



THE SLOVENIAN
NATIONAL
STATISTICS

TRUSTWORTHY
AND
USER-ORIENTED

Transaction based Hedonic price indices of Commercial Properties

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Transaction based HEDONIC approaches

- CPPI Handbook is giving the general overview of hedonic approaches – which are already described in RPPI Handbook even in a more detailed way.
- Absence of pragmatic guidelines
- Pilot work outcomes on OFFICE indices in Slovenia might be useful

Pilot work: Offices

Typical situation for commercial properties:

1. Small number of transactions:

total= 1056 observations in 2008-2011

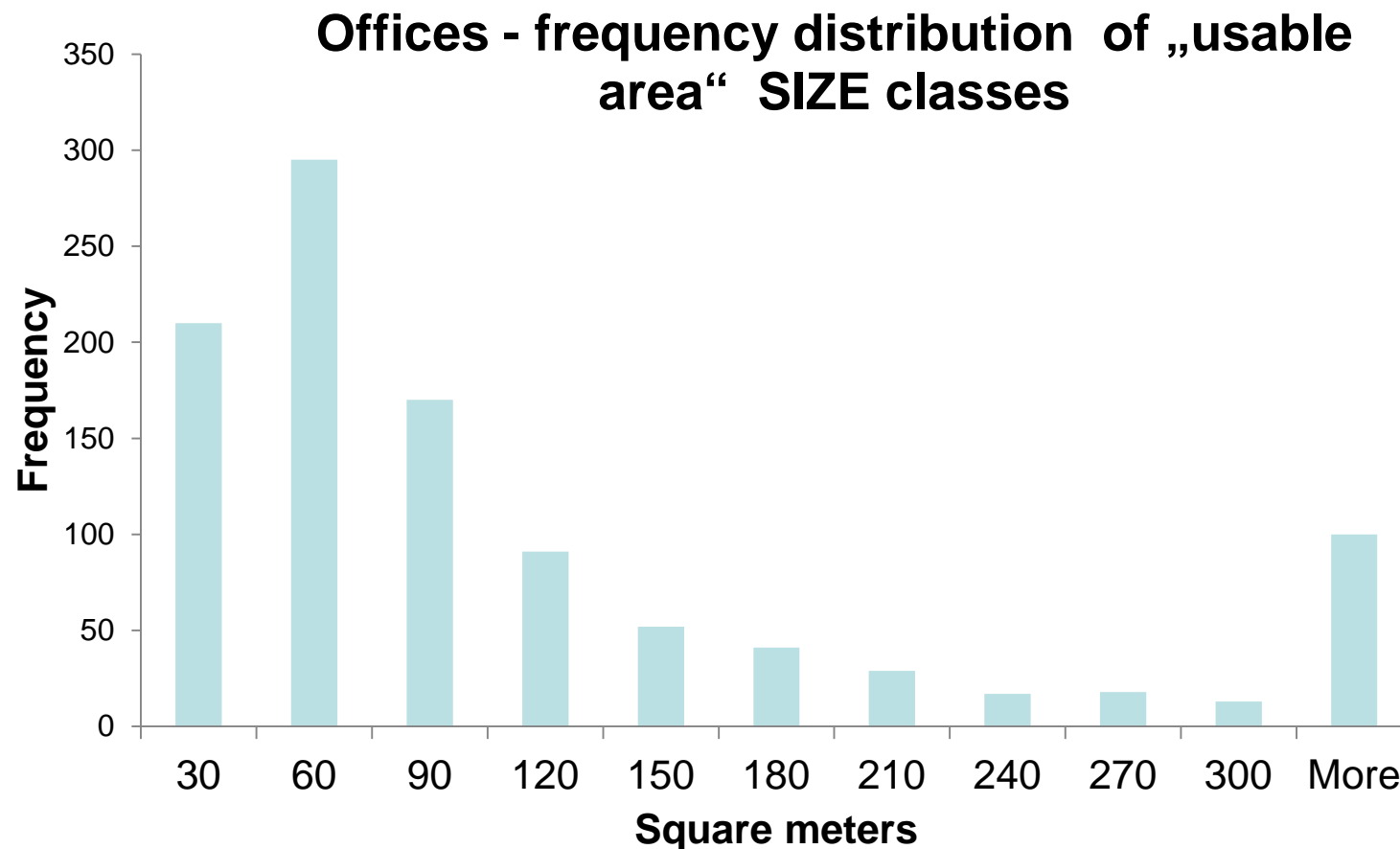
= 66 per quarter

= 132 semiannually

2. Size of sold premises varies greatly:

min=9 m² max=5871m² avrg=133m²

➔ HETEROSCEDASTICITY ??



Step 1: Segmentation of transactions

- Follow the classification from Sales Contract Reports, collected by national Office for Real Estate Mass Evaluation (= transaction data provider)

- Alternative / approximation: the use of Classification of types of Construction from administrative databases

95% of properties, reported as OFFICE transactions, had in the national Register of Real Estates the **CC_Si code** 122 xxxx – indicating Office buildings.

Step 2: Property characteristics data quality checking

- Time consuming phase: but methods well known to official statistics compiles -1/3 of total data processing time.
- Hedonics disadvantage: one single bad transaction may harm the index. Hedonics is not a robust approach!
- Hedonics advantage: regression analyses SW is offering several tools for detection of bad transactions – statistical OUTLIERS, and even for detection of weak or bad individual property characteristics.

Step 3: Regression model (offices)

Property characteristics = regression explanatory variables

1. Size_usable area76,4%
2. Region_GDP4,1%
3. Age1,5%
4. Commune_Tourist_attract...1,2%
5. Size_gross area0,27%
6. Showcase (window) (y/n)....0,25%
7. Air_condition (y/n)0,25%
8. Urban (yes/no)0,13%
9. Neighbourhoods wealth.....0,06%

R² = 0,84

Multiple

Regression

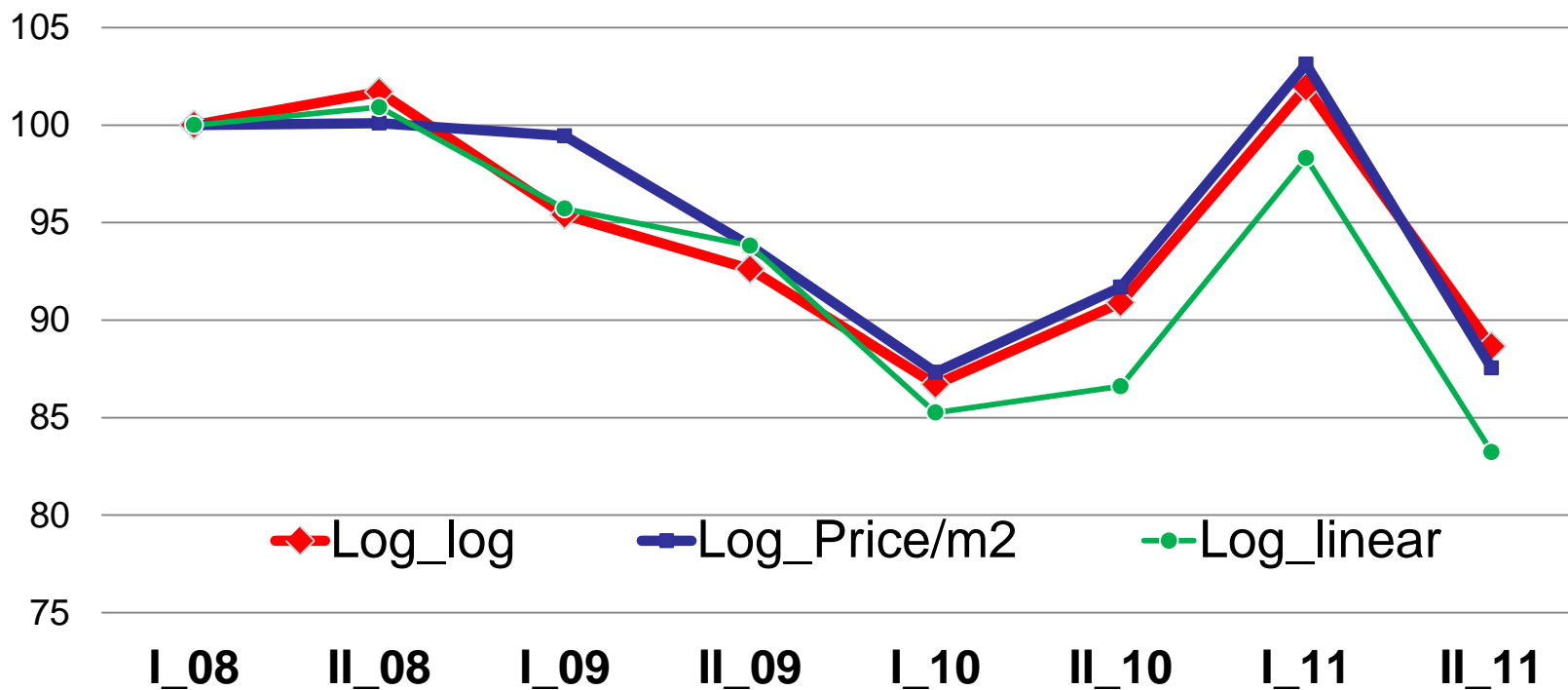
Coefficient

* Pooled regression (Time Dummy) applied in all cases

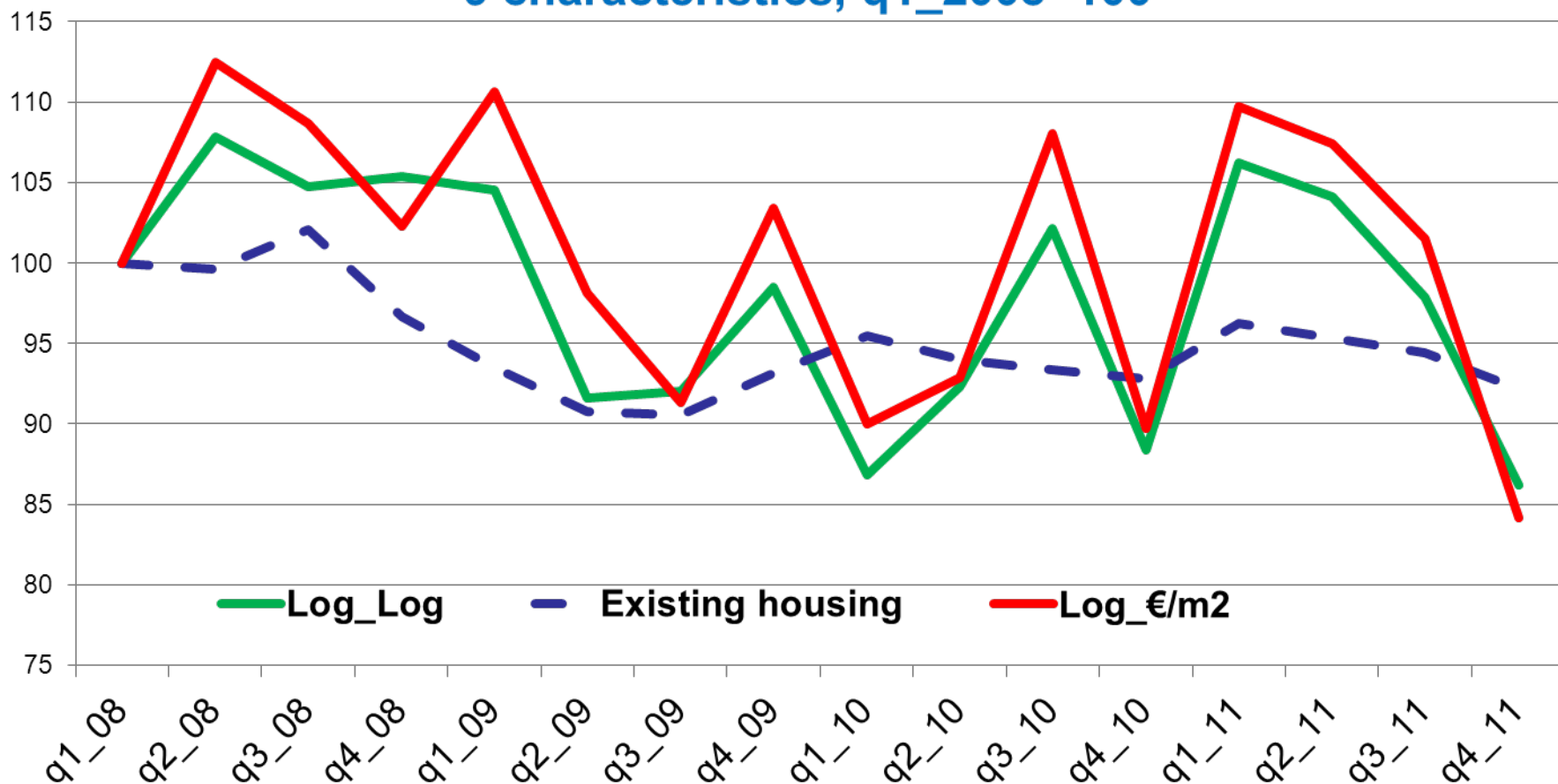
Step 4: Regression function form/curve

1. Log_linear: logarithm of transaction price
Best result $R^2= 0.69$; CoefVar=5,3 Heteroscedastic!
2. Log_linear: logarithm of „price per square meter“
Result: $R^2= 0.27$; CoVa=6,5 - Homoscedastic
3. Log_Log or „double logarithmic“: $R^2= 0.84$; CoVa=3,8
Homoscedastic

Offices, Slovenia, **semiannual**, Time Dummy, 9 variables, I_2008=100



Offices, QUARTERLY Price indices, Slovenia, Time Dummy, 9 characteristics, q1_2008=100



Conclusions and Lessons learned

- Transaction based Hedonic approach for OFFICE price indices calculation is feasible!
- Despite low number of transactions – non-volatile indices can be obtained semiannually.
- Quarterly, non-volatile indices might be achieved by chained hedonic index construction („characteristics prices“, „re-pricing index.)
- To avoid the danger of heteroscedaiscity the Log_Log the double logarithm regression curve can be used!
- Pooled regression (time dummy) is suitable for fast calculation of historical time series – not for regular calculations

Conclusions and Lessons learned

- Location characteristics can be constructed at statistical offices – independently of transaction data provider
- Retail properties revenue/value is particularly location sensitive and call for development of micro location variables
- CPPI Handbook could provide overview of existing researching of the location - property value context. Or directly provide some guidance to statisticians for construction of own location variables.



Thank you !

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