




NBP

Narodowy Bank Polski

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CPPI Data Compilation and Methodology in Detail

Workshop on Commercial Property Price Indices
Cappadocia, 7-8 May 2018



This presentation presents the personal opinions of the author and does not necessarily reflect the official position of the Narodowy Bank Polski

Motivation

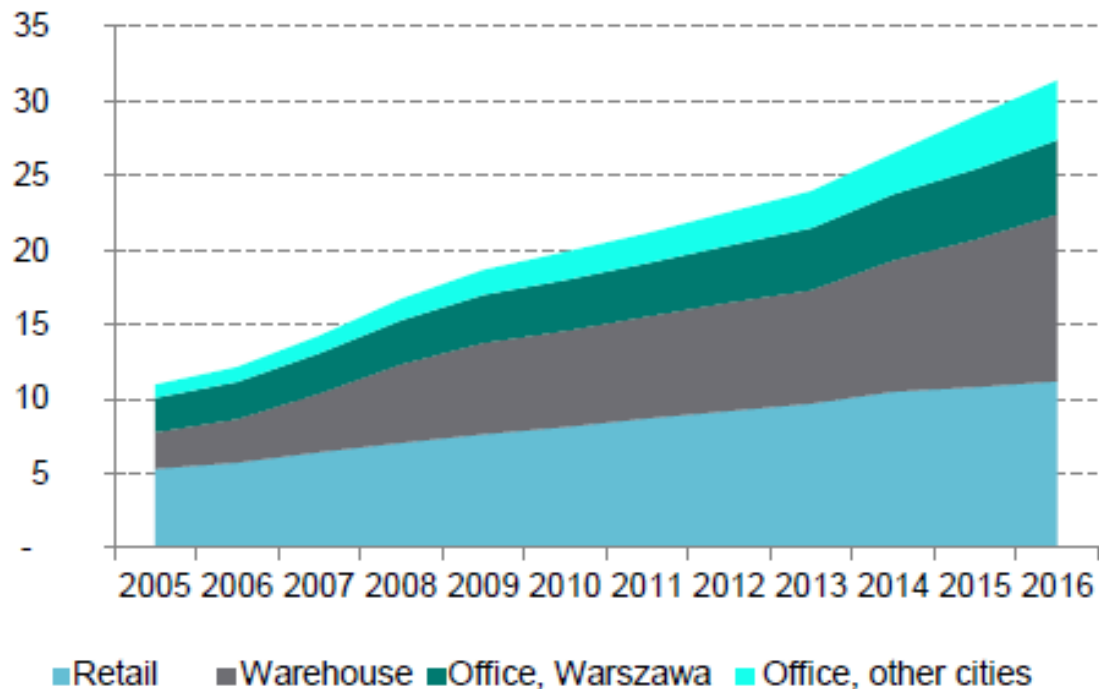
- **Firstly**, the knowledge of the CRE is important for the economy (policymakers) and for stability of the economy system
- **Secondly**, most of the current research focuses on the residential market - commercial market is less researched (problem with data availability)
- **Thirdly**, price increases and drops of CRE can be much higher as those of residential property
- **Finally**, Commercial property is strongly differentiated, so single observation can give a wrong impression about the market. Transactions are quite rare. However, if we control for changes in the quality of the traded sample, we get the hedonic price which shows us how the prices in the market behave.

Data sources:

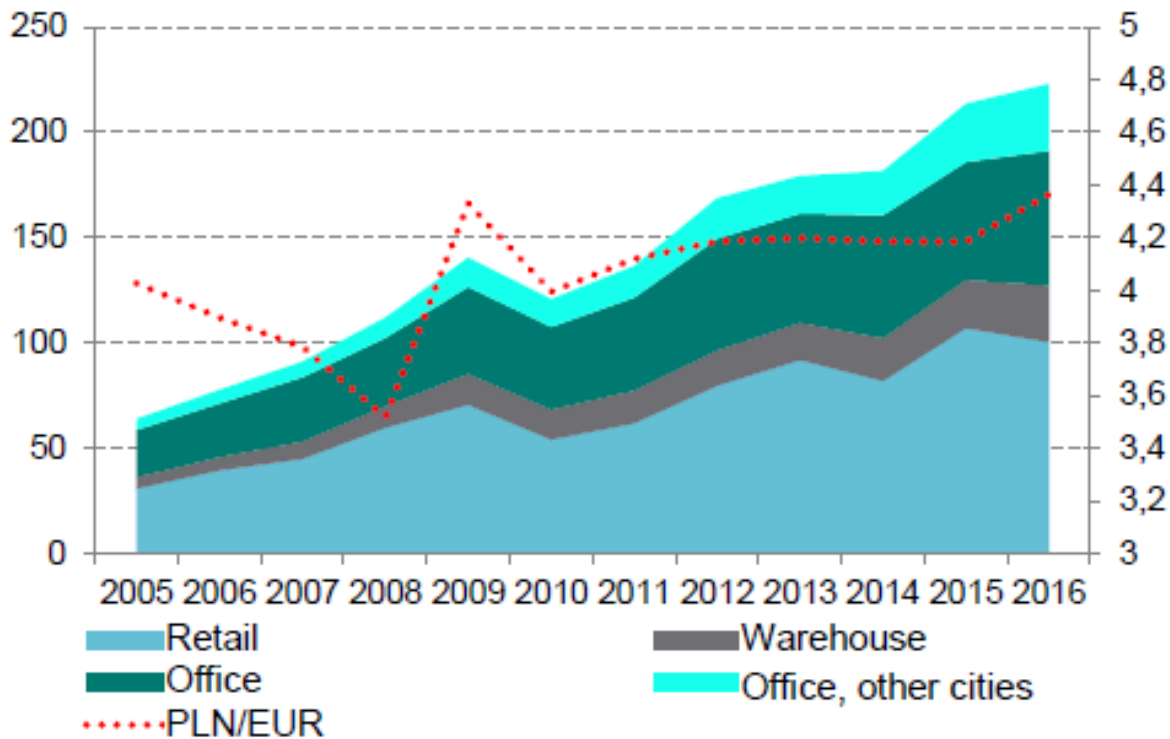
- We do not have (legal) regulations on the transfer of transaction information from „market” to our Central Bank (dwelling market is regulated, rents level in CRE are obligatory). The parties of the transactions keep details rather in secret.
- We collect data via 16 regional Branches of National Bank of Poland. (in each one we have local market analysts, they watch the market; when the transaction appears they check it and enter it into database).
- We use commercial databases (eg. Comparables.pl – commercial property consultancy agency). We need only transaction date and price. Each other information we (can) acquire via our local market analysts
- We focus only on „big transactions” i.e. Shopping mall, shopping centres, outlets and offices (we do not collect informations about small, local units like greengroceries)

Estimated area of the commercial stock in Poland

(in millions of square meters)



Estimated value of the commercial stock in Poland in PLN billion (left-hand axis) and PLN/EUR exchange rate (right-hand axis)



Real estate market in Poland in details:

Value of the commercial stock vs. residential stock in Poland

- Residential stock – ~757 bln EUR
- Commercial stock – ~54,5 bln EUR
- Credits for Residential stock – ~95 bln EUR
- Credits for CRE – ~26 bln EUR

The most expensive transactions in Poland:

- Złote tarasy – Warsaw – 620 mln EUR – 2012r. (66.000 sq. m)
- Manufaktura – Lodz – 390 mln EUR – 2012r. (110.000 sq. m)
- Arkadia – Warsaw – 350 mln EUR – 2010r. (110.000 sq. m)

Retail and Office Model

$\ln_price_EUR = f(\text{city size, location, type of building, age, average shop size, parking places, time dummy})$

$$\ln(p_i^t) = \beta_0 + \sum_{\tau=1}^T \delta^\tau D_i^\tau + \sum_{k=1}^K \beta_k z_{ik}^t + p_i^t$$

Ln price per sq. m
of leasable area

Const.

Time dummy

Hedonic
building
characteristic

Error

Numbers of observations

Year	Offices	Retail
2000	4	
2001	5	1
2002	6	3
2003	6	2
2004	8	3
2005	28	10
2006	29	16
2007	30	6
2008	18	7
2009	4	3
2010	17	6
2011	23	15
2012	16	7
2013	23	13
2014	27	6
2015	32	15
2016	29	11
2017	2	1

Office model

In_price_sqm_EUR	Coef,	Std, Err,	t	P>t
In_space_to_rent	-0,0324121	0,0262969	-1,23	0,219
Office_A-Class	0,2058833	0,0497925	4,13	0
In_age_plus2	-0,1148695	0,0285791	-4,02	0
In_distance_from_CityCent.	-0,091903	0,0223087	-4,12	0
Small Cities*	-0,6921474	0,0808738	-8,56	0
Big Cites*	-0,4102283	0,0572523	-7,17	0
Premium Office	0,4415073	0,1814473	2,43	0,016
y2000	-0,109129	0,1786249	-0,61	0,542
y2001	-0,0632671	0,1919331	-0,33	0,742
y2002	-0,0909308	0,1685238	-0,54	0,59
y2003	-0,2416303	0,1693217	-1,43	0,155
y2005	-0,0716208	0,1266809	-0,57	0,572
y2006	0,0428019	0,1257254	0,34	0,734
y2007	0,0581623	0,1262706	0,46	0,645
y2008	0,185875	0,1345831	1,38	0,168
y2009	0,1936396	0,1926053	1,01	0,316
y2010	0,0980557	0,13718	0,71	0,475
y2011	0,1347934	0,1330026	1,01	0,312
y2012	0,2551666	0,1396695	1,83	0,069
y2013	0,0754175	0,1303112	0,58	0,563
y2014	0,1444157	0,1308658	1,1	0,271
y2015	0,1548699	0,1287425	1,2	0,23
y2016	0,1357094	0,1371522	0,99	0,323
_cons	9,051514	0,3372553	26,84	0

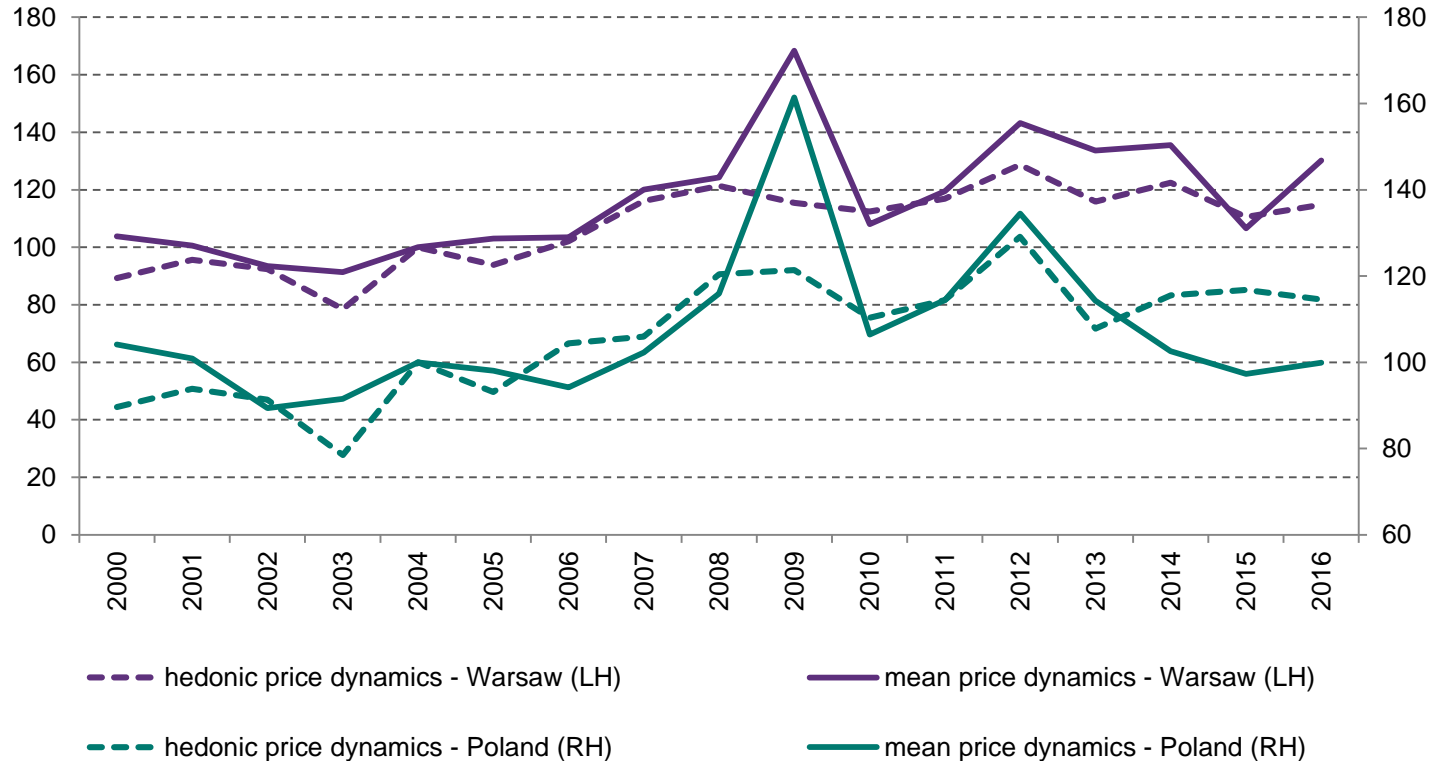
We use tests to rate the model:

- **t-test** (significance of the variable)
- **F-test** (significance of the whole model)
- **RESET** (Ramsey Regression Equation Specification Error Test
– general specification test)
- **White's test** heteroscedasticity of a random component
- **VIF** – variance inflation factor

*Small Cities – under 400 t. inh.

*Big Cities – above 400 t. inh.

Offices price dynamics (2004=100):



Retail model

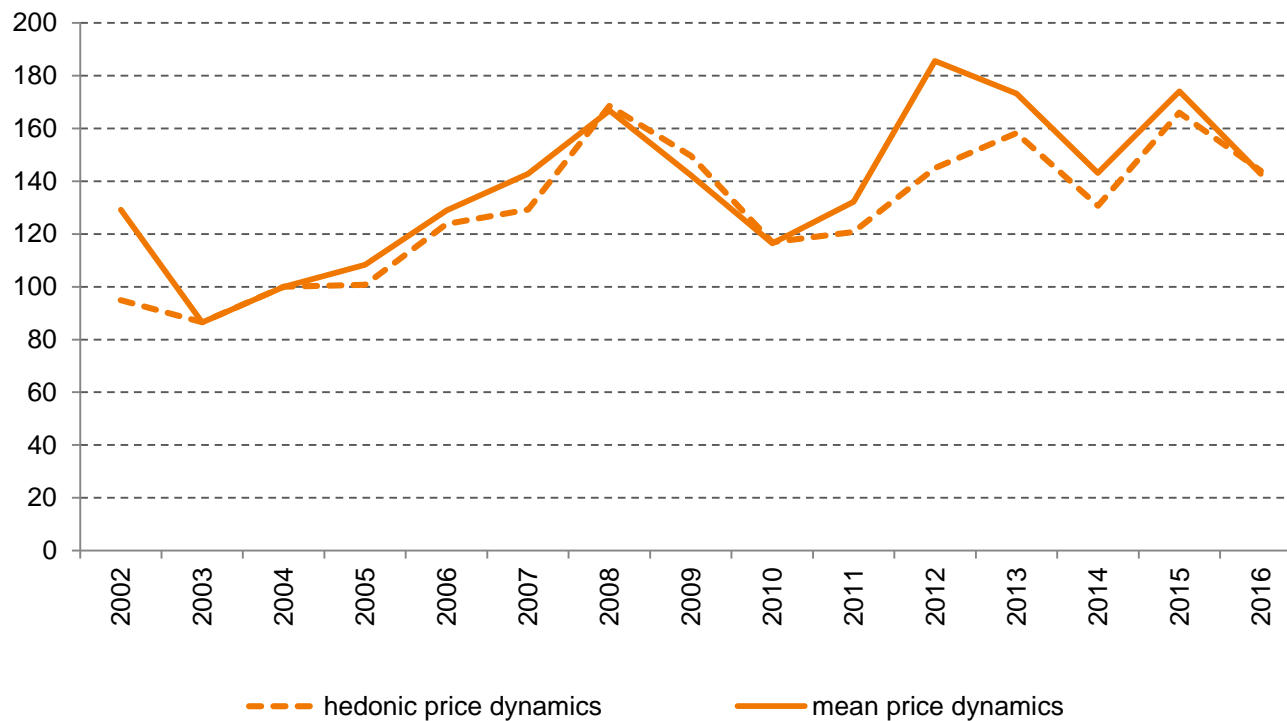
In_price_sgm_EUR	Coef,	Std, Err,	t	P>t
ln_space_to_rent	-0,0697881	0,0646604	-1,08	0,283
Big_City*	0,0504473	0,0761542	0,66	0,509
Shopping_Cent_Prime	0,6236537	0,1991679	3,13	0,002
Type_Retail_Park	-0,1713906	0,1358521	-1,26	0,21
ln_quantity_of_shops	0,1107734	0,0569622	1,94	0,055
ln_quantity_of_floors	0,118268	0,0636379	1,86	0,066
ln_age_plus2	-0,0203699	0,0464267	-0,44	0,662
yd2002	-0,0523027	0,3086301	-0,17	0,866
yd2003	-0,1448397	0,3326529	-0,44	0,664
yd2005	0,0078223	0,2354245	0,03	0,974
yd2006	0,2134757	0,2319794	0,92	0,36
yd2007	0,2564009	0,2419429	1,06	0,292
yd2008	0,5220004	0,2577177	2,03	0,046
yd2009	0,4032822	0,2619795	1,54	0,127
yd2010	0,1555369	0,2415507	0,64	0,521
yd2011	0,1890437	0,2274204	0,83	0,408
yd2012	0,3717169	0,2565952	1,45	0,151
yd2013	0,4587755	0,2330685	1,97	0,052
yd2014	0,2676526	0,2563636	1,04	0,299
yd2015	0,5071826	0,2335803	2,17	0,032
yd2016	0,3645676	0,2540688	1,43	0,155
_cons	7,481278	0,5470587	13,68	0

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*Big City – above 400 t. inh.

Retail price dynamics (2004=100):



Next step will be to...

1. We will try to change our index from Yearly into half-Yearly
2. We will try to include prices (dynamic) from the primary house market as explanatory variable into model

**Any comments, suggestions or questions
are welcome!**

We protect the value of money