



Bringing the Hedonic-repricing method up to date to adjust for qualitative differences in the residential real estate price index (RPPI)

Ottawa Group Meeting, Rome, June 7-10, 2022

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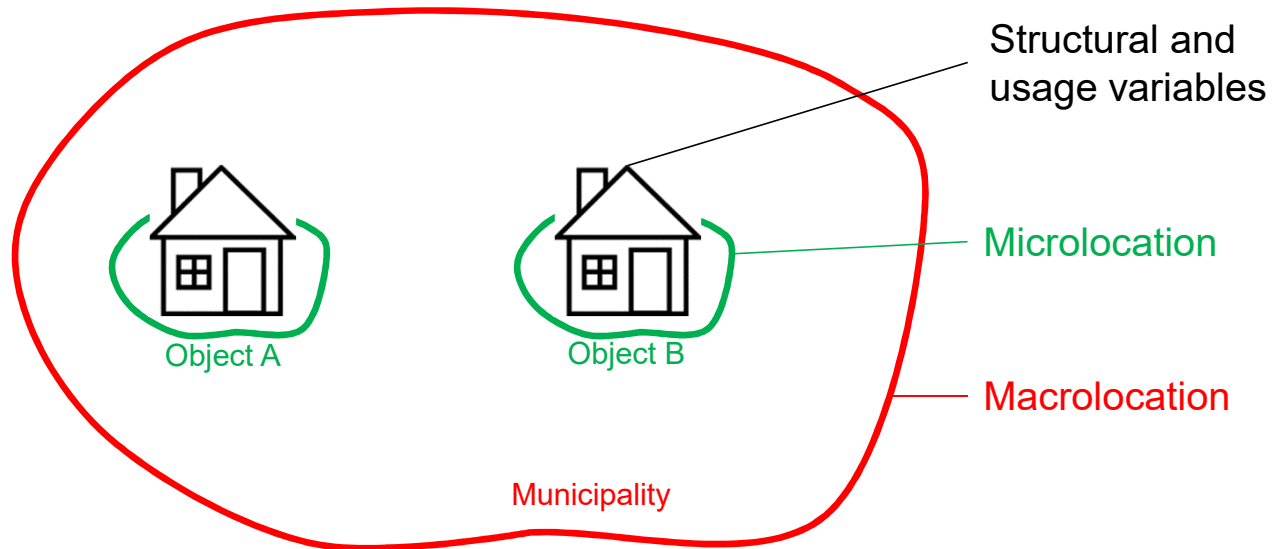


Swiss RPPI in brief

- November 2020 : publication of first results (backdated to 2019)
- Data source : mortgage institutions, covering almost 80% of the market
- Average of 7000 transactions per quarter
- About 20 variables available : transaction data, price, property characteristics
- Structural and usage variables, micro- and macrolocation
- Stratification combined with hedonic repricing
- Stratification according to property type and types of municipality



RPPI data





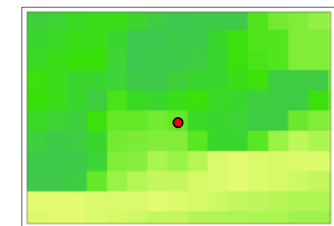
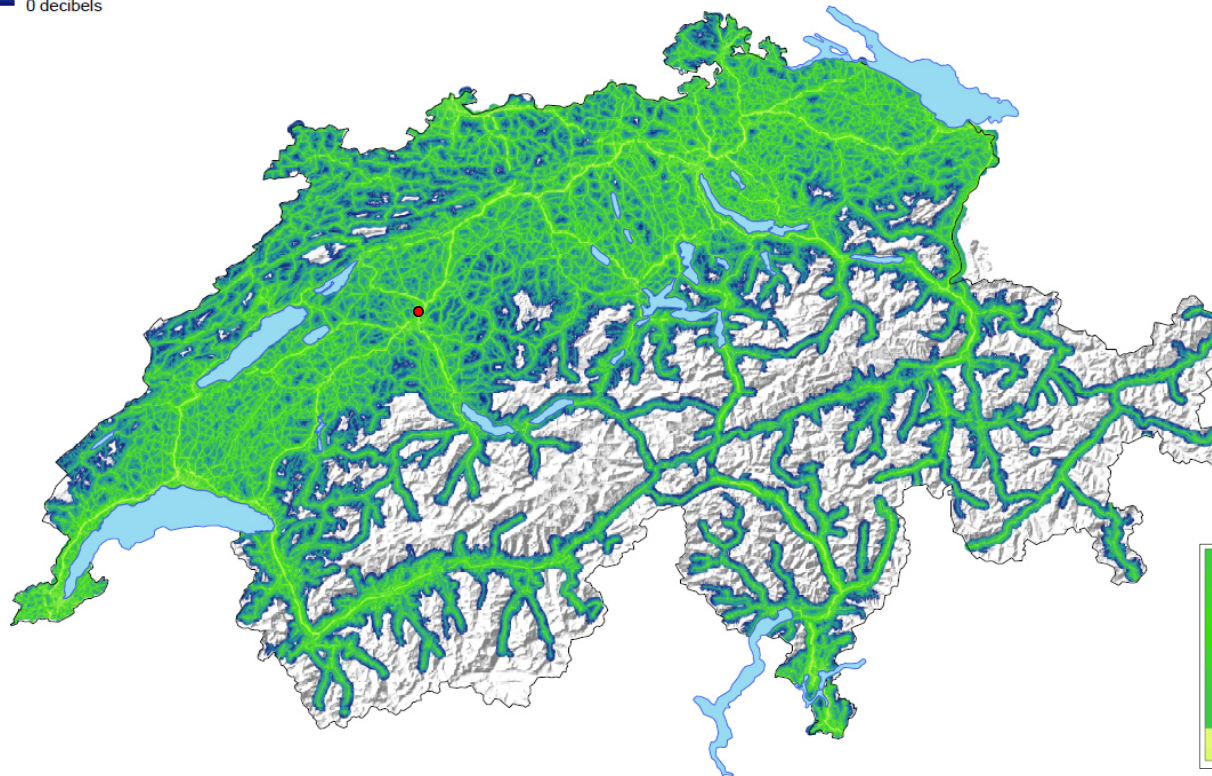
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Geolocalized information

Noise exposure in decibels





Quality adjustment and index compilation

	Urban municipalities of a large agglomeration	Urban municipalities of a medium-sized agglomeration	Urban municipalities of a small or outside agglomeration	Intermediate municipalities	Rural municipalities
Single family houses					
Condominiums					



Choice of hedonic model

Rolling time dummy : few transactions, many variables

Characteristics hedonic : many transactions, no geolocalised variables

Imputation hedonic method : many transactions, all kind of variables

Swiss RPPI : few transactions (7000 per quarter), many variables (20)

Rolling time dummy ? has a tendency to smooth the results (pooling)

Hedonic repricing ? Our choice



Hedonic repricing

$$P_{HR} = \frac{(\prod_{i=1}^{N^t} p_i^t)^{\frac{1}{N^t}}}{(\prod_{i=1}^{N^0} p_i^0)^{\frac{1}{N^0}}} \div \frac{(\prod_{i=1}^{N^t} \hat{\beta}_k^b(z_{ik}^t))^{\frac{1}{N^t}}}{(\prod_{i=1}^{N^0} \hat{\beta}_k^b(z_{ik}^0))^{\frac{1}{N^0}}}$$

$$P_{HR} = \left[\frac{\prod_{i=1}^{N^t} p_i^t}{\prod_{i=1}^{N^t} \hat{\beta}_k^b(z_{ik}^t)} \right]^{\frac{1}{N^t}} \times \left[\frac{\prod_{i=1}^{N^0} \hat{\beta}_k^b(z_{ik}^0)}{\prod_{i=1}^{N^0} p_i^0} \right]^{\frac{1}{N^0}}$$

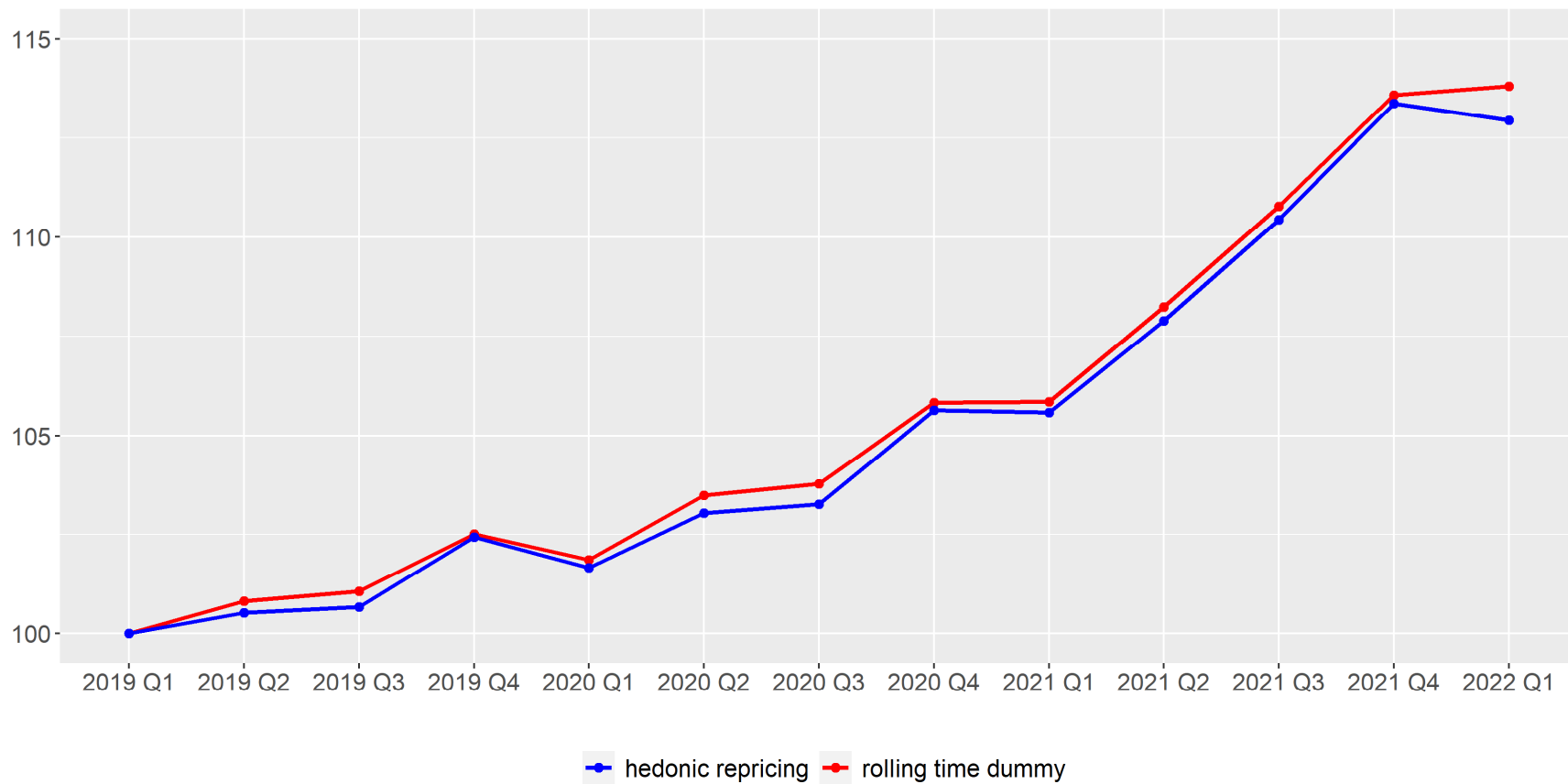


Hedonic repricing

- Uses the real transaction prices in periods t and 0 (or $t-1$)
- Uses the real characteristics in periods t and 0 (or $t-1$)
- Hedonic models with transactions covering 2 years ($T-2$ and $T-1$)
- Hedonic model for single family houses based on 22'000 transactions: R^2 0.82
- Hedonic model for condominium based on 34'000 transactions: R^2 0.86
- Hedonic model corrects the impact of the different characteristics between the two periods by using the same shadow price of each characteristic



Comparison with rolling time dummy





Comparison with rolling time dummy





Impact of the hedonic model update



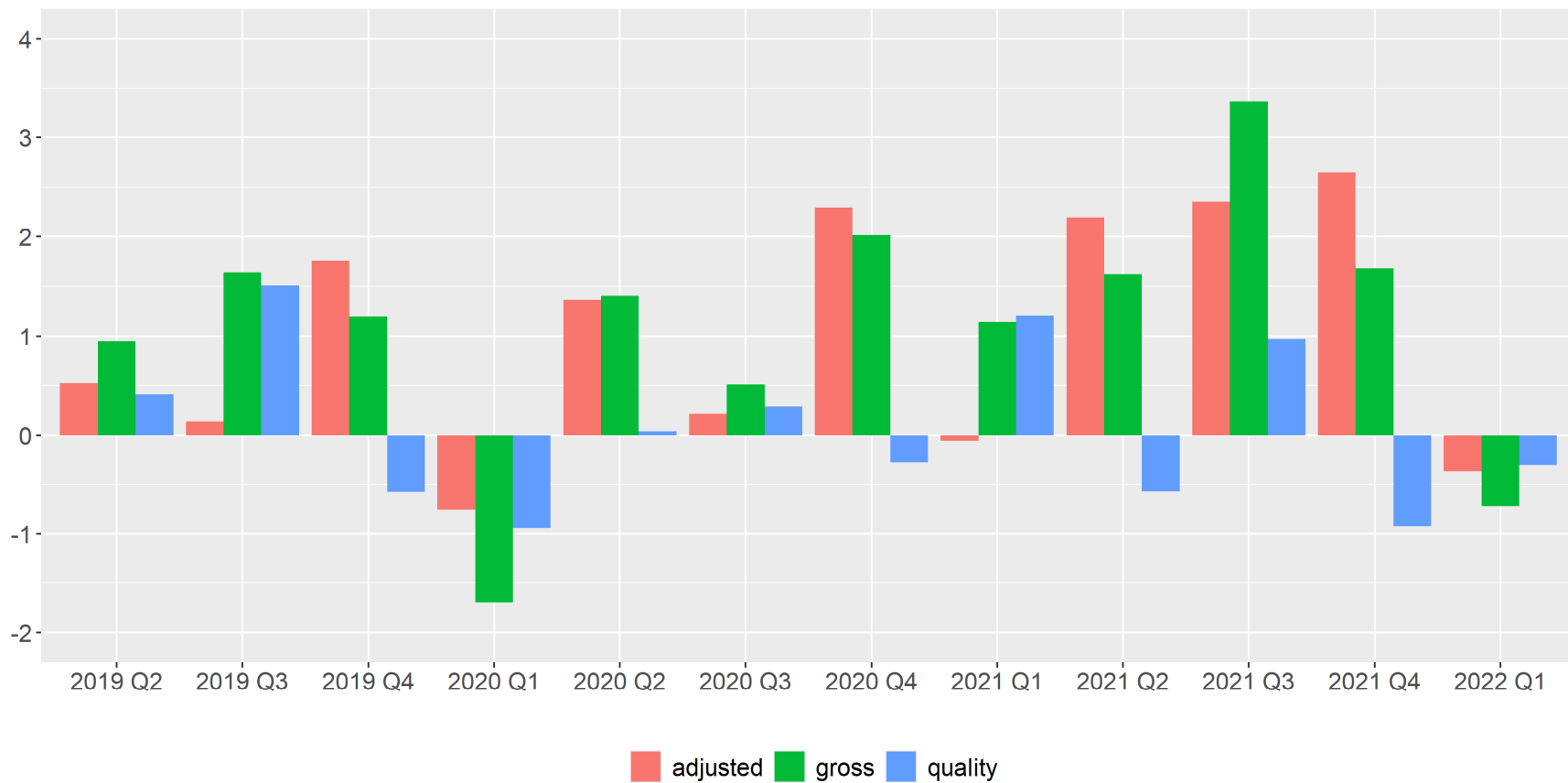


Rolling hedonic repricing





Decomposition quality effect and price effect



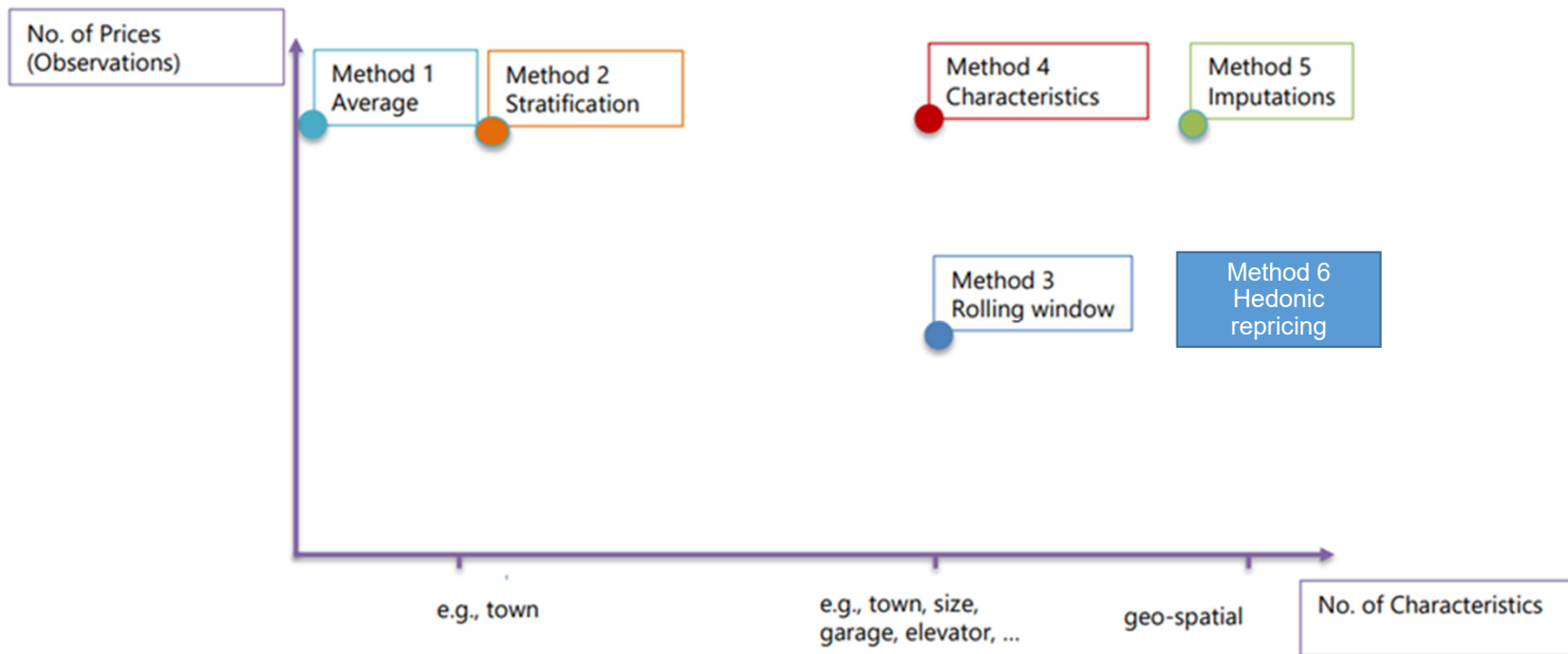


Conclusion and way forward

- Hedonic repricing appropriate when number of transactions is low and the number of quality characteristics is high
- Allows a direct decomposition of price effect and quality effect
- Hedonic repricing seems to be more responsible than rolling time dummy
- But requires a regular update of the shadow prices, annually seems sufficient
- Comparison with the hedonic imputation and characteristics prices method



Conclusion and way forward





Further information

- Paper Methodological principles: <https://www.bfs.admin.ch/bfs/en/home/statistics/prices/property-price.assetdetail.14716382.html>
- Hedonic models 2022: <https://www.bfs.admin.ch/bfs/en/home/statistics/prices/property-price.assetdetail.22689770.html>
- Paper Quality adjustment procedure: <https://www.bfs.admin.ch/bfs/en/home/statistics/prices/property-price.assetdetail.14716389.html> (DE)
- Expertise hedonic model Mick Silver: <https://www.bfs.admin.ch/bfs/en/home/statistics/prices/property-price.assetdetail.14966772.html>
- Github page survey tool:
<https://github.com/bfs-preis/impfi/wiki> (DE, FR, IT)

