

# **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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# Structure of the presentation

1. Motivation and introduction
2. Different analytical purposes
3. New weighting schemes
4. Results

*“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, **transactions** can be used as a **proxy for financings** in order to provide valuable clues on the build-up of risks in banks' new business.
- On the other hand, **through aggregation important information on the regional heterogeneity is lost.**
- Empirical evidence in other countries with **overheated housing markets** has shown that **regional developments can develop systemic relevance.**
- This means that, **at first, isolated undesired developments eventually gain breadth**; a deeper investigation of **spatial transmission channels** necessitates a **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

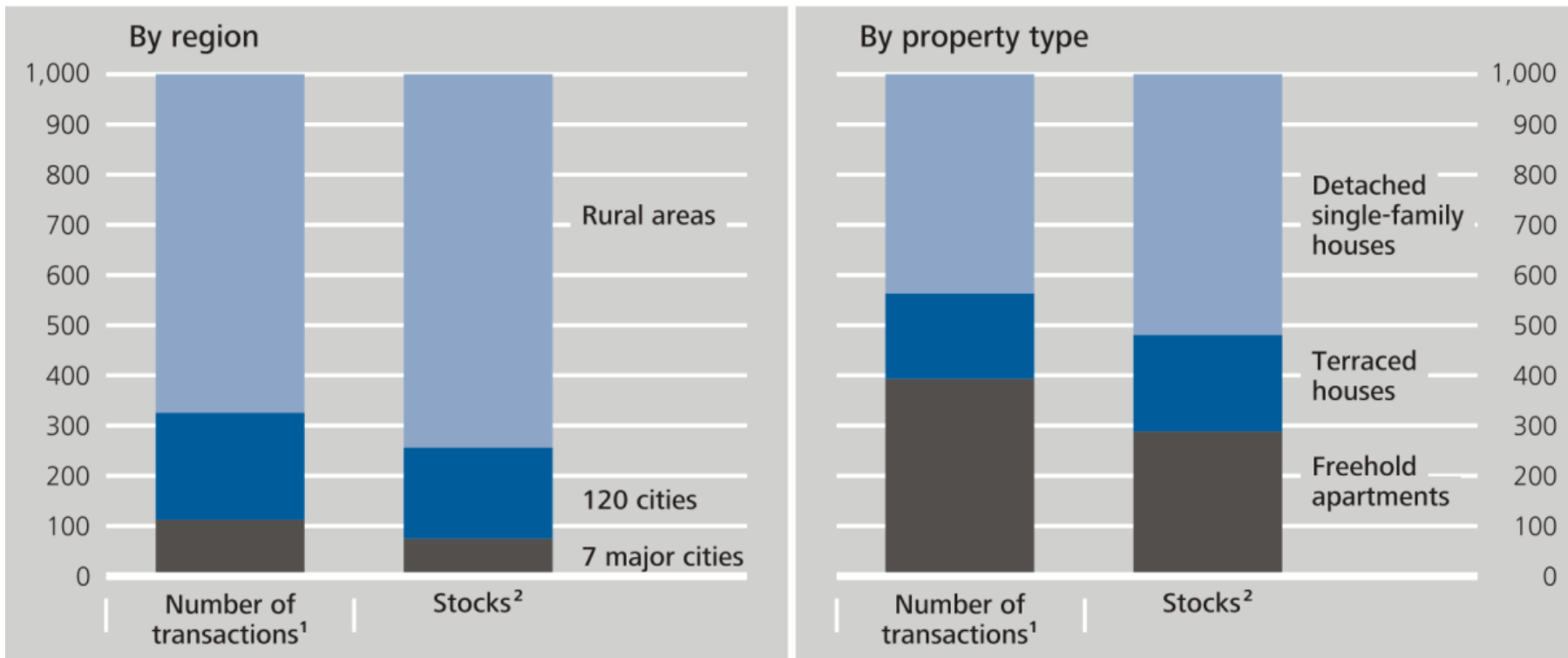
- **Purchase transactions** for freehold apartments and single and two-family houses are **available at the level of the rural districts and urban municipalities**.
- **Modifications needed** to break down single and two-family houses into terraced houses and detached single-family houses; for the cities, 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 ‰



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

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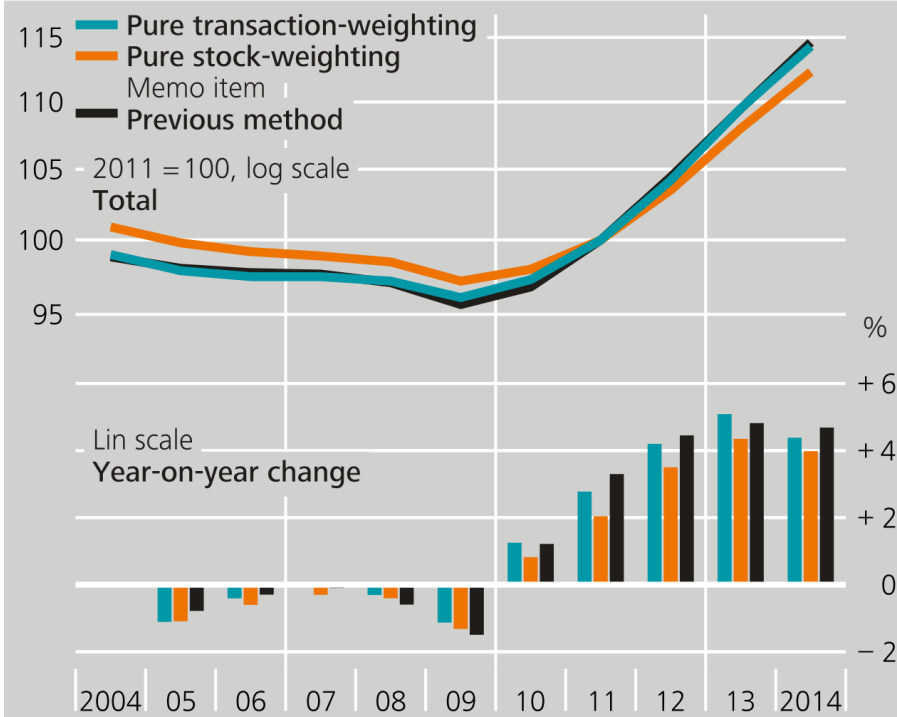
## 3. New weighting schemes

### 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.

## 4. Results

Comparison of purchase prices for residential real estate in Germany according to different weighting schemes



Source: Bundesbank calculations based on data provided by bulwiengesa AG.  
Deutsche Bundesbank  
12 Jun 2015, 08:17:33, S3PR0212.Chart

- **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.

# Contact

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