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OTHER REAL ESTATE PROPERTY IN SELECTED EURO AREA COUNTRIES

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Other Real Estate Property in Selected Euro Area Countries [1]

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Abstract: *After the household main residence (HMR), other real estate property (OREP) accounts for the second largest share of total household net wealth in the euro area. However, OREP remains mainly unstudied. Using Eurosystem HFCS data, I analyse OREP investment in Luxembourg, in selected euro area countries and in the euro area as a whole. For those households that own OREP, it represents an important share of gross wealth and generates non-negligible rental income. I identify several stylised facts of OREP characteristics with respect to their owners, type, use and location.*

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Non-technical summary

In addition to their Household Main Residence (HMR), many households invest in Other Real Estate Property (OREP). This study uses the Eurosystem Household Finance and Consumption Survey (HFCS) to establish key stylised facts about household investment in OREP. Although the focus of this study is on Luxembourg, the analysis also includes selected euro area countries (Belgium, Germany, France and the Netherlands) as well as the euro area aggregate. The key findings can be summarized as follows:

Finding 1: Luxembourg households are more likely to invest in real estate in comparison to the neighbouring countries. Around 28% own OREP (23% in the euro area) and 75% own OREP or their HMR (EA: 64%).

Finding 2: Households are more likely to own OREP if the reference person is male, highly educated or is part of a couple. OREP ownership peaks in age class 55-69. Self-employed and high income households are more likely to own OREP. Households that own their HMR are also more likely to own OREP. This pattern is similar across countries.

Finding 3: OREP in Luxembourg mostly consists of houses or flats (LU: 67%, EA: 57%), followed by apartment buildings (LU: 12%, EA: 5%) and building plots (LU: 11%, EA: 12%).

Finding 4: Among Luxembourg households that own OREP, 36% have rented it to tenants (EA: 32%) and 6% use it for business purposes (EA: 12%). Around one third use it privately (EA: 24%), e.g. as a second residence, and 13% own vacant OREP. The share of vacant OREP in Luxembourg is below the EA average (14%) but higher than in neighbouring countries.

Finding 5: OREP owned by Luxembourg households is mostly located in Luxembourg (65%), but also in Portugal (11%), France (7%), Belgium (4%), Germany (3%) and other countries (10%).

Finding 6: The value of OREP represents 31% of total household net wealth in Luxembourg (EA: 19%). Considering only Luxembourg households that own OREP, its average gross value is around €850,000 (median €300,000) per household. For the euro area, the average is around €211,000 (median around €103,000).

Finding 7: OREP generates rental income for 13% of Luxembourg households (EA: 9%). Among these households, the mean rental income is roughly €2,000 a month (median is €850), substantially above rental income in other euro area countries. For these Luxembourg households, rental income averages 17.2% of total income (median 9.7%). This is roughly in line with euro area results, since total income is higher in Luxembourg.

Finding 8: Multivariate analysis generally confirms the link between OREP ownership and certain household characteristics as suggested by descriptive statistics (finding 2). Luxembourg households are significantly more likely to own OREP if they have higher income or wealth, if they received gifts or transfers and if they are not employed in the public sector. If the analysis is

restricted to OREP used for business and rental purposes, there are significant positive effects associated with self-employment, income, wealth, education, birth in the country of residence, and gifts and transfers received. The sign and significance of the marginal effects are similar to those for the euro area.

Nichttechnische Zusammenfassung

Neben dem selbst genutzten Wohneigentum, investieren viele Haushalte in weitere Immobilien. Diese Studie basiert auf einer vom Eurosystem durchgeführten Umfrage zum Finanz- und Konsumverhalten von Haushalten (Eurosystem Household Finance and Consumption Survey) und trägt stilisierte Fakten über Immobilieninvestitionen von Haushalten zusammen, die nicht selbst als Wohneigentum genutzt werden. Diese Analyse konzentriert sich auf Luxemburg, die Eurozone als Ganzes sowie die nächsten Nachbarländer (Belgien, Deutschland, Frankreich und die Niederlande). Die wichtigsten Ergebnisse lassen sich wie folgt zusammenfassen:

Resultat 1: *Rund 28% der in Luxemburg ansässigen Haushalte investieren in Immobilien, die nicht selbst als Wohneigentum genutzt werden (Eurozone: 23%). Einschließlich des selbst genutzten Wohneigentums steigt der Anteil auf 75% (Eurozone: 64%). Diese Anteile sind in Luxemburg höher als in den Nachbarländern.*

Resultat 2: *Der Anteil der Haushalte mit Immobilien, die nicht selbst als Wohneigentum genutzt werden, ist höher, wenn die Bezugsperson männlich, gut ausgebildet oder verpartnert ist. Im Alter von 55-69 besitzen die meisten Haushalte Immobilien, die nicht selbst als Wohneigentum genutzt werden. Selbstständige und Haushalte mit hohem Einkommen besitzen eher diese Vermögenskategorie, ebenso Haushalte mit selbst genutztem Wohneigentum. Diese Muster sind über verschiedene Länder ähnlich.*

Resultat 3: *Die meisten Immobilien von in Luxemburg ansässigen Haushalten, die nicht selbst als Wohneigentum genutzt werden, sind Häuser oder Wohnungen (LU: 67%, Eurozone: 57%), gefolgt von Mehrfamilienhäusern (LU: 12%, Eurozone: 5%) und Grundstücken (LU: 11%, Eurozone: 12 %).*

Resultat 4: *In Luxemburg vermieten 36% der Haushalte ihre Immobilien, die nicht selbst als Wohneigentum genutzt werden (Eurozone: 32%). 6% nutzen die Immobilien für geschäftliche Zwecke (Eurozone: 12%) und rund ein Drittel nutzt die Immobilien privat (Eurozone: 24%), zum Beispiel als Zweitwohnsitz. Die restlichen 13% der Immobilien bleiben ungenutzt bzw. stehen leer. Dieser Anteil liegt unter dem Eurozonen-Durchschnitt (14%), aber höher als in den Nachbarländern.*

Resultat 5: *In Luxemburg ansässige Haushalte besitzen Immobilien, die nicht selbst als Wohneigentum genutzt werden, zu 65% in Luxemburg, aber auch in Portugal (11%), in Frankreich (7%), in Belgien (4%), in Deutschland (3%) und in anderen Ländern (10%).*

Resultat 6: *Immobilien, die nicht selbst als Wohneigentum genutzt werden, repräsentieren 31% des Gesamtnettovermögens von Haushalten in Luxemburg (Eurozone: 19%). Betrachtet man nur die Haushalte, die solche Immobilien in und außerhalb Luxemburgs besitzen, ist der Durchschnittsbruttowert etwa 850.000€ (Median 300.000€) pro Haushalt. Für den Euroraum ist der Mittelwert etwa 211.000€ (Median rund 103.000€).*

Resultat 7: *13% der in Luxemburg ansässigen Haushalte erhalten Mieteinnahmen aus Immobilien, die nicht selbst als Wohneigentum genutzt werden (Eurozone: 9%). Unter diesen Haushalten*

betragen die durchschnittlichen Mieteinnahmen etwa 2000€ pro Monat (Median 850€), was wesentlich über dem Durchschnitt der Eurozone liegt. Für diese Haushalte stellen die Mieteinnahmen 17,2% des durchschnittlichen Gesamteinkommens dar (Median 9,7%). Dies stimmt mit den Ergebnissen der Eurozone überein, da das Gesamteinkommen in Luxemburg höher ist.

Resultat 8: *Multivariate Analysen bestätigen im Allgemeinen die Verbindung zwischen Immobilien, die nicht selbst als Wohneigentum genutzt werden, und bestimmten Haushaltsmerkmalen aus der deskriptiven Analyse (siehe Resultat 2). Signifikant positive Effekte auf den Besitz von Immobilien, die nicht selbst als Wohneigentum genutzt werden, findet man in Luxemburg für das Haushaltseinkommen, das Vermögen, Schenkungen und Erbschaften und Beschäftige außerhalb des öffentlichen Sektors. Wird die Analyse auf geschäftliche und vermietete Immobilien beschränkt, zeigen sich positive Effekte mit selbständiger Erwerbstätigkeit, Einkommen, Vermögen oder Bildung, Geburt im Wohnsitzland, sowie Schenkungen und Erbschaften. Vorzeichen und Größe der marginalen Effekte sind in Luxemburg vergleichbar mit denen für den Euroraum.*

1 Introduction

After the Household Main Residence (HMR), Other Real Estate Property (OREP)[2] represents the second largest share of total household net wealth in the euro area. Most of the literature on household surveys focused on the HMR (Andrews and Caldera Sanchez, 2011; Christelis et al., 2013) or on certain financial assets such as stocks or mutual funds (Haliassos and Bertaut, 1995; Guiso et al., 2002, 2003). The aim of this study is to close this gap and compare OREP investment in Luxembourg and in selected euro area countries (Belgium, Germany, France, the Netherlands) and the euro area aggregate. Detailed information on household investment in OREP only recently became available with the release of the ex-ante harmonized Household Finance and Consumption Survey (HFCS)[3] in April 2013. HFCS data can be used to address a wide range of questions specifically about OREP: To what extent do households choose this investment? What type of real estate do they favour? How is it used? In which country is it located? How much is it worth? How is it distributed across households? What share of total net wealth does it represent? How much rental income does it generate? Which households favour this kind of investment?

Around 28% of Luxembourg households own OREP. This is 4 percentage points higher than the euro area average. In Luxembourg the value of OREP represents 31% of total household net wealth, 12 percentage points higher than the euro area average. Mean rental income for Luxembourg households is almost 4% of mean total household income, a share substantially above the euro area average (2.5%). OREP is the second largest component of mean household wealth in Luxembourg and represents 1/6 of total income on average among households earning rental income. In Luxembourg and the euro area, households are more likely to own OREP for business or rental purposes if their reference person is self-employed or born in the country of residence. This likelihood also increases with income, wealth, level of education and any gifts and transfers received.

The study proceeds as follows: Section 2 provides an overview of the real estate market in Luxembourg and introduces the related literature. The dataset is described in Section 3. Section 4 reports descriptive statistics on various aspects of OREP investment. Section 5 performs a multivariate analysis identifying different factors correlated with OREP ownership, and Section 6 concludes.

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[2] The definition of OREP is provided at the end of section 3 with the exact wording of the question.
[3] http://www.ecb.europa.eu/home/html/researcher_hfcn.en.html

2 The Luxembourg real estate market and related literature

Property prices in Luxembourg rose substantially over recent decades[4]. Figure 1 (left panel) shows property prices for new and existing dwellings in Luxembourg based on aggregate data from Statec, the national statistical institute. The index rose regularly from 1974 until the economic and financial crisis in 2008/2009.[5] Based on this index, I calculate the average annualised nominal capital gain from real estate property in each of the years prior to 2010. Excluding the most recent period, this annualised nominal capital gain ranged between 6% and 8% in Luxembourg, systematically above corresponding figures for the euro area or neighbouring countries (Figure 1, right panel).

Figure 1: Property price index and average annual returns, Luxembourg and selected countries

Luxembourg property price developments

Average yearly return since year of acquisition in selected countries
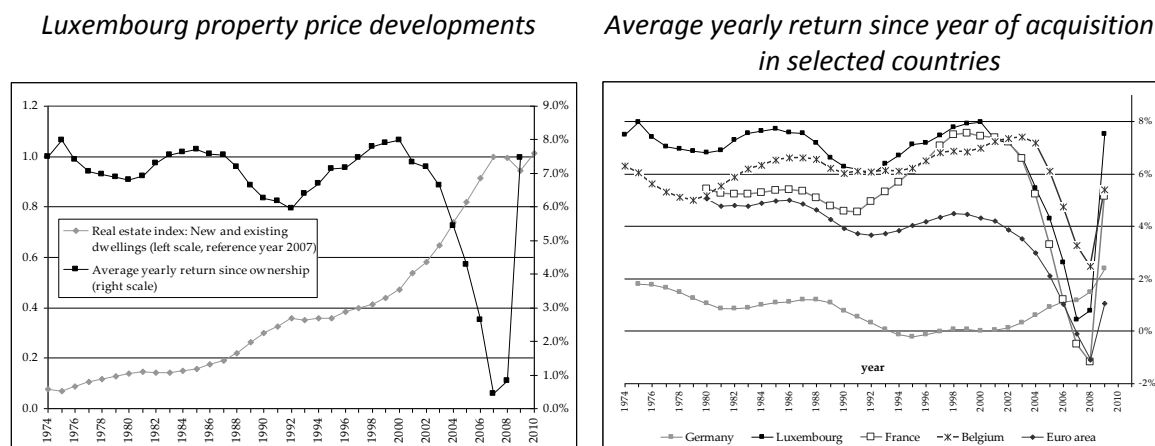
Source: Mathä, Porpiglia, and Ziegelmeyer (2014, Figure 1). Statec, BCL calculations. ECB Statistical Data Warehouse: Structural Housing Indicators Statistics (ESCB): Index for new and existing dwellings for Germany, Luxembourg and the euro area; index for existing dwellings for Belgium and France.

There is considerable concern in Luxembourg that real estate property prices are over-valued. The topic is discussed frequently in the press and also figured prominently in the 2013 election campaign, appearing in the manifestos of all major parties. In December 2013, the new government declaration by Prime Minister Xavier Bettel announced four important objectives: mobilising more land for construction, massive investment in social housing, reviewing existing housing legislation and revisiting housing subsidy policies.

Di Filippo (2015) evaluated how far property prices in Luxembourg deviated from their fundamentals using standard techniques applied to other countries by the European Commission, the IMF and the OECD. Estimation results suggest that property prices were over-valued before the crisis (2005 to mid 2008). After the mid of 2008, a drop of real estate prices

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[4] See text box 1.1 in BCL bulletin 2011/3.

[5] See BCL (2000) for a description of the index.

brought them back in line with fundamentals. Newspaper reports confirmed similar research results by Julien Licheron at CEPS/INSTEAD suggesting there is currently no empirical evidence of a housing bubble in Luxembourg.

Using household survey data, Mathä, Porpiglia, and Ziegelmeyer (2014) find that the average annual increase in the value of the household main residence was 6.2% between 1990 and 2010. Instead, households in neighbouring countries that include a cross-border commuter employed in Luxembourg saw their household main residence increase by only 3.4% on average over the same period. These authors demonstrate that increases in property values represent an important part of household total net wealth and can explain a substantial share of wealth differences between resident and cross-border households

Most of the household survey literature focused on the HMR (Andrews and Caldera Sanchez, 2011; Christelis et al., 2013) or on certain financial assets such as stocks or mutual funds (Haliassos and Bertaut, 1995; Guiso et al., 2002, 2003). In Luxembourg, text box 4 in BCL bulletin 2012-3 analyses the determinants of HMR ownership among resident households. The HMR is the main component of household real assets, especially for households in the low to medium income range. Results from a multivariate regression corroborate empirical findings for other OECD countries (Andrews and Caldera Sanchez, 2011) and relate HMR ownership to household characteristics such as gross income, age, marital status, immigrant status, and receipt of intergenerational transfers or gifts.

Cross-country studies (Guiso et al., 2002, 2003; Christelis et al., 2013) document substantial cross-country differences in household ownership of certain assets. Both household characteristics and institutional (country-specific) unobservable effects seem to explain the different degree of asset participation across countries (Sierminska and Doorley, 2012).

The existing literature features almost no results on investments in OREP, with the exception of Sierminska and Doorley (2012) and Arrondel et al. (2014). Sierminska and Doorley (2012) analyse the participation decision and the extent of investment in various asset and liability categories, including real estate, financial assets, own business assets, as well as mortgage and non-mortgage debt. They use the ex-post harmonized data from the Luxembourg Wealth Study covering Germany, Italy, Luxembourg, Spain and the United States. Among the categories investigated is *"investment real estate"*, which seems to correspond rather closely to OREP as defined in this study. Arrondel et al. (2014) use HFCS data to investigate participation, level of asset holdings, and share in gross wealth of various asset categories (including OREP). The other questions raised above in the introduction are not addressed by one of these papers.

3   Data

The Luxembourg Household Finance and Consumption Survey (LU-HFCS) is a representative survey of households resident in Luxembourg collecting detailed information on household assets and liabilities. It was conducted by the BCL and CEPS/INSTEAD in 2010/2011. The sample consists of 950 households and 2,540 individuals representing the 186,440 private households

and 462,618 individuals living in Luxembourg at 31 December 2010.[6] The LU-HFCS is part of the Eurosystem HFCS, described in a Statistics Paper published by the European Central Bank in April 2013 (HFCN, 2013a). This survey provides individual household data collected in a harmonised manner from more than 62,000 households across 15 euro area countries (the first wave excludes Ireland, Estonia, Latvia and Lithuania). Until now, information on the distribution of assets and liabilities across households was scarce and rarely comparable across euro area countries. In most countries, the survey was conducted in 2010.

This paper uses the LU-HFCS and the Eurosystem HFCS as main data sources. All but one question analysed below is harmonised across the Eurosystem HFCS datasets, as are the weighting and imputation procedures described in the methodological report (HFCN, 2013b). For the LU-HFCS, methodological aspects are described in Mathä, Porpiglia and Ziegelmeyer (2012).

Data are multiply imputed and weighted. Marginal effects are calculated at the observation level and then averaged. Marginal effects and standard errors are calculated using 5 multiply imputed datasets (Rubin, 1987, 1996). Finally, references below to personal characteristics of a household always refer to those of the *"financially knowledgeable person"* (FKP), the person who is best informed about the household finances and functions as the reference person in compiling the survey.

In the HFCS the question concerning OREP is phrased as follows: *"(Apart from your house/apartment) (Do you/Does your household) own any (other) properties, such as houses, apartments, garages, offices, hotels, other commercial buildings, farms, land, etc.?"* According to the interviewer instructions, business properties are included if *"they are fully or partially owned by the household. Properties owned directly by the business should not be included."* Shares in building societies or real estate investment funds are not included here but are covered in a separate question.

4   Descriptive Statistics

This section reports descriptive statistics and first stylised facts on households that own OREP in Luxembourg and other euro area countries.

4.1   OREP in Luxembourg and selected euro area countries

According to Table 1, around 25% of Luxembourg households own no real estate property, nearly 50% only own their HMR, 8% only own OREP, and 21% own both their HMR and OREP. In cross-country comparison, the share of households owning real estate is highest in Luxembourg (74.8%) followed by Belgium (72.8%). The lowest share of households owning real estate is in Germany (49.2%).

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[6] The sample excludes institutional households, households only employed by international organisations and individuals with no social security number.

Table 1: Share of households owning HMR and/or OREP

country	no property	only HMR	HMR & OREP	only OREP	total
BE	27.2%	56.5%	13.2%	3.2%	100.0%
DE	50.8%	31.4%	12.8%	5.0%	100.0%
FR	39.2%	36.1%	19.1%	5.6%	100.0%
LU	25.2%	46.7%	20.5%	7.7%	100.0%
NL	42.1%	51.8%	5.3%	0.8%	100.0%
euro area	35.6%	41.3%	18.8%	4.3%	100.0%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. Sierminska and Doorley (2012) report similar figures for Luxembourg (28% for OREP and 71% for HMR).

> **Finding 1:** *Luxembourg households are more likely to invest in real estate in comparison to the neighbouring countries. Around 28% own OREP (23% in the euro area) and 75% own OREP or their HMR (EA: 64%).*

Table 2 illustrates that investment in OREP varies strongly with household characteristics.

Table 2: OREP ownership by household characteristics

	gender		age class				education			marital status			
country	female	male	below 40	40-54	55-69	70 and above	low	middle	high	single	couple	divorced	widowed
BE	12.5%	19.7%	8.1%	16.9%	20.9%	21.4%	12.6%	14.6%	20.6%	10.7%	19.2%	14.3%	15.2%
DE	16.1%	19.4%	9.8%	21.2%	25.7%	14.9%	5.6%	15.1%	28.9%	11.0%	23.9%	12.9%	11.7%
FR	21.0%	27.1%	12.5%	27.0%	35.1%	26.3%	20.6%	24.5%	31.7%	14.6%	33.2%	18.4%	22.8%
LU	22.4%	32.1%	17.8%	27.2%	36.9%	36.9%	22.8%	25.6%	39.2%	17.1%	34.7%	25.1%	24.9%
NL	3.9%	7.4%	2.7%	6.7%	8.1%	6.2%	4.4%	4.6%	9.2%	3.7%	9.3%	4.3%	2.5%
euro area	19.6%	26.0%	13.5%	26.1%	31.3%	21.8%	21.5%	19.9%	31.0%	14.3%	29.4%	15.5%	18.1%

	main employment status					gross household income quintile					HMR ownership		total
country	employee	self-employed	unemployed	retired	other	quintile 1	quintile 2	quintile 3	quintile 4	quintile 5	no	yes	
BE	14.5%	33.4%	6.5%	22.3%	5.7%	9.3%	11.7%	11.6%	19.8%	29.5%	10.6%	18.9%	16.4%
DE	17.8%	37.8%	2.6%	17.3%	12.9%	5.6%	5.5%	15.0%	24.6%	38.4%	8.9%	29.0%	17.8%
FR	20.3%	50.7%	6.4%	30.0%	9.4%	11.5%	17.7%	21.6%	25.8%	46.9%	12.4%	34.6%	24.7%
LU	24.0%	45.7%	8.1%	40.0%	18.7%	11.6%	17.0%	26.5%	36.4%	49.3%	23.4%	30.5%	28.2%
NL	5.4%	16.1%	18.5%	7.8%	2.1%	5.2%	5.9%	3.9%	6.3%	9.2%	1.8%	9.3%	6.1%
euro area	20.2%	45.3%	11.2%	25.3%	18.6%	11.2%	15.1%	20.1%	26.7%	42.3%	10.7%	31.3%	23.1%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

> **Finding 2:** *Households are more likely to own OREP if the reference person is male, highly educated or is part of a couple. OREP ownership peaks in age class 55-69. Self-employed and high income households are more likely to own OREP. Households that own their HMR are also more likely to own OREP. This pattern is similar across countries.*

On average, Luxembourg households that invest in OREP own 1.71 such properties (Figure 2). This is slightly below the average in France (1.78) but slightly above the one for the euro area (1.66). These differences are not statistically significant. Germany and the Netherlands are significantly below the euro area average. The Netherlands has not only the lowest share (6%) of households owning OREP but also the lowest average number of properties (1.32).

Figure 2: Mean number of OREPs among OREP owners
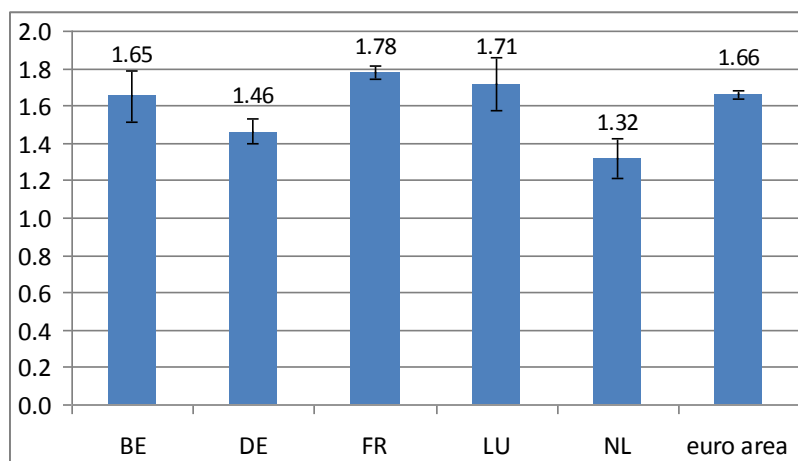
Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. The error bars indicate the 95% confidence interval.

For households that own more than one property, the remainder of this section focuses on the OREP with the highest current value.[7] The type of OREP is shown in Table 3.

Table 3: Type of OREP

country	house or flat	apartment building	industrial building/ warehouse	building plot/estate	garage	shop	office	hotel	farm	other	total
BE	66%	2%	1%	24%	4%	2%	0%	0%	1%	0%	100%
DE	57%	16%	1%	16%	3%	0%	1%	0%	3%	3%	100%
FR	64%	6%	9%	2%	4%	0%	0%	0%	12%	4%	100%
LU	67%	12%	1%	11%	1%	2%	1%	0%	2%	3%	100%
NL	63%	0%	0%	4%	7%	3%	1%	0%	1%	20%	100%
euro area	57%	5%	4%	12%	5%	2%	1%	0%	11%	3%	100%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. The category building plot/estate does not include other land on which construction is not allowed.

> **Finding 3:** *OREP in Luxembourg mostly consists of houses or flats (LU: 67%, EA: 57%), followed by apartment buildings (LU: 12%, EA: 5%) and building plots (LU: 11%, EA: 12%).*

In the euro area, the third most important category is *"farm"* (11%), but this represents only 2% of OREP in Luxembourg, with similar shares in Belgium, Germany and the Netherlands, and 12% in France. *"Apartment buildings"* have the highest share in Germany (16%) and the lowest in the Netherlands with almost 0%. All the other categories play a minor role for Luxembourg. In the Netherlands, the high share of the type *"other"* might represent caravans on site or garden plots separate from the HMR.

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[7] In Luxembourg 36% of households with OREP own more than one property (BE: 31%; DE: 27%; FR: 41%; NL: 26%; EA: 34%). One alternative would be to include all OREPs separately in the analysis. However the survey only collects details on the most important OREPs (2 in Belgium, Luxembourg and the Netherlands, but 3 in Germany and France, limiting comparability).

Finding 4: Among Luxembourg households that own OREP, 36% have rented it to tenants (EA: 32%) and 6% use it for business purposes (EA: 12%). Around one third use it privately (EA: 24%), e.g. as a second residence, and 13% own vacant OREP. The share of vacant OREP in Luxembourg is below the EA average (14%) but higher than in neighbouring countries.

Table 4 reports the different uses of OREP. In Luxembourg, 13% of OREP is declared vacant.[8] Among these vacant properties, 28% are building plots, 51% are houses or flats, 14% are apartment buildings, 5% are farms and 2% are offices. One should keep in mind that vacant houses or flats also result from natural fluctuations in the rental market. It needs some time before recently vacated apartments are rented again. Among Luxembourg households who own OREP, 6% declare that they provide it to others for use at no charge (EA: 9%) and 7% use it for other purposes (EA: 9%).

Table 4: Use of OREP

country	private use	business use	rent use	vacant	free use	other use	total
BE	26%	5%	39%	11%	16%	3%	100%
DE	11%	8%	59%	9%	6%	6%	100%
FR	24%	9%	42%	7%	10%	8%	100%
LU	33%	6%	36%	13%	6%	7%	100%
NL	63%	11%	15%	10%	1%	0%	100%
euro area	24%	12%	32%	14%	9%	9%	100%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

The LU-HFCS included a country-specific question asking whether households owned OREP abroad and where (Table 5). The rows in the top panel break down OREP located in each country according to the country of birth of the reference person in the household. The columns in the bottom panel break down OREP by country of birth of the reference person according to the country in which the OREP is located.

Finding 5: OREP owned by Luxembourg households is mostly located in Luxembourg (65%), but also in Portugal (11%), France (7%), Belgium (4%), Germany (3%) and other countries (10%).

In the top panel, the row labelled LU indicates that 82% of the OREP located in Luxembourg is owned by households in which the reference person is born in Luxembourg. For real estate owned by Luxembourg residents but located in Portugal (row labelled PT), 88% is owned by Luxembourg households in which the reference person is born in Portugal. Similar effects are

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[8] In Luxembourg, high property prices and rents led to the "Pacte logement" (2008, Art. 15-28), which allows municipalities to impose a tax on empty dwellings and unused building land. A dwelling is considered vacant if it is not occupied for a period of 18 consecutive months. Building land is considered unused if construction has not started three years after the land was zoned for construction or after a household acquired such property. So far, only six municipalities apply this tax on empty dwellings (Beckerich, Bettendorf, Diekirch, Esch-sur-Alzette, Esch-sur-Sûre, Redange-sur-Attert) and 74 municipalities have introduced the new tax class on unused building land (Welter, 12.02.2015, Journal.lu).

observed in the rows for Belgium and France although to a smaller extent. In contrast, among Luxembourg households that own OREP located in Germany (row DE), 44% are headed by a reference person born in Luxembourg and 29% by a reference person born in Germany.

Table 5: Location of OREP owned by Luxembourg residents according to country of birth

location of OREP	country of birth							total
	LU	BE	DE	FR	other	PT	total	in %
LU	82%	1%	2%	4%	6%	5%	100%	65%
BE	22%	51%	2%	7%	18%	0%	100%	4%
DE	44%	0%	29%	12%	9%	5%	100%	3%
FR	27%	11%	0%	50%	13%	0%	100%	7%
other	12%	0%	0%	5%	83%	0%	100%	10%
PT	4%	4%	0%	0%	5%	88%	100%	11%
total	59%	4%	2%	7%	14%	13%	100%	100%

location of OREP	country of birth							total
	LU	BE	DE	FR	other	PT	total	in %
LU	90%	19%	55%	38%	27%	26%	65%	65%
BE	1%	49%	3%	3%	5%	0%	4%	4%
DE	2%	0%	42%	6%	2%	1%	3%	3%
FR	3%	20%	0%	47%	6%	0%	7%	7%
other	2%	0%	0%	6%	56%	0%	10%	10%
PT	1%	11%	0%	0%	3%	73%	11%	11%
total	100%	100%	100%	100%	100%	100%	100%	100%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

The bottom panel reports the geographical distribution of OREP for Luxembourg households according to the country of birth of the reference person. The column labelled LU refers to households in which the reference person is born in Luxembourg. It appears that 90% of these *"native"* households own OREP in Luxembourg and only 3% in France and 2% in Germany. For Luxembourg households in which the reference person is born in Germany (column DE), 55% own OREP in Luxembourg and 42% in Germany. In the other columns (reference person born in Belgium, France, Portugal or other countries), the share of OREP located in Luxembourg is lower and ranges from 19% to 38%.

The question on the location of OREP allows us to establish whether the type of OREP (Table 6) and its use (Table 7) differ according to the country in which it is located. Given the low number of observations, Tables 6 and 7 only distinguish OREP in Luxembourg and abroad.

Table 6: Type of OREP by geographical location (question specific to LU-HFCS)

country	house or flat	apartment building	industrial building/ warehouse	building plot/estate	garage	shop	office	hotel	farm	other	total
located outside LU	86%	10%	0%	3%	0%	0%	0%	0%	0%	1%	100%
located in LU	58%	13%	1%	15%	2%	2%	2%	0%	3%	4%	100%
located in/outside LU	67%	12%	1%	11%	1%	2%	1%	0%	2%	3%	100%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

Table 6 indicates that most OREPs located abroad are houses or flats (86%), followed by apartment buildings (10%), and building plots (3%). OREP located in Luxembourg also includes industrial buildings (1%), garages (2%), shops (2%), offices (2%) and farms (3%). Houses and flats only represent 58% of OREPs located in Luxembourg, substantially less than for OREPs abroad.

On the other hand, building plots are substantially more often observed in Luxembourg (15%) than abroad (3%). The share of apartment buildings is also higher in Luxembourg (13%).

Table 7: Use of OREP by geographical location (question specific to LU-HFCS)

country	private use	business use	rent use	vacant	free use	other use	total
located outside LU	68%	1%	16%	6%	4%	4%	100%
located in LU	14%	8%	46%	16%	7%	9%	100%
located in/outside LU	33%	6%	36%	13%	6%	7%	100%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

The dominance of houses and flats in OREP owned abroad is reflected in its use (Table 7). Private use by the Luxembourg household (as a secondary residence) accounts for 68% of OREPs located abroad, compared to 14% in Luxembourg. OREP located in Luxembourg is more often rented (46% versus 16%) or used for business purposes (8% versus 1%). OREP is more likely to be vacant if it is located in Luxembourg, reflecting the larger share of building plots in Luxembourg.

4.2 Share of OREP in household wealth

The Eurosystem Household Finance and Consumption Network (HFCN, 2013a) recently reported sizeable wealth differences between euro area countries. It may not be surprising that median household net wealth is highest in Luxembourg (€397,800), but it is puzzling that German households rank last (€51,400), almost 8 times poorer. Using the mean instead of the median, Slovakian households rank last (€79,700), while Luxembourg households remain at the top (€710,100). Table 8 reports the mean value of OREP across all households in each country while Table 9 focuses only on households that own OREP. In Table 8 the median value is not reported since less than 50% of households own OREP (Table 2) so the median across all households would be zero. Whether gross or net of any outstanding mortgage, the mean value of OREP is highest in Luxembourg.

Table 8: Value of OREP across all households

country	OREP - gross value mean	[95% conf. interval]		OREP - mortgage mean	[95% conf. interval]		OREP - net value mean	[95% conf. interval]		net wealth mean	[95% conf. interval]		share in mean net wealth
BE	44,001	36,691	51,311	2,880	1,875	3,884	41,121	34,047	48,195	338,647	314,091	363,204	12%
DE	45,644	35,588	55,699	7,836	6,035	9,636	37,808	28,043	47,574	195,170	169,610	220,729	19%
FR	51,560	48,282	54,838	5,817	5,244	6,389	45,744	42,584	48,904	233,399	223,805	242,993	20%
LU	239,261	161,709	316,812	18,435	11,736	25,133	220,826	144,742	296,909	710,092	601,211	818,973	31%
NL	16,216	8,689	23,742	4,956	86	9,826	11,260	5,464	17,056	170,244	154,790	185,697	7%
euro area	48,682	45,395	51,970	5,320	4,672	5,969	43,443	40,208	46,678	230,809	221,939	239,678	19%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

> **Finding 6:** *The value of OREP represents 31% of total household net wealth in Luxembourg (EA: 19%). Considering only Luxembourg households that own OREP, its average gross value is around €850,000 (median €300,000) per household. For the euro area, the average is around €211,000 (median around €103,000).*

Table 8 reports that the value of OREP represents about 20% of total household net wealth (net of mortgage debt and other liabilities) in Germany, France and the euro area. Lower shares are observed for Belgium (12%) and the Netherlands (7%). This confirms that OREP is an important component of total net wealth in Luxembourg.

Table 8 and Table 9 report the 95% confidence interval of the mean value. The confidence interval indicates the precision of the mean estimate. In case of Luxembourg, the confidence level of 95% indicates that one can be 95% confident that we found a interval in which the true value of the population mean is between the stochastic endpoints of €586,000 and €1,113,000. The 95% confidence interval is large for Luxembourg and reflects the rather small sample size, the variability within the population of Luxembourg, the sampling process, and the uncertainty of the imputation procedure.

Table 9: Value of OREP among OREP owners

country	gross value				mortgage				net value			
	mean	[95% conf. interval]		median	mean	[95% conf. interval]		median*	mean	[95% conf. interval]		median
BE	268,818	232,908	304,727	174,000	17,593	11,836	23,349	0	251,225	215,539	286,911	150,000
DE	256,457	204,169	308,746	115,000	44,023	34,615	53,432	0	212,434	160,490	264,378	90,000
FR	208,750	196,768	220,733	115,854	20,101	17,976	22,226	0	188,649	176,961	200,338	102,286
LU	849,590	585,813	1,113,367	300,000	65,461	42,167	88,756	0	784,129	524,331	1,043,927	261,756
NL	265,668	162,133	369,202	165,529	81,067	6,876	155,258	0	184,601	96,002	273,200	115,595
euro area	211,036	197,982	224,089	103,442	22,428	19,739	25,116	0	190,120	176,919	203,321	90,152

| country	net wealth				share in net wealth	
	mean	[95% conf. interval]		median	mean	median
BE	763,641	677,801	849,480	546,992	33%	27%
DE	631,376	498,729	764,023	345,400	34%	26%
FR	568,087	534,529	601,644	355,692	33%	29%
LU	1,499,118	1,174,499	1,823,737	882,533	52%	30%
NL	540,609	436,557	644,661	437,191	34%	26%
euro area	551,693	518,716	584,669	330,679	34%	27%

*Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. * The median value of mortgages is zero since less than 50% use OREP as collateral.*

The estimated mean value of OREP of €850,000 among OREP owners seems high for Luxembourg. But this value is strongly influenced by valuable OREPs used for business purposes. In addition, each OREP owner has invested in 1.7 OREPs on average (Figure 2).

Figure 3 reports the composition of gross wealth by country. In Luxembourg and the euro area, OREP follows the HMR as the second largest component of gross wealth. In Germany and France, OREP and financial assets have similar shares in total gross wealth. In Belgium and the Netherlands the share of OREP is substantially smaller than the share of financial assets. This is consistent with the net figures presented in Table 8. Compared to the whole population of Luxembourg households, the mean (or median) net wealth of those who own OREP is more than twice as high (Table 9). For households that own OREP, total net wealth averages around €1,500,000 (median near €880,000). OREP represents more than 50% of the mean and 30% of the median value of net wealth.

Figure 3: Composition of gross wealth across countries
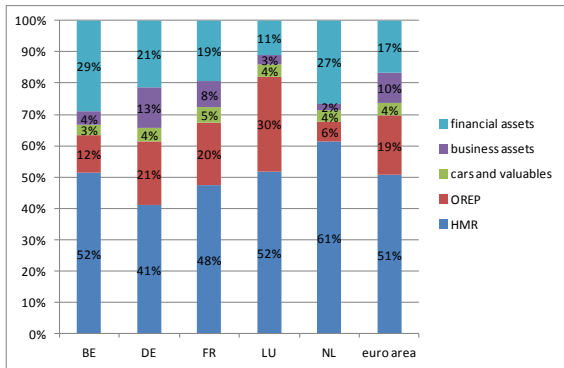
Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. Business assets do not include OREP used for business purposes, which is included in OREP.
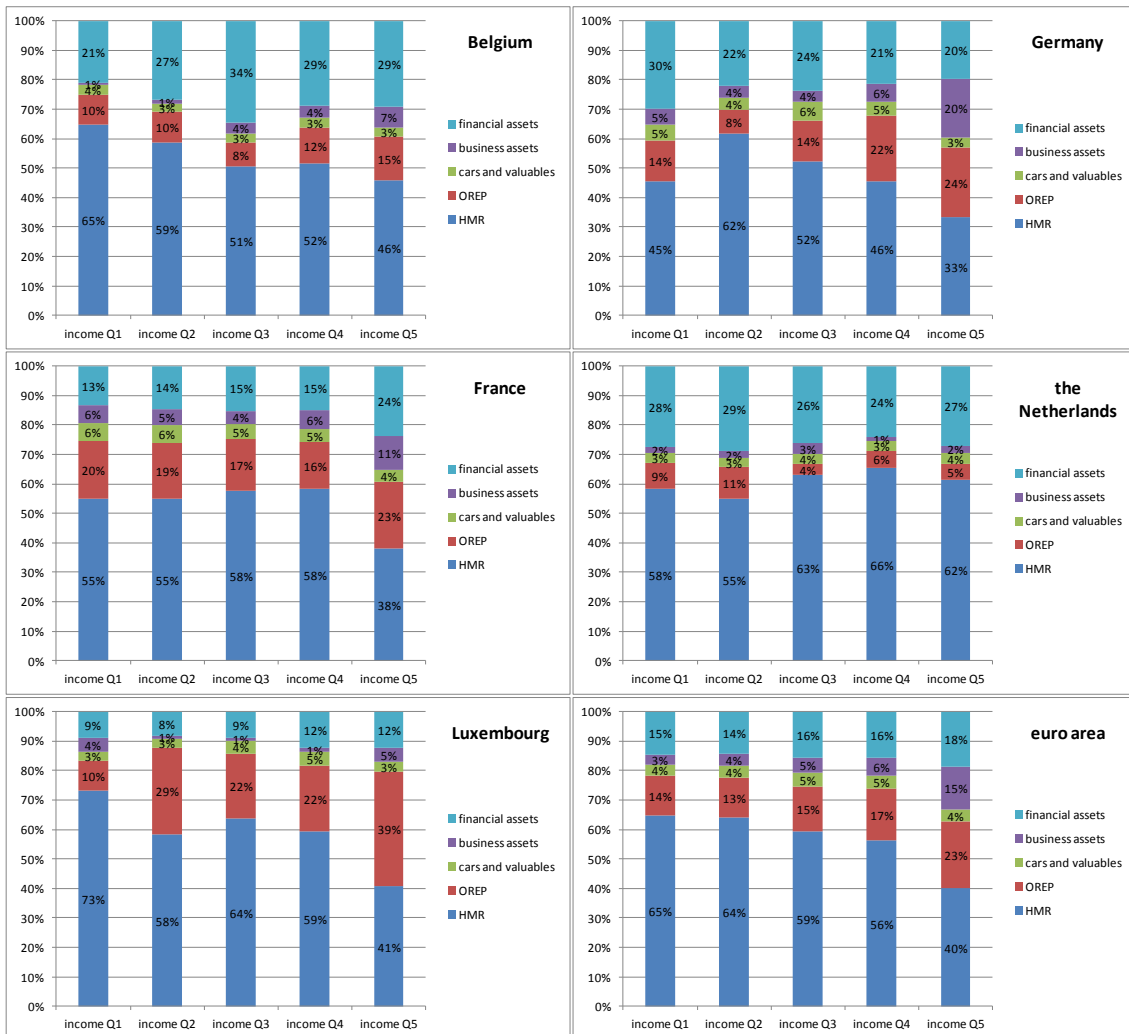
Figure 4: Composition of gross wealth according to income quintile

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. Business assets do not include OREP used for business purposes, which is included in OREP.

Figure 4 shows how the composition of total gross wealth by asset category differs across gross income quintiles. For Luxembourg, the HMR becomes less important for higher income quintiles (Q1: 73% - Q5: 41%). The increasing share of financial assets (from 9% in Q1 to 12% in Q5) only partly explains this reduction. The largest offsetting change is in the share of OREP (from 10% in Q1 to 39% in Q5). The euro area displays a similar pattern although the increase in the OREP share is less pronounced. The wealth composition appears quite stable over income quintiles in the Netherlands. In Germany the shares of business assets and of OREP increase in the top quintile.

Table 10 indicates that for Luxembourg households, the mean (median) net value of OREP located outside Luxembourg is €348,000 (€174,000) and for OREP located in Luxembourg it is €1,000,000 (€350,000). Thus, the location of OREP influences its value significantly. OREP located in Luxembourg has benefited from strong capital gains on the local real estate market (Figure 1).

Table 10: Value of OREP by geographical location (question specific to LU-HFCS)

country	mean	median
located outside LU	348,193	174,000
located in LU	1,016,677	350,000
located in/outside LU	784,122	261,756

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

For Luxembourg, Mathä, Porpiglia and Ziegelmeyer (2012) compare the value of the HMR from the HFCS to asking and transaction prices for houses and apartments published by the *"Observatoire de l'Habitat" (2011)*. This comparison is not possible for OREP since the HFCS did not collect as much detail as for the HMR (size of the residence and type of housing).

4.3   Rental income from OREP

Table 11 provides detailed statistics on rental income from OREP.

Table 11: Annual rental income from OREP

| country	owner-ship	annual rental income from OREP			annual total household income			share in total income		
		mean among rental income recipients	median	mean across all hhs	mean among rental income recipients	median	mean across all hhs	mean among rental income recipients	median	mean across all hhs
BE	7.5%	12,201	7,200	918	77,454	49,742	49,536	15.8%	14.5%	1.9%
DE	13.3%	12,270	6,220	1,626	73,912	56,487	43,531	16.6%	11.0%	3.7%
FR	12.2%	9,463	4,326	1,153	61,928	44,582	36,918	15.3%	9.7%	3.1%
LU	13.3%	24,356	10,200	3,229	141,341	105,644	83,657	17.2%	9.7%	3.9%
NL	1.1%	6,183	6,000	66	62,842	62,387	45,792	9.8%	9.6%	0.1%
euro area	8.8%	10,902	5,763	958	66,587	49,680	37,841	16.4%	11.6%	2.5%

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

Finding 7: OREP generates rental income for 13% of Luxembourg households (EA: 9%). Among these households, the mean rental income is roughly €2,000 a month (median is €850), substantially above rental income in other euro area countries. For these Luxembourg

households, rental income averages 17.2% of total income (median 9.7%). This is roughly in line with euro area results, since total income is higher in Luxembourg.

The share of households with rental income from OREP is similar in Germany (13%) and slightly lower in France. Over all households in Luxembourg, average rental income from OREP represents 3.9% of total household income, 1.4 percentage points above the euro area average.[9] Figure 5 (left panel) plots the share of rental income in total income across the income distribution. In Luxembourg, the share ranges from 0.4% (EA: 0.8%) in income quintile 1 to 6.2% (EA: 3.8%) in income quintile 5. The share of rental income increases strongly from quintile 4 to 5 in France, Luxembourg and the euro area. Differences are even more pronounced over wealth quintiles (Figure 5, right panel). For the first three wealth quintiles the share of rental income in total income is always below 1%. In the top quintiles, the rental share in Luxembourg rises from 1.1% (EA: 1.3%) in wealth quintile 4 to 10.2% (EA: 6.0%) in wealth quintile 5.

Figure 5: Share of rental income in total income according to income and wealth quintiles
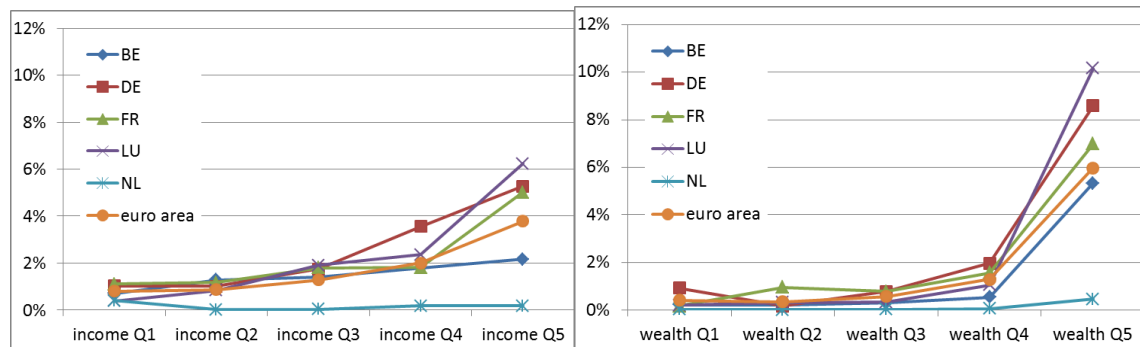
Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted.

5 Multivariate Analysis

I now turn to the determinants of OREP investment in Luxembourg and its neighbouring countries.[10] Let the dependent variable be 1 if a household owns OREP, and 0 otherwise. This variable can be modelled as a probit process, as follows

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[9] This cannot be compared to national accounts, where *"Rents (D45)"* only refers to rents from land and subsoil assets. Income that households receive from renting buildings is considered production of real estate services (P.1), which also includes rents from non-residential buildings and an estimate of imputed rents for owner occupied dwellings (see ESA95 §3.64).

[10] Arrondel et al. (2014) use the amounts invested in OREP as an additional dependent variable. Their tobit model relies on the strong assumption that zero and positive values are generated by the same probability mechanism (see Cameron and Trivedi, 2010, chapter 16). One could object that the amount invested in OREP is not chosen independently of the original decision to invest in OREP. Proper estimation of a bivariate sample-selection model requires exclusion restrictions that influence the participation decision but not the amount invested. These are almost impossible to find with the data available.

$$\Pr\!\left(W_i = 1 \mid x\right) = \Pr\!\left(W_i^{*} > 0 \mid x\right) = \Phi(x) \tag{1}$$

$$W_i^{*} = \beta_0 + \beta_1 Z_i + \beta_2 E_i + \beta_2 Y_i + \beta_3 H_i + \beta_4 I_i + \varepsilon_i \tag{2}$$

The probability that household *i* owns OREP is expressed as a function of a variety of determinants *x*, which influence a latent variable W_i^{*}. If the latent variable W_i^{*} is larger than zero, the household owns OREP – otherwise, it does not. The latent variable is determined by equation (2), which models it as a linear function of vectors *Z, E, Y*, *H* and *I*. The vector Z includes characteristics of the reference person or household, such as age and age squared, gender, civil status (single, couple, divorced or widowed), household size, and an immigration dummy equal to one if the reference person is born in the country of residence.[11] The vector *E* includes a set of dummy variables indicating the education level (low, middle, high). The vector *Y* includes employment status (employee, self-employed, unemployed, retired and other), total household income[12], a dummy for temporary employment, and dummies for employment in the financial or public sector. The variable *H* contains a homeownership dummy and dummies for adjusted[13] total net wealth quintiles. Empirical studies[14] often include wealth quintiles to proxy for different behaviour or attitudes along the wealth distribution. The vector *I* includes the amount of gifts and inheritances received (including the HMR)[15] and the number of years since the household received the largest gift or inheritance. Finally, ε_i is an error term that is assumed to be i.i.d. Appendix A provides a definition of all variables used in this analysis. These are common in the literature reviewed in section 2. The variables included are measured at the time the survey was conducted and not at the time the household acquired the OREP, so results should be interpreted as descriptive analysis rather than an attempt to establish causal links.

To mitigate problems related to heteroskedasticity, inverse hyperbolic sine transformations are applied to all positive and negative monetary amounts. Since the country samples represent different shares of the overall population in each country, the model needs to be estimated using weights. The weight attached to each sampled household reflects its relative importance to ensure that results are representative for individual countries (or for the euro area as a whole). This is consistent with the recommendations by Faiella (2010) using the Italian Survey of Household Income and Wealth and by Magee et al. (1998) using the Canadian Survey of Consumer Finances. The weights account for the omission of relevant sampling information in surveys with complex designs. Otherwise, all available operational and geographic variables used in sampling design would need to be modelled explicitly. In addition, the HFCS

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[11] Country of birth is not available for households resident in France or the Netherlands.

[12] Rental income is subtracted from total income. Since 13% of OREP owners receive rental income from their estate, this source of endogeneity bias has to be avoided.

[13] Total net wealth is adjusted by subtracting the net value of OREP to avoid an obvious endogeneity bias.

[14] See e.g. Arrondel et al. (2014) or Le Blanc et al. (2014).

[15] In France the survey did not include a question on inherited or gifted HMRs.

oversampled wealthy households, who are more likely to own OREP, so weights are needed to mitigate the risk of endogenous sampling (Solon et al., 2013). Marginal effects are calculated for each household and reported as weighted averages along with robust standard errors. The marginal effects indicate the percentage point increase in the likelihood of owning OREP if all other factors are constant. All estimates are based on the multiple imputed datasets.

The probit model is estimated separately for Luxembourg and the neighbouring countries to assess similarities and differences. Pooled estimates for the euro area are also provided, including country-specific fixed effects.[16] Three different specifications are estimated for the pooled euro area dataset: the first includes all 15 euro area countries present in the Eurosystem HFCS; the second includes the additional temporary employment dummy (which requires dropping Finland, where this question was omitted); the third includes additional data on gifts and transfers received as well as the temporary employment dummy (which requires dropping both Finland and Italy, where this question was omitted).

The results for Luxembourg indicate that few variables have a significant influence on OREP ownership (Table 12). This probably reflects estimation uncertainty given the lower number of observations in Luxembourg. A 10% increase in income (excluding rental income) raises the likelihood of owning OREP by 1 percentage point. A 10% increase of gifts and transfers received raises the likelihood of OREP ownership by 0.16 percentage points. This result is intuitive given that gifts or transfers can include OREP or serve as collateral for its acquisition. Wealthier households appear to be more likely to invest in OREP, although in Luxembourg marginal effects are only significant at the 10% level for the 2nd and 5th wealth quintile. In the euro area regressions, the marginal effects increase systematically with moves to higher wealth quintiles. All three effects are also observed for the euro area as a whole, as well as for most of the neighbouring countries. Income is not significant in the regressions for the Netherlands and Belgium. Gifts and transfers received are not significant in the regression for the Netherlands. Public sector employment appears to have a significantly negative effect on the likelihood of owning OREP in Luxembourg. One possible explanation could be that public sector employees are more risk averse and OREP is perceived as a risky investment.[17] However, in the euro area regressions the marginal effect of public sector employment is positive and significant. This puzzling result is left for future research.

Sierminska and Doorley (2012, table A1) find that OREP investment is more likely for wealthier households, households in which the reference person is male, has below or above average education, or is self-employed. They find that the probability of owning OREP decreases with age, which seems implausible, and is lower if the referenced person is married or widowed.

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[16] These country-specific effects may reflect different institutional frameworks such as (in)direct subsidies or tax rebates. The five countries included in this study are not sufficient to conduct a more detailed analysis of institutional differences.

[17] Fuchs-Schündeln and Schündeln (2005) stressed that risk-averse individuals self-select into low-risk occupations.

Table 12: Probit - Determinants of investment in OREP

	BE	DE	FR	LU	NL	EA15	EA14	EA13
male (d)	0.053 ***	-0.016	0.002	0.015	-0.004	0.012 *	0.012	0.004
	(0.020)	(0.017)	(0.010)	(0.035)	(0.018)	(0.007)	(0.008)	(0.008)
age	0.006	0.013 ***	0.013 ***	0.001	0.010 **	0.016 ***	0.016 ***	0.013 ***
	(0.004)	(0.004)	(0.002)	(0.008)	(0.004)	(0.001)	(0.002)	(0.002)
age2	-0.000	-0.000 ***	-0.000 ***	0.000	-0.000 **	-0.000 ***	-0.000 ***	-0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
single (d)	0.020	-0.009	-0.040 ***	-0.046	-0.015	-0.006	-0.006	-0.016
	(0.036)	(0.029)	(0.015)	(0.051)	(0.022)	(0.011)	(0.011)	(0.013)
divorced (d)	0.018	-0.028	-0.071 ***	0.004	-0.025	-0.051 ***	-0.051 ***	-0.043 ***
	(0.034)	(0.031)	(0.016)	(0.053)	(0.030)	(0.013)	(0.014)	(0.015)
widowed (d)	0.002	-0.016	-0.024	-0.046	-0.059 **	-0.044 ***	-0.043 ***	-0.037 ***
	(0.033)	(0.035)	(0.016)	(0.074)	(0.030)	(0.012)	(0.012)	(0.014)
hhsize	0.021 **	0.002	0.001	0.002	0.001	0.010 ***	0.010 ***	0.008 **
	(0.010)	(0.010)	(0.005)	(0.015)	(0.009)	(0.003)	(0.004)	(0.004)
mideduc (d)	0.024	0.069 **	0.033 ***	-0.002	0.008	0.020 ***	0.020 ***	0.023 ***
	(0.026)	(0.032)	(0.011)	(0.040)	(0.018)	(0.008)	(0.008)	(0.009)
higheduc (d)	0.039	0.111 ***	0.057 ***	0.074	0.043 **	0.072 ***	0.073 ***	0.061 ***
	(0.025)	(0.034)	(0.013)	(0.046)	(0.018)	(0.009)	(0.010)	(0.010)
born in country of residence (d)	0.042	0.001		-0.019				
	(0.031)	(0.027)		(0.036)				
ihs(total income excl. rental income)	0.007	0.036 **	0.013 ***	0.103 ***	-0.005	0.018 ***	0.017 ***	0.019 ***
	(0.009)	(0.016)	(0.005)	(0.032)	(0.004)	(0.004)	(0.004)	(0.004)
self-employed (d)	0.114 **	0.056 *	0.157 ***	0.050	0.076 **	0.124 ***	0.124 ***	0.101 ***
	(0.048)	(0.029)	(0.016)	(0.056)	(0.032)	(0.012)	(0.012)	(0.013)
unemployed (d)	-0.021	-0.126 **	-0.101 ***	-0.144	0.072	-0.043 ***	-0.042 ***	-0.045 **
	(0.052)	(0.063)	(0.026)	(0.111)	(0.053)	(0.015)	(0.016)	(0.018)
retired (d)	0.062 *	0.011	-0.003	0.028	-0.002	0.022 *	0.022 *	0.022
	(0.037)	(0.033)	(0.017)	(0.063)	(0.025)	(0.012)	(0.012)	(0.014)
other (d)	-0.064	0.015	-0.035	-0.031	-0.034	0.012	0.011	0.013
	(0.049)	(0.031)	(0.023)	(0.071)	(0.033)	(0.013)	(0.013)	(0.015)
employment status missing (d)	-0.031				-0.015	0.002	0.002	-0.007
	(0.082)				(0.023)	(0.041)	(0.041)	(0.040)
temporary employment (d)	0.009	0.042	0.057 *	0.018			0.007	0.002
	(0.066)	(0.042)	(0.030)	(0.082)			(0.019)	(0.021)
financial sector (d)	0.042	0.031	0.066 **	-0.067	0.013	0.037	0.037	0.046 **
	(0.053)	(0.038)	(0.031)	(0.056)	(0.036)	(0.023)	(0.023)	(0.024)
public sector (d)	0.043	0.033	0.017	-0.138 ***	-0.002	0.034 ***	0.034 **	0.032 **
	(0.032)	(0.029)	(0.015)	(0.051)	(0.022)	(0.013)	(0.013)	(0.015)
HMR owner (d)	-0.089 **	0.012	-0.011	-0.090	0.048 *	0.038 ***	0.037 ***	0.007
	(0.037)	(0.028)	(0.019)	(0.058)	(0.027)	(0.013)	(0.013)	(0.014)
ihs(amount gifts & transfers)	0.007 ***	0.012 ***	0.017 ***	0.016 ***	-0.001			0.015 ***
	(0.002)	(0.002)	(0.001)	(0.004)	(0.002)			(0.001)
years since largest transfer	-0.000	-0.002 **	-0.000	-0.002	0.002			-0.001 *
	(0.001)	(0.001)	(0.000)	(0.002)	(0.002)			(0.000)
net wealth quintile 2 (excl. OREP) (d)	0.102 **	0.002	0.028	0.099 *		0.049 ***	0.051 ***	0.030 *
	(0.047)	(0.037)	(0.019)	(0.060)		(0.013)	(0.013)	(0.015)
net wealth quintile 3 (excl. OREP) (d)	0.097 *	0.064 *	0.100 ***	0.087	0.011	0.090 ***	0.091 ***	0.075 ***
	(0.052)	(0.037)	(0.024)	(0.081)	(0.034)	(0.016)	(0.016)	(0.017)
net wealth quintile 4 (excl. OREP) (d)	0.175 ***	0.062	0.116 ***	0.016	0.022	0.111 ***	0.111 ***	0.086 ***
	(0.053)	(0.041)	(0.026)	(0.091)	(0.036)	(0.017)	(0.017)	(0.019)
net wealth quintile 5 (excl. OREP) (d)	0.222 ***	0.165 ***	0.194 ***	0.157 *	0.057 *	0.210 ***	0.211 ***	0.169 ***
	(0.052)	(0.044)	(0.027)	(0.092)	(0.034)	(0.017)	(0.017)	(0.019)
country fixed effects						yes	yes	yes
mean observations over MI=5	2170	3565	14523	950	1275	62083	51138	42379
minimum observations over MI=5	2169	3565	14523	950	1268	62081	51136	42371
mean pseudo R2 over MI=5	0.135	0.209	0.207	0.161	0.172	0.159	0.126	0.201
minimum pseudo R2 over MI=5	0.133	0.208	0.206	0.157	0.167	0.159	0.126	0.201

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. See appendix A for variable definitions, standard errors in parentheses. To achieve convergence in estimation, only net wealth quintiles 3 to 5 are included for the Netherlands. Marginal effects are calculated at the observation level and then averaged. Marginal effects and standard errors are calculated using 5 multiply imputed datasets (MI=5) (Rubin, 1987, 1996). (d) indicates a 0/1 dummy variable.* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 12 also provides additional stylised facts from the regressions for the euro area and other countries: the probability of OREP ownership rises with age but falls with age squared, reaching a maximum at age 65 in all three EA regressions; households in which the reference person is divorced, widowed or unemployed are less likely to own OREP; the better educated, self-employed, or retired are more likely to own OREP.

There are several limitations to this multivariate analysis. The year of OREP acquisition is unknown, which prevents controlling for macroeconomic conditions at that time, e.g. real-estate dynamics before acquisition. Furthermore, marginal effects only imply correlation, not causation, so caution is required when interpreting results. In addition, OREP is of different types (Table 3) and put to different uses (Table 4) complicating the analysis. Analysis is much simpler for the HMR, which is necessarily a residential building and can only be a house or a flat. One possibility would be to increase homogeneity by restricting the analysis to only some types or uses. However, the limited size of the Luxembourg sample would make it difficult to obtain significant effects when analysing subgroups. Table 13 attempts this by redefining the dependent variable to focus only on OREP used for business and rental purposes (Table 4).

In the regression for Luxembourg, the minimum pseudo R-squared increases from 0.157 in Table 12 to 0.202. These numbers are not directly comparable since the dependent variable is different, but the improvement in fit suggests that the more homogeneous sample yields a better explanation via the included variables. The difference in R-squared is much more limited for the other regressions.

In Table 13, the Luxembourg results indicate that the likelihood of owning OREP for rental and business purposes is higher for the self-employed, as could be expected. The likelihood of owning OREP also increases with income, education, birth in the country of residence, gifts and transfers received and net wealth. The sign and significance of the marginal effects on these variables are the same as for the euro area.

Finding 8: Multivariate analysis generally confirms the link between OREP ownership and certain household characteristics as suggested by descriptive statistics (finding 2). Luxembourg households are significantly more likely to own OREP if they have higher income or wealth, if they received gifts or transfers and if they are not employed in the public sector. If the analysis is restricted to OREP used for business and rental purposes, there are significant positive effects associated with self-employment, income, wealth, education, birth in the country of residence, and gifts and transfers received. The sign and significance of the marginal effects are similar to those for the euro area.

Table 13: Probit - Determinants of investment in OREP used for business and rental purposes

	BE	DE	FR	LU	NL	EA14	EA13
male (d)	0.011	-0.022	0.007	0.013	0.001	-0.005	-0.003
	(0.013)	(0.014)	(0.008)	(0.026)	(0.004)	(0.006)	(0.006)
age	0.004	0.006 *	0.005 ***	0.002	0.003 *	0.006 ***	0.005 ***
	(0.003)	(0.003)	(0.002)	(0.006)	(0.002)	(0.001)	(0.001)
age2	-0.000	-0.000	-0.000 **	0.000	-0.000	-0.000 ***	-0.000 ***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
single (d)	-0.016	-0.002	-0.023 *	-0.016	0.004	-0.002	-0.011
	(0.019)	(0.024)	(0.012)	(0.036)	(0.005)	(0.008)	(0.010)
divorced (d)	-0.018	-0.028	-0.047 ***	-0.028		-0.028 **	-0.030 **
	(0.027)	(0.028)	(0.013)	(0.038)		(0.011)	(0.013)
widowed (d)	-0.012	-0.031	-0.004	-0.043		-0.021 **	-0.022 *
	(0.021)	(0.030)	(0.012)	(0.054)		(0.010)	(0.011)
hhsize	0.001	-0.014 *	-0.001	-0.008	-0.005 **	-0.002	-0.004
	(0.007)	(0.008)	(0.004)	(0.011)	(0.002)	(0.002)	(0.003)
mideduc (d)	0.021	0.049	0.025 ***	0.041	-0.003	0.016 ***	0.019 ***
	(0.017)	(0.031)	(0.008)	(0.030)	(0.005)	(0.006)	(0.007)
higheduc (d)	0.022	0.066 **	0.035 ***	0.088 ***	0.003	0.032 ***	0.027 ***
	(0.017)	(0.033)	(0.010)	(0.034)	(0.005)	(0.007)	(0.008)
born in country of residence (d)	0.002	0.042		0.059 **			
	(0.021)	(0.025)		(0.026)			
ihs(total income excl. rental income)	0.000	0.015	0.001	0.048 **	-0.002 *	0.006 **	0.005 *
	(0.006)	(0.012)	(0.003)	(0.020)	(0.001)	(0.003)	(0.003)
self-employed (d)	0.023	0.054 **	0.150 ***	0.073 *	0.014	0.101 ***	0.087 ***
	(0.032)	(0.023)	(0.011)	(0.038)	(0.009)	(0.008)	(0.010)
unemployed (d)	-0.066 **	-0.129 **	-0.087 ***			-0.036 ***	-0.042 ***
	(0.028)	(0.055)	(0.019)			(0.013)	(0.015)
retired (d)	0.013	-0.009	-0.002	-0.013	0.006	0.004	-0.002
	(0.024)	(0.027)	(0.012)	(0.045)	(0.007)	(0.009)	(0.011)
other (d)	-0.038	-0.012	-0.003	0.043	-0.002	-0.003	-0.005
	(0.041)	(0.024)	(0.018)	(0.047)	(0.008)	(0.010)	(0.011)
employment status missing (d)	-0.088				-0.000	0.015	-0.021
	(0.061)				(0.009)	(0.044)	(0.055)
temporary employment (d)	-0.032	-0.022	0.008	0.037		-0.023 *	-0.025 *
	(0.033)	(0.036)	(0.022)	(0.066)		(0.013)	(0.014)
financial sector (d)	-0.015	0.016	0.037 *	-0.019		0.012	0.020
	(0.036)	(0.033)	(0.022)	(0.043)		(0.016)	(0.017)
public sector (d)	-0.023	0.024	0.018	-0.064	-0.006	0.018 *	0.015
	(0.022)	(0.025)	(0.013)	(0.039)	(0.008)	(0.011)	(0.012)
HMR owner (d)	-0.037	0.029	0.014	-0.026	-0.003	0.021 **	0.017
	(0.026)	(0.025)	(0.014)	(0.044)	(0.009)	(0.011)	(0.012)
ihs(amount gifts & transfers)	0.003 **	0.007 ***	0.009 ***	0.007 ***	0.000		0.007 ***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)		(0.001)
years since largest transfer	0.000	-0.001 *	0.001 *	-0.002	-0.000		-0.000
	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)		(0.000)
net wealth quintile 2 (excl. OREP) (d)	0.067 *	-0.056	0.046 **	0.129 **		0.021 *	0.008
	(0.035)	(0.036)	(0.022)	(0.066)		(0.011)	(0.013)
net wealth quintile 3 (excl. OREP) (d)	0.063	0.073 **	0.103 ***	0.152 **	0.005	0.075 ***	0.066 ***
	(0.039)	(0.035)	(0.023)	(0.072)	(0.010)	(0.015)	(0.016)
net wealth quintile 4 (excl. OREP) (d)	0.099 **	0.060	0.101 ***	0.095	0.015	0.080 ***	0.068 ***
	(0.039)	(0.039)	(0.024)	(0.078)	(0.013)	(0.015)	(0.017)
net wealth quintile 5 (excl. OREP) (d)	0.146 ***	0.156 ***	0.154 ***	0.199 ***	0.020	0.147 ***	0.132 ***
	(0.039)	(0.040)	(0.024)	(0.076)	(0.013)	(0.015)	(0.017)
country fixed effects						yes	yes
mean observations over MI=5	2170	3565	14523	950	1275	51138	42379
minimum observations over MI=5	2169	3565	14523	950	1268	51136	42371
mean pseudo R2 over MI=5	0.137	0.233	0.199	0.210	0.222	0.169	0.193
minimum pseudo R2 over MI=5	0.134	0.233	0.198	0.202	0.188	0.168	0.192

Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. See appendix A for variable definitions, standard errors in parentheses. To achieve convergence in estimation only net wealth quintiles 3 to 5 are included for the Netherlands. Marginal effects are calculated at the observation level and then averaged. Marginal effects and standard errors are calculated using 5 multiply imputed datasets (MI=5) (Rubin, 1987, 1996). (d) indicates a 0/1 dummy variable.* significant at 10%; ** significant at 5%; *** significant at 1%. Finnish data do not contain information on the use of OREP so there is no EU15 regression. Some explanatory variables are dropped in certain regressions because of perfect failure prediction cases.

6   Conclusion

"If you're not going to put money in real estate, where else?" This quote by Tamir Sapir, who invested heavily in New York real estate (Blankfeld, 2010) appears to match the investment behaviour of households resident in Luxembourg. HFCS data indicates that 67% of these households own their HMR and 28% have invested in OREP. The HMR represents 52% of household gross wealth, and OREP another 30%. Although OREP is also an important investment in neighbouring countries and in the euro area, it is rarely analysed in the existing literature. This study uses Eurosystem HFCS dataset to show that OREP not only represents an important component of gross wealth but also provides a non-negligible share of gross income in those households that own it. Several stylised facts are reported on the type, use and location of OREP. In Luxembourg and the euro area, the probability that a household owns OREP for business or rental purposes increases with self-employed status, income, education, birth in the country of residence, gifts and transfers received and net wealth.

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Appendix A: Variable definitions of explanatory variables

Variable name	Variable description
Main household characteristics	
male (d)	reference person is male
age, age2	age and age squared of the reference person
single (d)	reference person is single
married (d) (ref.)	reference person is married or has a consensual union on a legal basis
divorced (d)	reference person is divorced
widowed (d)	reference person is widowed
hhsize	number of household members
lowedu (d) (ref.)	reference person with low education (ISCED=0,1,2)
midedu (d)	reference person with medium education (ISCED=3,4)
higheduc (d)	reference person with high education (ISCED=5,6)
born in country of residence (d)	reference person is born in the country of residence
Employment and income related characteristics	
ihs(total income)	inverse hyperbolic sine transformation of total household gross income (as defined in Annex I of HFCN, 2013a) in log form
ihs(total income excl. rental income)	inverse hyperbolic sine transformation of total household gross income (as defined in Annex I of HFCN, 2013a) minus rental income in log form
temporary employment (d)	reference person has a temporary working contract
employee (d) (ref.)	main labour status of reference person is employee
self-employed (d)	main labour status of reference person is self-employed
unemployed (d)	main labour status of reference person is unemployed
retired (d)	main labour status of reference person is retired
other (d)	main labour status of reference person is other employment status not listed before
employment status missing (d)	main labour status of reference person is missing
financial sector (d)	reference person works in the financial sector (NACE: K)
public sector (d)	reference person works in the public sector (NACE: O, P, Q)
Variables related to assets	
HMR owner	household owns fully or partially the HMR
no real estate property (d) (ref.)	Household owns no real estate property
only HMR (d)	Household owns only the HMR and no OREP
only OREP (d)	Household owns only OREP and not the HMR
both HMR and OREP (d)	Household owns both the HMR and OREP
net wealth quintile	country specific total net wealth quintile, where net wealth is defined as the difference between total gross assets (real and financial assets) and total liabilities as defined in Annex I of HFCN (2013a); quintile 1 is the reference category
net wealth quintile (excl. OREP)	country specific total net wealth quintile, where net wealth is defined as the difference between total gross assets (real and financial assets) and total liabilities as defined in Annex I of HFCN (2013a); the net value of OREP is subtracted from net wealth; quintile 1 is the reference category
Variables related to intergenerational transfers	
ihs(amount gifts & transfers)	inverse hyperbolic sine transformation of the total amount of gifts or inheritances received in log form (at the time of transfer; including HMR)
years since largest transfer	number of years since the largest gift or inheritance was received
Country fixed effects	
country (d)	C=1 if household resident in C $\in$ {AT, BE, CY, ES, FI, FR, GR, IT, LU, MT, NL, PT, SL }, zero otherwise; DE is reference country.

(d) denotes variable being a dummy variable. (ref.) indicates the reference group in the regressions. ihs= inverse hyperbolic sine transformation.

Appendix B: Summary statistics

country	BE	DE	FR	LU	NL	euro area
obs	*2,327*	*3,565*	*15,006*	*950*	*1,301*	*62,521*
male (d)	54%	51%	61%	60%	63%	54%
age	52.2	52.0	52.2	49.9	51.9	52.7
single (d)	20%	25%	29%	25%	37%	22%
couple (d)	54%	50%	46%	53%	43%	54%
divorced (d)	13%	12%	12%	13%	12%	11%
widowed (d)	13%	13%	14%	9%	8%	13%
hhsize	2.3	2.0	2.2	2.5	2.2	2.3
loweduc (d)	26%	14%	38%	36%	28%	35%
mideduc (d)	37%	57%	39%	38%	39%	41%
higheduc (d)	38%	29%	23%	26%	34%	24%
born in country of residence (d)*	90%	86%		57%		89%
total gross income	49,536	43,531	36,918	83,657	45,792	37,841
employee (d)	43%	49%	47%	56%	47%	45%
self-employed (d)	5%	7%	8%	6%	4%	8%
unemployed (d)	9%	5%	5%	3%	2%	5%
retired (d)	32%	30%	34%	24%	21%	31%
other (d)	8%	9%	6%	11%	13%	10%
employment status missing (d)	2%	0%	0%	0%	13%	1%
temporary employment (d)**	4%	6%	5%	4%	4%	5%
financial sector (d)	2%	3%	1%	9%	3%	2%
public sector (d)	16%	12%	14%	17%	15%	12%
amount gifts & transfers***	35,627	44,946	33,614	57,498	5,248	33,290
years since largest transfer ***	4.8	5.0	5.8	4.2	0.6	5.1
net wealth	338,647	195,170	233,399	710,092	170,244	230,809

*Source: own calculations based on the HFCS UDB 1.0; data are multiply imputed and weighted. * not available in ES, FR, NL; ** not available in FI; *** not available in FI, IT.*