Objectified Housing Sales and Rent Prices in Representative Household Surveys
The Impact on Macroeconomic Statistics

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Introduction

Reliable macro-economic housing and wealth statistics as well as counterfactual analyses across housing tenure status require hypothetical sales and rent price estimates reflecting current market conditions and representing the housing stock. However, the vast majority of dwellings forming a country's housing stock is, at any given moment, neither on sale nor available for rent. Additionally, a housing unit cannot be simultaneously active on the rent and sales market. This naturally occurring fact, however, limits the compilation of macroeconomic housing statistics targeting the entire stock and reflecting current market conditions. Survey data is widely used to estimate housing stock prices, but the information thus elicited is self-reported and prone to several well-documented sources of imprecision (Vermeulen, 2017; Chakraborty and Waltl, 2018; Bach et al., 2019; Kennickell, 2019; Waltl, 2020). We fill this gap by employing a country-representative survey - the Household Finance and Consumption Survey (HFCS) - enriched by actual market data for compiling objectified macro-economic statistics.

Method

- We amended the Luxembourg HFCS (LU-HFCS) by questions on dwelling characteristics (most importantly location) facilitating the imputation of objectified current market sales and rent prices for all dwellings appearing in the survey
- Hedonic imputation models are estimated on observed sales and rent market data from the Luxembourg Housing Observatory (a facility collecting advertised sales and rent data for the entire country)
- Model framework:

$$\log P_{it}^{S \vee R} = \beta X_{it} + \lambda L_{it} + \varepsilon_{it}, \quad i = 1, \ldots, n,$$

where $P_{it}^{S} \in \mathbb{R}_s^n$ is a sales price of dwelling l at time t and $P_{it}^{R} \in \mathbb{R}_r^n$ is a monthly rent price at time t. X contains physical and L locational characteristics.
- Impute objectified current market sales and rent prices for each dwelling in the LU-HFCS regardless of tenure status

Results

As a first result, we find that survey respondents tend to be simultaneously good (or bad) in estimating hypothetical sales and rent prices revealing a certain measurable "degree of ability" performing such tasks in general.

Regarding HMR characteristics, we find an increase in respondent imprecision (both under- and over-reporting) for homes acquired a long time ago, indicating that it becomes more difficult for owners to track house prices over extended periods of time. Furthermore, under-reporting is more likely to occur for larger premises.

Not surprisingly, we firmly confirm a large deviation between rents paid and the current market rent, in-line with the large increases in rents over the last decades. The tenure status - renting versus owner-occupying - turns out to be a prime explanatory predictor for home value mis-estimation: Renters tend to be much more likely to mis-report the market value of their home.

We find significant increases in total wealth. Although the most affluent households - both in terms of income and wealth - are found to be overoptimistic regarding the value of their main residence, the remaining 80% of households are overall wealthier than they think. Opposing effects lead to a small decreasing impact on measured wealth inequality - along the income and wealth distribution.

Geographically, over-reporting is less common in the urban agglomerations Luxembourg City and Esch-sur-Alzette than in the rest of the country dominated by smaller municipalities and rural areas. These larger urban areas, however, differ in the degree of under-reporting: Under-reporting is more common in Luxembourg City and less common in Esch-sur-Alzette, compared to the rest of the country.

Applications

Wealth Measures

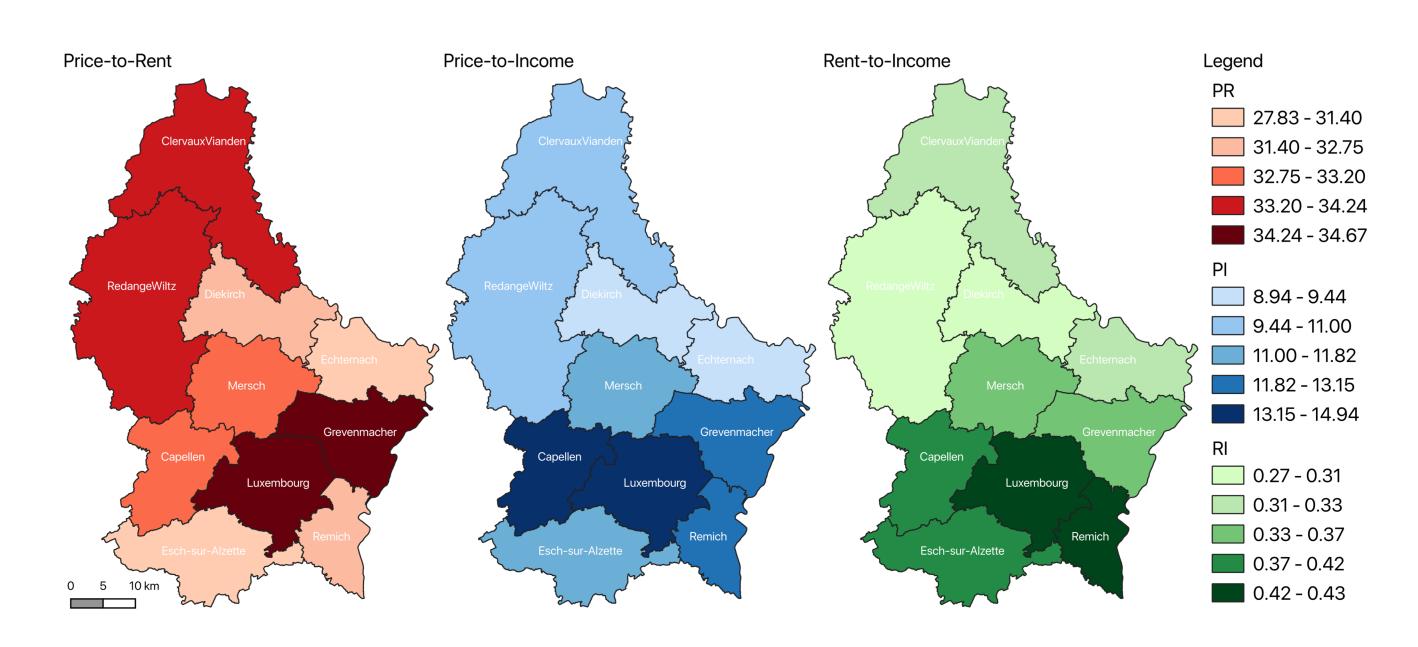Net Wealth= Real Assets+ Financial Assets- Liabilities
Measured Average Net Wealth held by Luxembourg households increases quite substantially (+ around EUR 50,000) when relying on imputed values
The increases are distributionally relevant - the wealth distribution shift along several dimensions (including wealth itself, income and groups formed by formal education)

Housing Market Indicators

- Standard aggregate measures include the price-to-rent ratio (PR), price-to-income ratio (PI), and the rent-to-income ratio (RI). We build a micro-level bridge between the household income and their home's market value, addressing the mismatch that usually plagues these ratios (Gan and Hill, 2009)
- We find a substantial degree of variation for all ratios

Quantile Level	0.10	0.25	0.50	0.75	0.90
Price-to-Rent Ratio (PR)	24.7	27.6	32.0	37.1	42.6
Price-to-Income Ratio (PI)	6.4	8.4	12.0	18.7	31.3
Rent-to-Income Ratio (RI)	0.19	0.26	0.38	0.59	0.96

- Variation is also associated with regional deviations

Note: The figures depict median PR, PI and RI ratios per canton relying on imputed prices and rents. Cantons with a low number of survey respondents are merged with their neighbours.

Housing Affordability

- Would renters in Luxembourg (hypothetically) be able to become owners of their currently inhabited rented home given current market, financial and living conditions?
- Perform micro-simulation using concepts by Gan and Hill (2009) :
  - Purchase affordability (the ability to borrow enough funds to purchase a home): 30.6% of all renting households have sufficient net liquid assets to pay for the transaction costs. Only 5.7% achieve an initial LTV of at most 80%.
  - Repayment affordability (the monthly financial burden imposed on a household repaying its mortgage): 37% of all renting households have a non-negative FM.
  - Purchase and repayment affordability: 18.1% of all renting households simultaneously fulfil both criteria.
- We also find that for 73.1% of all renting households monthly interest payments (considering the tax deductibility of interest rate payments) are lower than the monthly rent.
- Therefore, only 15.3% of all renting households could theoretically purchase their main residence, repay the mortgage they therefore need to take out, and also benefit form doing so.

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