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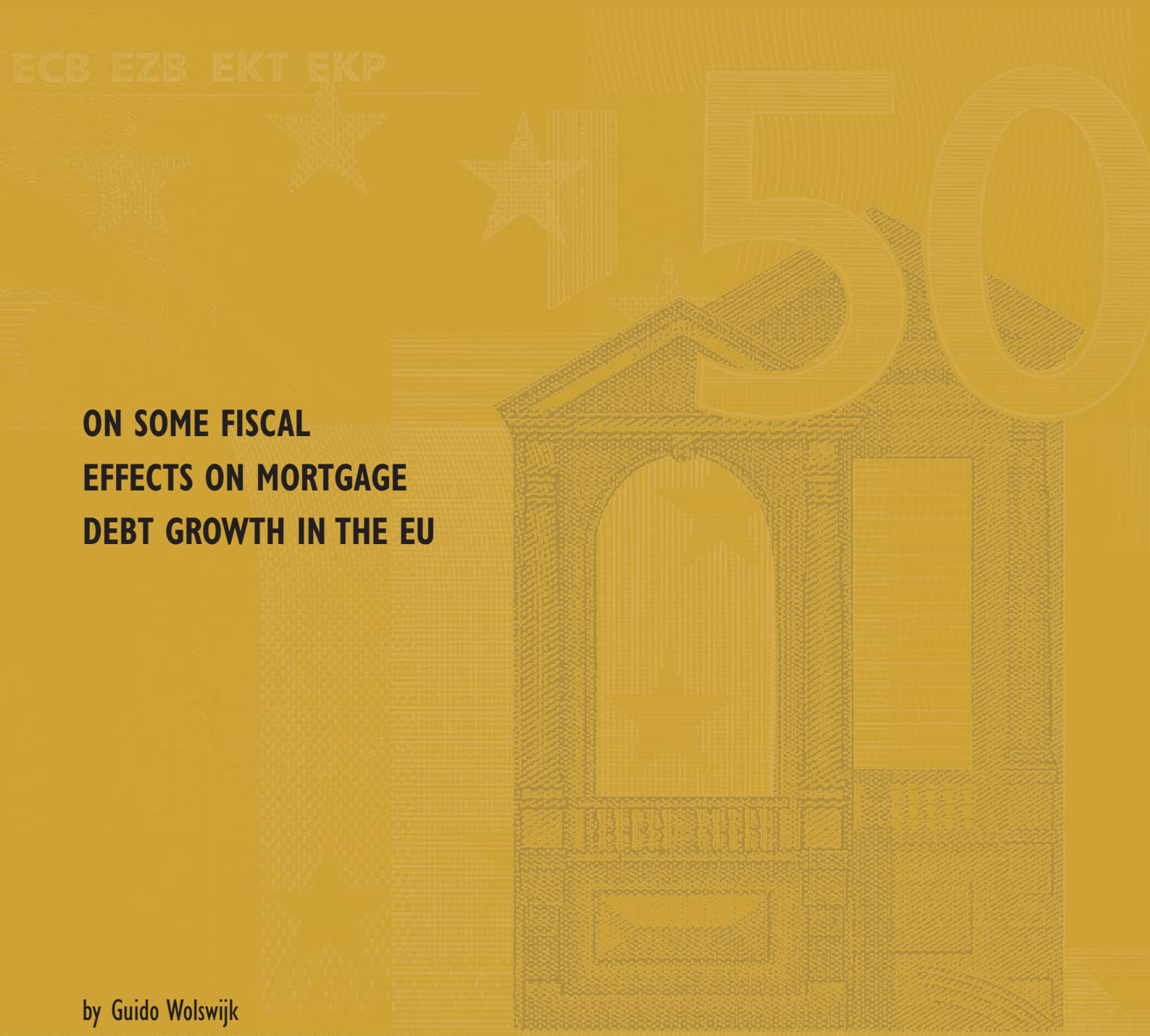

ON SOME FISCAL EFFECTS ON MORTGAGE DEBT GROWTH IN THE EU

by Guido Wolswijk

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Abstract

This paper analyses some fiscal aspects of mortgage debt in the EU. It first describes the main fiscal instruments that governments use to affect mortgage-financed home-ownership. In the empirical part, real mortgage debt growth is analysed for 15 EU countries using pooled regressions. Fiscal effects are included via after-tax interest rates. Other factors shown to be relevant for mortgage debt growth are house prices, financial deregulation, and stock markets while the effects of household income and inflation are less evident. Finally, the role of structural fiscal measures in reducing housing market volatility is highlighted.

JEL classification: E51, E62, G21, H31, R21
Key words: mortgage credit, loans, tax policy, income tax, interest deductibility

Non-technical summary

Mortgage debt in most EU countries has risen quickly in the last few years. In line with its growing size, mortgage debt has taken up a prominent place in economic analysis and macroeconomic policy-making. Changing property prices in combination with mortgage debt changes may have macroeconomic consequences, e.g. via taking up mortgage debt for non-housing consumption purposes ("mortgage equity withdrawal"). In addition, interest rate setting on mortgage debt (fixed, variable) may have implications for monetary policy transmission. Financial stability considerations may also rise in tandem with mortgage debt.

The aim of this paper is to analyse some effects of fiscal instruments on mortgage debt growth in the EU. Empirical research on mortgage debt has largely ignored the role of fiscal instruments affecting housing markets and mortgage credit. Nevertheless, it is obvious that various government instruments affect mortgage-financing decisions. In particular, fiscal measures may affect housing-related decisions via the taxation of imputed rent on own houses, the deductibility of mortgage interest payments from income tax, and capital gains taxes on the revenue of selling a house. Most EU governments subsidise owner-occupied housing, especially when mortgage-financed, on account of foreseen social and macroeconomic benefits.

Simple analysis, based on a case-study (Sweden) and on a graphical comparison of mortgage debt and the degree of fiscal subsidisation, already hints at potential effects of fiscal instruments. The Swedish housing market crisis in the early 1990s reflected a substantial reduction in fiscal subsidisation, as confirmed in a number of studies, although other factors also were important. Comparing mortgage debt levels with the degree of fiscal subsidisation, it is noteworthy that the Netherlands, the country with the highest mortgage debt-to-GDP level, provides the highest degree of fiscal subsidisation, while Greece, a country with one of the lowest debt ratios, on balance imposes a tax levy on mortgage-financed housing.

A more formalised approach to determinants of mortgage credit, and of the specific role of fiscal factors in that, is undertaken by using pooled regressions for mortgage debt for 15 EU countries, over the period 1982-2003. The estimates indicate that real mortgage lending growth is positively affected by stock market growth, by house price increases and by financial deregulation measures, while after-tax interest rates exerted a negative effect. The latter variable includes housing subsidy elements via the deductibility of mortgage interest payments that is allowed in most EU countries. Real growth of disposable income also positively affects mortgage demand in some versions of the estimates but not in all. A negative effect of consumer price inflation on mortgage growth was found in some estimates. These results are fairly robust: while

changing the timeframe has some impact on the conclusions, the group of countries included in the sample does not much affect results, nor does the estimation-technique employed.

Finally, the use of fiscal instruments in correcting housing market imbalances is briefly discussed. In doing so, the need for an intervention is assumed, and policy options in other areas such as supervision, are disregarded. Structural fiscal measures may contribute to reducing volatility on housing and mortgage markets, for instance via increased reliance on automatic stabilisation, or via reducing mortgage interest relief via tax deductibility. Supply-side measures (e.g. a tenure-neutral fiscal system encouraging the development of a private rental sector as an alternative to occupying a house) also may play a useful role in this respect. Caution is needed in the active use of fine-tuning measures, such as changes to stamp duty rates, to correct housing market imbalances, given doubts about possibilities for adequate timing and calibration of such measures.

1. Introduction

Mortgage debt in the EU has risen quickly in the last few years. As a consequence, its relevance for economic policies has increased as well. In particular, there is increased attention for its implications for macro-economic developments, money growth and financial stability. From a macroeconomic point of view, mortgage lending may affect wealth and balance sheet effects of asset prices, depending on opportunities for mortgage equity withdrawal: the use of mortgage financing for non-housing purposes. From a monetary policy point of view, housing finance aspects deserve close monitoring as bank loans to households for house purchase are a counterpart to the monetary aggregate M3. Furthermore, mortgage markets may affect the monetary transmission process, for instance via interest rate fixations (fixed or variable interest rate mortgages). Financial stability considerations, finally, call for examination of the risk implications of growing mortgage debt levels for both banks and consumers.

While a growing number of studies on mortgage debt and house prices emerge, the attention paid to the role of fiscal factors usually is rather limited. The theoretical literature suggests that fiscal instruments may have a potentially large role in affecting mortgage developments, but there is only little empirical work in which such fiscal factors are included for European countries. This is not very satisfactory, also taking into account that taxes and subsidies may be used as policy instruments to steer housing and mortgage developments.

This paper considers the contribution of fiscal measures in the EU countries to trends in household debt. In particular, we conduct an empirical analysis of the role of fiscal factors in mortgage debt growth in the EU countries, and discuss the role of these fiscal instruments in steering housing markets. While focussing on mortgage debt, inevitably we will also touch upon housing market developments, as mortgage growth is much related to what happens in the housing market. Taking a cross-country approach inevitably reduces country-specific elements that can be included in the analysis. The availability and quality of relevant data differs substantially across countries, while institutional characteristics specific to one country cannot be taken into account. Thus, this study focuses on common elements in mortgage financing in the EU.

The outline of this paper is as follows. Section 2 describes recent mortgage developments and the main fiscal instruments used by governments in the countries of the former EU-15 to steer housing market developments. Section 3 then provides some evidence of the effects of fiscal instruments on mortgage growth, using pooled regressions. The question whether fiscal instruments could be used to address housing and mortgage market imbalances is taken up in section 4. Section 5 contains the conclusions.

2. Mortgage debt and fiscal policy

Household indebtedness has grown quickly in the EU in the last decade. This mainly reflects a sharp increase in mortgage debt, although there are remarkable differences between the EU countries as regards level and growth rates (Table 1). In 2003, mortgage debt levels varied from 13% of GDP (Italy) to 100% of GDP (the Netherlands), resulting in the Dutch mortgage market being more than double the size of Italian one. Real growth of mortgage debt varied from -1% (Portugal) and +22% (Greece and Ireland) and - at first glance – do not appear to be closely related to real house price increases.

Table 1. General EU mortgage and housing market characteristics, 2003.

	Mortgage debt (% of GDP)	Share in EU mortgage market (%)	Real mortgage growth rate (%)	Growth in real house prices (%)
Austria	26.4	1.4	9.0	-2.9[§]
Belgium	28.5	1.8	3.5	6.3
Denmark	87.5	3.9	4.8	-0.4
Finland	35.6	1.2	7.6	5.0
France	24.7	9.1	7.7	9.9
Germany	54.3	27.2	0.9	-2.4
Greece	17.4	0.6	21.6	2.3
Ireland	45.0	1.4	21.7	11.2
Italy	13.3	4.1	18.5	10.0
Luxembourg	33.4	0.2	15.6	5.1[e]
Netherlands	99.9	10.7	14.3	0.3
Portugal	50.6	1.6	-1.1	-1.6
Spain	42.1	7.4	16.4	14.5
Sweden	50.0	3.2	5.7	4.6
UK	70.4	26.4	3.4	18.1

Data sources: see annex 2.
[§] 2002
[e] 2000

Differences in mortgage debt levels in Europe reflect a variety of factors, including social preferences, the degree of financial deregulation, and governments' past and current housing- and mortgage-related policies. Governments affect mortgage debt growth and housing market developments in numerous ways, ranging from restrictions on the use of land to mortgage interest payment deductions from income tax, and from effects of government debt levels on (mortgage) interest rates to subsidised housing loans from state banks.[3] Below, we concentrate on three main fiscal instruments:

- *Tax on imputed rent*

In a minority of the countries in the sample (Belgium, Italy, Luxembourg, the Netherlands), owner-occupiers had to report imputed rent to their national tax offices in 2003. The background to this tax is to put owning and occupying a house on an equal footing with other investments that offer a financial return rather than services in kind. In countries were imputed rent is taxed, the tax levy usually is relatively low reflecting the use of out-of-date market values as valuation base Instead of taxing imputed rent, some governments have introduced a property tax, amongst others on account of high enforcement costs of a tax on imputed rent (Freeman et al., 1996).

- *Interest deductibility*

Interest deductibility provides a fiscal advantage to house owners that finance their dwelling via a mortgage rather than via own equity, thus increasing leverage. A large majority of EU countries allows income tax deductibility of mortgage interest payments. Usually, the facility is open only for owner-occupied dwelling, and there are limits to the amount deductible. While in some countries it is eligible for all owner-occupiers (Spain, Italy, Denmark, Sweden, Finland, the Netherlands), in others interest deductibility is targeted to specific households (Germany, France, the United Kingdom). A few countries (Austria, Belgium) allow tax deductibility of part of the reimbursement payments for a limited time period.

While this fiscal provision may increase the affordability of principal dwellings, and thus the amount of mortgage debt taken up, it could also impact on the type of mortgage loan. In the Netherlands, for instance, a mortgage loan coupled with a capital insurance used to be fiscally favoured. Similarly, interest-only loans were introduced to take full advantage of the nearly

[3] It should be recognised that, in their turn, housing market developments also have an effect on governments' financial positions. Schuknecht and Eschenbach (2002) provide a detailed description of asset price effects on fiscal variables.

unlimited deductibility of mortgage interest payments. In Germany, Bauspar loans were fiscally favoured, limiting the development of other loan types (Mercer Oliver Wyman, 2003).

- *Capital gains tax*

In most countries the capital gain on the sale of principal owner-occupied dwellings is, in principle, included in capital gains taxes. In practice, however, it is often exempted, particularly if the owner has been occupying the dwelling for a number of years before selling it ("anti-speculation clause"). Such exemptions usually do not apply to financial investments.

Table 2 roughly summarises countries' fiscal treatment of housing and its finance. Generally, the table presents the situation for an owner-occupier living in his/her primary dwelling. As to the capital gains tax, the table describes the tax regime for an owner-occupier selling his/her house after having lived in it for a long period (more than 10 years) and using the sale proceeds to buy another house. A country-specific description of the three fiscal instruments as prevailing in 2003 is included in annexes A1-A3. [4]

Table 2. Main tax categories affecting housing/mortgages in the EU as per 2003.

	Tax on imputed rent	Interest deductibility	Capital gains tax[a]
Austria	N	Y	n
Belgium	Y	Y	n
Denmark	N	Y	n
Finland	N	Y	n
France	N	N	n
Germany	N	N	n
Greece	N	Y	N
Ireland	N	Y	n
Italy	Y	Y	n
Luxembourg	Y	Y	n
Netherlands	Y	Y	N
Portugal	N	Y	n
Spain	N	Y	n
Sweden	N	Y	n
UK	N	N	n

[a] Capital letters denote absence of a capital gains tax, small letters refer to a capital gains tax being in place, but the gains on selling a house being de facto exempted, for instance because it is sold a certain number of year after its acquisition.
Source: International Bureau of Fiscal Documentation (2003)

[4] Donner (2001) and ECB (2003) provide information on other fiscal instruments used in EU countries to stimulate housing production and consumption.

Comparing the tax treatment of housing as described in the table with that of renting suggests that government fiscal systems tend to favour ownership of dwellings over renting, and debt-financing over other sources of financing. Thus, tax systems are not neutral, i.e. the decision for the owner to occupy the residence himself or to rent it out is affected by tax considerations. In a neutral system, imputed rent is taxed, mortgage interest payments are fully deductible, and capital gains are subject to a capital gains tax, as these tax elements normally also applies to landlords.[5] Governments seek to influence private agents' housing decisions as housing is considered a merit-good with positive external effects, while income distribution arguments may also play a role. However, the financial involvement in the housing market appears to be trending downward, with a shift in emphasis from production to consumption subsidies, and an increased market orientation (Ball and Grilli, 1997).

Van den Noord (2003) has quantified governments' involvement in housing markets for the euro area countries. He calculated the 1999 tax wedges and the resulting real cost of financing a house (nominal interest rate plus tax wedge minus inflation), taking into account information on tax interest deductibility, tax credits and imputed income from housing. His results, reproduced in table 3, show that governments on balance subsidise housing, with few exceptions where it is neutral (Belgium, France, Germany), and one in which, on balance, a tax is levied on mortgage-financed housing (Greece). It should be noted, though, that explicit government subsidies have not been included in the calculations. This would change the picture for instance for Germany because of government expenditures for its Eigenheimzulage.

Table 3. Net housing subsidisation in the euro area, following Van den Noord (2003)

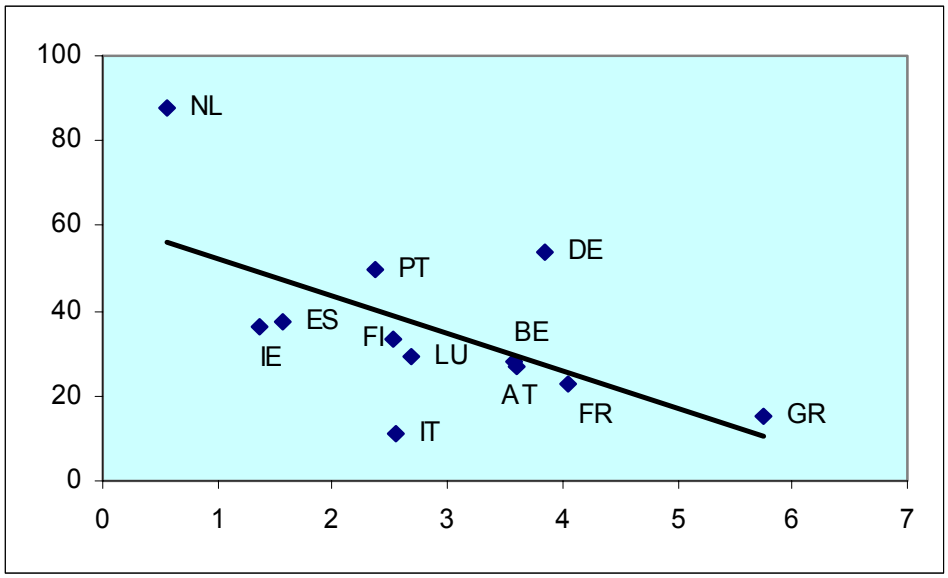
	Real cost of financing	Tax wedge[a]		Real cost of financing	Tax wedge[a]
Austria	3.6	-0.6	Ireland	1.4	-0.9
Belgium	3.6	0.0	Italy	2.6	-0.5
Finland	2.5	-0.9	Luxembourg	2.7	-1.0
France	4.1	0.0	Netherlands	0.6	-2.0
Germany	3.9	0.0	Portugal	2.4	-0.2
Greece	5.7	1.6	Spain	1.6	-0.9

[a] A minus-sign indicates net subsidisation of owner-occupied housing.
Source: Van den Noord (2003)

[5] Housing at the same time is also a consumption good. Tax neutrality in a broader sense thus would imply that houses also need to be taxed similar to durable consumption goods like cars.

Plotting Van den Noord's measure of real financing costs and 2003 mortgage debt levels as percentage of GDP shows the expected negative correlation. The Netherlands and Greece stand out as opposite cases regarding real financing costs, which is reflected in the highest, respectively the one-but-lowest mortgage debt ratio.

Graph 1. Real financing costs (horizontal axis) and mortgage debt as % of GDP (vertical axis), 2003.



3. Some evidence on fiscal effects on mortgage debt

Following the rough indications of a relation between fiscal instruments and mortgage debt, we now turn to a more formal empirical analysis. Generally, linking fiscal factors to mortgage credit growth is far from easy. Data on fiscal aspects of mortgage debt – to the extent available - are far from homogeneous. Furthermore, the identification of fiscal effects is complicated by fiscal changes sometimes being spread out over a long period, by announcements of changes well ahead of its implementation, and by measures being compensated by other fiscal measures.[6]

[6] For instance, the abolition of mortgage interest deductibility in the UK was spread out over 21 years (1979-2000). An illustration of compensating fiscal measures is the abolition in Germany in 1986 of mortgage interest tax deductibility, compensated by the introduction of a government subsidy scheme (Eigenheimzulage).

Studies on mortgage debt growth in Europe often focus on describing the effects of tax structures in one or a few countries (e.g. Eschenbach and Schuknecht, 2002, and Debelle, 2004). Another branch of the literature analyses cross-country differences in mortgage lending. Freeman et al. (1996), analysing tax and subsidy systems in twelve OECD countries, conclude that tenure patterns are associated with fiscal subsidies, but there are many more factors operating. Studies that approach the subject from an empirical angle include Calza et al. (2001), studying total loan growth (households and corporations) at the aggregate euro area level, using a VECM with GDP growth and (before-tax) interest rates as explanatory factors. In addition, the determinants of bank lending in single EU countries has been the subject of empirical research, as e.g. Fitzpatrick and McQuinn (2004) for Ireland, De Greef and De Haas (2000) for the Netherlands, Fernandez-Corugedo and Muellbauer (2003) for the UK, and Magri (2002) for Italy. Following the severe housing crisis in Sweden in the early 1990s, a number of papers have assessed the causes of this crisis, also paying attention to changes in fiscal conditions (Box 1).

Box 1. The housing market crisis in Sweden in the early 1990s

The Swedish housing market crisis early 1990s was characterised by sharply falling mortgage credit and dwelling prices. This box recalls the main developments, focussing in particular on the role of changes in fiscal instruments.

The Swedish housing market had experienced large increases in mortgage lending and rising prices at the end of the 1980s, following financial deregulation that started 1986, and foreign exchange markets deregulation. At the same time, the economy was growing fast, housing tax deductions were increased and interest subsidies were expanded, when real interest rates were already declining. This process reversed as of 1990, when an international recession hit the economy, interest rates rose, and banks started tightening mortgage lending standards, as reflected in higher loan-to-value ratios. House prices already were falling, when in 1991 a dual income tax system was introduced, with tenure neutrality as an objective. Mortgage interest payments could no longer be deducted at the marginal tax rate (up to 70%) but only at a standard capital income rate (30%). At the same time, the government abolished the tax on imputed rent, introduced a property tax, introduced VAT on new dwellings, and reduced subsidies to the construction sector.

A number of empirical studies support the impression arising from this brief description that changes in fiscal parameters may have worked out pro-cyclical and contributed to the housing market crisis. In particular, Englund et al. (1995) estimate that the change in tax rates applying to deductible mortgage interest payments had a negative house price effect of 10-15% by 1993, on a total decline of 25%. In addition, the construction sector received a heavy blow. Housing completions in the 1990s where only around one-fourth of the levels seen in the build-up phase of the boom. Agell et al. (1995) also conclude that these tax rate changes had a strong negative impact on house prices (capitalisation effect), depressing private consumption. The much less favourable tax treatment of owner-occupied houses has been identified by Englund (1999) as one of the reasons for the breaking of the boom and the subsequent deep recession.

This paper makes a first attempt to include relevant fiscal factors in empirical research on EU mortgage credit growth. Specifically, we apply pooled regressions using an *ad hoc* specification. Explanatory variables predominantly reflect demand factors, assuming mortgage supply to be largely accommodating. While not ideal, we have chosen this approach in view of the data limitations. For the same reason, this paper focuses on the 15 countries of the former EU only and not on the current 25 EU members. Pooled regressions are used to generate sufficient observations for tracking common determinants of real mortgage debt growth.

Table 4 Basic characteristics of real growth of mortgage debt in 15 EU countries, 1982-2003

	Average real growth rate of mortgage loans (%)	Standard deviation (%)
Austria	7.4	4.2
Belgium	4.0	4.8
Denmark	5.0	4.9
Finland	4.8	6.8
France	3.0	2.9
Germany	3.8	3.1
Greece	9.4	13.8
Ireland	12.7	10.8
Italy	7.2	7.0
Luxembourg§	8.9	6.7
Netherlands	7.2	5.3
Portugal	14.6	10.4
Spain¶	14.8	5.4
Sweden	4.2	6.6
UK	8.2	6.3

Data sources: see annex 2.
¶ Series starting 1984.
§ Series starting 1997.

Real mortgage debt is the main dependent variable, with nominal debt deflated by the national consumer price index. Table 4 gives an indication of the country-variation in real debt growth. Persistent high growth rates are seen in many Southern-European countries (Greece, Portugal, Spain, and Italy) as well as in Ireland and the Netherlands. On the other hand, the average real growth in Sweden has been rather modest but relatively volatile.

As to the choice of explanatory variables, theoretical considerations and data availability lead to the following factors to consider:

- *Disposable income*. Higher real disposable income per person increases the affordability of houses, and thus would have a positive effect on mortgage-financing. Generally, owner-occupation levels in Europe rise with income, with the exception of Greece.[7] Higher income may also increase economic confidence and job security, providing incentives to increase debt for consumption-smoothing. A negative relation between income and mortgage debt arises if households use higher income for debt repayment, for instance because debtless ownership raises social status or facilitates early retirement. While positive effects dominate in empirical studies in this area, exceptions have been reported for the US and Italy (Crook, 2003).

- *After-tax interest rate/capital costs*. Low mortgage interest rates increase households' capacity to borrow while keeping the same debt servicing costs as per cent of income. Low rates may also increase borrowing against real estate to finance consumption expenditures (mortgage equity withdrawal). Whether a nominal or a real interest rate is more relevant is an open issue; a real rate captures real financing costs, a nominal rate is more relevant for assessing the maximum allowed mortgage, labelled the 'tilt' effect.[8] Given tax deductibility of mortgage interest payments in many countries, it is the after-tax interest rates that should matter. Interest rates are an important element in the broader concept of capital costs of housing, reflecting the costs of capital invested in housing.

  In particular, we adopted the following measure:

$$CC = (1-t).r.\ M \qquad [1]$$

  With CC = capital costs of mortgage-financed own housing
  t = relevant tax rate for mortgage interest deductibility
  r = nominal mortgage interests rate
  M = mortgage value

  Dividing both sides by the house price then gives:

$$\frac{CC}{V_t} = (1-t).r.\ \frac{M}{V_t} \qquad [2]$$

  With V = price of the house

[7] Of the Greek households with less than 60% of the median income, 90% owns a home, compared to just over 80% of households with incomes of more than 140% of the median income. For the EU-15, the average numbers are 50% and 72% respectively (Eurostat, 2004).
[8] Apart from demand effects, the interest rate effect may also capture decreased willingness of banks to extend credit in case of higher interest rates because of increased default risk (Hoffman, 2004).

This reflects the nominal after-tax interest costs for the mortgage-financed part of the house value, which is the variable used in the estimations below.

- *Wealth*. Higher wealth could lead households to invest more in houses, being part of the investment portfolio. A positive effect may also arise from future home-owners building up the required down-payment via financial investments. However, real estate can also be an alternative to stock or bond market investment. Crook (2003) reports that for the US and Italy positive relationships are the rule. We use national stock market indices as an indicator for financial non-housing wealth.

- *House prices*. High house prices may choke off mortgage demand of starters on the housing ladder, but may spur demand by current owners as it creates room for equity withdrawal where allowed. In addition, higher house prices raise the amount of mortgage to be financed. Furthermore, a positive coefficient could be expected on account of households' speculative behaviour. Using adaptive expectations formation, households may see current house price increases as indicating an upward trend, creating incentives to buy and finance the dwelling to profit from future capital gains.[9] The comparability of house price data is rather low.

- *Mortgage supply*. Deregulation in the European financial markets has removed many obstacles to a competitive supply of mortgages. Increased competition and decreasing regulation have lowered the interest mark-up and caused a catch-up in mortgage lending. It also paved the way to financial innovations, like interest-only loans, making mortgage financing feasible for a larger part of the population. The timing and pace of liberalisation of mortgage markets has varied substantially between countries (Girouard and Blöndal, 2001). Financial deregulation is crudely approximated by dummies taking value 1 in years of major reforms (see annex 3), lacking more elaborate banking competition measures on a euro area wide basis.

[9] For the US, evidence of adaptive expectations formation for house prices is reported by Case and Shiller (1988).

- *Consumer price inflation*. Inflation operates through various ways on the demand for mortgages. On the one hand, high inflation can be reflected in higher nominal interest rates, lowering mortgage demand as the part of household income that has to be spent on housing finance increases. In addition, high inflation shifts the burden of interest payments and repayments to the initial phase of the loan, with negative effects on housing credit demand (Nickell, 2002). High inflation variability, which usually increases with inflation, also may exert a dampening effect on mortgage demand. On the other hand, to the extent that households' income increases in line with inflation, it may reduce the debt-to-income ratio and thus create room for additional debt take-up. Furthermore, inflation may give rise to additional housing demand from investors that regard real estate as a reasonably inflation-safe hedge. Tsatsaronis & Zhu (2004) argue that this can be the case in particular if the prevailing pension financing system is of a pay-as-you-go type, as this hinders the coming into being of an equity investment culture. Finally, tax advantages of mortgage interest deductibility rise with inflation as tax deductibility applies to nominal rather than real interest expenses.[10]

Outcomes

Information on the sources and the construction of the data to be used is included in Annex 2. The logarithm of real mortgage debt is our main dependent variable, with nominal debt deflated by the national consumer price index. The use of logs in this type of analysis is standard.[11] Series have been tested on unit roots (Annex 4). It appears that most variables are stationary when expressed in changes in logarithms. While expressing the variables in log-levels in principle would be preferable to detect longer-term relations, the stationarity tests indicate differences in the degree of differencing needed to arrive at stationarity, thus not supporting estimations in levels. Therefore, the change in the log of real mortgage debt is taken as the dependent variable, and most independent variables are also expressed in change-in-log form.[12]

[10] A numerical example may explain this. Assuming a 4% nominal interest rate, 2% inflation and a relevant tax rate of 50%, the after-tax real interest rate is (50%*4%)-2% = 0%. Assuming the inflation rate to increase by 2% to 4%, and be fully reflected in the nominal interest rate (6%) so that the real-interest rate is constant, the after-tax real interest rate decreases to -1%, i.e. (50%*6%)-4%.

[11] Using logs takes into account that in countries with high debt levels the mortgage market may already be full-grown while high mortgage credit growth in other countries may reflect some catching-up from low initial levels. This choice is supported by a correlation coefficient of -0.62 between 1980 mortgage debt levels as % of GDP and average real mortgage growth rates over the 1981-2003 period.

[12] A similar approach has been used by De Greef and De Haas (2000) studying real mortgage lending in the Netherlands.

Table 5 contains the basic results for the estimations for the 15 EU countries. All estimates include country-specific intercepts to capture mortgage-related factors peculiar to the country concerned. This may, for instance, reflect differences in cultural values (e.g. the social status of owning a debt-free house) and in legal efficiency (e.g. the time it takes for a bank to repossess a house if the owner defaults). The second column shows results using pooled OLS over the entire estimation period.

Table 5. Pooled estimates for real mortgage loans, 1982-2003 and sub-periods.

	1982-2003	1982-1992	1993-2003
Δ LOG REAL LOANS (-1)	0.57 (12.8)**	0.38 (5.2)**	0.51 (7.4)**
Δ LOG REAL HOUSEHOLD INCOME PP	0.22 (2.5)**	0.20 (1.8)*	0.07 (0.3)
Δ CAPITAL COST	-0.02 (-4.5)**	-0.02 (-3.1)**	-0.02 (-3.0)**
DEREGULATION DUMMY (-1)	0.05 (3.3)**	0.05 (3.0)**	0.01 (0.4)
Δ LOG REAL STOCK MARKET (-2)	0.03 (2.8)**	0.04 (2.7)**	0.03 (2.1)**
Δ LOG REAL HOUSE PRICE	0.14 (3.5)**	0.19 (3.5)**	0.19 (2.3)**
Δ LOG CONSUMER PRICE	-0.36 (-3.4)**	-0.59 (-3.8)**	-0.80 (-2.6)**
Adjusted R-squared	0.71	0.75	0.74
S.E. of regression	0.0397	0.0364	0.0400
D-W	1.98	1.97	1.83
Nr of observations	275	124	151

Fixed country-effects are not shown.
** = significant at the 5% significance level, * = significant at the 10% significance level.

From this, we note the following results:

- Lagged changes in the log of real mortgage debt have a positive effect, which may reflect adjustment time but could also indicate omitted variables. As noted before, the cross-country nature of this study does not allow taking into account some factors that can be included in single-country estimates.
- Higher real disposable income per person has a positive and significant effect on mortgage demand, indicating that households take advantage of increased affordability to exert additional mortgage demand.

- Higher capital costs (the after-tax interest rate on the mortgage-financed part of the house value) choke off demand for housing loans. Based on the empirical outcomes, changes in the nominal rather than the real interest rates have been included.
- Major financial deregulation measures have had a positive effect on the demand for mortgages.
- Booming stock markets add positively to the demand for mortgages, with a two year lag. Most likely, this reflects a wealth effect. In addition, increased consumer confidence could be a factor.
- Contemporaneous house price changes have a positive effect on mortgage loans granted.
- Inflation has a negative effect on real mortgage lending growth, possibly reflecting the demand-reducing effect of higher initial debt burdens that results from inflation. The coefficient value indicates that the negative impact is relatively strong.

The positive effect of house prices on mortgage lending could be related to house price increases not being exogenous to mortgage credit. Higher house prices, for instance reflecting increasing housing demand, are often accompanied by increased mortgage demand, also reflecting mortgage equity withdrawal. At the same time, increasing mortgage supply for instance by looser bank standards, may increase finance availability to larger parts of the population, thus putting upward pressure on housing demand.

We formally tested for Granger-causality, and were not able to reject the hypothesis that mortgage debt does not 'cause' house prices. Following the approach adopted by Follain and Dunsky (1997), a (simple) equation for house price increases was run (table 6), and the estimated values were included in the equation for real mortgage debt. This, however, did not affect the sign of the coefficient, remaining positive and significant, providing indications that the above equation-specification is not seriously biased. A significant effect of property prices on bank lending is in line with Hoffman (2004), running a VECM model for 16 industrialised countries.

Table 6. Pooled estimations for house prices, 1982-2003

	OLS
Δ LOG REAL HOUSE PRICE (-1)	0.64 (14.9)**
Δ CAPITAL COST (-1)	-0.026 (-3.5)**
LOG REAL STOCK MARKET (-1)	0.03 (2.5)**
Δ LOG REAL HOUSEHOLD INCOME PER PERSON	0.26 (2.4)**
AFFORDABILITY INDEX¶	-0.04 (-4.1)**
Adjusted R-squared	0.59
S.E. of regression	0.0472
D-W	1.90
Nr of observations	275

Fixed country-effects are not shown.
¶ Affordability is measured as interest payments over disposable income, divided by the long-run average of that variable. A negative sign thus indicates that a high share of interest payments in income dampens real mortgage demand.
** = significant at the 5% significance level, * = significant at the 10% significance level.

A number of other variables were not included in the final equations.

- This applies to tax measures other than tax deductibility of mortgage interest payments. While including other tax factors affecting mortgage demand would be desirable, the required data are not available on an EU–wide basis for the period under consideration. To capture some fiscal aspects, tax reform dummies were included in years of major housing tax reforms but the results were not very satisfactory.[13] Compensatory fiscal measures or the spreading out of measures and of their effects over time may account for this result.[14]

- Population growth also did not produce satisfactory results. It could be expected that larger populations call for more dwellings, and therefore more mortgage lending. The non-significance could be related to the fact that what matters more is population in the age group

[13] Englund and Ioannides (1997), studying international house price dynamics for 15 OECD countries, also tested for fiscal effects via the introduction of dummies for years with major tax reforms but generally also failed to find significant effects.
[14] At the national level, household surveys indicate the importance of fiscal stimulus to the housing market. Martins and Villanueva (2003), for instance, estimate lower probabilities of new loan contracts after the scaling down of a Portuguese interest subsidy programme.

around 20-35. Furthermore, the number of households could be a more relevant factor than the population size.[15] Finally, demographic variables may matter only in the longer-term.

- Changes in the government pension expenditure ratios were also included, but without success. Inclusion of this variable can be justified by arguing that high government spending on old-age benefits reduces households' incentives to invest in housing as a means of securing income at retirement via absence of interest and principal payments. Doling and Horsewood (2003) argue that outright house ownership enables the elderly to live rent-free, and thus facilitates early retirement. However, no such effect was discernable in the data.

As to the capital cost variable included, slightly more elaborate measures were tested. Expected capital gains on real estate have been included in additional specifications as such gains reduce the costs of owning a house.[16] This is reflected in the following specification of the capital costs:

$$CC^b = (1-t).r.\ M - (V^e_{t+1} - V_t) \qquad [3]$$

with CC^b = broad measure of capital costs of mortgage-financed own housing, and
V^e_{t+1} = expected house price next year

Dividing by the house price (V) then gives:

$$\frac{CC^b}{V_t} = \frac{(1-t).r.\ M}{V_t} - \frac{(V^e_{t+1} - V_t)}{V_t} \qquad [4]$$

which states that the capital cost per house price unit equals the after-tax interest rate on the mortgage-financed part of the house value minus the expected percentage increase in the house price. Next year's house price has been modelled as an ARMA (1.1) process.[17] The more refined concept of capital costs did not produce satisfactory results. Including the variable substantially reduced the goodness of fit, although the variable remained significant. This result possibly reflects the volatile nature of expected capital gains in our specification. It could also reflect the exclusion of other capital cost elements, such as the (opportunity) costs of the non-mortgage (equity) part of housing finance, government subsidy schemes, or property taxation.

[15] The number of households is growing faster than population. While EU population grew by 5% between 1980 and 1995, the number of households increased by 19%. However, no complete dataset on the number of households is available over the entire horizon.
[16] For lack of data, pre-tax capital gains have been used, which however may not differ too much from after-tax gains given absence of a capital gains tax in some countries, and exemptions from this tax when sold after a number of years of occupying and owning it in other countries.
[17] A similar approach was adopted by Rosen (1979) for the US.

Similarly, the empirical results did not improve when using the difference between housing capital costs and renting costs. While this could be seen as a relevant cost measure for households deciding between buying and renting a house, there was no empirical support for this hypothesis, both when including and when excluding capital gains in the capital cost measure.

To test the robustness of the results, a number of alternative estimation procedures were followed. This includes changes to the time period covered, to the estimation technique used, and to the countries included.

As regards the time period, the sample was split in two, and separate equations were run for both sub-periods (table 5, 3rd and 4th column). Statistical results for the deregulation dummy and for real household income differ considerably between the sub-periods, with the coefficients loosing statistical significance over time. Given the concentration of deregulation activities in the first half of the sample, this is not very disturbing. As to real disposable income, decreased significance possibly reflects increasing leanness of banks in offering mortgage credit, as is also reflected in higher loan-to-value and loan-to-income standards over time. It might also indicate that an increased share of the population is no longer liquidity-constrained, thus reducing the relevance of current income and increasing the relevance of wealth. However, the latter hypothesis is not fully consistent with our results, with stock market coefficients staying marginally decreasing over time.

Next, the equations were re-estimated using White-consistent estimators and 2-Stage Least Squares (2SLS), to test for sensitivity to the estimation techniques. The first estimator has been applied to tackle possible heteroscedasticity, while 2SLS has been applied to take account of possible effects of the dependent variable (mortgage loans) on independent variables, notably house prices. Comparing results (table 7), household disposable income seizes to be significant when applying 2SLS, as does consumer price inflation, while the stock market effect markedly increases.

Table 7. Real mortgage loans growth to households, 1982-2003

	OLS	WHITE	2SLS
Δ LOG REAL LOANS (-1)	0.57 (12.8)**	0.59 (12.8)**	0.54 (10.3)**
Δ LOG REAL HOUSEHOLD INCOME PP	0.22 (2.5)**	0.08 (2.5)**	-0.12 (-1.0)
Δ CAPITAL COST	-0.02 (-4.5)**	-0.02 (-4.5)**	-0.02 (-4.1)**
DEREGULATION DUMMY (-1)	0.05 (3.3)**	0.04 (3.3)**	0.04 (2.1)**
Δ LOG REAL STOCK MARKET (-2)	0.03 (2.8)**	0.03 (2.8)**	0.10 (2.0)**
Δ LOG REAL HOUSE PRICE	0.14 (3.5)**	0.18 (3.5)**	0.17 (3.7)**
Δ LOG CONSUMER PRICE	-0.36 (-3.4)**	-0.26 (-3.4)**	-0.18 (-0.84)
Adjusted R-squared[§]	0.71	0.68	0.74
S.E. of regression	0.0397	0.0393	0.0410
D-W[§]	1.98	2.03	2.17
Nr of observations	275	275	203

Fixed country-effects are not shown.
[§] Weighted statistics
** = significant at the 5% significance level, * = significant at the 10% significance level.

Finally, the sensitivity of the outcomes to the countries included in the sample was tested, as results of pooled estimates can be dominated by one particular country. Large differences between the housing and mortgage markets in the countries of the EU do not allow for an *a priori* exclusion of this possibility. The basic equation was therefore re-estimated leaving out one country at the time. Table 8 shows the lowest and largest value of all coefficients obtained as well as the country that was deleted from the sample to arrive at that result. Overall, coefficient values and significance levels were not much affected by leaving out a country. Disposable income lost some significance when leaving out Finland and Greece, but in both cases remained significant at the 10% level. Furthermore, coefficient variation is relatively high for household income and for consumer price inflation. Finally, the table shows that Greece can be identified as somewhat outlying, reflected in four occasions where the coefficient was highest or lowest when leaving out Greece. Dispersion of results is reasonably well spread over the other countries, with Scandinavian countries somewhat over-represented.

Table 8. Coefficient characteristics[§]

	OLS	MIN	MAX	Coefficient dispersion*
Δ LOG LOANS (-1)	0.57	0.53 (Sweden)	0.59 (Italy)	10.6
Δ LOG REAL HOUSEHOLD INCOME PP	0.22	0. 16 (Greece)	0.30 (Denmark)	62.0
Δ CAPITAL COST	-0.018	-0.020 (Luxembourg)	-0.015 (Greece)	26.2
DEREGULATION DUMMY (-1)	0.05	0.03 (Ireland)	0.05 (Italy)	45.6
Δ LOG REAL STOCK MARKET (-2)	0.028	0.024 (Greece)	0.034 (Finland)	32.7
Δ LOG REAL HOUSE PRICE	0.14	0.12 (Finland)	0.17 (Spain)	33.4
Δ LOG CONSUMER PRICE	-0.36	-0.48 (Sweden)	-0.24 (Greece)	67.1

[§] Name of country excluded in the estimation-equation in brackets.
* The coefficient dispersion measures the difference between the maximum and the minimum coefficient value, divided by the full-sample OLS coefficient value.

Sub-grouping for countries was also applied to analyse whether countries can be grouped on the basis of mortgage finance systems. Country sub-divisions according to Kasparova and White (2001) and Tsatsaranis and Zhu (2004) did not produce results that deviate markedly from the results for the EU total as shown in the tables above.[18] We also considered the twelve euro area countries as a specific sub-group. Compared to the larger sample of 15 EU countries, this subset is more-monetary policy relevant, but on the other hand it results in the loss of a number of observations. Again, results for the coefficient values and the significance levels did not depart markedly from those reported above for the EU 15-sample of countries.

Overall, therefore, our results indicate that real mortgage debt in the EU is affected negatively by after-tax interest rates, and positively by stock market growth, house price increases and financial deregulation, while the impact of disposable income and inflation is less evident.

[18] Based on mortgage finance systems, Tsatsaranis & Zhu (2004) distinguish three groups: Belgium, Germany, Spain, France, Italy, next Denmark, Finland, the Netherlands, and finally the United Kingdom, Ireland, and Sweden. Kasparova and White (2001) group the countries as follows: Austria, Belgium, Germany, France, Luxembourg and the Netherlands, then Spain, Italy, Greece, and Portugal, and finally Denmark, the United Kingdom, and Sweden.

4. Fiscal instruments to influence housing markets

As mentioned in the introduction, one reason for focussing on fiscal aspects of mortgage debt is that fiscal factors represent a policy instrument. While the previous sections only focused on a very limited set of fiscal instruments, and fiscal aspects are underrepresented in economic housing research, it is relevant to briefly discuss the use of fiscal instruments in avoiding or correcting housing market imbalances. This issue is increasingly relevant as euro area countries no longer have national monetary policies to their disposal, and the macroeconomic importance of mortgage debt is growing with its size. Unlike in equity markets, national instruments affecting housing and mortgage markets do not seem to have lost effectiveness due to increasing internationalisation of markets. As mortgage developments are linked to underlying housing market developments, this section also includes measures that impact on the demand and supply of owner-occupied dwellings.

We first discuss government policies to reduce housing market volatility in general and next some specific fine-tuning measures.[19] In doing so, we will only hint at some main strengths and weaknesses of the instruments, as its concrete use must depend heavily on country- and situation-specific features. The effectiveness of certain instruments may be specific to certain conditions. As an illustration, housing supply may be very inelastic in the short and medium-term because of restrictive land policies. In such a case, increasing demand for houses on account of more generous fiscal subsidies is likely to be reflected to a large extent in higher house prices. Such subsidy capitalisation benefits current home-owners, turning the tax subsidy in an instrument of redistribution rather than of allocation.[20]

Reducing housing market volatility

A number of structural fiscal measures can be considered that counterbalance sharp changes in mortgage debt or house prices.

- High stamp duties can be used to stabilise housing markets. Stamp duties is a transaction tax that is payable when buying a house, and it is one element in transaction costs, which for instance also include property registration fees. Stamp duty rates in Europe vary from 0% (in

[19] Alternative policy options, including prudential supervisory policy, regional policy, and improved information disclosure, fall outside the scope of this paper.
[20] Berger et al. (2000) even conclude that government subsidies on interest rates in Sweden have been fully capitalised, although this is not undisputed.

some cases in Finland and Ireland) up to 13% in Greece. Increasing stamp duties raises the costs of moving, thus reducing housing speculation by reducing liquidity. However, it may distort the choice of (potential) house owners and negatively impact on labour mobility.[21]

- Increasing the role of automatic stabilisers can also be considered, for example via a regular updating of market values of dwellings as the tax base for real estate tax, property tax, wealth tax and/or tax on imputed rent. Regular updating implies that taxes are levied on recent market-based values. As a result, house price booms would automatically raise the tax amount, thus raising the costs of housing and dampening demand. Not updating housing values, on the other hand, usually results in regressive taxation as the tax burden as percentage of the house price falls in case of rising house prices. Related to this, Muellbauer (2003) advocates introducing property taxes with up-to-date market values as valuation basis, attributing a major part of the stable housing development in Denmark to this type of tax.

- The capital gains tax could also include anti-cyclical (or anti-speculation) elements. Making exemptions from capital gains taxes for primary houses depending on the number of years it has been owner-occupied before it is sold provides fiscal incentives to keep dwellings longer. However, increasing the cost of moving negatively affects labour mobility rates.

- Structural reductions in mortgage interest tax relief, lowering demand at given interest rates, could also have a beneficial effect on housing market volatility. Indeed, Van den Noord (2003) reports that house price variability is highest in countries with the largest tax wedges. At the same time, reducing mortgage interest deductibility will increase the interest-sensitivity of mortgage demand and - to the extent that this subsidy is capitalised - will cause capital losses for current owners. Suggestions to restrict this type of subsidy can be found in the Contact Group on Asset Prices (2002).

- A high elasticity of housing supply can reduce the likelihood of excessive housing market developments. A case in point is Germany where low price volatility, amongst others, reflects municipalities' policies of releasing more land and building permits in housing market upswings (Kasparova and While, 2001). In other countries, less strict regulations on land use

[21] Van Ommeren and Van Leuvensteijn (2003) estimate for the Netherlands that a 1%-point increase in transaction costs (which apart from stamp duties also includes capital gains taxes and brokerage fees) relative to the house price decreases home-owners' mobility by 8%.

may be required to achieve this. However, annual new housing supply on average is only a fraction of existing housing stock (around 1%), not sufficient to offset large price pressures, while production time lags also need to be taken into account.

- A large private rental sector may act as a shock absorber, helping to contain housing market shocks. Assuming private rents not to react instantaneously to house price changes, the rental sector offers an alternative for those preferring to wait for a housing boom or bust to pass over. By taking away fraction of the demand for own houses, price pressures may be limited while at the same time labour mobility may be fostered as moving does not automatically imply buying another house.[22] In addition, owners of private rental houses may seek to sell these houses during house price booms, thus increasing owner-occupied housing supply. Changes in the degree of tenants' protection, in rent regulation and in the often unfavourable tax positions of landlords may be needed to increase rental supply.

Fine-tuning housing markets

While the above measures can be considered for reducing housing market volatility in general, in specific circumstances these may not be sufficient as regards size or timing. Fine-tuning measures then may need to be considered. We discuss VAT rates, stamp duties, property taxes, and subsidies.

- In five EU countries, building and repairing houses is subject to the normal VAT rate, while in the other ten, a reduced rate applies or it is even fully exempted. Varying rates according to the cyclical state of the housing market could be considered but legal constraints from the EU level need to be taken into account, and the supply response may take some time to realize.

- Raising stamp duties in a housing boom may cool off the market. In the UK, stamp tax 'holidays' have been implemented in 1992, during which period the threshold for stamp duties was raised. This lowers transaction costs of moving, and therefore should have a positive effect on housing market activity. However, if anticipated, changes in these tax rates could become a source of volatility rather than limiting it. Furthermore, its effectiveness may be limited, given that costs can be spread out over the duration of mortgage contracts, there

[22] For the UK, persons in private rented houses have highest mobility rates, according to Cameron and Muellbauer (1998).

are numerous other costs involved in changing residence, and some countries allow such costs to be included in the mortgage amount.

- Changes in property tax rates can be used to fine-tune housing market developments. Maclennan et al. (1999) propose using the property tax to reduce house price volatility in the UK, making the Bank of England responsible for setting the property tax rate.

- Subsidies may be temporarily raised or lowered with a view to stabilising housing markets. This, for instance, has been applied in Portugal in 1999 when the government tightened eligibility requirements for mortgage subsidies directed towards low-income families, with a view to avoid overheating the housing market. Measures can equally be taken on the supply side, extending or reducing temporary investment incentives.

The possibilities and effectiveness of fiscal fine-tuning of housing markets can be questioned (see also Contact Group on Asset Prices, 2002). First, it needs to be established that there is disequilibrium, and that serious repercussions from not stopping it could arise (Nickell, 2002). Second, the timing and calibration of discretionary policies need to be appropriate. In this respect, Stephens (1996), surveying the UK government responses during the housing market recession in the early 1990s, found three out of the eight government measures to be anti-cyclical (for instance the increase in the stamp duty threshold), two neutral, and two pro-cyclical.[23] Finally, another drawback of using fine-tuning measures could be that it creates uncertainty in the market and could lead to anticipatory behaviour which may become a source of volatility too.

While in general structural measures seem to be preferable, exactly which measure to use in a given situation and country very much depends on national characteristics of the mortgage and housing markets, and the fiscal instruments available. In applying them, due account has to be given to other considerations, notably effects on labour mobility, the effectiveness of the instruments, and possible distortionary effects in housing markets. In addition, experiences as in Sweden in the early 1990s suggest that small changes to fiscal instruments generally seem preferable to avoid large disruptions to housing markets, with adverse effects on the economy and on financial stability.

[23] He also considered policy changes by lenders, building societies and insurance companies, and assessed most of their measures to be pro-cyclical, e.g. tightening capital adequacy requirements during housing recessions, widening margins to cover for provisions and write-offs, and lowering loan-to-value ratios.

5. Conclusion

Mortgage market developments increasingly gain importance for economic analysis and policymaking. While the role of fiscal instruments in affecting mortgage growth often is acknowledged in the theoretical literature, the empirical follow-up has been minimal.

The empirical analysis for 15 EU countries, based on pooled regressions, indicates that real mortgage lending is positively affected by financial deregulation measures, stock market growth, and house price increases, while after-tax interest rates exert a negative effect. The latter includes tax elements via the deductibility of interest payments. Real growth of disposable income may positively affect mortgage debt, and inflation may do so negatively, although the evidence for these two variables is rather mixed. Changes to the time period, the estimation-method and the countries included indicate that these results are fairly robust. Nevertheless, caveats regarding data-based analysis of fiscal effects on mortgage debt, notably related to data availability, quality and comparability, call for caution in interpreting the results. Future work that may lead to a further underpinning of the conclusions could focus on extending the fiscal aspects of mortgages to be included in the empirical analysis. In addition, there may be benefits to a formal framework for modelling housing and mortgage developments, separating mortgage demand from supply factors and including explicit linkages between home-ownership and mortgage demand.

Finally, this paper briefly examined opportunities for and limitations on employing fiscal instruments to correct housing market imbalances. Only main strengths and weaknesses of the main instruments have been discussed as its concrete should depend on country- and situation-specific features. In general, where needed, structural fiscal measures can be envisaged to reduce housing market volatility, which could focus on reduced mortgage interest relief and on increased reliance on automatic stabilisation, for instance via regular updates of housing values relevant for property and other taxes. More reservations seem to be needed for applying fine-tuning measures on the housing market, as doubts about appropriate timing and calibration prevail.

Annex 1. Main tax instruments affecting housing/mortgages in EU countries, 2003

A1 Tax on imputed rents

Country	*Yes/No*	*Remark*
Austria	N	
Belgium	Y	On the basis of average net rent values
Denmark	N	Replaced in 2000 by county and municipal property taxes
Finland	N	
France	N	Abolished in 1965
Germany	N	Abolished in 1987
Greece	N	Abolished in 2003
Ireland	N	
Italy	Y	But owner-occupied dwelling largely exempted
Luxembourg	Y	But tax amount based on dated values
Netherlands	Y	Up to 0.8% of market value, with a maximum
Portugal	N	
Spain	N	Unless owner does not occupy the dwelling, then imputed rent due
Sweden	N	Replaced by a real estate tax in 1991
UK	N	Abolished in 1963

Source: International Bureau of Fiscal Documentation (2003)

A2. Tax on capital gains

Country	*Yes/No*	*Tax rate (max) applicable**	*Remark*
Austria	Y	50%	No taxation if sold more than 10 years after acquisition
Belgium	Y	16.5% (flat)	No taxation if sold more than 5 years after acquisition
Denmark	Y	15%	Owner-occupied dwellings excluded
Finland	Y	29%	No taxation if used 2 years or more as primary residence
France	Y	49.6%	No taxation if principal residence
Germany	Y	48.5%	Owner-occupied dwellings excluded
Greece	N	-	
Ireland	Y	20%	No taxation on private residence
Italy	Y	45%	Principal dwelling of owner excluded
Luxembourg	Y	38%	Main residence exempted from taxation
Netherlands	N	-	
Portugal	Y	40%	Exemption for permanent dwelling if gain reinvested in permanent residence within certain time period
Spain	Y	25%	Not taxation if reinvested in new primary residence
Sweden	Y	30% (flat)	Deferred taxation on major residence if gain exceeds a threshold
UK	Y	40%	Main residence excluded from taxation

Source: International Bureau of Fiscal Documentation (2003)

* The tax rates are not well comparable as they disregard thresholds applying, deductions allowed from the capital gains, the progression of the system, the number of years the dwelling has been owned and occupied, and local surcharges.

A3. Mortgage interest payments tax deductibility

Country	*Yes/ No*	*Maximum tax rate*	*Remark*
Austria	Y	50%	Tax deductible as special expense up to a limit that goes to 0 as annual income increases
Belgium	Y	50%	Tax deductible up to income from immovable property, but some additional deduction possible. Deduction decreases over time, for at most 12 years
Denmark	Y	15%	Deductible from capital income that is subject to income tax, unlimited
Finland	Y	29% (flat rate)	Normally deductible from capital income that is subject to income tax
France	N	-	Gradually abolished over the period 1991-2000. Only tax credit in very special cases for loans before 1998
Germany	N	-	Abolished in 1986 with the introduction of a subsidy scheme (Eigenheimzulage)
Greece	Y	40%	Since 2003, tax credit of 15% for annual mortgage interest, subject to limits
Ireland	Y	42%	"Tax credit" at 20% standard income tax rate, at source, with (low) limits
Italy	Y	45%	Tax credit of 19% for annual mortgage interest, with limit
Luxembourg	Y	38%	Tax deductible, with (low) limits
Netherlands	Y	52%	Tax deductible without limit, for at most 30 years
Portugal	Y	40%	Tax credit of 30% of mortgage interest and amortisation, with a limit
Spain	Y	45%	Tax credit of 25% of amounts paid (principal and interest) in first two years, 20% thereafter up to a threshold, and 15% for payments above the threshold
Sweden	Y	30%	Interest not attributable to any source of income is deductible from capital income
UK	N	-	Abolished in a number of steps (1983, 1988, 1991, 2000)

Source: International Bureau of Fiscal Documentation (2003)

Annex 2: Data sources

GDP	EMF (2004)
Number of dwellings	EMF (2004)
Household disposable income	OECD
Loan-to-value ratio	EMF (2004)
House price	BIS/ECB
Marginal income tax rate	Office of Tax Policy (2002)
Mortgage debt as % of GDP	EMF (2004)
Mortgage interest rates	OECD/IMF
Pension expenditure	OECD Social Expenditure database
Population	Eurostat
Rent price indices	ILO, Laborsta
Stock market indices	Thomson financial services/Datastream

Explanatory notes to the data:

- *Household disposable income*: For Greece and Luxembourg, data refer to compensation of employees, as sufficiently long time-series on disposable household income are not available.
- *Marginal income tax rates for mortgage interest deduction*: estimates of the top marginal personal income tax rate for an average family, multiplied by a variable broadly reflecting the tax deductibility of interest payments in a year in a country. The latter variable has value 1 if there is no limit on deductibility, a value 0 in case no deduction is allowed at all, and value 0.5 in intermediate cases.
- *Mortgage debt*. Up to 1997, data refer to mortgage debt as included in ECB (2003). The series have been extended on the basis of annual growth rates of residential mortgage debt from European Mortgage Federation (2004). For Luxemburg, EMF data have been used for the entire sample.
- *Mortgage interest rate*: Compiled for each country as a weighted average of short-term and long-term interest rates, the weights being the share of short- respectively long-term mortgage debt in total national mortgage debt in 2002.

Annex 3: Major financial deregulation measures in EU countries

	Year	Financial Deregulation Measure
Belgium	1987	Abandoning of interest rate setting for deposits
Denmark	1982	Liberalisation of mortgage contracts and interest rate setting
Spain	1987	Deregulation of interest rates
Finland	1986/87	Interest rate deregulation/ withdrawal of mortgage lending guidelines
France	1987	Elimination of credit controls
Greece	1987	Interest rate deregulation
Ireland	1986	Elimination of credit controls
Italy	1994	Elimination distinction short- long-term credit institutions
Portugal	1984	Private banking allowed
Portugal	1996	Final stage of privatisation process
Sweden	1985	Interest rate deregulation, abolishment bank lending ceilings

Sources: Girouard and Blöndal (2001) for the larger countries, various publications for smaller countries.

Annex 4: ADF test on unit roots, 1981-2003

	Level	Change
Log real mortgage loans to households	7.17	45.82**
Log consumer price level	103.44**	87.15***
Log real disposable income per person	9.86	99.58***
Capital costs	14.31	157.83***
Log real house prices	44.14**	74.27***
Log real stock index	19.44**	192.74***
Log pension expenditure (% of GDP)	21.12***	115.56***
Log nominal rent index	88.59***	84.49***

*** = significant at 1% level, ** = significant at 5% level.

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