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TAX INCENTIVES AND HOUSE PRICE VOLATILITY IN THE EURO AREA: THEORY AND EVIDENCE

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ABSTRACT. A problem associated with inflation differentials in monetary unions is that the "crowding-in" effect of lower real interest rates associated with high inflation will initially outweigh the loss of competitiveness (crowding out). The crowding-in effect may produce volatility in house prices, especially if tax regimes favour the occurrence of bubbles. This paper shows that this is the case notably in the smaller countries of the euro area, and this could explain the persistence of inflation differentials in the area to some extent.

JEL Classification: H2; E52; E61; F42.
Keywords: Taxation; Economic and Monetary Union.

RÉSUMÉ. Un problème dû aux différences d'inflation en union monétaire est que, initialement, l'effet stimulant de taux d'intérêt bas venant des taux d'inflation élevés l'emporte sur l'effet perte de compétitivité. L'effet stimulant peut produire une volatilité accrue des prix d'immobilier, surtout lorsque le régime fiscal tend à favoriser l'émergence de bulles. Cet article démontre que c'est en effet le cas, notamment dans les plus petits pays de la zone euro, ce qui peut expliquer en partie la persistance des différentiels d'inflation dans la zone euro.

Classification *JEL* : H2 ; E52 ; E61 ; F42.
Mots-clefs : Fiscalité ; union économique et monétaire.

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Introduction

The Maastricht Treaty stipulates that countries' inflation rates should converge towards (and not exceed by more than $1^{1/2}$ percentage points) the average of the three lowest inflation member countries to qualify for entry into the euro area. Inflation dispersion indeed diminished considerably in the run-up to EMU in 1999, but has picked up somewhat since, although it has not been large by historical standards and is also not out of line with inflation differentials observed among regions in the United States (OECD, 2003).

Nevertheless, monetary policy will always have to focus on the area as a whole, and seldom fit the requirements of any individual country. Therefore, inflation differentials may persist (Hoeller *et al.*, 2002). A problem associated with inflation differentials in monetary unions is that the "crowding-in" effect of lower real interest rates associated with high inflation will initially outweigh the loss of competitiveness (crowding out). The crowding-in effect may produce housing bubbles, especially if mortgage markets are relatively liberal, transaction costs in housing markets low, supply of housing price-inelastic and if tax regimes provide incentives to households to take on large amounts of debt. As documented elsewhere (ECB, 2003), most of these factors play prominent roles notably among the smaller countries of the area, and this could explain the persistence of inflation (and growth) differentials in the euro area to some extent. The purpose of this paper is to elaborate in more detail the contribution of the tax regimes to the cyclical volatility in house price volatility in the euro area.

The article starts with a discussion of a simple theoretical model of the housing market. This is followed by an empirical investigation of the ex ante impact of income taxation on the real financing cost of owner-occupied housing in euro area countries. The paper ends with some concluding remarks.

A simple model of owner-occupied housing

The housing cycle may be driven by supply shocks – such as demographic changes, changes in labour supply or productivity – or by demand shocks that directly impinge on disposable household income. In turn, the cycle in owner-occupied housing markets produces swings in household wealth which add to the overall cyclical variation in economic activity (Boone and Girouard, 2002).

One additional factor that can exacerbate cyclical volatility in house prices are the myriad tax incentives governments provide to stimulate house ownership by subsidising mortgage debt. A tax system that contains generous incentives for house ownership not only results in a higher, steady-state level of house prices (and an associated misallocation of resources), but may also result in greater cyclical volatility of house prices. Even though tax incentives by themselves do not cause volatility in house prices (except in the period immediately following their introduction as prices adjust to the new equilibrium), they interact with and magnify the

shocks that impinge on house prices, such as demographic change, bottlenecks in urban planning and variations in real disposable incomes.

This means that the tax breaks for owner-occupied housing may act as a destabilising force, to some extent offsetting the automatic stabilising properties that are normally attributed to income taxation (Van den Noord, 2002). In a monetary union with quite varied tax systems this may be one factor behind persistent inflation and growth divergence across countries. This can be demonstrated with a relatively simple model based on Poterba (1984, 1991).[2]

According to this model, the demand for owner-occupied housing declines with the purchase price of housing. However, the price sensitivity of demand tends to fall (*i.e.* the slope of the demand curve to increase) with the degree of preferential tax treatment and expected house price inflation (or capital gain). A fall in the interest rate also produces a reduction in the price sensitivity of demand. This can be shown as follows. The starting point is the assumption that equilibrium in the market for existing owner occupied houses requires that homeowners, in their role as investors, earn the same return on housing investment as on other assets. This requires that they equate the marginal value of rental services from owner-occupied housing with the user cost of capital attached to a marginal unit of housing:

$$R(H) = [r(1 - \tau) + \theta + \delta - \pi]P_H \qquad (1)$$

where R is the marginal value of the rental services per period on owner-occupied homes, r is the nominal interest rate, τ is the marginal effective tax rate on interest income (which in a tax system that taxes net interest income in the same way as other earnings is equal to the marginal income tax rate), θ represents the rate of taxation on the value of the property, δ is the rate of depreciation, P_H is the price of owner-occupied housing and π is the expected rate of house price inflation $E((dP_H/dt)/P_H)$. The marginal value of the rental services is a negative function of the total housing stock H, hence $dR/dH<0$. Therefore equation (1) can be interpreted as the (downward-sloping) demand function for housing.

The supply function relates the total stock of housing to the flow of net construction, which is a function of the ratio of house prices to construction cost (C):

$$H_t = (1 - \delta)H_{t-1} + \varphi(P_H/C)_t \qquad (2)$$

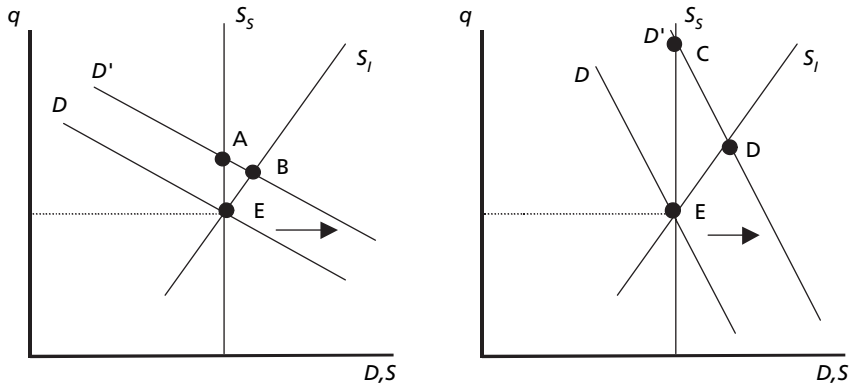
φ is the positive short-run price sensitivity of supply. This sensitivity is typically very small and therefore the short-run supply curve tends to be very steep. However, the long-run price sensitivity is equal to φ/δ, which for relatively small values for δ should be considerably larger than the short-run sensitivity.

FIGURE 1 depicts these relationships and illustrates how price dynamics behave following a positive (permanent) demand shock. The left panel shows what would happen if the tax treatment of housing is less generous (*i.e.* the marginal effective tax rate on net interest

2. Swank *et al.* (2002) developed a similar model for the Dutch, owner-occupied housing market, making a distinction between first-time buyers and home owners who "climb the housing ladder" by exchanging their existing home for a more expensive one.

income is low). In this case, the demand curve is relatively flat. Initially the equilibrium moves along the vertical short-run supply curve S_S from E to A. Eventually supply will expand (S_I is the long-run supply curve) towards the long-run equilibrium B. So, prices first go up and then come down again, but settle at a higher level than prior to the shock.

Figure 1 - The impact of a demand shock on house prices



The right panel depicts the situation when the tax treatment of housing is generous – *i.e.* τ is large. The demand curve is now steeper because the impact of price increases on demand will be choked off by the tax break. The shock now produces a sharper initial increase in the price level and a sharper subsequent fall than in the left panel. However, house price volatility as conventionally gauged by the house price elasticity with respect to an exogenous percentage change in housing demand is the same in both cases.[3]

But a further observation should be made. After a positive demand shock has produced a first-round effect on house prices, households may anticipate further price increases. This can be formalised by assuming the expected capital gain π to be a simple linear function of the observed price change. In this case, the tax regime does impinge on the volatility in house prices as conventionally defined. This can be shown again with the help of the theoretical model, in which equation (1) now reads:

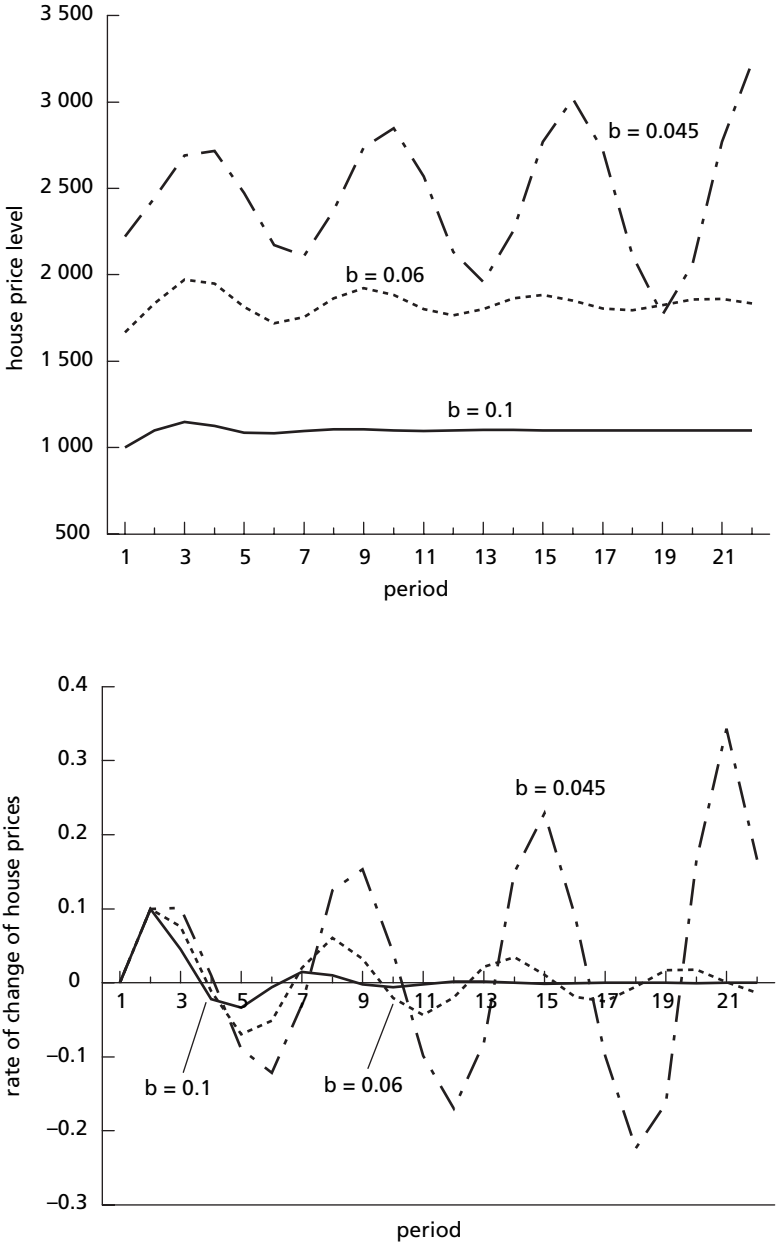
$$R(H) = [r(1-\tau) + \theta + \delta)]P_H - a(dP_H / dt); a\rangle 0 \qquad (1a)$$

3. This can be easily verified by rearranging equation (1) and computing the elasticity of house prices with respect to the rental *R*:

$$\frac{dP_H}{dR} \cdot \frac{R}{P_H} = 1$$

Hence the price elasticity with the rental is independent of the tax facility. This should then also be true for the price elasticity with respect to housing demand.

Figure 2 - The impact of an exogneous demand shock on house prices



Note: In all simulations a = 0.05. The initial values in $t = 0$ for house prices are the equilibrium prices in the absence of shocks. The initial value of the rent variable R is arbitrarily fixed at 100 and the size of the (sustained) shock to R is +10 per cent.

Rearranging and converting into discrete-time yields:

$$P_{Ht} = \frac{a}{b}(P_{Ht-1} - P_{Ht-2}) + \frac{R_t}{b}; b = r(1-\tau) + \theta + \delta n \qquad (1b)$$

This specification indicates that after an initial demand shock operating through the rental R an accelerator mechanism sets in if $a>0$. This mechanism will be stronger for larger tax deductions (larger τ) and lower property tax rates (smaller θ). The equation will produce an oscillating development of the price level and also its rate of change, with the amplitude greater for higher values of the ratio a/b, and with an explosive development if $b<a$. This is illustrated in FIGURE 2 for different combinations of the parameters b and a[4]. From the simulations, it can be inferred that the higher the tax deductibility of interest payments (or the lower the property tax), the larger will be the volatility of house prices following an exogenous demand shock. It should again be stressed that the tax variables themselves do not cause the price volatility. It is rather their interaction with exogenous shocks that matters.

THE IMPACT OF TAX BREAKS ON HOUSING COST

In this section we estimate the tax wedge between the market interest rate and the financing cost of housing investment, to the extent these are affected by the personal income tax system and the system of property taxation.

Personal income tax

To compute the impact of personal income taxation we consider the case where housing investment is entirely financed by borrowing. The basic features of personal income tax systems that affect the borrowing cost of housing investment are:[5]

– whether the interest payments on mortgages are deductible from taxable income, and if so, whether there are limits on the deductible period or the deductible amount;
– whether tax credits are available;
– whether the imputed income from owner-occupied housing is taxed.

The methodology draws on earlier OECD work (Fukao and Hanazaki, 1986) and involves the following three steps:

– making an assumption on the typical price of one unit of housing, P. This is assumed to be 6 times the disposable income of an average production worker (*APW*);
– calculating the after tax nominal interest rates, $i_a(t)$, while using all possible tax relief. This after-tax rate is time-dependent, due to the limited duration of tax relief in some countries. Where applicable, tax relief is calculated for a single earner couple with two children;

4. The simulations solely reflect the dynamics stemming from the endogeneity of the price expectation term in equation (1b), *i.e.* there is no interaction with housing supply which is held constant.
5. Obviously other parts of the tax system, such as wealth tax, property tax, taxation on real estate transactions, VAT, etc. also affect the real financing cost of owner-occupied housing. These are not considered here, but they clearly constitute an interesting area for further research.

– converting the time series of after tax, nominal interest rates $i_a(t)$ into a single flat nominal interest rate i_f, with the same present value.

To calculate the equivalent flat rate financing cost the procedure is as follows. The following basic relationship should hold:

$$\int_0^\infty i_f P e^{-(i-\pi)t} dt = \int_0^\infty i_a(t) P e^{-(i-\pi)t} dt \tag{3}$$

where π is the inflation rate. From this, the three relevant cases can be derived (constant regime over time, one change or two changes within the regime). In the first case, it must follow that:

$$i_f = i_a \tag{4}$$

If there is one change over time, the following must hold:

$$i_f = i_{a1} + (i_{a2} - i_{a1}) e^{-(i-\pi)t_1} \tag{5}$$

where i_{a1} and i_{a2} denote, respectively, the financing cost before and after t_1. In the third case we find:

$$i_f = i_{a1} + (i_{a2} - i_{a1}) e^{-(i-\pi)t_1} + (i_{a3} - i_{a2}) e^{-(i-\pi)t_2} \tag{6}$$

where i_{a3} is the financing cost after t_2.

The tax wedge is found by simply subtracting the pre-tax interest rate from the nominal financing cost.

All tax parameters refer to the 1999 tax codes reported in IBFD (1999). There are five different cases:

Case 1: deduction with a ceiling but no time limit

This model is applied to **Austria** and **Finland**, except that in the latter country the tax rate is not the marginal tax rate on earned income but the rate on capital income (plus a small mark-up). In formal terms, we find for Austria and Finland, respectively (note that the ceiling in Austria was 20000 shillings and in Finland 20000 Markkas):

$$i_a = i - 0.5 \min(20000 / P, i) \tag{7a}$$

$$i_a = i - 0.3 \min(20000 / P, i) \tag{7b}$$

A variant of this model is found for **Ireland**, where the full deduction changes into a partial deduction (80 per cent) after five years.

$$i_a(t) = \begin{cases} i - 0.24 \min(5000 / P, i), t \le 5 \\ i - 0.8 \times 0.24 \min(5000 / P, i), t > 5 \end{cases} \tag{7c}$$

Luxemburg again has a similar system, but has three deduction levels, a standard level that applies after ten years, a high level in the initial five years, and an intermediate level in between.

$$i_a(t) = \begin{cases} i - 0.46 \min(240000 / P, i), t \leq 5 \\ i - 0.46 \min(180000 / P, i), 5 < t \leq 10 \\ i - 0.46 \min(120000 / P, i), t > 10 \end{cases} \quad (7d)$$

Case 2: deduction without a ceiling, no time limit and taxation of imputed rent

In this model, which is applied in the **Netherlands**, the imputed rent as a fraction of the value of the unit of housing (1.25 per cent) is taxed at the top marginal rate of 60 per cent, but interest expenses are fully deducible against total income:

$$i_a = i - 0.6(i - 0.0125) \quad (8a)$$

A variant of this model is found in **Belgium**, where interest payments are deductible against the imputed rent income only:

$$i_a = i - 0.58 \min(i - 0.0125, 0) \quad (8b)$$

Case 3: deduction of a fixed fraction of the acquisition value, subject to a ceiling and a time limit

This system is applied in **Germany**, where during the first eight years 5 per cent of the acquisition cost may be deducted up to an annual ceiling of 5000 DM:

$$i_a(t) = \begin{cases} i - 0.53 \min(0.05, 5000 / P), t \leq 8 \\ i, t > 8 \end{cases} \quad (9)$$

Case 4: no tax relief

The **French** system has no tax relief, so the after-tax interest rates is equal to the market rate, *i.e.*

$$i_a = i \quad (10a)$$

The **Greek** system is also in this category, but it also taxes the imputed rent (3.5 per cent of acquisition cost) at the top marginal rate of 45 per cent:

$$i_a = i + 0.45 \times 0.035 \quad (10b)$$

Case 5: tax credit with indefinite duration

Italy and **Portugal** apply a relatively simple system with the credit amounting to, respectively, 19 and 20 per cent of the financing cost subject to a ceiling of, respectively 1330000 lire and 100000 escudo:

$$i_a = i - \min(1330000 / P, 0.19i) \quad (11a)$$

$$i_a = i - \min(100000 / P, 0.30i) \quad (11b)$$

Table 1 - Property taxation

Country	Tax regime	Estimated effective tax rate
Austria	Residential property situated in Austria is subject to real-estate tax (*Grundsteuer*). It is levied on the assessed standard value (*Einheitswert*) which is generally lower than the market value. The tax is levied at a basic federal rate of 0.2%. The result is multiplied by a municipal coefficient ranging up to 5. Real estate tax is deductible for corporate income tax purposes, but not for personal income tax purposes.	0.5%
Belgium	There is no real-estate tax in Belgium.	0
Finland	Real-estate tax (*kiinteisövero*) is imposed on any kind of immovable property located in Finland. The rate applicable to residential buildings ranges from 0.22% to 0.5% of the taxable value. Rates are fixed by the municipalities, which are also the sole recipients of the revenue from this tax.	0.36%
France	The property tax (*taxe foncière*) and dwelling tax (*taxe d'habitation*) are distinct taxes and may be levied cumulatively. The property tax is a local tax that applies to all developed building located in France. The dwellings tax is a local tax per person occuping a dwelling. Both taxes are computed by applying certain coefficients to half the notional rental value, as determined by the *cadastre*, although the dwellings tax is liable to allowances dependent on the family situation.	0.5%
Germany	The real-estate tax (*Grundsteuer*) is levied by municipalities. It is imposed on the tax value at a basic federal rate of 0.35%. The result is multiplied by a municipal coefficient, which ranges from 2.8 to 6, and brings the effective rate to between 0.98% and 2.1%. The average is around 1.5%. It is not deductible for personal income tax purposes for owner-occupiers.	1.5%
Greece	The state real-estate tax (FAP) in imposed annually on the value of immovable property. There is a tax-free threshold of GRD 69 million of the value, and any excess is taxed at a progressive rate varying between 0.3% up to a maximum of 0.8%. In addition a local real-estate duty (TAP) is payable to local authorities. The rate, set by the local councils, varies between 0.025% and 0.035% of the assessed value of the property. Property taxes are not deductible for personal income tax purposes.	0.57% –100x 69mln/P
Ireland	There is no real-estate tax in Ireland.	0
Italy	The municipal tax on immovable property (*imposta comunale sugli immobili*) is levied on the imputed rental income as determined by the immovable property registry, multiplied by 100. The rate ranges from 0.4% to 0.7% dependent on the municipality. The tax is not deductible for income tax purposes.	0.5%
Luxemburg	There is no real-estate tax in Luxembourg.	0
Netherlands	A real estate-tax (*onroerende zaakbelasting*) is levied by municipalities. The taxable base is established by public valuation. The tax rate differs for each municipality (ranging between approximately 0.1% and 0.9%). The tax is not deductible for personal income tax purposes.	0.5%
Portugal	The municipal real estate tax (*contibuição autárquica*) is levied on a taxable value which is determined according to the Valuation Code. The rates vary, depending on the municipality, between 0.7% and 1.3%. The tax is not deductible for personal income tax purposes (except for taxpayers deriving rental income from immovable property).	1%
Spain	This tax is levied by the municipalities on the cadastral value of the property. The value is adjusted every eight years with reference to the market value of the property. The general tax rates are 0.4% for urban property and 0.3% for rural property, but higher rates may apply. It is deductible only against rental income for income tax purposes.	0.4%

Source: IBFD, 1999, *European Tax Handbook 1999*, Amsterdam and OECD Secretariat.

Spain has a much more complex system, with 25 per cent (20 per cent after two years) of the financing cost, up to 750000, pesetas credited, and 15 per cent of the following 750000 pesetas credited:

$$i_a(t) = \begin{cases} i - \gamma(t)i, iP \leq 750000 \\ i - \gamma(t)750000 / P - 0.15(i - 750000 / P), 750000 < iP \leq 1500000 \\ i - \gamma(t)750000 / P - 0.15 \times 750000 / P, iP > 1500000 \end{cases} \quad (11c)$$

$$\gamma(t) = \begin{cases} 0.25, t \leq 2 \\ 0.20, t > 2 \end{cases} \quad (11d)$$

Property taxation

An overview of the property tax regimes is found in TABLE 1. No property tax is levied in Belgium, Ireland and Luxemburg. One country applies a progressive rate schedule (Greece). The other countries apply flat rates although these may vary across local jurisdictions. As a rule, we assume that the average effective property tax rates apply. Their estimates are also found in TABLE 1. These effective rates should be subtracted from the financing cost to obtain the financing cost net of property tax.

The tax wedge

The results for the computed tax wedge are summarised in TABLE 2 and FIGURE 3.[6] The tax subsidy for owner-occupied housing is found to be the largest in some of the smaller, euro area economies, notably in (in the order of the size of the subsidy) the Netherlands, Luxembourg, Ireland, Finland and Spain. The subsidy is practically nil in Austria, Italy and Belgium. Comparatively heavy taxation of owner-occupied housing is a feature of France, Portugal, Germany and Greece.

6. The country abbreviations stand for: AUT = Austria, BEL = Belgium, FIN = Finland, FRA = France, DEU = Germany, GRC = Greece, IRL = Ireland, ITA = Italy, LUX = Luxemburg, NLD = the Netherlands, PRT = Portugal and ESP = Spain.

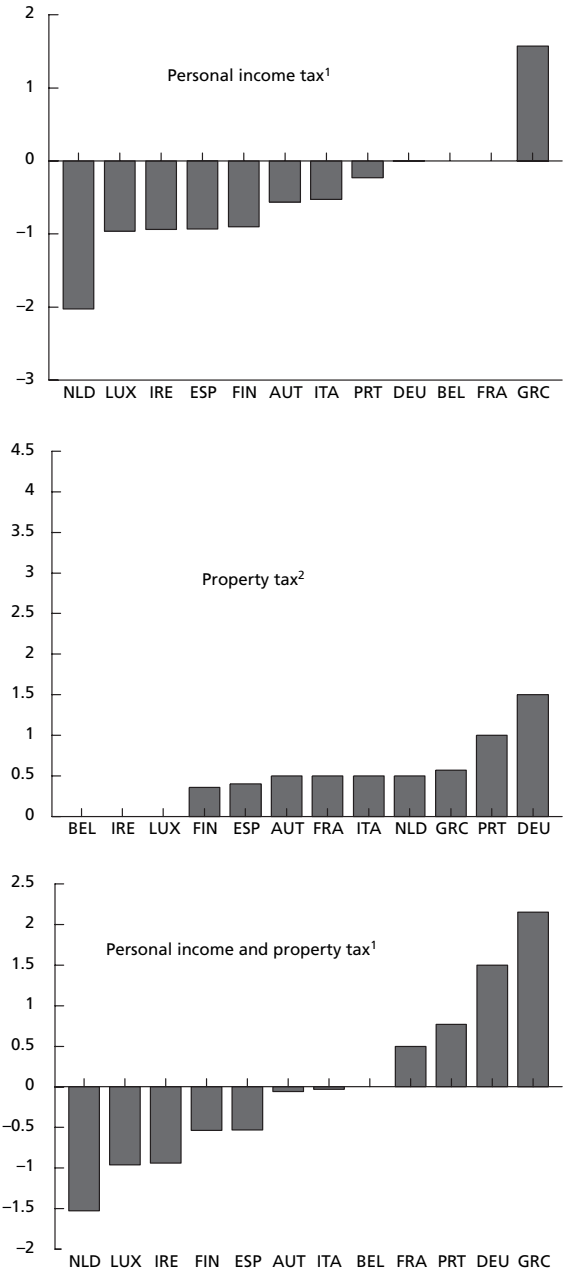
Table 2 - Computation of the tax wedge

	AUT	BEL	FIN	FRA	DEU	GRC	IRL	ITA	LUX	NLD	PRT	ESP
Deduction limit (thousands)												
First period	20	. .	20	. .	5	. .	5	1 330	240	. .	100	. .
Second period	. .	. .	. .	. .	. .	. .	5	. .	180	. .	. .	. .
Third period	. .	. .	. .	. .	. .	. .	. .	. .	120	. .	. .	. .
Imputed rent (% of value)	. .	1.25	. .	. .	. .	3.50	. .	. .	. .	1.25	. .	. .
Interest rate	4.68	4.71	4.72	4.62	4.49	6.31	4.77	4.73	4.67	4.63	4.78	4.73
Marginal tax or credit rate	0.50	0.58	0.30	. .	0.53	0.45	0.24	0.19	0.46	0.60	0.30	0.25
Cost of financing	4.12	4.71	3.82	4.62	4.49	7.88	3.83	4.20	3.71	2.60	4.55	3.79
First period	4.12	4.71	3.82	4.62	4.48	7.88	3.62	4.20	3.11	2.60	4.55	3.59
Second period	. .	. .	. .	. .	4.49	. .	3.85	. .	3.50	. .	. .	3.80
Third period	. .	. .	. .	. .	. .	. .	. .	. .	3.89	. .	. .	. .
Tax wedge (personal income tax)	–0.56	0.00	–0.90	0.00	0.00	1.58	–0.94	–0.53	–0.96	–2.03	–0.23	–0.93
Property tax rate	0.50	0.00	0.36	0.50	1.50	0.57	0.00	0.50	0.00	0.50	1.00	0.40
Tax wedge (total)	–0.06	0.00	–0.54	0.50	1.50	2.15	–0.94	–0.03	–0.96	–1.53	0.77	–0.53

Source: OECD Secretariat.

Figure 3 - The tax wedge

Per cent



1. Difference between after-tax and pre-tax real interest rate on mortgage loans; 1999 tax rules and interest rates.
2. Rate as a per cent of property value, 1999 tax rules.

Source: OECD Secretariat and author's calculations.

Empirical evidence

The theoretical model suggests that price variability of owner-occupied homes would be largest in countries where the associated tax breaks are largest. Is there any empirical evidence in favour of this prediction?

FIGURE 4 plots the development of real house prices overtime, in eight euro area countries for which series are available, together with their exponential trend lines[7]. It is clear that house prices have been fluctuating in all these countries, but the amplitude has been by far the smallest in Germany and France, which are also the countries in this sample which tax rather than subsidise owner-occupied housing. Conversely, bubble-like episodes are observed in Italy (early-1980s and early-1990s), Spain (early-1990s and early-2000s), the Netherlands (late-1970s and early-2000s), Finland (early-1990s), Belgium (early-1970s) and Ireland (since the mid-1990s) – all countries which to various extents subsidise owner-occupied housing. There is however, one caveat, namely that breaks in the trend may have occurred that are obviously not captured by our simple methodology. For example the Netherlands, Spain and Ireland have experienced a (probably structural) increase in labour participation rates. As a result, household earnings and expectations thereof have shown a structural increase and this is probably reflected also in an upward, structural shift in real house prices. Nonetheless, house price developments prior to the labour-supply shocks in these countries raise the suspicion that equilibrium is again being overshot.

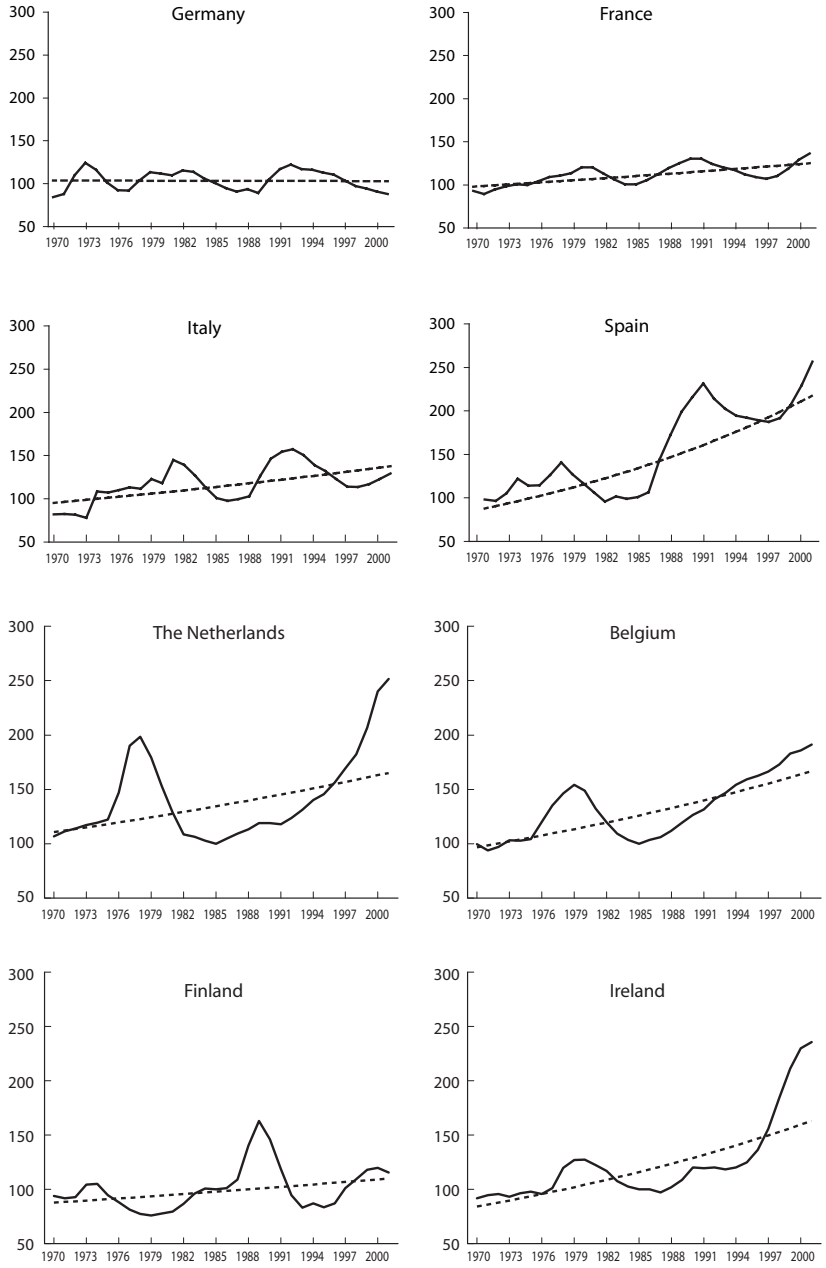
Regressing the marginal, effective tax wedges on owner-occupied housing in our sample on the variability of house prices (gauged by the root mean square of the percentage deviation from trend) seems to confirm a strong correlation between the two (FIGURE 5). About three-quarters of the cross-country price variability is explained by the tax wedge on housing. The most striking example is the Netherlands, which combines the largest tax breaks with the largest price variability. There is a middle range containing Ireland, Spain, Finland, Belgium and Italy, and the least prone to price variability with the smallest tax breaks are France and Germany.

A number of additional observations are in order. Obviously, causality between house price volatility and tax breaks may go in both directions: in countries where house prices are high and volatile for reasons such as strong supply constraints due to tight regulation, slow urban planning and limited land availability, governments may also be more tempted to provide high housing subsidies to stimulate construction and house-ownership of low income earners. This political-economy twist to the story is interesting, especially since the tax subsidy may actually make things worse for lower-income earners, who typically are the least likely to benefit from the tax subsidy, but still face high and volatile house prices. Another observa-

7. The source of these series is the Bank for International Settlements (BIS). Series are available for Germany, France, Italy, Spain, the Netherlands, Belgium, Finland and Ireland. The BIS has only rather short series available for Austria and Portugal, so it was not possible to distinguish between cyclical and trend growth in real house prices.

Figure 4 - Real house prices

Index, 1985 = 100*

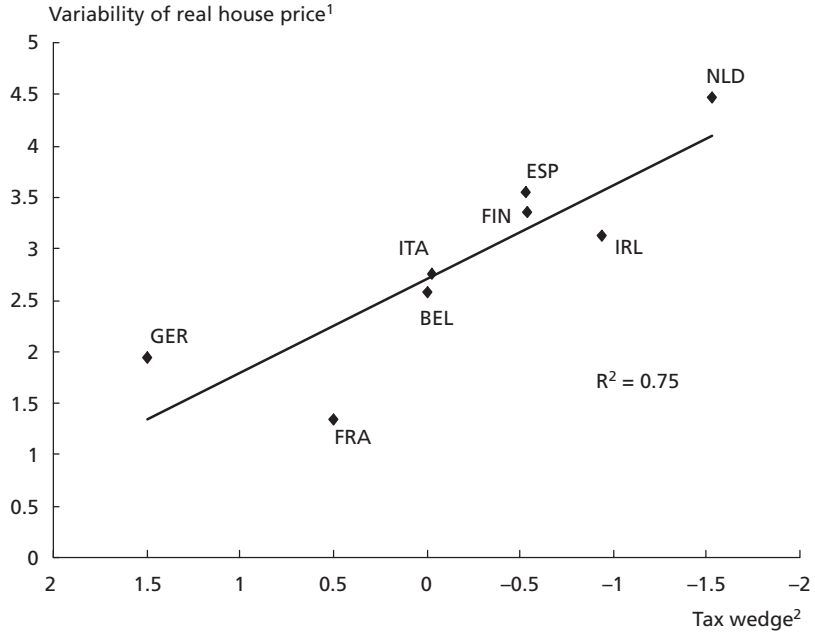


* Deflated with the price index for household consumption; the dashed line is the exponential trend.

Source: Bank for International Settlements (BIS) and author's calculations.

Figure 5 - Correlation between the tax wedge and variability of house prices

Per cent



1. Root mean square deviation of real house price from trend, 1970-2001.
2. Difference between after-tax and pre-tax real interest rate on mortgage loans; 1999 tax rules, interest rates and inflation.

Source: OECD Secretariat and author's calculations.

tion is that, as TABLE 3 shows, countries that rank high in terms of the amount of tax subsidies available for owner-occupied housing and volatility of real house prices, generally also rank high on levels of mortgage debt and inflation. All these phenomena are closely intertwined. The tax subsidy stimulates taking on loans (in fact the tax subsidy typically increases with the loan-to-value ratio), but this in turn raises the interest rate sensitivity of the market. High inflation, moreover, reduces the real after-tax mortgage interest rate, and conversely a buoyant housing market, *via* wealth effects on consumption, may lead to higher inflation. In these countries, property prices may rise to unsustainable levels and if financial supervision arrangements and prudential standards are not sufficiently robust, problems of financial stability may result. This concern has recently prompted the ECB (2003) to call for increased monitoring of the evolution of households' indebtedness and financial fragility, as well as for a strengthening of the role of risk assessment procedures.

Table 3 - Structural features of housing markets and inflation differentials

Per cent, countries ranked according to the size of the tax advantage

	Tax wedge[1]	Variability of real house prices[2]	Mortgage debt as a share of GDP[3]	Loan to value ratio	HICP inflation[4]
Netherlands	–1.53	4.5	74	112	3.1
Ireland	–0.94	3.1	30	60–70	4.1
Finland	–0.54	3.4	21	75–80	2.0
Spain	–0.53	3.6	32	80	3.0
Austria	–0.06	. .	30	60	1.6
Italy	–0.03	2.8	10	. .	2.4
Belgium	0.00	2.6	28	80–85	1.9
France	0.50	1.3	22	. .	1.7
Portugal	0.77	. .	47	70–80	3.3
Germany	1.50	1.9	47	70	1.3

1. Difference between after-tax and pre-tax real mortgage interest rate, 1999.
2. Mean root square per cent difference from trend, 1970-2001.
3. 2001.
4. Average 1999-2003.

Sources: BIS, ECB and OECD Secretariat.

Concluding remarks

The apparent divide between high- and low-inflation countries in the euro area appears to be related in part to the difference in tax treatment in owner-occupied housing. Income tax systems in several euro area countries are conducive to volatile house prices and this may have been interacting with the generally higher inflation rates (and hence lower real interest rates) observed in these countries, since the advent of the common currency. The extent to which this has led to a housing "bubble" in these countries is difficult to ascertain at this stage, given the short existence of the single currency, but there are indications that, at least in some countries, house prices may have peaked. In "normal" times the differential tax treatment of housing in EMU is a concern because it may contribute to the "asymmetric" transmission of monetary policy. To the extent tax systems contribute to the occurrence of housing bubbles, it may also be a concern for macroeconomic stability for the area as a whole.

P. v.d. N.[8]

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