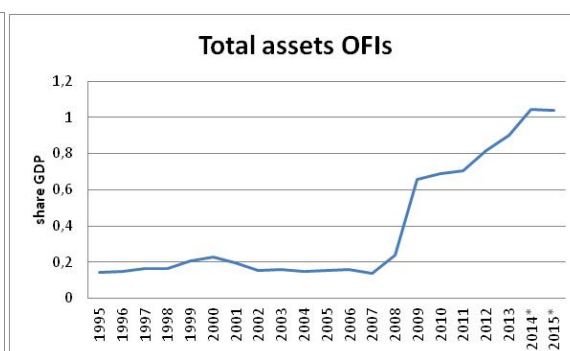
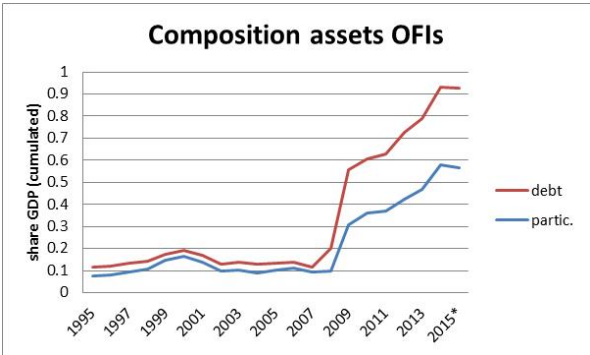Source: CBS   Source: CBS

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[54] In this context one should realise that the banking sector in the Netherlands essentially consists of four large banks. Three banks have been bailed out after the financial crisis and two of these banks are still (dominantly) state owned.

of total assets between MFIs and OFIs is due to a change in definitions which follows on the one hand outsourcing of asset management of pension funds to investment funds (including private equity funds), see Figure 7.13 below and the discussion there. On the other hand the shift reflects the increased role of OFIs in asset management of households as we discussed around Figure 3.7 above.

The composition of the assets of investment funds changed considerably from 2008 onwards, which coincides with the definition change – see Figure 7.9. After 2008 funds invested for half of their assets in participations (and some equity) and for about 40 per cent in debt certificates. We do not present a separate figure for the liabilities of investment funds, since the liabilities consist almost exclusively of outstanding participations (and equity). Moreover, we argue in section 7.4 that given the jumps in the data around 2008 and the clear impact of changes in definitions one might in particular focus on the data from 2009 onwards.

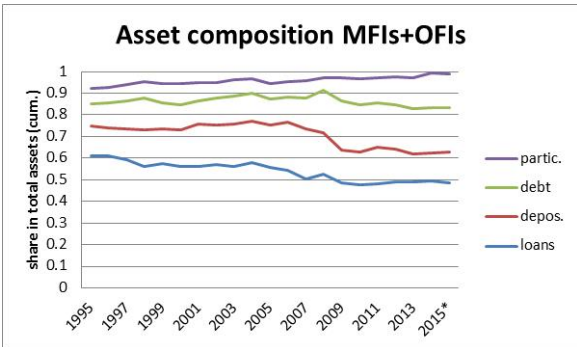Figure 7.9   Figure 7.10
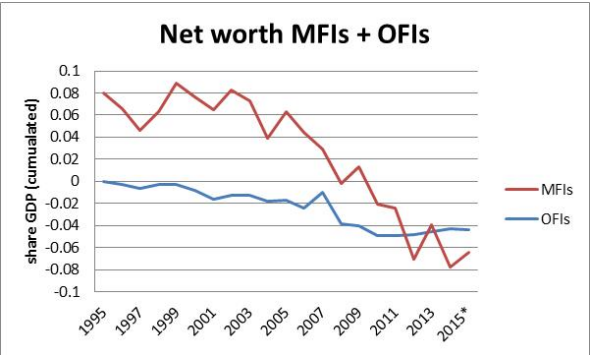
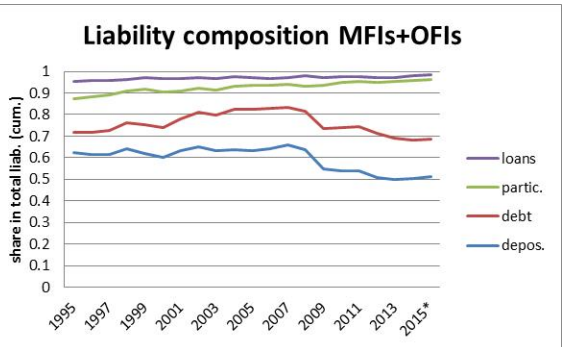Source: CBS   Source: CBS

Given the role of OFIs in asset management of pension funds and households, it seems reasonable to combine investment funds and banks in our model as one extended banking sector.[55] We present the assets and liabilities of the combined sector in Figures 7.11 and 7.12, respectively.

Figure 7.11   Figure 7.12

Source: CBS   Source: CBS

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[55] The alternative would be to include the investment funds, or at least the majority, in the pension funds. But then the participations on the assets side of the pension funds would cancel out against the participations on the liability side of the investment funds and the suggestion would be that pension funds still manage their own investments in financial assets by combining OFIs and pension funds. Since this is not the case, we prefer to make this outsourcing of asset management visible as indicated above.

Comparison of Figures 7.3 and 7.11 reveals that the addition of investment funds in the extended banking sector yields a distinct role for participations as an asset and a larger role of debt. Participations in investment funds essentially replace the equity and debt, mainly bonds, initially held by households and pension funds in their portfolios. The addition of investment funds also led to a higher share of participations (and equity) in the liabilities of the extended banking sector compared to that of the MFIs – compare Figures 7.12 and 7.4.

Finally, the net worth of banks and investment funds is presented in Figure Figure 7.10. Investment funds have a relatively small negative net worth, which is initially compensated by the positive net worth of banks. However, the latter decreases consistently over time, from around 8 per cent of GDP in 1995 till –4 per cent of GDP in 2015. This implies that the combined net worth decreases from around 8 per cent of GDP in 1995 till –8 per cent of GDP in 2015. When closing the model in section7.4 we will impose a zero net worth on the combined banking sector.
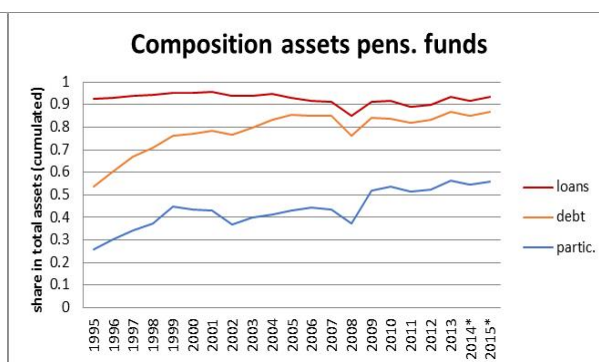
7.3 *Pension funds*

The Netherlands has a funded pension system according to which wage earners (and employers) are obliged to contribute to their pension fund by paying a premium based on their wage. When retiring, the pensioners receive a pension benefit. As a consequence, the Netherlands has a very large pension sector. Moreover, since insurances consist predominantly of life insurances, which have a similar function as pensions, we include insurances in the pension funds sector. One observes from Figure 7.13 how both assets and liabilities of the pension funds and insurance sector have increased to about 250 per cent of GDP. For comparison we added the claims of households discussed in Figure 3.6 – these are somewhat lower.
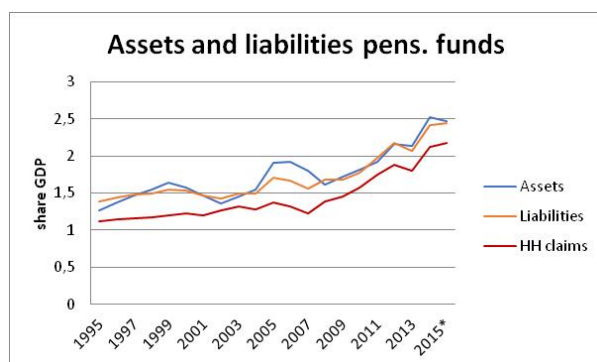
Figure 7.13   Figure 7.14

Source: CBS   Source: CBS

First we discuss the assets of pension funds. As is illustrated in Figure 7.14, the share of participations (and equity) in total assets of pension funds increased consistently over time – for a further discussion of the historical development see Bezemer and Muysken (2015). Next to that, debt certificates and bonds also constitute an important part (almost 30 per cent) of the assets of pension funds, while the importance of loans has diminished considerably. As we already discussed above, from 2009 onwards a substantial part of the portfolio of pension funds is handled by investment funds: the corresponding assets are included as participations on the balance sheet of pension funds.

Another characteristic of the assets of pension funds is the foreign exposure, as appears from Figure 7.15. Till 2008 the share of domestic assets of pension funds decreased till below 25 per cent of total

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assets. The increase till 60 per cent after 2008 is due to the introduction of investment funds, which are registered domestically – compare the share of assets invested through investment funds ('inv.f'in Figure 7.15). However, investment funds only invest about 20 per cent of their assets
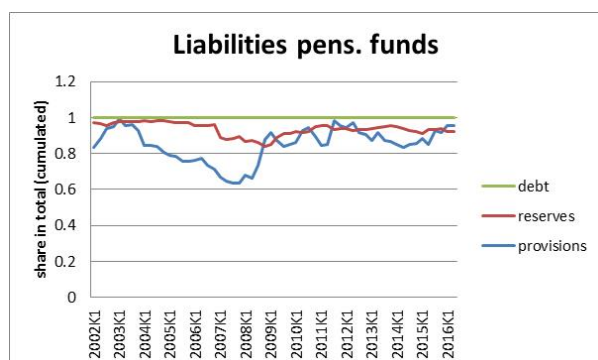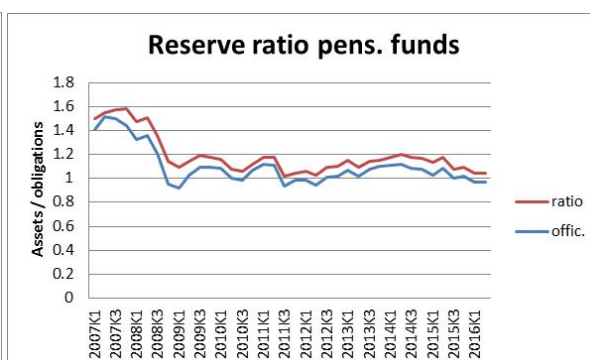
Figure 7.15
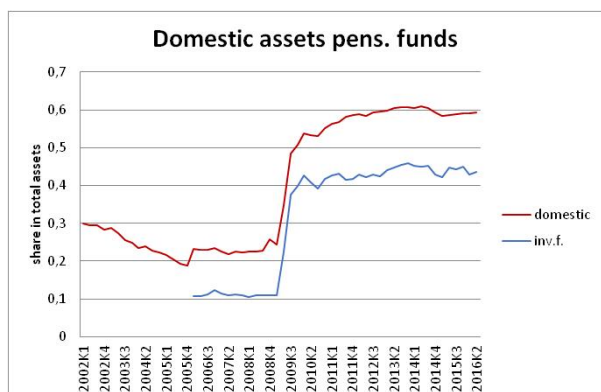
Source: DNB

domestically. As a consequence, the share of foreign assets remains indirectly about 75 per cent of the total assets of pension funds.

Figure 7.16   Figure 7.17

Source: DNB   Source: DNB

Turning to the liabilities of pension funds, these are predominantly liabilities to households – see Figure 7.13. These liabilities appear in Figure 7.16 as pension provisions. One should realise that future liabilities of pension funds are discounted at the market interest rate. This implies that a decrease in the interest rate then leads to higher liabilities on the balance sheet of the pension fund in the form of higher pension provisions.[56] Thus the low interest rate from 2008 onwards explains why the liabilities and assets of the pension funds have increased dramatically after the financial crisis: from 120 per cent of GDP in 2007 to 180 per cent in 2015 – see Figure 7.13. Figure 7.17 illustrates how the dramatic increase in provisions was at the expense of the reserves of the pension funds. Consequently, the reserve ratio of pension funds has fallen below the critical threshold of 110 per cent in recent years – see Figure 7.17.[57] This forced pension funds to increase contributions and

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[56] A similar problem holds for life insurances of, which have a financing structure which is quite similar to that of pension funds. Life insurances constitute the majority of the insurance sector.

[57] In Figure 7.17 the official reserve ratio ('offic.') as taken from DNB is presented, together with the reserve ratio calculated from the balance sheet data ('ratio') – these are very similar.

decrease benefits. It also initiated a debate about the desirability and the nature of the funded pension system. These interest rate movements also explain both the swings in valuation changes after 2007 and their subsequent increase – see Figure 3.15, which is reproduced below. After 2007 these valuation changes constituted about 70 per cent of the changes in the value of liabilities, while the valuation changes constituted 30 per cent over the whole period since 1995.
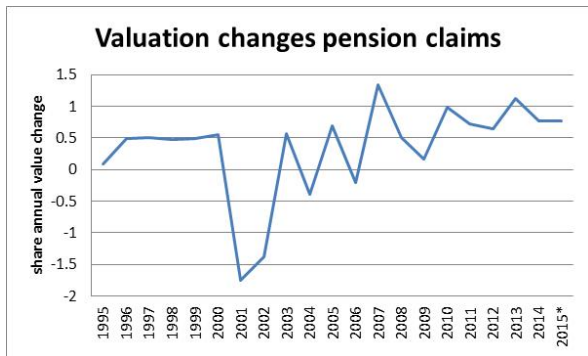
Figure 3.15   Figure 7.18[58]
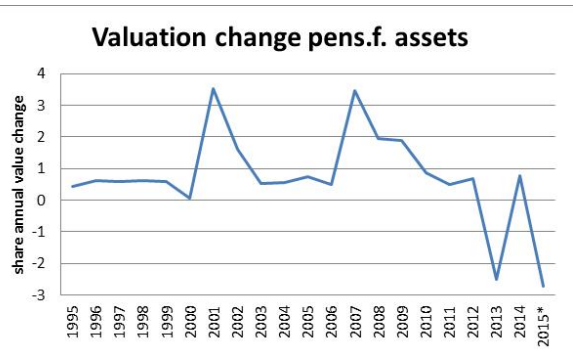
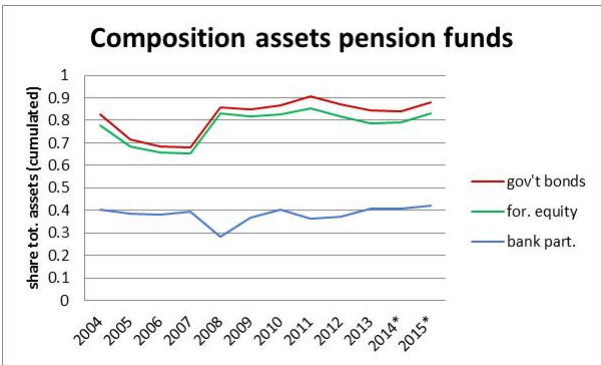Source: CBS   Source: CBS

The valuation changes of assets pension funds are presented in Figure 7.18. The sharp increases after the dot-com crisis in 2000 and the financial crisis in 2007 reflect the fall in equity prices, which by far exceeded the fall in value of the assets – see also Figure 7.12. The high volatility since 2010 is related to the Euro-crisis which started in that year. The effect is opposite to that of liabilities since after 2007 the valuation changes constituted 16 per cent of total annual value changes, compared to 70 per cent over the whole period.

Simplifying the balance sheet of pension funds and the interaction with other sectors

An important simplifying assumption is that in order to maintain consistency with household data we identify the liabilities of pension funds with the claims of households. That is, we take the lower line of Figure 7.13 as liabilities. Moreover, for simplicity we impose a zero net worth on pension funds. That is, we assume assets and liabilities to be equal – Figure 7.13 illustrates that both are very close to each other.

Figure 7.19   Figure 7.20
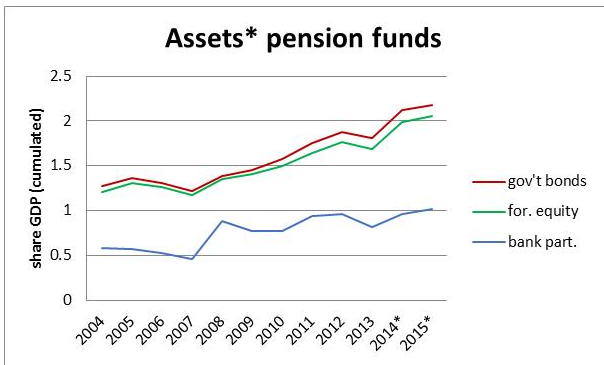
Source: CBS + own calculations   Source: CBS + own calculations

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[58] The observation for 2013 was actually -5.6, but is presented as -2.5 to keep the figure mangeable.

Regarding the composition of assets, we know from Figure 5.13 that pension funds invest in government debt and from Figure 6.18 that pension funds invest in foreign equity. Both should be explicitly recognised in the balance sheet of pension funds. From our discussion above, it is then reasonable to assume that the remaining assets of pension funds are invested through investment funds, which appear on the balance sheet of pension funds as participations. The resulting composition of assets, relative to CBS total assets, is presented in Figure 7.19.

Since we imposed that the assets of pension funds equal the claims from households, we cover between 85 and 90 per cent of total assets of pension funds, as appears from Figure 7.19. Comparison with Figure 7.14 shows that the share of bank participations in the simplified balance sheet is somewhat lower than observed form the original data, although the latter might also contain some foreign assets. Broadly speaking the simplified balance sheet seems consistent with the original data. The composition of the assets relative to GDP is presented in 7.20.

The balance sheet for 2015 is presented in Table 7.2

Table 7.2   Assets and liabilities of the pension fund sector, 2015 (share GDP)

ASSETS		LIABILITES	
Gov't bonds	0.12	Pension claims HH	2.17
Particip. banks	1.01		
Equity foreign	1.04	Net worth	0

7.4 *A simplified balance sheet for the banking sector and the interaction with other sectors*

It is very hard to relate the data on assets and liabilities of banks presented in Figures 7.11 and 7.12 to other sectors. Moreover, since the balance sheets of all sectors have been defined, except for banking, we can derive the balance sheet of the banking sector as a residual. When we collect the assets and liabilities from the other sectors related to banks, together with the data from the foreign sector, we find the data presented in Figures 7.21 and 7.22, respectively.
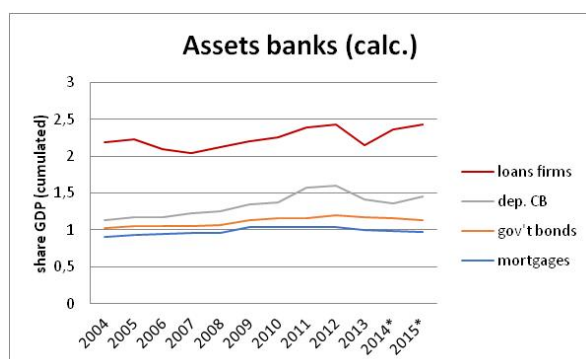
Figure 7.21   Figure 7.22
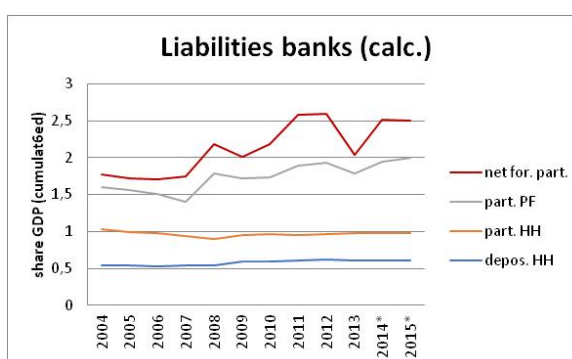
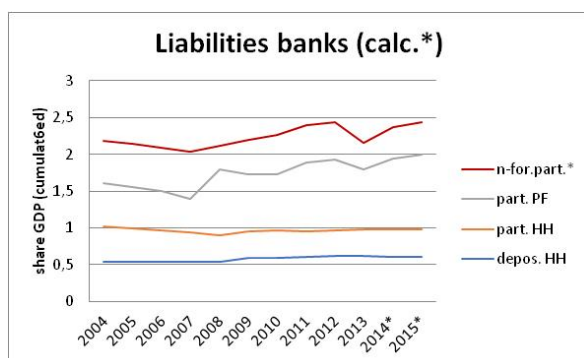Source: CBS + own calculations   Source: CBS + own calculations

From Figure 7.21 one observes that loans to households and firms constitute the majority of assets of banks. Next to that, banks hold a small amount of government bonds and deposits at the central bank. On the liability side households have the largest claim on banks (and investment funds), while

pension funds also have increased their claims through their participations in investment funds – see Figure 7.22. The net foreign claims are relatively low, since we have netted out a lot of claims, compare Figures 6.18 and 6.19. The result is a clear initial net surplus of banks, as can be observed from comparing Figures 7.21 and 7.22. In the early years the implied surplus is about 50 per cent of GDP, later the surplus decreases erratically alternating between small surpluses and deficits. This development is inconsistent with the observed small surplus, later small deficit, presented in Figure 7.10.

Figure 7.23

Source: CBS + own calculations

We therefore present an alternative approach to simplify the banking data, by imposing a zero net worth on banks. To find this we recalculate the net foreign participations in the banking sector to obtain a zero net worth. The resulting composition of liabilities is presented in Figure 7.23. One observes that the net foreign participations in banks ('n-for. part.') are higher, compared to Figure 7.22 ('net for. part.'). Also, because we now have recalculated the net foreign participations in banks, this also affects the balance sheet of the foreign sector and changes the net foreign debt. From Figure 6.24 we have seen that the recalculated net foreign debt follows the observed debt reasonably well, in particular after 2008. We therefore use the data presented in Figures 7.21 and 7.23 for the banking sector. The corresponding assets and liabilities for 2015 are presented in Table 7.3. As a final point, since we have used the data from other sectors to construct the banking sector, the valuation changes are also implied by the other sectors.

Table 7.3   Assets and liabilities of banks, 2015 (share GDP)

ASSETS		LIABILITES		
Deposits at CB	0.33	Deposits HH		0.61
Gov't bonds	0.16	Participations	HH	0.37
Loans firms	0.97	Participations	PFs	1.01
Mortgages HH	0.97	Participations	For.	0.44
		Net worth		0

One should be aware that the net participations issued by domestic banks abroad follow from participations by banks (and investment funds) issued abroad of 280 per cent of GDP minus participations from abroad held by banks of 229 per cent of GDP. Hence the actual foreign exposure is about 250 per cent of GDP in 2015, compared to the 44 per cent of GDP suggested by the balance sheet. This considerable actual foreign exposure is to a large extent also due to the investment policy

of pension funds, who invest in domestic investment funds, while these latter funds invest abroad – see also the discussion of Figure 7.15 above. Finally one should realise that we ignored in our analysis the special financial institutions (SFIs) with assets and liabilities of about 500 per cent of GDP – see Figure 6.8 above.

8. Concluding remarks

In this paper we collected data on the Dutch economy in a stock-flow consistent way for the period 1995 – 2015. The data are presented in the format of the stock-flow consistent model for the Dutch economy of Meijers and Muysken (2016), presented as Tables 1.1 – 1.2 above. We distinguish between households, firms, government, a foreign sector and a financial sector – the latter comprising a central bank, banks and pension funds. The resulting balance sheets are summarised for the year 2015 in Table 8.1, where the financial assets and liabilities are presented as a share of GDP.

For each sector some remarkable observations can made from Table 8.1. The household sector holds a large amount of mortgage debt, almost 100 per cent of GDP, which is almost equal to the value of houses. It then is not surprising that given the unequal distribution of wealth about one third of households have a mortgage debt exceeding their house value.[59] On the other hand households have a huge amount of pension claims, over 200 per cent of GDP. This is partly related to the aging problem and the low interest rate. Not surprising various authors argue in favour of using part of the pension claims to finance the mortgages – see Hollanders (2016).

Firms have a strong position in net foreign financial assets of 66 per cent of GDP. However, one should realise that total financial assets of firms are 170 per cent of GDP (Figure 4.6) – the financial assets constitute almost 50 per cent of the total assets of firms. We identify these financial assets for simplicity with direct investments, which are netted out with direct investments from abroad. The accumulation of these assets results from firms' savings, which constitute the largest part of domestic savings – for a further discussion see MMS (2016).

Another interesting observation from Table 8.1 is that the physical capital stock of firms is 175 per cent of GDP, where we included the capital stock held by government. The actual capital stock of firms is about 125 per cent of GDP (Figure 2.15). Moreover, to find the traditional capital/output ratio of 3 one needs to add the housing stock, which is 116 per cent of GDP. These observations have important implications for the calculation of potential output, which is often related to the capital stock.[60]

Government in our model does not have any assets, as is the case in most macroeconomic models. The problem with this simplification is that government spending has no productive contribution to the economy, which is quite counter intuitive. Also, one may wonder why the so-called EMU debt of 65 per cent of GDP is almost 20 per cent higher than the debt resulting from the national accounts (Figure 5.9). Both the notion of unproductive government spending and the high debt are used in the public debate as arguments to reduce government spending – see f.i. Kühn et al. (2010). An interesting observation is also the development of tax rates (Figure 5.14): the rate of indirect taxes remained stable over time, while the rate of taxes on households increased and that of firms decreased. In 2015 households pay about 19 per cent taxes on disposable income, while firms pay about 8 per cent on gross profits.

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[59] The share of households so-called 'under water' increased from 13 per cent of the households in 2007 who had a mortgage exceeding the value of their house to almost 35 per cent in 2013 and 2014. In 2015 it decreased to 32 per cent.
[60] In many SFC models a fixed capital output ratio is used to calculate directly potential output. Zezza (2008) uses a capital-output ration of 1.2, which is quite similar to our findings. However, as we discussed in section 1 Burgess at al. (2016) use a capital output ratio of 4.

The interaction of the domestic economy with the foreign sector is very large. Direct foreign investments by domestic firms and direct investments from foreign firms are 168 percent and 102 per cent of GDP, respectively. Next to that, the participations by banks (and investment funds) issued abroad are 280 per cent of GDP and the participations from abroad held by banks are 229 per cent of GDP. As a consequence the actual foreign exposure is 330 per cent of GDP higher in 2015 than the 200 per cent Table 8.1 suggests. Finally one should realise that we ignored in our analysis the special financial institutions (SFIs) with assets and liabilities of about 500 per cent of GDP – see Figure 6.8.

Pension wealth is invested to a large extent abroad. Partly pension funds invest directly abroad as is indicated by the foreign equity of 104 per cent of GDP on the asset side in Table 8.1. Partly the investment is indirectly because the domestic investment funds in which pension funds participate (101 per cent of GDP on the asset side) have a large foreign exposure (Figure 7.15). This foreign orientation of pension funds is relevant since in the public debate arguments are made to invest pension wealth domestically in order to stimulate the economy.

Banks (including investment funds) have a substantial net foreign exposure as appears from Table 8.1. Following from the observations above this is about 200 per cent of GDP larger than the 44 per cent of GDP suggested by the balance sheet. This considerable actual foreign exposure is to a large extent also due to the investment policy of pension funds, who invest in domestic investment funds, while these latter funds invest abroad.

An important observation which does not appear from Table 8.1 is that valuation changes constitute an important part of changes in wealth. With respect to household wealth we found that of the annual change in value of houses, financial assets and pension claims on average 80, 40 and 70 per cent, respectively, is due to valuation changes. For firms we found that valuation effects in net direct investment are much lower than those in equity – the latter are probably around 100 per cent of the annual value change. The valuation changes of assets pension funds are 70 per cent of total annual value changes (but only 16 per cent since 2007). We could not identify the valuation changes for the foreign sector from our data, but these are probably considerable too. The valuation changes for banks follow from those of the other sectors.

Reflecting on the analysis in this paper, it should be obvious that this is a very broad analysis which yields many questions for further research. In several instances we have made simplifying assumptions in order to be able to connect assets and liabilities across sectors. Looking for additional information can be useful to provide a better sectoral allocation.

On several places we have netted out assets and liabilities. A further analysis seems useful on the pitfalls of this approach – we have indicated on several places the under estimation of the foreign exposure. To illustrate this point we have summarised in Table 8.2 the foreign positions in full. One observes that foreign claims on the Netherlands then increase threefold in 2015: from 131 per cent of GDP to 373 per cent.

Finally, although we have been able to identify the importance of valuation changes in various sectors, a further analysis of their nature is still warranted. Asset prices obviously play a crucial role here. Better information on the valuation changes may help to analyse the development of these prices and to include these in our models. As we have seen in our discussion of empirical country SFC models in section 1, these prices are usually taken as exogenous.

Table 8.1   Assets and liabilities, 2015 (share GDP)

ASSETS		LIABILITIES	
Households			
Houses	1.16	Mortgages	0.97
Deposits	0.61		
Participations	0.37		
Pension claims	2.17	Net worth	3.34
Firms			
Net foreign dir. inv.	0.66	Loans banks	0.97
Capital	1.75	Equity abroad	0.56
		Net worth	0.87
Government			
		Net worth (EMU debt)	−0.65
		Bonds held by: foreign	*0.31*
		banks	*0.16*
		Central Bank	*0.07*
		pension funds	*0.12*
Foreign sector			
Equity firms	0.56	Net foreign dir. inv.	0.66
Bonds gov't	0.31	Equity pens. funds	1.04
Net part. banks	0.44	Foreign reserves	0.26
		Net worth	− 0.66
Central Bank			
Bonds gov't	0.07	Deposits banks	0.33
Foreign reserves	0.26	Net worth	0
Pension fund			
Gov't bonds	0.12	Pension claims	2.17
Part. banks	1.01		
Equity foreign	1.04	Net worth	0
Banks			
Deposits at CB	0.33	Deposits HH	0.61
Gov't bonds	0.16	Participations HH	0.37
Loans firms	0.97	Participations PFs	1.01
Mortgages HH	0.97	Participations For.	0.44
		Net worth	0

Table 8.2   Full assets and liabilities, 2015 (share GDP) [61]

ASSETS		LIABILITIES	
		Households	
Houses	1.16	Mortgages	0.97
Deposits	0.61		
Participations	0.37		
Pension claims	2.17	Net worth	3.34
		Firms	
Foreign dir. inv.	*1.68*	*Dir. inv. from abroad*	*1.02*
Capital	1.75	Loans banks	0.97
		Equity abroad	0.56
		Net worth	0.87
		Government	
		Net worth (EMU debt)	−0.65
		Bonds held by: foreign	*0.31*
		banks	*0.16*
		Central Bank	*0.07*
		pension funds	*0.12*
		Foreign sector	
Dir. inv. in NL	*1.02*	*Dir. inv. from NL*	*1.68*
Part. banks in NL	*1.84*	*Part. banks from NL*	*1.40*
Equity firms	0.56	Equity pens. funds	1.04
Bonds gov't	0.31	Foreign reserves	0.26
		Net worth	− 0.66
		Central Bank	
Bonds gov't	0.07	Deposits banks	0.33
Foreign reserves	0.26	Net worth	0
		Pension fund	
Gov't bonds	0.12	Pension claims	2.17
Part. banks	1.01		
Equity foreign	1.04	Net worth	0
		Banks	
Deposits at CB	0.33	Deposits HH	0.61
Gov't bonds	0.16	Participations HH	0.37
Loans firms	0.97	Participations PFs	1.01
Part. in for. banks	*1.40*	*Part. from abroad*	*1.84*
Mortgages HH	0.97	Net worth	0

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[61] Netted out positions in Table 8.1 are presented in italics in this table.

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