vdp Transaction Based Indices for German Real Estate Markets

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vdpResearch was founded in 2008 as a 100 % subsidiary of the Association of German Pfandbrief Banks.

**Primary Aims:**

- Analysis and forecast of real estate markets from the view of the German financial industry.
- Providing actual market information such as rents, prices, etc. for use in property valuation.

In order to fulfill their aims, vdpResearch operates a transaction database that is quarterly updated by the participating banks.
Data Collection

Transactions database

Bank 1 ➔ Bank 2 ➔ Bank 3 ➔ Bank n

Quarterly updates

100,000 observations p.a.

**Prices**
- Transaction Price
- Market Value
- Rent

**Characteristics**
- Transaction Date
- Living Space
- Usable Space
- Construction Year
- Location (Macro and Micro)
- Fit-out
- Condition

100,000 observations p.a.
Methodological Approach

Transaction database

- Prices
- Characteristics

Preparation of data

- Codified valuation techniques
- Econometrics

Specification of the hedonic model

Estimation of the hedonic model
Participants

Aareal Bank
HypoVereinsbank
Münchener Hypothekenbank eG
Deutsche Genossenschafts-Hypothekenbank
Sparkasse KölnBonn
Valovis Bank
DKB Deutsche Kreditbank AG
PSD Bank
Deutsche/Hypo
Hypothekenbank Frankfurt
Postbank
HSH Nordbank
LBBW Landesbank Baden-Württemberg
SEB
Deutsche Pfandbriefbank
pbb
WL Bank
wüstenrot
Sparkasse Holstein
Made in Holstein.
Berlin Hyp
BVR
Fall 2013
Property Finance by vdp Member Banks

Mortgage lending market in Germany

Total loan outstanding at the end of 2012: 667 Bill. €

Market share of member banks of vdp in 2012:
31.1 % Residential real estate
63.9 % Commercial real estate

<table>
<thead>
<tr>
<th>New Mortgage Loans by Property Type</th>
<th>2011 million €</th>
<th>2012 million €</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family and two-family houses</td>
<td>22,037</td>
<td>22,171</td>
<td>0.6%</td>
</tr>
<tr>
<td>Condominiums</td>
<td>7,513</td>
<td>7,809</td>
<td>3.9%</td>
</tr>
<tr>
<td>Multi-family houses</td>
<td>16,473</td>
<td>14,857</td>
<td>-9.8%</td>
</tr>
<tr>
<td>Other residually used buildings</td>
<td>338</td>
<td>1,100</td>
<td>225.4%</td>
</tr>
<tr>
<td>Office buildings</td>
<td>23,682</td>
<td>22,329</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Retail buildings incl. Warehouse facilities</td>
<td>17,919</td>
<td>13,256</td>
<td>-26.0%</td>
</tr>
<tr>
<td>Hotel buildings</td>
<td>3,853</td>
<td>2,738</td>
<td>-28.9%</td>
</tr>
<tr>
<td>Industrial buildings</td>
<td>987</td>
<td>1,653</td>
<td>67.5%</td>
</tr>
<tr>
<td>Other commercially used buildings</td>
<td>3,498</td>
<td>6,567</td>
<td>87.7%</td>
</tr>
<tr>
<td>Total</td>
<td>96,300</td>
<td>92,480</td>
<td>-4.0%</td>
</tr>
<tr>
<td>of which foreign</td>
<td>23,539</td>
<td>20,005</td>
<td>-15.0%</td>
</tr>
</tbody>
</table>

Source: vdp statistics
Residential Property Prices –
Hedonic Model for Houses

Hedonic Model:
\[
\ln p_{\text{Houses}}^{t_{it}} = b_0 + \sum_{k=1}^{K} \hat{a}_k x_{i\text{it}} + \sum_{t=1}^{T} \hat{d}_i^t D^t_i + \hat{\delta}_{i\text{t}} \{i\ t\} \ ^\wedge \ t \ _i
\]

- Price: Transaction price per square meter living-space

- Regressors
  - Macro location (municipality)
  - Micro location (street level)
  - Construction year
  - Fit-out and condition
  - Lot-size
  - Living-space

Index:
\[
p_{\text{Houses}}^{t} = \exp(\hat{d}^t)
\]
Residential Property Prices – Multi Family Houses Capital Value Index

Hedonic Rent index for living space

Hedonic Cap rate index for living space

\[ CV_{t}^{MF} = \frac{R_{t}^{MF}}{CR_{t}^{MF}} \times 100 \]

Capital value index for living space

= Rent index/Cap Rate-Index
Commercial Property Prices – vdp Office Buildings Rent Index

- vdp Office Buildings Rent Index
- vdp Office Buildings Rent Index (annual average)

Index (2003=100)

- 2013Q1 Level: 104.2
- QOQ: 1.0%
- YOY: 3.5%

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Commercial Property Prices – vdp Office Buildings Cap Rate Index
Commercial Property Prices – vdp Office Buildings Capital Value Index

vdp Office Buildings Capital Value Index

Index (2003=100)

- vdp Office Buildings Capital Value Index
- vdp Office Buildings Capital Value Index (annual average)

2013Q1
Level: 121.1
QOQ: 1.0%
YOO: 5.2%

(c) vdpResearch 2013
A unique feature of the vdp transactions database is the fact that besides the transaction price the database also contains the price building characteristics.

Due to new participating banks the database will increase at a higher rate.

We expect the first delivery of transaction data from the National Association of Cooperative Banks (BVR) in October 2013. BVR members represent about 20% of market volume in real estate financing.

All vdp price indices are published quarterly, six weeks after end of the preceding quarter on the vdp and vdpResearch websites.
Regional Differences in Residential Property Prices – Owner Occupied Housing

Source: vdpResearch, own calculations
Regional Differences in Residential Property Prices

Source: vdpResearch
### Hamburg – Price Trend and Price Level

<table>
<thead>
<tr>
<th>Hamburg Houses</th>
<th>Lage</th>
<th>very good</th>
<th>good</th>
<th>average</th>
<th>mediocre</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Euro per m² living space</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fit-out</td>
<td></td>
<td>3725</td>
<td>3230</td>
<td>2935</td>
<td>2715</td>
</tr>
<tr>
<td></td>
<td>very good</td>
<td>3240</td>
<td>2810</td>
<td>2555</td>
<td>2365</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>2930</td>
<td>2540</td>
<td>2310</td>
<td>2140</td>
</tr>
<tr>
<td></td>
<td>average</td>
<td>2925</td>
<td>2535</td>
<td>2305</td>
<td>2135</td>
</tr>
<tr>
<td></td>
<td>mediocre</td>
<td>5155</td>
<td>4045</td>
<td>3660</td>
<td>3140</td>
</tr>
<tr>
<td></td>
<td>good</td>
<td>4415</td>
<td>3465</td>
<td>3135</td>
<td>2690</td>
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<tr>
<td></td>
<td>average</td>
<td>4140</td>
<td>3245</td>
<td>2940</td>
<td>2520</td>
</tr>
<tr>
<td></td>
<td>mediocre</td>
<td>3675</td>
<td>2880</td>
<td>2610</td>
<td>2235</td>
</tr>
</tbody>
</table>

Source: vdpResearch

Source: vdpResearch, (11.7% to 14.4%), (14.4% to 16.1%), (16.1% to 17.7%), (17.7% to 20.1%), (20.1% to 22.9%)
www.vdpResearch.de