PROPERTY TAX REFORM AND THE USER COST OF OWNER-OCCUPIED HOUSING IN THE EU

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In this paper we compute the user cost of housing capital investment in four EU countries (France, Italy, Spain and the UK) following Poterba (1984, 1992) and Poterba and Sinai (2008) to investigate the role played by tax policy during the recent period. Our results suggest that current tax provisions – including both recurrent property taxes and mortgage interest tax deductions – bring about significant differences in the user cost of capital across income deciles. Taking a normative perspective, we also simulate the effects of taxing imputed rental income. In a sensitivity analysis, we show that house price evolutions have dominated other considerations about the user cost over the recent period, leading to large variations in the cost of housing investment. This even occurs when prospective homeowners incorporate a long-term view of the housing market.

1 Introduction

The housing bubble boom and bust represent a key element of the recent global financial crisis. In certain instances tax incentives have played a non-trivial role toward incentivising home acquisition in the wake of buoying asset prices and credit access. While home ownership is often considered as positive from a social perspective (e.g., higher civic behaviour of home owners), sharp fluctuations in house prices might also have disrupting effect on the economy as a whole, including for public finances, consumption and the labour market, (see Bover and Jimeno, 2007 and Bover, 2006). For instance countries such as Ireland and Spain have experienced substantial tax revenues windfalls and shortfalls in close connection with the house price evolutions, (see Barrios and Rizza, 2010). From a household perspective, housing investment often represent the most important lifetime investment and house price fluctuations and mortgages can have very large effects on net wealth and consumption, see Bover (2012).

In this paper we investigate this issue taking a user cost of capital approach to owner-occupied housing (Poterba, 1984 and 1992; Poterba and Sinai, 2008). Based on this approach, home ownership is considered as an investment decision and an indicator for the marginal cost of investing in housing against investment alternatives is considered taking explicitly the role of tax incentives (through property taxes and mortgage deductibility) into account. We compute country-specific average user costs of capital to analyse the role of tax policy and housing price expectations on the cost of housing investment per income decile based on micro-data across a set of EU countries.

The paper utilises the EUROMOD microsimulation model, which makes use of the EU-SILC data set, to provide detailed household-level information, including incomes, tax rates and demographic characteristics. Individual variations in the determination of the user cost of housing investment is introduced across a number of key variables, namely marginal income tax rates, mortgage interest relief and property taxes (including a hypothetical imputed rent tax). Indicators on the effective tax burden are calculated at household level considering explicitly the interaction of the tax system, including specific housing tax provisions, with the benefit system.

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These tax indicators are combined with long-run time series on house prices in order to consider alternative hypotheses regarding the housing price expectations.

The analysis is carried out for selected EU countries, namely France, Italy, Spain and the UK, focusing on the distributional impacts by income decile, which allows for a focus on which household groups are (dis)favoured by the current tax system, and how this has possibly changed under the various tax reforms implemented in the countries considered. Our results show that house price expectations are key to determine the evolutions of the cost of housing investment and that the tax systems, which often provide generous tax rebate on mortgage interest payments, can lead to significant differences in the cost of owner-occupied households across income deciles.

The following section outlines the theoretical background to our approach. Section 3 explains how the baseline estimates were obtained and shows the baseline values by income decile. Section 4 explains the simulations carried out and analyses the results, and Section 5 concludes drawing out some policy implications of the research.

2 Theoretical framework

2.1 The user cost of housing

Incentives to homeownership can be captured by a synthetic measure, the user cost of capital (Himmelberg et al., 2005). Under this approach, homeownership is considered an investment decision, and treated as such according to the neoclassical investment theory (Poterba, 1984). In such framework, an equilibrium relationship is derived between the imputed rental income accruing to homeowners and the cost associated with homeownership, which in turn identifies the marginal cost of purchasing additional housing services. The user cost has been extensively used to measure tax expenditures favouring owner-occupied housing, such as the tax exemption of imputed rents and the deductibility of mortgage interest payments, in the US (Poterba, 1992; Poterba and Sinai, 2008a; Poterba and Sinai, 2008b).

Our analysis follows this well-established literature closely. As a starting point, it is useful to consider the hypothetical case where homeownership is treated as a business, and thus the associated economic profits are subject to taxation. With income tax deductions on the interest paid on mortgage the net-of-tax income could be expressed as:

$$(1-t)[R-\{i+t_p+\beta+m+\delta-\pi\}P_H]$$

where R is the imputed rental income from housing capital, P_H is the price of a unit of housing capital, t is the income tax rate, i is the owner's interest, or foregone equity cost, t_p is the recurrent property tax rate.[1] In addition, β is a risk premium associated with the housing investment, δ is the economic depreciation rate, m denotes maintenance costs (assumed not tax-deductible), and π is the nominal asset revaluation term (capital gain).

In equilibrium, the net income from homeownership must be zero. This allows the derivation of the user cost of capital (denoted with c) as the ratio R/P_H or:

$$R/P_H \equiv c=\{i+t_p+\beta+m+\delta-\pi\}$$

Keeping in mind that the equilibrium relationship is valid with unchanged tax rules, the expression for the cost of capital can be modified to account for the different tax provisions

[1] Throughout the analysis, we rule out the possibility recurrent property taxes are benefit taxes. In other words, we do not consider the case where, by financing local public services, property taxes can indirectly provide a positive utility to taxpayers.

potentially applicable to homeownership. In particular, some taxes fall on ownership in a recurrent fashion. They can be designed as taxes on the flow of services from ownership (taxation of imputed rents), or on (a proxy of the value of) the stock, such as the recurrent property tax. Furthermore, a tax relief might be offered to the cost of financing housing by debt. In addition, taxes might be levied upon acquisition or disposal of immovable property, when they normally take the form of transfer (or registration) taxes and capital gains taxes, respectively.

Accounting for these taxes, while assuming – consistent with common practice – that imputed rents are not taxed, leads to the following general formulation for the cost of capital for an additional unit of housing investment:

$$c = \{i(1 - t_M\varphi)\lambda + t_p + \beta(1 - t_y) + m + \delta - \pi(1 - t_{capgain}) + (1 - \lambda)i(1 - t_y)\}(1 + t_{trans}) \tag{1}$$

The new elements in (1) are explained in turn. First, (1) assumes that, in the presence of a transfer tax, the actual disbursement for a housing unit of price P_H is $(1 + t_{trans})P_H$, where t_{trans} is the statutory transfer tax rate.[2] Moreover, when a capital gains tax is applied, the after-tax asset revaluation term becomes $\pi(1 - t_{capgain})$, with $t_{capgain}$ being the tax rate on the capital gains.

An important component of the generalised cost of capital relates to the financing of the house purchase. The formulation in (1) takes the traditional view that the financial cost is equal to a weighted average of the cost of equity and the cost debt, with weights given by the corresponding shares of finance (Poterba, 1992). However, we do not differentiate between the cost of equity and that of debt, and hence use a single interest rate to capture the cost of finance. As noted by Himmelberg *et al.* (2005), mortgage interest rates reflect the risk-adjusted required return on a housing loan, as well as a premium for the borrower's refinancing and default options. The cost of funds for a housing investment should not include these additional factors. Thus, in the empirical application, we use the 10-year government bond rate as a measure for the cost of funds. In the presence of a tax relief for mortgage interest payments, the after-tax nominal cost of debt becomes $i(1 - t_M\varphi)$, where t_M is the rate at which the relief is granted, and the φ is the fraction of interest benefitting for the tax subsidy. In the case of a deduction granted via the PIT system, t_M represents the marginal tax rate for the taxpayer. In the case of a tax credit reducing the individual tax liability proportionally to the interest paid, t_M would be the same across all taxpayers. The possibility of a cap to the amount of subsidised interest payments is introduced through the parameter φ, which ranges between 0 (no tax relief) to 1 (full tax relief). In practice, the parameter φ allows for additional heterogeneity to be included in the empirical model, since tax systems in Europe often link the amount of deductible interest to individual and household characteristics. The requirement of a down payment is incorporated via λ, the loan-to-value ratio. Hence, the fraction of the house that is equity-financed, $(1 - \lambda)$, foregoes earned interest at the unit yield of i, which is taxed, not necessarily under the PIT schedule, at the rate t_y, for which we employ the effective marginal tax rate (EMTR). The fact that housing and alternative assets are not in the same risk class is reflected in the pre-tax risk premium term β, for which the relevant tax rate is again t_y. Admittedly, the calibration of the risk premium is somewhat arbitrary, and is not explicitly derived from optimised portfolio choices based on the risk-return trade-off. In that, we again follow the available literature (Poterba and Sinai, 2008a).

2 In order to isolate the impact of transaction taxes, this formulation explicitly assumes no capitalisation of taxes into property prices.

2.2 A closer look at housing-related taxes

There is consensus in the literature that the tax exemption of imputed rental income represents the main tax expenditure for owner-occupied housing, in terms both of foregone revenue and induced economic distortions. Imputed rent refers to the amount that an owner would pay to rent a property of equivalent quality. The argument for taxing imputed rent can be derived from the Haig-Simons approach set forth in Haig (1921) and Simons (1938). The theoretical argument is that a comprehensive income tax base should reflect all the potential consumption opportunities – both monetary and non-monetary – while leaving the stock of wealth unaffected. Imputed rent clearly constitutes part of the homeowner's non-monetary consumption set (and hence, expands their monetary consumption set). Therefore excluding imputed rent from the tax base is argued to be undesirable on the grounds of horizontal equity (compared with otherwise similar renters), and also on efficiency grounds, as it would lead to distortions in the housing and rental markets.

The Haig-Simons approach would entail taxing the rental income it generates while allowing deduction of the costs incurred, including maintenance costs and interest payments in the case of debt-financed investment, depreciation and other costs of providing housing services. In this way, only the net return on investment would be subject to taxation. Capital gains from housing transactions would also be taxed to achieve neutrality *vis-à-vis* the taxation of other assets in countries where realised capital gains are subject to taxation more broadly.

In practice, however, while national tax systems vary significantly in their treatment of immovable property, they tend to be biased in favour of owner-occupied housing, in a way which is hard to justify from a purely economic point of view. For the purpose of our analysis, this warrants some qualifications of the general expression in (1). While the imputed rent tax exemption is duly reflected therein, in practice capital gains taxation of primary residences is usually either tax-exempt, or subject to specific conditions, for instance in terms of the duration of tenure. Likewise, recurrent property taxes present a high degree of heterogeneity, in terms of both design and revenue yield, thus entailing a very different effective tax burden across countries.

2.3 Calculating effective marginal tax rates with the EUROMOD microsimulation model

In order to calculate the individual rate of income tax, t_y, we calculate the effective marginal tax rate using EUROMOD, which is a microsimulation model of EU countries personal income taxes and benefits (including benefits such as unemployment, family benefits, etc.) applied to all household revenues sources, including wages, self-employment income, pensions and unemployment benefits. The model generates gross and net household income applying countries' tax codes and calculates theoretical benefit entitlements and tax liabilities. EUROMOD is a static model, *i.e.*, simulations abstract from potential behavioural reactions of a representative sample of individuals and of changes in the socio-demographic characteristics of the population. EUROMOD is managed, maintained, developed and updated by the Microsimulation Unit of the Institute for Social and Economic Research, based at the University of Essex, which is specialised in socio-economic research and surveys, in particular as regards the production and analysis of longitudinal data. The model is developed in collaboration with national experts who update the tax and benefit coding and provide updated reports on the tax and benefit system of each country. The European Commission has recently adopted the model for its tax modelling activities. The model is run and physically located at the Joint Research Centre premises in Seville (Institute for Prospective Technological Studies).The aggregate estimates for expenditure and number of recipients of each benefit (and revenue and number of tax payers of each tax) are regularly compared with the same information from external sources (e.g., administrative statistics and national microsimulation models, whenever available) including detailed tax and benefit simulation as well as income distribution indicators. The results of the validation exercises are included in the country reports (available on the EUROMOD website at https://www.iser.essex.ac.uk/euromod) which contain background information on the tax-benefit system for each country, a detailed description of all tax-benefit components simulated in EUROMOD, a general overview of the input data (including information on sample quality, weights, data adjustment, imputations and assumptions) and an extended summary of the validation process. EUROMOD baseline results do not comprehensively take into account non take-up of benefits or tax evasion.

In order to calculate the EMTRs we follow the approach of Jara and Tumino (2013). Thus, the EMTRs for each individual are evaluated taking account of taxes paid by, and benefits paid to all members of a household and affecting household current cash disposable income. Individual level EMTRs are calculated according to the following formula:

$$EMTR = 1 - \frac{Y_{HH}^{1} - Y_{HH}^{0}}{G_k^{1} - G_k^{0}}$$

where *YHH* represents the household disposable income to which the individual *k* belongs and *G* represents the earnings of the individual. The household disposable income is calculated first and then individual earnings are increased sequentially by a given margin for each earner in the household accounting for all new tax liabilities and benefits entitlements for all individuals *k* in the same household *HH*. The same procedure is then applied to the successive income earners in the household. In computing the EMTR we have chosen to increase only the largest component of an individuals' aggregate income which, in our sample, is gross labour income. As in Jara and Tumino (2013), the margin applied is equal to 3 per cent which corresponds approximately to a one hour increase for a worker working 40 hours per week.

In most countries the EMTR is high for low income earners (mostly because they begin to lose means-tested benefits). These high EMTR values are thus reflective of the disincentive effect of existing tax and benefit systems in the EU on the extensive margin of labour supply. The EMTR tends to be relatively stable in the middle of the distribution, before it becomes more progressive for the higher income deciles.

3 Empirical implementation

Calculating the user cost requires calibrating and simulating a number of parameters that enter equation (1).

In what follows, we focus on taxes and relief that are levied in a recurrent fashion, as they can immediately be related to ownership. Operationally, they can also be simulated using the microsimulation model. By contrast, the rates of transaction taxes used are the statutory ones (for France and Italy) or the average statutory rates (for Spain and the UK, where a progressive scale applies).

For the interest rate we use the 10-year government bond rate, which represents a non-risky alternative return on investment.[3] The risk premium estimate, and the maintenance and depreciation estimates are taken from Poterba and Sinai (2008a). The loan-to-value ratio is taken from Calza *et al.* (2013), who report country-specific averages for some European countries. Although this

[3] Ideally one would have used bond rates of longer maturity, e.g., 20-year. However such bonds are more rarely issued than 10-year bonds or bonds with shorter maturity. The 20 and 10- year bond yield are usually highly correlated such that we opted for the 10-year bond maturity rate as better and more representative data was available.

clearly does not account for differences in access to finance within countries, it allows us to focus on tax variables as the only source of heterogeneity across households.

To account for house price dynamics, as reflected in individual expectations, for the majority of our simulations we use the average growth in house prices for 1989 to 2013 (OECD House Price Index). Using this time frame gives a reasonable estimate of the underlying growth in house prices and its foreseeable evolutions for potential buyers. In a sensitivity analysis, we also look at the impact that house price variation has on the user cost of housing, by varying the assumptions on how households' expectations on future house prices are formed (the methodology is described in Section 4.5).

For the individual/household-level analysis, we use the EUROMOD microsimulation model, which is based on the EU Statistics on Income and Living Conditions (EU-SILC) data (for France, Italy and Spain) and the FRS data (for the UK). The sample size of the survey is as follows:

Table 1

Sample Size of EU-SILC and FRS Data Used for EUROMOD
(2010 wave)

Country	Individuals	Households
France	26,387	11,042
Italy	47,420	19,147
Spain	36,922	13,597
UK	57,380	25,200

The survey data is for 2010, which is the most recent wave for both EU-SILC and the FRS. EUROMOD then applies uprating factors to each of the relevant variables to account for the year-on-year anticipated changes. For example, variables may be uprated by the change in average earnings, average gross pension changes, the harmonised index of consumer prices or the change in aggregate tax receipts.[4]

3.1 *Baseline results*

To highlight the country-level differences, we first report the country-level values, shown in Table 2.

One can see large variations between the countries, with the UK having the lowest user cost of housing followed by France, Spain and lastly Italy, where the user cost is more than twice that of the UK. Building on this, we move to estimates for the user cost of housing calculated disaggregated by decile.

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4 See *EUROMOD Country Reports* for more details.

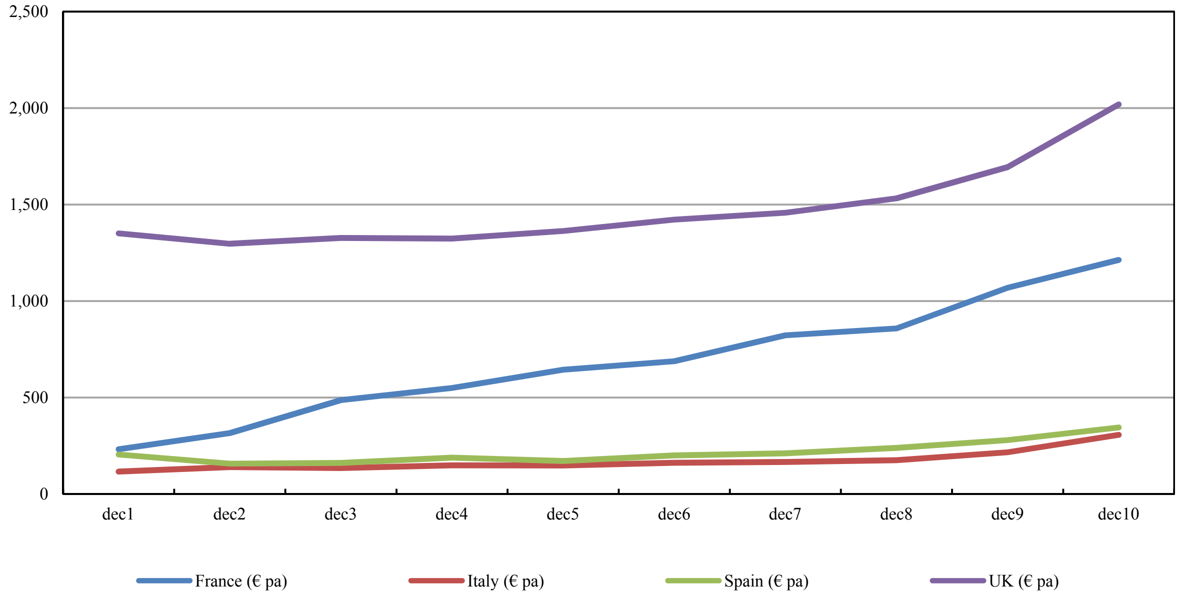
Table 2

User Cost of Housing by Country in 2013

Country	Average User Cost of Housing
France	0.0309
Italy	0.0486
Spain	0.0424
UK	0.0236

Figure 1

Existing Property Taxes per Unit of Housing by Deciles, 2013



Note: The UK figures have been converted from pounds sterling to euros at the average exchange rate for 2013: 1.178 euros = 1 pound sterling.
Source: EUROMOD and authors' calculations.

3.1.1 Existing property tax values

Information on property taxes paid by household is available in EUROMOD. The microsimulation model estimates by household, the value of the tax liability. The values themselves are shown by decile for the four countries in Figure 1. As can be seen, the value of the property tax paid is progressive across countries, although to different degrees. The progressivity in the value of the property tax paid is the most pronounced in the case of the UK and France and it is the least pronounced in the case of Italy and Spain.

Alternatively, Figure 2 provides an indication on the progressivity of actual property taxes as measured in terms of the gross disposable income. Figures are provided by income quintile so as to simplify the reading of this graph. Accordingly, property tax systems appear to be largely regressive in most countries, with the regressivity being the most pronounced in the UK and Spanish cases while being mildly regressive in the Italian case. In the French case the property tax system appears to be progressive until the third quintile and regressive afterward. In the Italian case the property tax system appears to be relatively neutral.

Additionally using EUROMOD one can simulate the tax credit that is received by household from the mortgage interest relief (in those countries where it applies, namely France, Spain and Italy). The values in euros themselves are shown by decile for the three countries in Figure 8.[5]

As for the property taxes, the mortgage tax relief appears to be regressive when considering level values. Considering relative values (in percent of net disposable income) as in Figure 4 confirm the regressive nature of mortgage interest relief. This is especially so in the Spanish case.

The property taxes and subsidies need to be entered into the user cost of housing equation in *per unit of housing* terms. In order to estimate house price value we use an indirect estimate based on the concept of the imputed rent, for which we have estimates at the household-level.

Estimates of the imputed rent have been made by Verbist *et al.* (2015), which use the rental equivalence method (sometimes referred to as the opportunity cost approach).[6] The relationship between imputed rent and the value of the house will vary, though the literature tends to take five percent as a rule of thumb (e.g. Mirrlees *et al.*, 2011:384). The accuracy of this estimate will also vary across individuals, though we argue that for the distribution as a whole and for the deciles, it will be a reasonable approximation. Taking this estimate of the house price, we calculate the property taxes and subsidies per unit of housing, as required for the user cost equation.

These individual-level values are entered into the user cost of housing equation, resulting in the baseline user cost of housing estimates shown in Table 3. The baseline figures are represented graphically in Figure 3.

As already noted, the differences across countries are substantial. Table 3 and Figure 3 show the within country differences. In France, the user cost is fairly stable across deciles, whereas in Italy, Spain and the UK, it is regressive. In the UK the user cost is nearly 59 per cent higher for the poorest decile compared to the richest. To a lesser extent, this is the case in Italy and Spain (39 and 27 per cent respectively).

4 Simulations of tax reforms

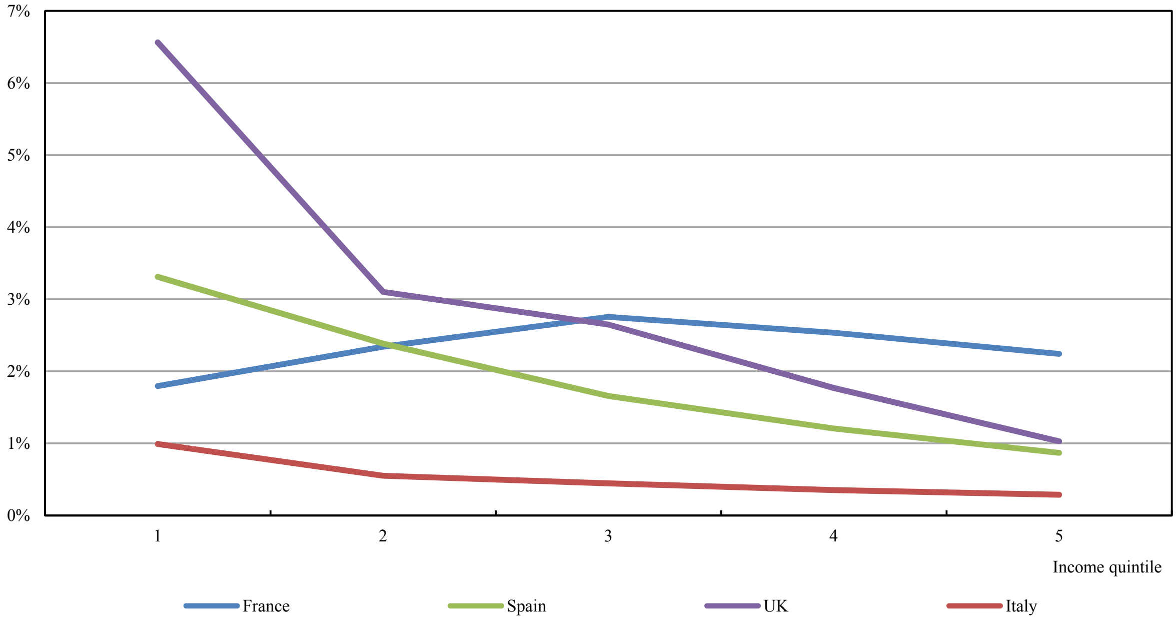
In the following we consider the influence of the various components of the cost of capital, namely the mortgage tax deduction, property taxes, the impact of substituting current property taxes with an imputed-rent based tax. We also pay specific attention to the role played by housing price expectations. The latter is particularly relevant to consider the evolution of the user cost of capital during the period given the large fluctuations in house prices.

[5] In the UK, mortgage interest tax relief was fully abolished in 2000 (having been phased out over many years).

[6] These estimates are calculated using hedonic price estimations of the rental value of owned housing based on the EU-SILC micro-data from EUROSTAT. Note that the EU-SILC database already provides estimates of imputed rent, but as Juntto and Reijo (2010) indicate, these suffer from lack of comparability between countries given the variety of approaches used to collect this data. The Verbist et al. (2015) estimations on the contrary use the same empirical model applied to EU-SILC micro- data (with the only exception of United Kingdom, where analysis will be based on a national household budget survey, the Family Resources Survey). Verbist *et al.* (2015) estimate the imputed rent equivalent in two steps. The first step being a regression on private market tenants with rent as the dependent variable. The second step takes the coefficients of the explanatory variables and applies them to owner occupiers, correcting for the selection bias using a Heckman procedure and adding an error component in order to account cross-households' heterogeneity observed in the rent data.

Figure 2

Existing Property Taxes per Unit of Housing by Quintile, 2013



Source: EUROMOD and authors' calculations.

Figure 3

Mortgage Interest Tax Relief per Unit of Housing by Deciles, 2013

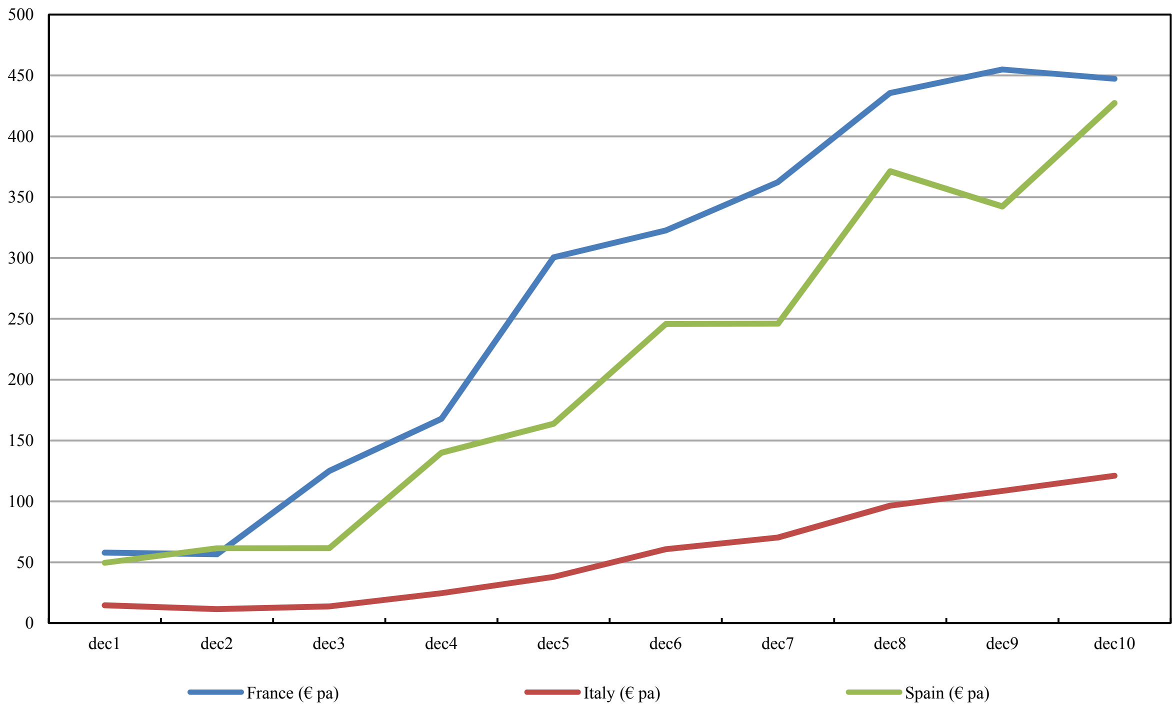


Figure 4

Mortgage Interest Tax Relief, 2013
(percentage of net disposable income)

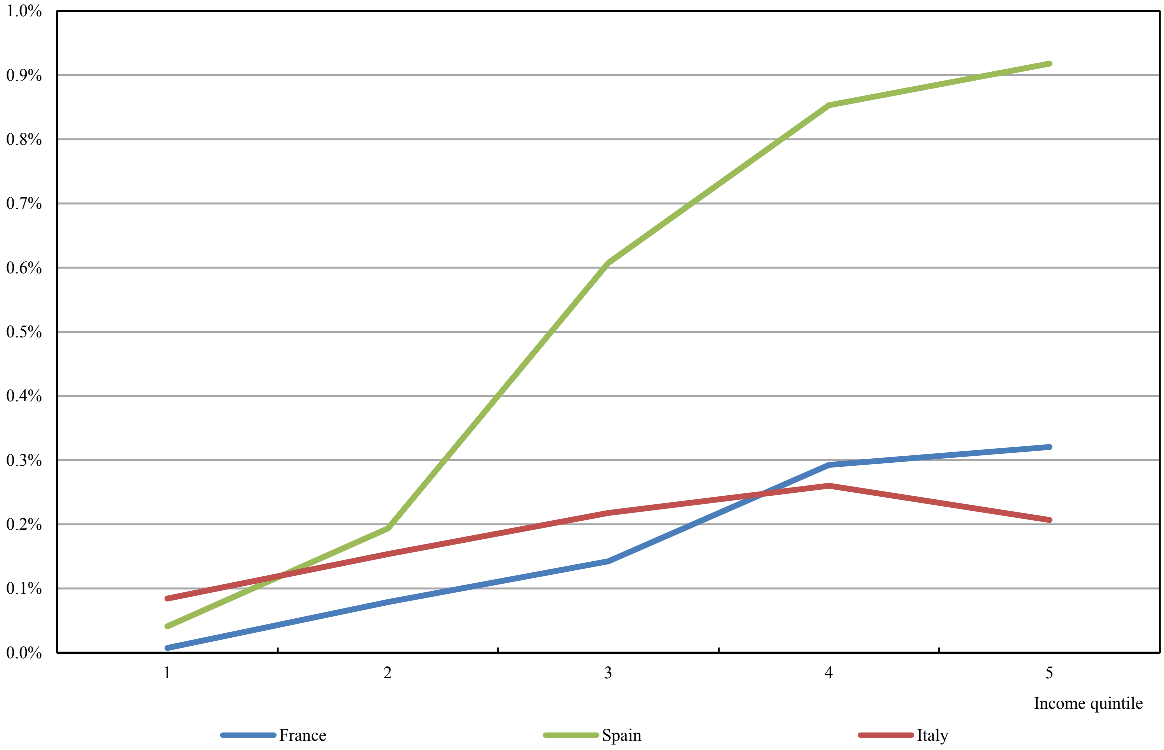


Table 3

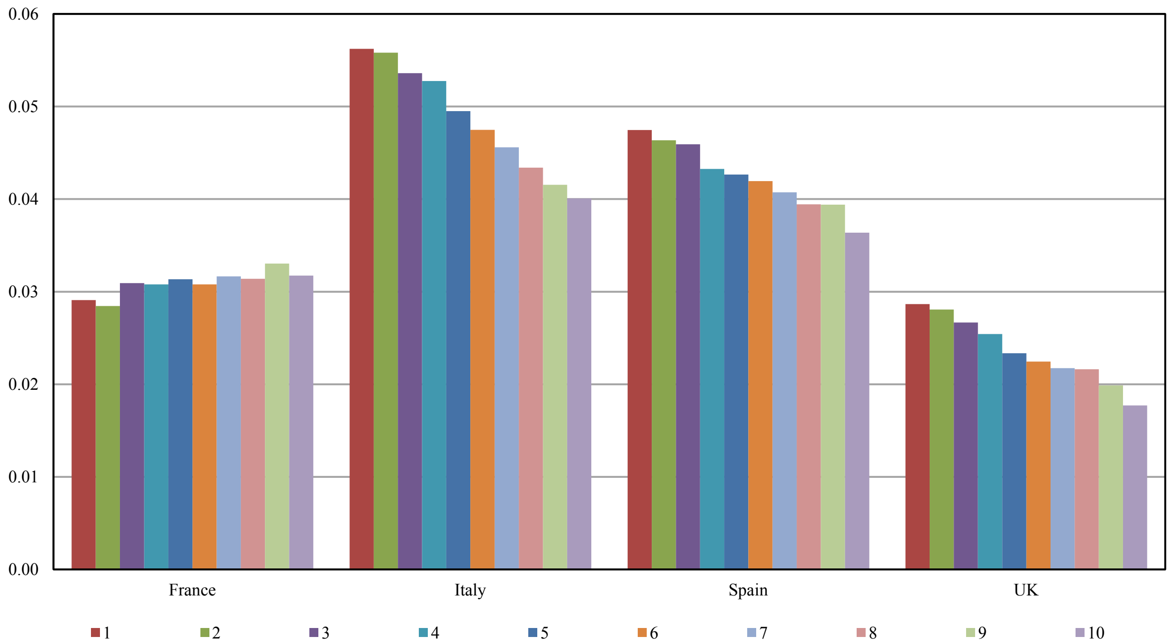
Baseline User Cost of Housing:
Individual-level EMTR and Property Tax and Subsidy Estimates, 2013

Country	User Cost of Housing		by Income Decile									
	Average	CoV*	1	2	3	4	5	6	7	8	9	10
France	0.0309	4.25%	0.0291	0.0285	0.0309	0.0308	0.0313	0.0308	0.0317	0.0314	0.0330	0.0317
Italy	0.0486	12.14%	0.0562	0.0558	0.0536	0.0527	0.0495	0.0475	0.0456	0.0434	0.0415	0.0401
Spain	0.0424	8.31%	0.0475	0.0464	0.0459	0.0433	0.0427	0.0420	0.0407	0.0394	0.0394	0.0364
UK	0.0236	15.21%	0.0287	0.0281	0.0267	0.0254	0.0234	0.0224	0.0218	0.0216	0.0199	0.0177

* Coefficient of variation.

Figure 3

Baseline User Cost of Housing by Income Decile (2013)



4.1 *Impact of removing mortgage interest subsidy*

The consequences of removing the mortgage interest deduction are shown in the following tables.

Table 4 shows the new user cost of housing, while Table 5 shows the percentage change relative to the baseline.

Table 4

User Cost of Capital: Baseline Calculation with Mortgage Interest Relief Removed (2013)

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	0.0344	0.0326	0.0319	0.0344	0.0343	0.0348	0.0343	0.0351	0.0349	0.0365	0.0352
Italy	0.0531	0.0607	0.0603	0.0581	0.0572	0.0540	0.0520	0.0501	0.0479	0.0460	0.0446
Spain	0.0474	0.0525	0.0514	0.0510	0.0483	0.0477	0.0470	0.0458	0.0445	0.0445	0.0415
UK	0.0236	0.0287	0.0281	0.0267	0.0254	0.0234	0.0224	0.0218	0.0216	0.0199	0.0177

Table 5

Change in User Cost of Capital:
Baseline v Baseline Calculation with Mortgage Interest Relief Removed, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	10.1%	10.7%	10.9%	10.1%	10.1%	10.0%	10.1%	9.9%	10.0%	9.5%	9.8%
Italy	8.4%	7.4%	7.4%	7.7%	7.8%	8.3%	8.6%	8.9%	9.3%	9.7%	10.0%
Spain	10.7%	9.7%	9.9%	10.0%	10.5%	10.6%	10.8%	11.1%	11.4%	11.4%	12.2%
UK	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

The change in user cost is shown graphically below.

Figure 4

Change in User Cost Due to Removal of Mortgage Interest Relief by Income Decile, 2013

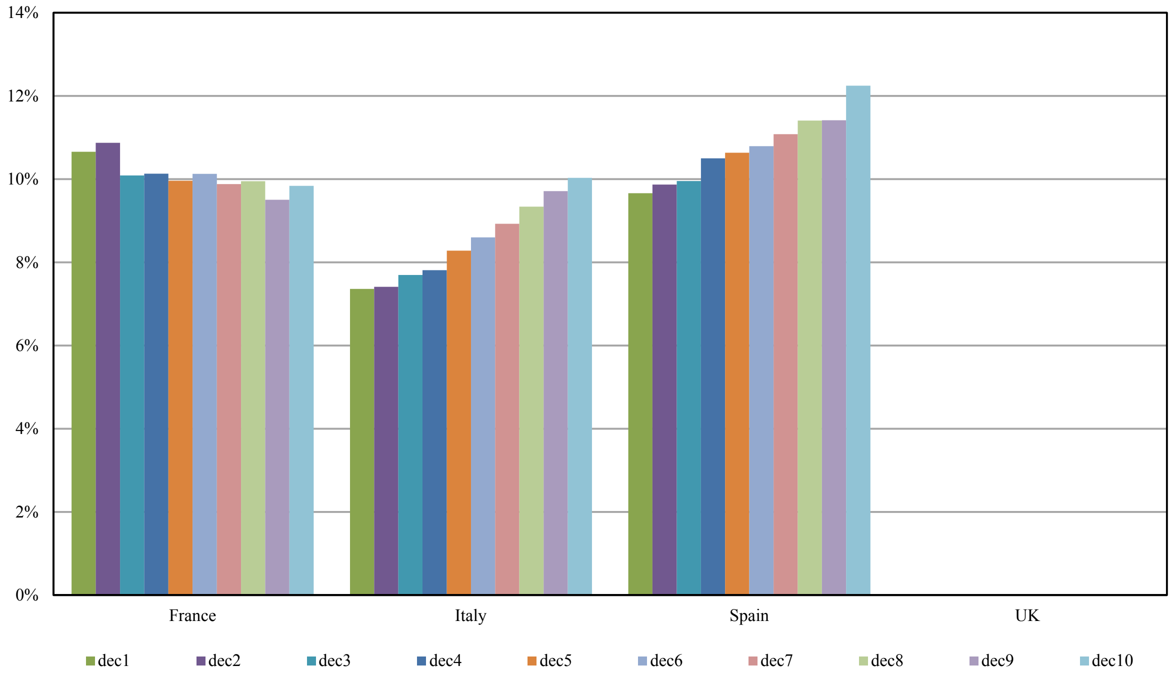


Table 6

User Cost of Capital: Baseline Calculation with Existing Property Taxes Removed, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	0.0243	0.0261	0.0247	0.0254	0.0248	0.0247	0.0241	0.0239	0.0235	0.0234	0.0221
Italy	0.0469	0.0548	0.0540	0.0520	0.0510	0.0480	0.0459	0.0440	0.0418	0.0396	0.0376
Spain	0.0401	0.0450	0.0444	0.0440	0.0411	0.0409	0.0398	0.0386	0.0372	0.0369	0.0335
UK	0.0161	0.0208	0.0198	0.0185	0.0174	0.0156	0.0149	0.0144	0.0145	0.0132	0.0119

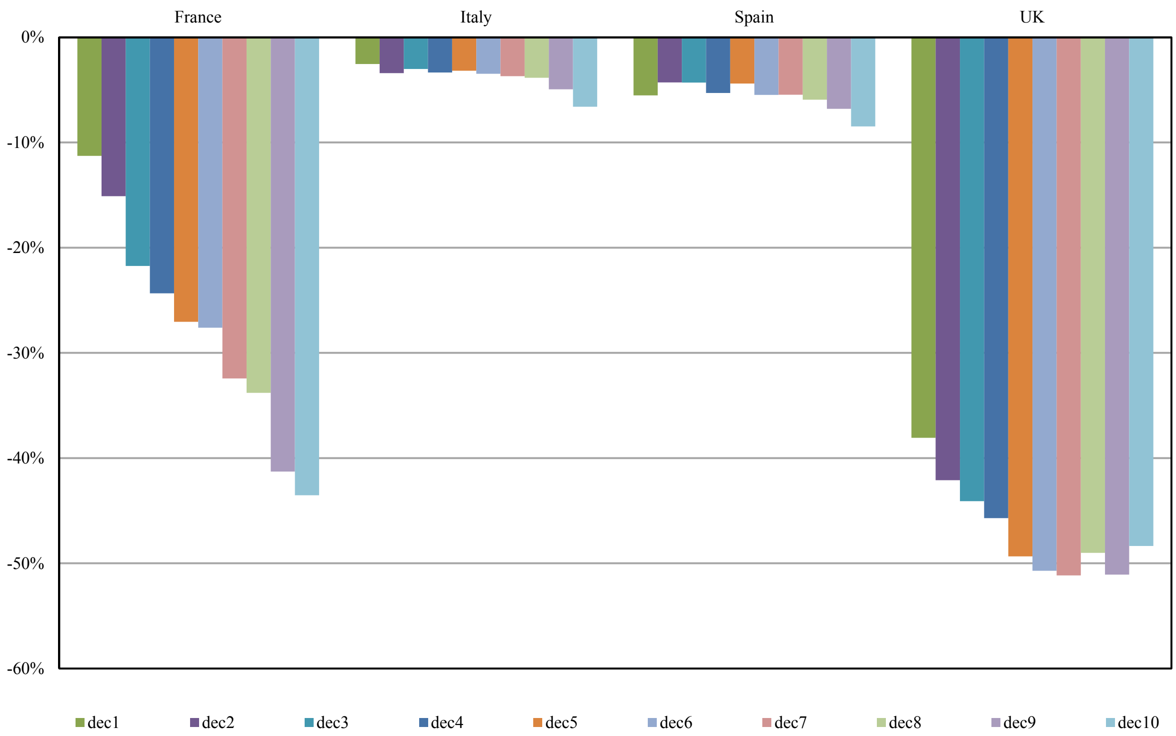
Table 7

Change in User Cost of Capital:
Baseline v Baseline Calculation with Existing Property Taxes Removed, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	-27.4%	-11.3%	-15.1%	-21.7%	-24.3%	-27.1%	-27.6%	-32.4%	-33.8%	-41.3%	-43.5%
Italy	-3.7%	-2.5%	-3.4%	-3.0%	-3.4%	-3.2%	-3.5%	-3.7%	-3.8%	-4.9%	-6.6%
Spain	-5.5%	-5.5%	-4.3%	-4.3%	-5.3%	-4.4%	-5.5%	-5.5%	-5.9%	-6.8%	-8.5%
UK	-46.3%	-38.1%	-42.1%	-44.1%	-45.7%	-49.3%	-50.7%	-51.2%	-49.0%	-51.1%	-48.4%

Figure 5

Change in User Cost Due to Removal of Existing Property Taxes by Income Decile, 2013



Clearly, the user cost of housing rises in all cases as a subsidy is being removed, except for the UK where mortgage interest relief has long been abolished (the values shown equal the baseline values). In the case of France, the change in the user cost is large, despite only being applied to a minority of homeowners, with an average increase in the user cost of 10.1 per cent. The relief is also important in Italy and Spain with average increases of 8.4 per cent and 10.7 per cent respectively. In all cases, one sees some regressivity in the existing subsidy, as removing it impacts the higher deciles more than the lower deciles.

4.2 *Impact of removing existing property taxes*

This simulation removes the existing recurrent property taxes compared with the baseline (both mortgage interest relief and transaction taxes are left in place). Table 6 showing the value of the user cost of housing and Table 7 the percentage change from the baseline.

The change in user cost is shown graphically in Figure 5.

One sees that the recurrent property taxes represent an important component of the user cost of housing in both France and the UK, where removing them would reduce the value by 27.4 per cent and 46.3 per cent respectively. In France, the existing tax is shown to be progressive, as higher income deciles pay a higher tax as a share of the property value. In Italy and Spain, the recurrent property taxes are less important for the user cost, though the changes observed are still significant.

4.3 Impact of introducing an imputed rent tax

This simulation adds an imputed rent tax to the baseline, and therefore *in addition* to the existing taxes and subsidies. (The tax reform scenario is shown in Section 4.4 below.) The imputed rent for each household is taxed at the standard rate for VAT in each country (between 20 and 22 per cent), which follows the notion that housing services should be taxed in the same way as other consumption services.

By design, a tax on imputed rent has a fairly uniform impact across the deciles. The variation in the percentage changes in Table 9 are due the fact that it is charged on net imputed rent (which differs from gross imputed rent by the costs of mortgage interest, and varies by individual) and from the different baseline values (the denominator in the percentage calculation).

4.4 Replacing existing property taxes with imputed rent tax

The previous section showed an imputed rent tax charged in addition to current taxes and subsidies. A more likely simulation involves having such a tax replace the existing recurrent property tax. In these simulations, the rate of the imputed rent tax has been adjusted so as to remain revenue neutral overall. The appropriate rate for a revenue-neutral imputed rent tax is shown in Appendix 1.

The change in user cost is shown graphically below.

Figure 6

Change in User Cost Due to Introduction of Imputed Rent Tax by Income Decile, 2013

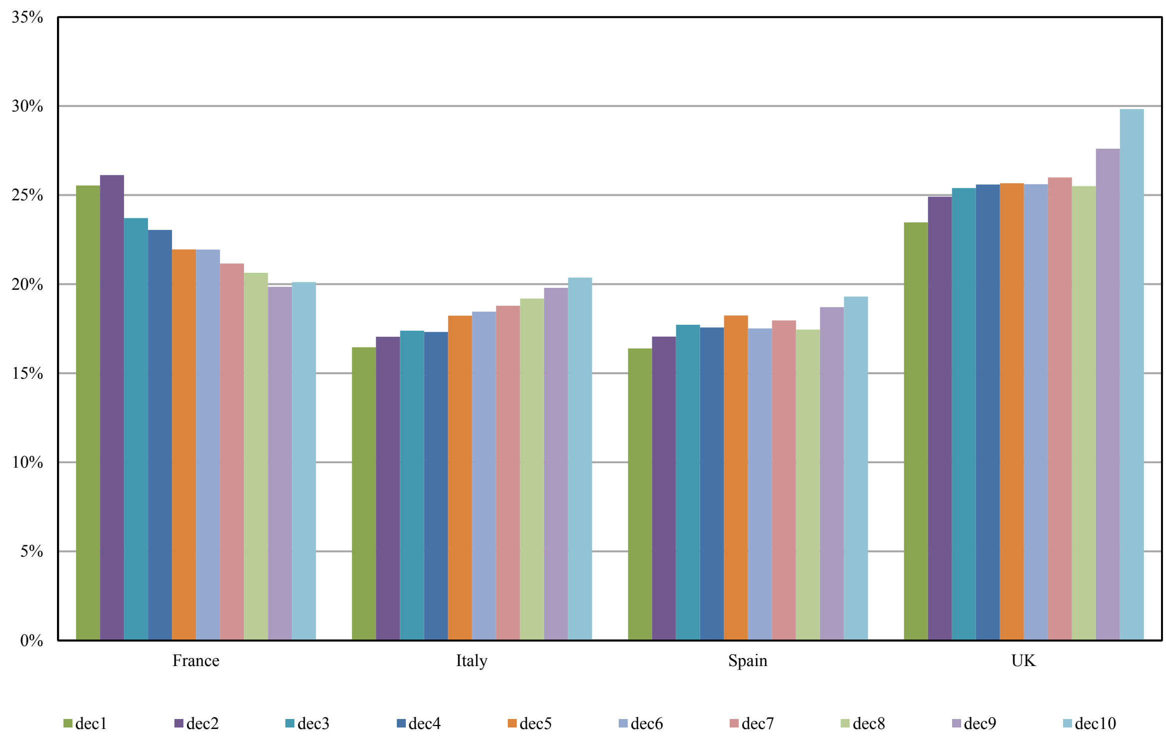


Table 8

User Cost of Capital: Baseline Calculation with Imputed Rent Tax Introduced, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	0.0398	0.0391	0.0385	0.0405	0.0400	0.0402	0.0395	0.0401	0.0396	0.0412	0.0397
Italy	0.0594	0.0673	0.0673	0.0649	0.0638	0.0605	0.0582	0.0561	0.0537	0.0518	0.0503
Spain	0.0515	0.0568	0.0559	0.0558	0.0525	0.0522	0.0509	0.0497	0.0478	0.0485	0.0451
UK	0.0317	0.0375	0.0374	0.0358	0.0342	0.0314	0.0302	0.0294	0.0290	0.0275	0.0252

Table 9

Change in User Cost of Capital: Baseline v Baseline Calculation with Imputed Rent Tax Introduced, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	22.4%	25.5%	26.1%	23.7%	23.0%	22.0%	21.9%	21.2%	20.6%	19.8%	20.1%
Italy	18.2%	16.5%	17.1%	17.4%	17.3%	18.2%	18.5%	18.8%	19.2%	19.8%	20.4%
Spain	17.7%	16.4%	17.1%	17.7%	17.6%	18.2%	17.5%	18.0%	17.5%	18.7%	19.3%
UK	25.8%	23.5%	24.9%	25.4%	25.6%	25.7%	25.6%	26.0%	25.5%	27.6%	29.8%

Table 10

User Cost of Capital: Baseline Calculation
with Imputed Rent Tax Introduced and Other Property Taxes Removed, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	0.0313	0.0340	0.0326	0.0329	0.0320	0.0316	0.0309	0.0306	0.0299	0.0298	0.0284
Italy	0.0486	0.0566	0.0559	0.0539	0.0528	0.0498	0.0477	0.0457	0.0435	0.0413	0.0393
Spain	0.0424	0.0473	0.0468	0.0465	0.0434	0.0432	0.0420	0.0408	0.0393	0.0391	0.0357
UK	0.0235	0.0287	0.0281	0.0267	0.0253	0.0229	0.0219	0.0213	0.0212	0.0200	0.0187

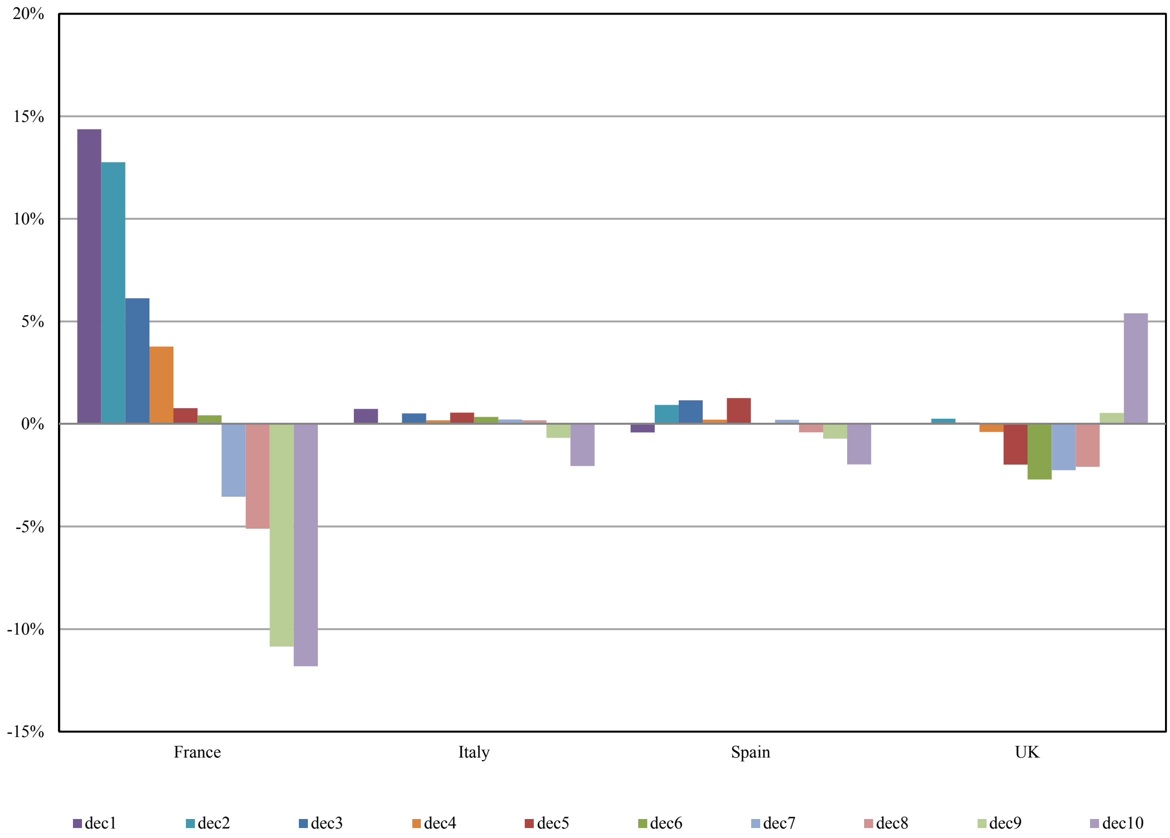
Table 11

Change in User Cost of Capital: Baseline v Baseline Calculation
with Imputed Rent Tax Introduced and Other Property Taxes rEmoved, 2013

Country	User Cost of Housing	by Income Decile									
	Average	1	2	3	4	5	6	7	8	9	10
France	1.1%	14.4%	12.8%	6.1%	3.8%	0.8%	0.4%	-3.5%	-5.1%	-10.8%	-11.8%
Italy	0.1%	0.7%	0.1%	0.5%	0.2%	0.6%	0.3%	0.2%	0.2%	-0.7%	-2.1%
Spain	0.1%	-0.4%	0.9%	1.2%	0.2%	1.3%	0.0%	0.2%	-0.4%	-0.7%	-2.0%
UK	-0.4%	0.1%	0.3%	0.1%	-0.4%	-2.0%	-2.7%	-2.3%	-2.1%	0.5%	5.4%

Figure 7

Change in User Cost Due to Introduction of Imputed Rent Tax and Removal of Other Property Taxes by Income Decile, 2013



The change in user cost is shown graphically above.

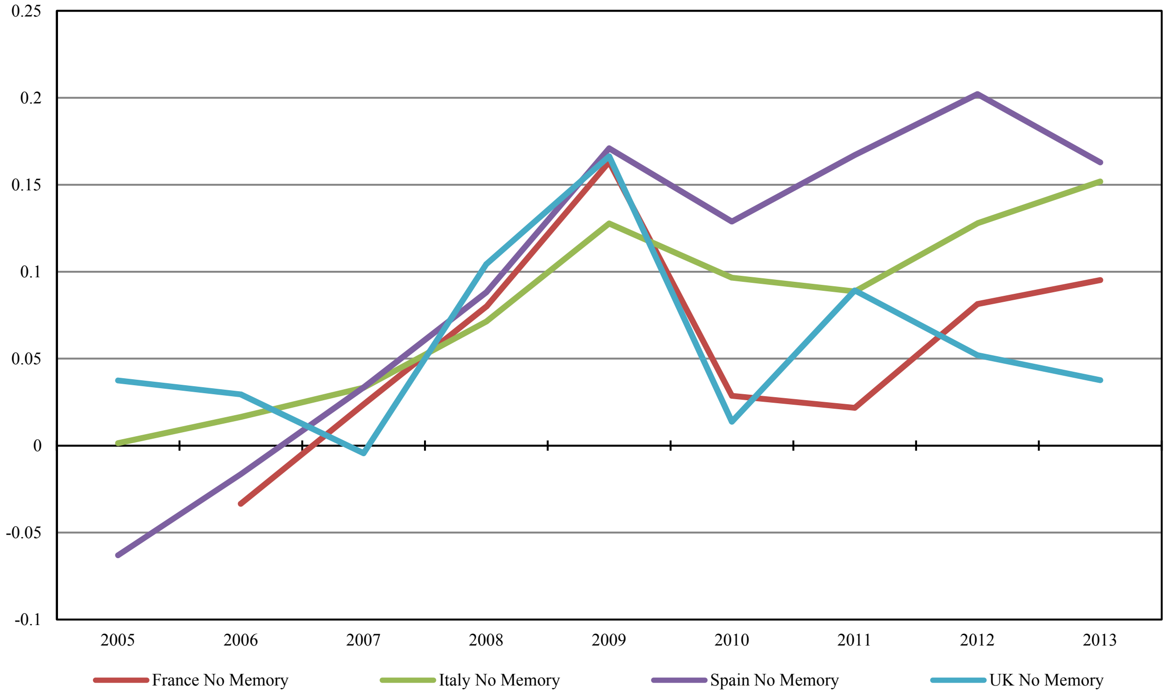
As we have argued, imputed rent represents a useful benchmark aim for economists, rather than a precise practical tax base from a policy perspective. Current deviations are an indication of how the policy has drifted from this idea over time from a "neutral" Haig-Simons-style property tax and the actual property tax. Part of this drift is due to the non-updating of house prices, often for many decades. In this sense, the imputed rent values used in this paper (from Figari *et al.*, 2014) are likely better than the legislated values.

The imputed rent was been used to guide policy in France. When the French property tax was originally designed to closely follow the imputed rent idea, see Verbist *et al.* (2015) France's results regarding the reform suggest that the existing property tax is more progressive than an imputed rent tax would be.

Spain and Italy (where the property tax is a smaller component of the user cost) show less impact overall, while the UK shows that an imputed rent would shift some of the taxes, especially from the 5th to 8th deciles to the 10th decile. This reflects the banding system in the UK property tax, where the top band can encompass moderately expensive properties up to multi-million pound properties, and charge both the same amount.

Figure 8

Evolution of the Expected User Cost of Capital with Fully-adaptive Expectations, Scenario (i), 2006-2013



4.5 *Sensitivity analysis: Impact of house price expectations*

The above simulations assumed that the rise in house prices, which is an important component in the user cost of housing, remains constant at the average growth rate between 1989 and 2013. The actual movements in house prices are shown in Figure 11 in the Appendix. In this simulation, we investigate the impact on the user cost of housing if households adapt, or partially adapt, their expectations based on the recent past.

We employ a simple weighted average of the long-term trend and the recent past:

$$\{E(\pi)\}_t = a \; . \; \pi_{ST} + (1 - a) \; . \; \pi_{LT}$$

where π_{ST} refers to the rise in house prices over the recent past (short-term), specifically the past year, and π_{LT} refers to the geometric mean rise in house prices over the long term, since 1989. The parameter '*a*' is the weight that the household gives to each piece of information, so an '*a*' of 1 implies that expectations are fully adaptive, and the trend over the past year is expected to continue indefinitely. An '*a*' of 0 implies that only the long-term trend is considered.

We look at how the user cost of housing evolves over time. The simulations run from 2006 to 2013 and also make incorporate variations in property taxes and subsidies and the 10-year bond rate. The three scenarios shown offer various degrees of adjustment of house price expectations: Figure 8 shows the results where '*a*' equals 0.9, near-fully adaptive expectations, Figure 9 where '*a*' equals 0.5, somewhat adaptive expectations, and Figure 10 'a' equals 0.1, nearly only long-term expectations.

Figure 9

Evolution of the Expected User Cost of Capital Somewhat Adaptive Expectations, Scenario (ii), 2006-2013

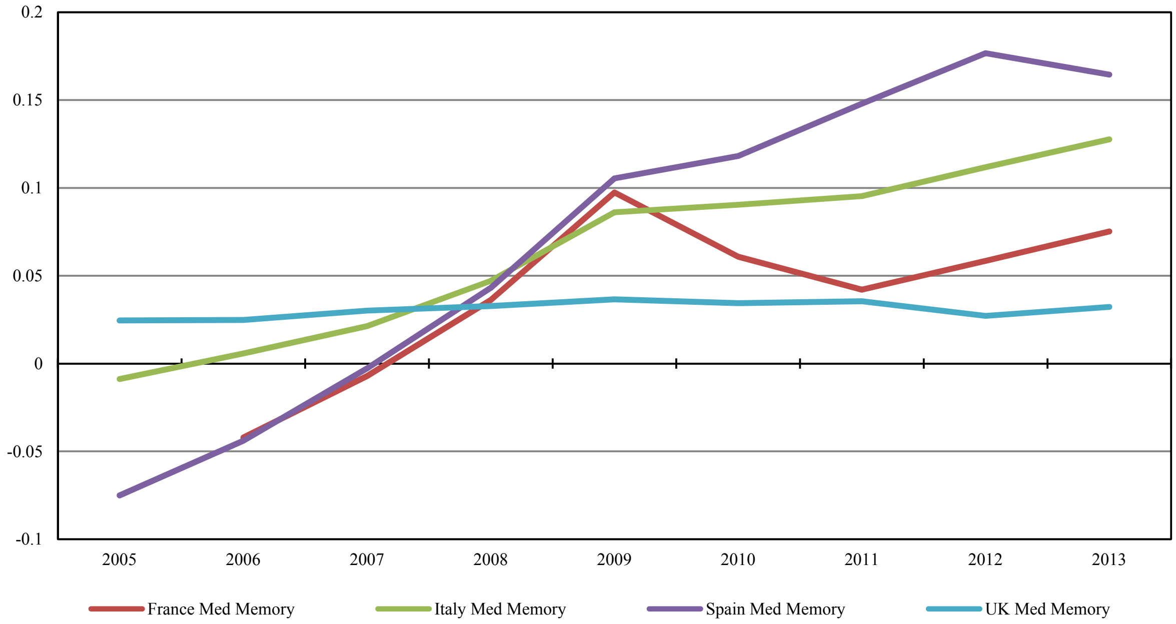
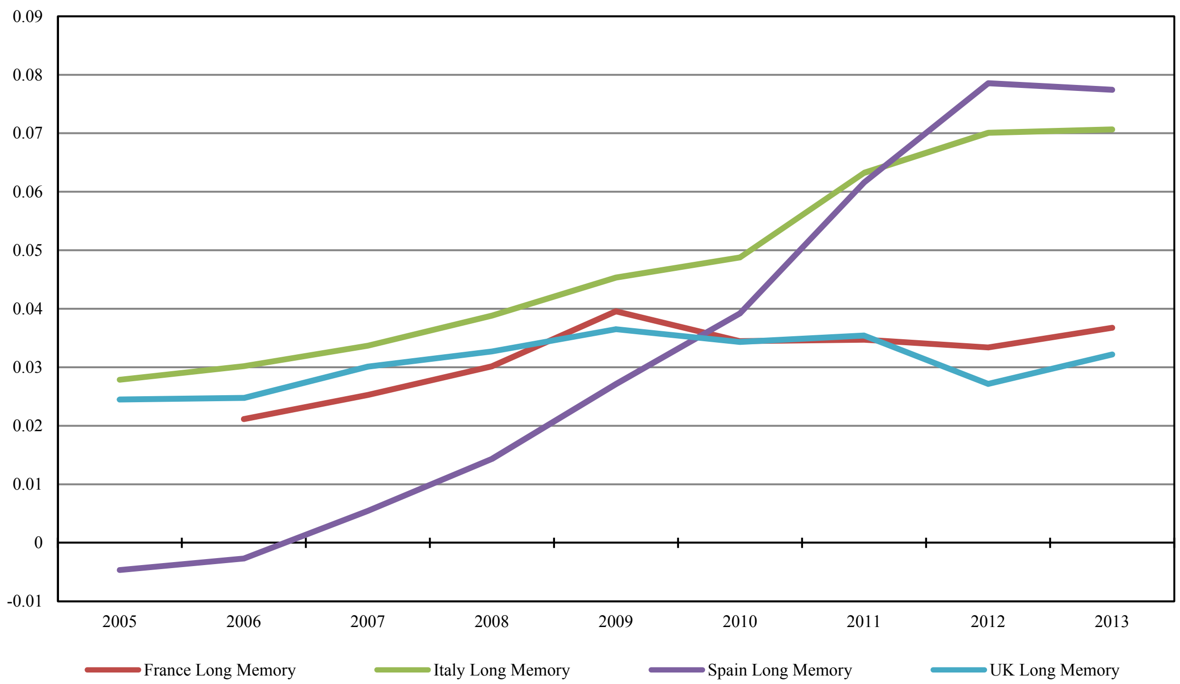


Figure 10

Evolution of the Expected User Cost of Capital Near-Only Long-term Expectations, Scenario (iii), 2006-2013



We consider Figure 8 interesting as an extreme scenario where house owners (or prospective owners) naïvely expect prices to continue to move as they have done in the past year. One sees that were house owners in Spain to adapt their expectations to this extent, their expected user cost of housing would range from minus 0.06, as the housing market was booming, to 0.21 as prices were falling most steeply. Indeed for all countries, large movements are seen under this extreme assumption. Figure 10 is considered more plausible, in that homeowners mostly rely on the long-term trend, with a small adjustment for the recent past. Therefore, if house prices are rising (or falling) steeply, there is a weak sense that this will continue. Though the changes in the user cost are much less, they still demonstrate that house price expectations can dominate the investment decision. This is seen most clearly in the case of Spain, where the user cost in 2005 and 2006 is below zero, meaning that the costs of holding capital are slightly more than compensated by the expected gain from price rises. As the housing bubble bursts in 2007, the expected user cost rises to nearly 0.08. Italy also shows a large difference over this period (approximately from 0.03 to 0.07), while France and the UK are relatively stable, reflecting the relative stability of the overall housing market during the period. Nevertheless, even in these countries fluctuations from 0.021 to 0.040 (France) and from 0.024 to 0.036 (UK) are still significant. Further disaggregation has been carried out by decile for long memory scenario, with the results show in the Appendix as Figures 12-15.

This analysis emphasises why booms and busts in the housing market can be self-sustaining. The user cost of housing fluctuates markedly based on the movement of house prices. When considering a purchase decision, the expected user cost facing the prospective buyer forms is hugely dependent on the expected house price changes. Any prospective buyer who bases their expectation on past price movements in the way suggested above would expect a lower user cost as prices rise, and so would be more inclined to buy, which sends the price even higher, fuelling the housing boom (especially as the housing market typically features an inelastic supply). Conversely, falling house prices raise the user cost, and deepen the housing bust.

5 Conclusions and policy implications

We have used the user cost of housing to investigate the impact of taxes and subsidies on the home ownership decision. The results demonstrate the mixed distributional consequences of the current tax and subsidy schemes. In particular, the mortgage interest relief (in France, Italy and Spain only) and property taxes tend to be regressive, with higher income deciles able to benefit more as measured by the impact on the user cost of housing.

The paper has argued that a tax on imputed rent is reasonable from a tax neutrality perspective. In particular, we analyse the differences emerging from a counterfactual experiment where the existing recurrent housing is replaced by an imputed rent tax. Interestingly, the existing taxes in Italy and Spain have fairly similar implications for the user cost as would an imputed rent tax. The deviations are large for the UK, especially for the richest decile, reflecting the relatively low tax rate on high value properties. In France, an imputed rent tax would be less progressive than the existing recurrent property tax.

One important element of the user cost of capital is the expected price change of the asset. When house prices move dramatically, this can dominate other considerations about the user cost. This even occurs when prospective homeowners incorporate a long-term view of the housing market.

APPENDIX 1
CALCULATING A REVENUE-NEUTRAL TAX REFORM

In order to set the rate of imputed rent tax so as to exactly match the lost revenue from removing the existing property tax, the following calculation was made. First, we calculate the total property tax revenue, ptaxrev:

$$ptaxrev = \sum_{decile=1}^{10} (propertytax\_rate_{decile} \times housevalue_{decile})$$

where "propertytax_e" is the average rate of property tax for each and "housevalue" is to the total value of housing owned by each decile (including weights to represent the whole population).

The same calculation is done for the imputed rent charged at the standard VAT rate (see Table 8 and Table 9).

$$irtaxrev = \sum_{decile=1}^{10} (irtax\_rate_{decile} \times housevalue_{decile})$$

This allows us to calculate the revenue-neutral imputed tax rate, irtaxneu_rate, by simply scaling the existing imputed rent tax rate:

$$irtaxneu\_rate = \frac{ptaxrev}{irtaxrev} \times irtax\_rate$$

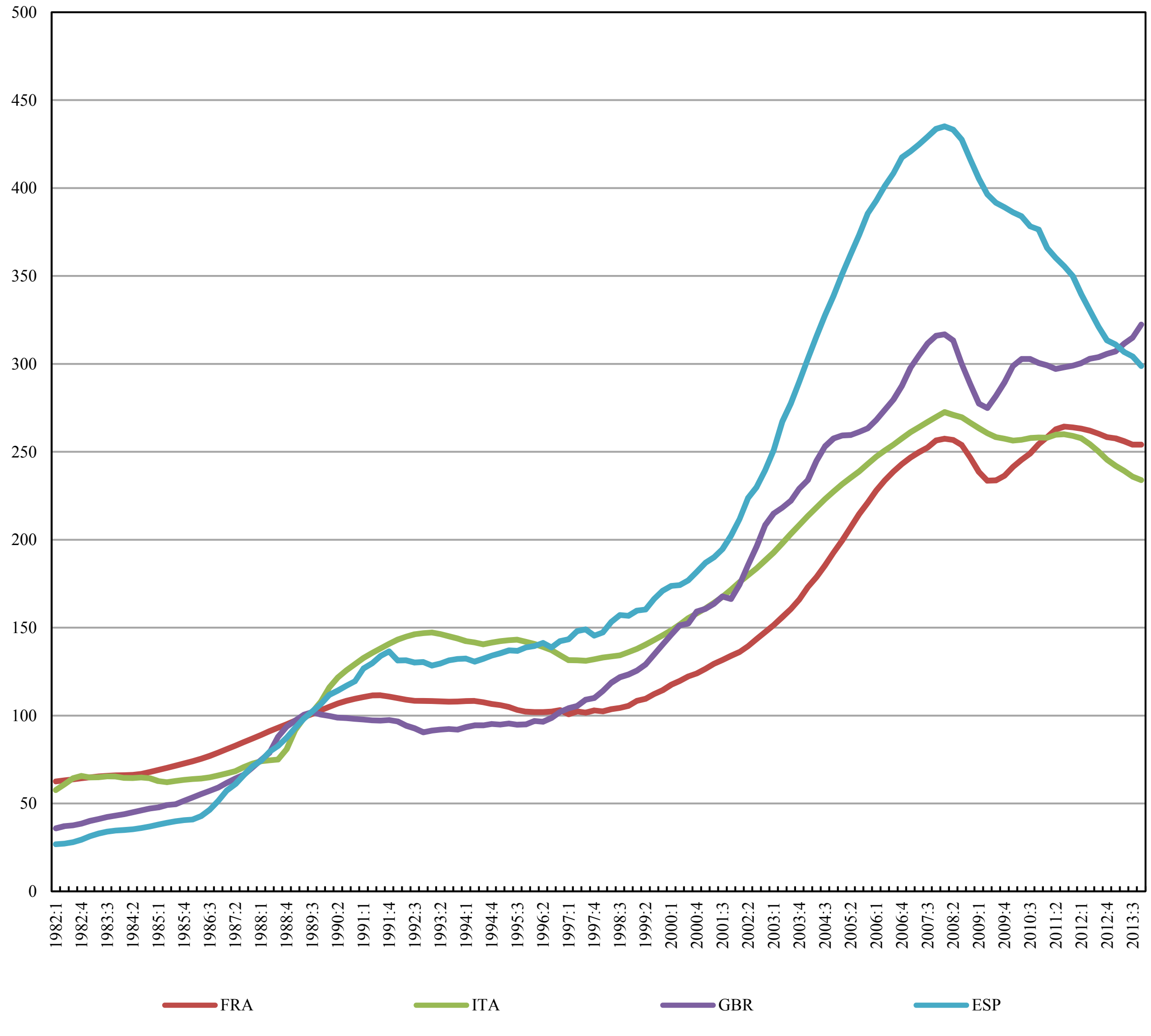
Note that irtaxneu_rate may be greater or less than the imputed rent charged at the standard VAT rate.

APPENDIX 2
ADDITIONAL FIGURES

Figure 11 shows the evolution of house prices indexed to 100 in 1989, which is an element of all calculations, and is especially relevant to the simulations in Section 4.5 where the house price expectations are allowed to vary.

Figure 11

House Price Index – OECD
(1989=100; 1982-2013)



Figures 7 to 10 show the user cost of capital over time, based on a long memory of house prices split by income decile. See Section 4.5 for further explanation.

Figure 12

France – User Cost of Capital, Long Memory of House Prices by Income Decile, 2006-2013

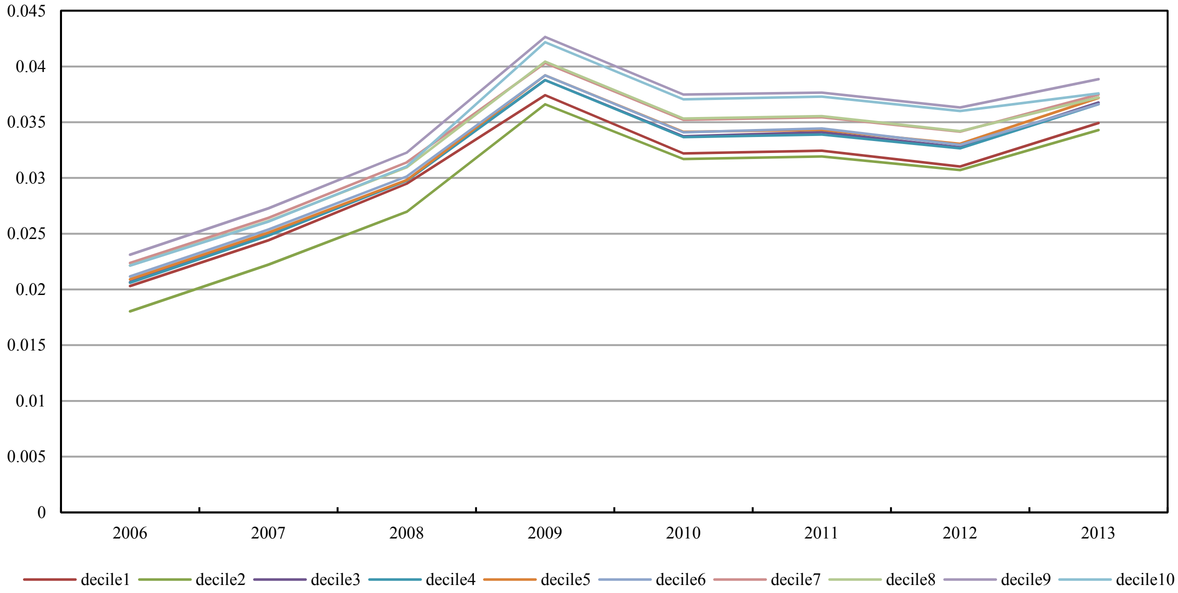


Figure 13

Italy – User Cost of Capital, Long Memory of House Prices by Income Decile, 2006-2013

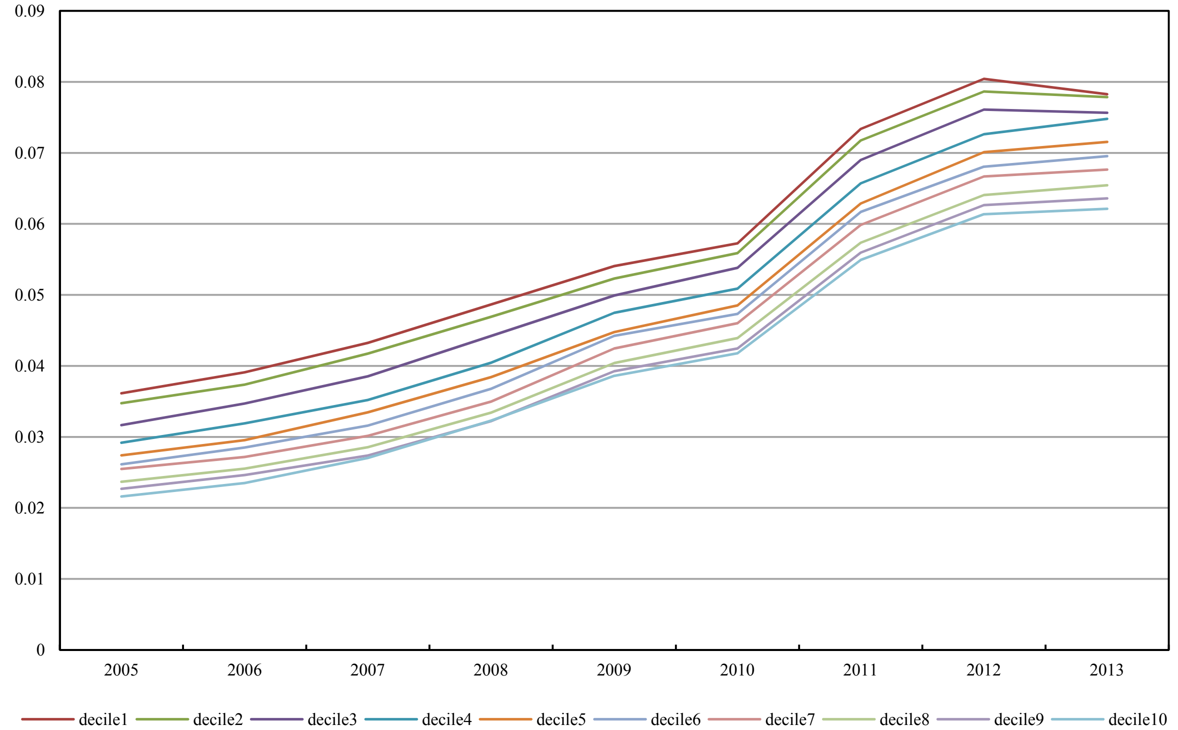


Figure 14

Spain – User Cost of Capital, Long Memory of House Prices by Income Decile, 2005-2013

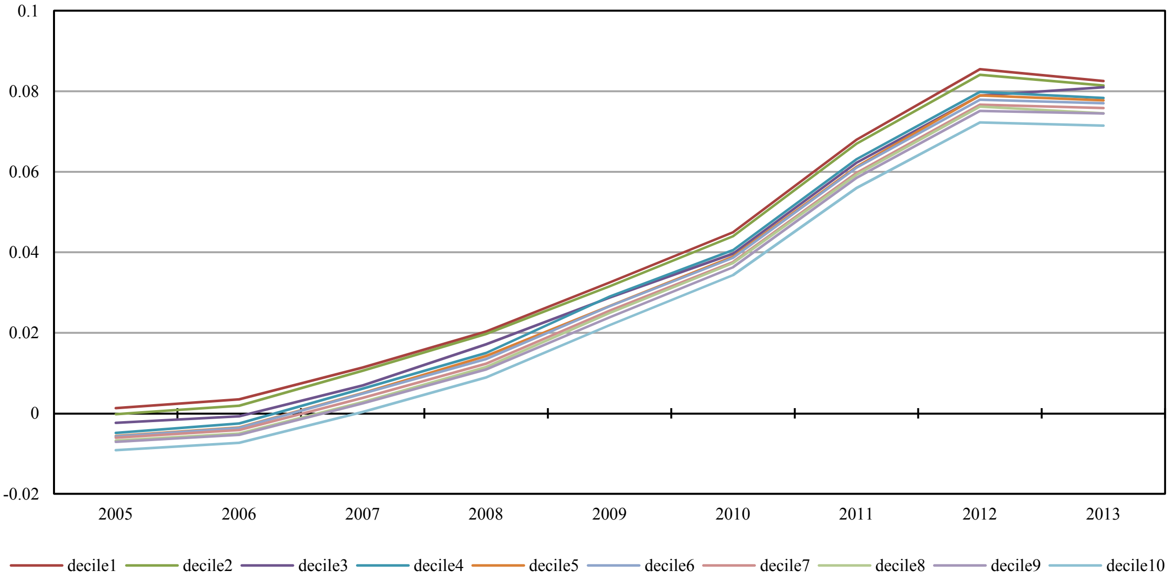
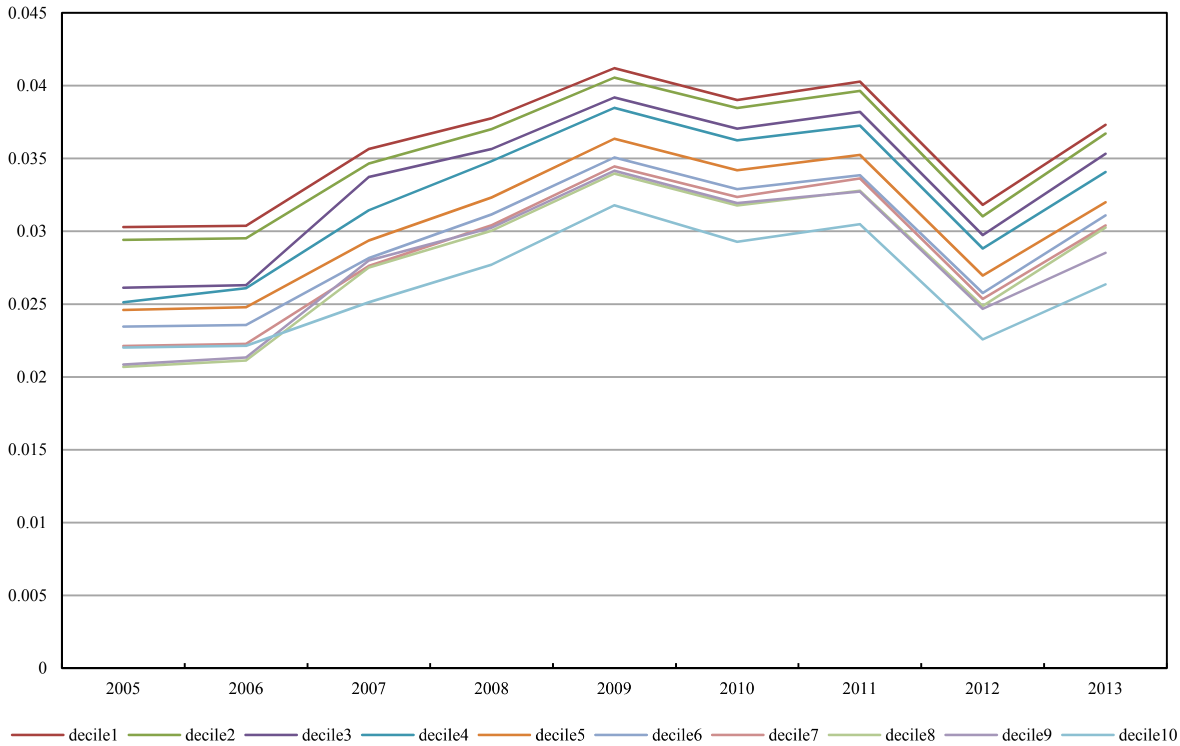


Figure 15

UK – User Cost of Capital, Long Memory of House Prices by Income Decile, 2005-2013



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