New weighting schemes in the house price indices of the Deutsche Bundesbank
How should we measure residential property prices to inform policy makers?
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* This presentation represents the author’s personal opinions and does not necessarily reflect the views of the Deutsche Bundesbank or its staff.
Structure of the presentation

1. Motivation and introduction

2. Different analytical purposes

3. New weighting schemes

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“Real estate prices (residential and commercial)” (Recommendation 19 of the G20 Data Gaps Initiative)
1. Motivation and introduction

- Four stylised facts about the German residential property market:

  • About every third euro spent in Germany for private consumption purposes is spent on housing, including imputed rentals for homeowners.

  • Owner-occupied properties constitute the most significant asset of German households; the rate of home ownership in Germany equates to just 44%.

  • Hence, more than half of the German households are renters. Among the homeowners, two out of five have a mortgage.

  • The value of the property stock is an important part of the wealth of the German economy: gross fixed assets in housing stand at 265% of GDP.
1. Motivation and introduction

- The **various motivations for the analysis of house prices** call for **alternative measures** to be applied.

  • **Macroeconomic**: identification of price signals, evaluation of monetary policy channels, volume measurement in National Accounts.

  • **Macroprudential**: assessment of asset price bubbles, build-up of risks in banks‘ credit exposures, financial soundness of private households.

  • However, these **indicators** can give **different results**, which could **undermine their credibility for many users**.

- Owing to **newly available data sources** it is now possible to expand the previous method of calculating house price indices with regard to weighting schemes and hence to take better account of **different analytical purposes**.
2. Different analytical purposes
2.1 Macroeconomic identification of price signals

− In a market economy, **prices give signals about relative scarcities** through equilibria between supply and demand.

− In this way, both enterprises and consumers gain important insights into their production and consumption decisions, respectively, so that **scarce resources are allocated to where they are most efficiently used**.

− Real estate prices are a significant economic indicator and **rising house prices are often associated with economic growth**.

− They **stimulate construction activity and promote house sales**. Not least, price increases **support private consumption via the wealth effect** (more on the measurement of “The Wealth of Nations” shortly).
2. Different analytical purposes
2.1 Macroeconomic identification of price signals

- For monetary policy making, house price indices are an integral part of inflation measurement.

- In the near future, owner-occupied housing should become part of the European Harmonised Indices of Consumer Prices – as with other durable consumer goods, the net acquisitions approach will be applied.

- For the identification of pure price signals, a price index at constant quality is a condition *sine qua non*.

- Since for short-term business cycle analysis, the most recent developments are at the centre of attention, aggregation should be performed using transactions only (albeit not necessarily in terms of chain-linked indices).
2. Different analytical purposes
2.2 Uses in National Accounts

In addition, figures on residential property are needed in **National Accounts**:

- **Converting nominal to real figures (deflationing):** The calculation of the volume requires a pure price index for this asset class (of course, nominal values have a right in their own as an indicator).

- Neglecting the issue of land-structure spilt, the **measurement of the value of the entire housing stock** calls for **stock-weighted indices**, which would also be appropriate for the **assessment of households’ wealth effects**.

- Furthermore, **deflators** are needed to estimate the **real output of the services of the real estate industry** as well as **gross (fixed) capital formation in new dwellings** – in both cases, a **transaction-based price index** would be needed, which must cover new dwellings only in the latter case.
2. Different analytical purposes

2.3 Financial stability

- Apart from the potential build-up of asset price bubbles, the risks of banks’ credit exposures associated to the financial soundness of private households are most relevant.

- Here, the change in values of financed objects need to be tracked over time.

- This has two dimensions:

  1. Hazards emerging from newly granted loans, and

  2. value changes of properties in the credit stock.
2. Different analytical purposes

2.3.1 Evaluation of build-up of housing bubbles at the current end

- The build-up of asset price bubbles frequently comes with misallocations, a strong surge in housing investment, say. In case of an adjustment, this bears the risk of higher probabilities of default in the non-financial corporations sector.

- Focussing on the homebuying of private households, the initial ratio of the loan to the value of the property is of special interest for macroprudential authorities.

- Price dynamics have to be seen here in conjunction with further indicators on the financing; particularly risky is the typical coincidence of housing booms and a credit expansion with lower lending standards.
2. Different analytical purposes
2.3.1 Evaluation of build-up of housing bubbles at the current end

- Much like in short-term business cycle analyses, \textit{transactions} can be used as a \textit{proxy for financings} in order to provide valuable clues on the build-up of risks in banks‘ new business.

- On the other hand, \textit{through aggregation important information on the regional heterogeneity is lost.}

- Empirical evidence in other countries with \textit{overheated housing markets} has shown that \textit{regional developments can develop systemic relevance.}

- This means that, \textit{at first, isolated undesired developments eventually gain breadth}; a deeper investigation of \textit{spatial transmission channels} necessitates a \textit{geographical breakdown.}
2. Different analytical purposes
2.3.2 Valuation of financed objects in the course of time

− Another important indicator is the change in values – price changes including quality changes – of financed objects over time.

− This is because, from the banks‘ perspective, the residual value of a home is of interest only should the debtor default, since then the bank would have to sell the home on the market (possibly in a forced sale).

− Since the quantity, i.e. floor space or number of bedrooms, is constant in general, the change in the property‘s value between the time of purchase and a potential foreclosure is:

\[
(4) \quad \text{Value change} = \text{Price change} + \text{Quality change}.
\]
2. Different analytical purposes
2.3.2 Valuation of financed objects in the course of time

- The **quality of the house**, however, is not fixed but it is assumed to be subject to a constant annual depreciation rate.

- The **sole exogenous variable in the model** then would be the **quality-adjusted price**.

- Still, it is not the absolute residual value of the house that matters but its ratio to the residual mortgage in the event of credit default.

- In the **first years of the life of the loan**, though, the **amortisation rate of the annuity is rather low**, so that the **loan-to-value ratio worsens initially**.
2. Different analytical purposes
2.3.2 Valuation of financed objects in the course of time

- From a macroprudential view, only prices of financed objects would be relevant.

- A bank’s credit portfolio would, furthermore, have a changing composition; newly financed objects enter, others exit due to repayments of the loans.

- For financial stability purposes, additionally, institution-specific figures are indispensable for the identification of risk potentials.

- The tails of the distribution need close examination as do credit vintages which reflect then-effective lending standards.
3. New weighting schemes
3.1 Data sources

- In principle, the available information permits **two options for weighing together the properties** – freehold apartments, terraced houses and detached houses – within an administrative district or city as well as for condensing these data into an **aggregate** for **Germany as a whole**.
  - Specifically, one averaging based on stocks and another based on purchase transactions.

- It should be noted that **weighting is based on space data** (stocks or turnover) since the price data provided by bulwiengesa AG are absolute figures in euro per square metre or are converted into such using the classification of building types.

- In addition, the **underlying price information** provided by bulwiengesa AG remains unchanged.
3. New weighting schemes

3.1 Data sources

− The results of the building and apartment count in the 2011 Census can now be used as a source of data on the housing stock in Germany.
  • Contains information on the number of freehold apartments and single and two-family houses

− The Bundesbank obtains data on the number of transactions and transaction values at the administrative district level from a subsidiary of the Association of German Pfandbrief Banks (Verband deutscher Pfandbriefbanken) called vdpResearch GmbH.
  • Data for freehold apartments as well as for single and two-family houses at the administrative district level

− To determine the weights for new buildings and existing properties, the information on weighting shares in the house price index (HPI) calculated by the Federal Statistical Office (Destatis) can be used.
3. New weighting schemes
3.2 Stock-weighting

− Data from the Census allows apartments in single-family houses to be clearly distinguished from freehold apartments, broken down by municipalities.

− Additionally, the transaction-based HPI weights are used throughout for the breakdown into first-time occupancy and re-sale for all administrative districts and cities as well as for property types.

− The space is formally calculated as follows.

\[
\text{Total space}_{i,j,k} = \text{Stock}_{i,k} \times \text{Share}_j \times \text{Living space}_{i},
\]

where i refers to the three above-mentioned property types, j reflects re-sales or first-time occupancies and k represents the relevant municipality.

− Although this weighting scheme results in a simple and closed solution, the next count of buildings and apartments will only be conducted in 2021, meaning that a new basis can only be introduced with a time lag.
3. New weighting schemes
3.3 Transaction-weighting

- **Purchase transactions** for freehold apartments and single and two-family houses are available at the level of the rural districts and urban municipalities.

- **Modifications needed** to break down single and two-family houses into terraced houses and detached single-family houses; for the cities, a discount must additionally be made on the data from the districts; the Census results are likewise used for both purposes.

- The breakdown into newly constructed properties and existing properties again uses the HPI weights.

- Figures from the years 2010 to 2012 are used for the transactions since purchase transactions are subject to cyclical fluctuations.
3. New weighting schemes

3.4 Differences in the weights

Real estate transactions and stocks in Germany

Weights in %

By region

- Number of transactions¹
- Stocks²

- Rural areas
- 120 cities
- 7 major cities

By property type

- Number of transactions¹
- Stocks²

- Detached single-family houses
- Terraced houses
- Freehold apartments

¹ Average for the years 2010 to 2012. Source: vdpResearch GmbH. ² Space available according to 2011 Census.

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3. New weighting schemes
3.4 Differences in the weights

− The differences in the weights can be explained by structural differences in the sales rates (the ratio of purchase transactions to housing stock) both between municipalities and property types.

− For example, freehold apartments are given a higher weight in a transaction-weighting scheme. Their sales rate is higher than that of houses.

− A breakdown by municipality also reveals that urban regions have a higher share when weights are transaction-based. The reason for this is, again, the higher sales rate compared with rural municipalities, not just for apartments but also for houses.

− The convention can therefore hold that the sales rate is higher in cities than in rural areas and is likewise higher for apartments than for houses.
− No fundamentally different statements can be made on trend patterns and the timing of turning points than could be made on the basis of the previous method.

− Equally, the signs of the annual rates of change remain unaffected, as does the determination of an acceleration or braking of price dynamics.

− In principle, the stock-weighted data show a flatter pattern compared with the price indices calculated using transactions.
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