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A new real estate index of the Swiss multi-family housing market

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Why a new index?

The existing indexes have a relatively short history being composed of both residential, commercial and office transactions

- The Wüest & Partner – a transaction-based hedonic index starting in 1985
- The IAZI index – a transaction based index starting in 1987. It comprises both commercial and residential property (some 2849 transactions)
- The ZKB MFH index – transaction-based index which stops in 2000



What is special about real estate prices?

- The price of a given piece of property is not available unless a transaction or an appraisal takes place. The infrequent transaction of properties leads to a need to use appraisers
- Appraisal prices are costly and time-consuming to obtain
- The presence of the appraiser introduces arbitrariness in the estimated price (average 10% spread around "equilibrium" price (Diaz-Wolverton 1989))



How to deal with such data?

The existing techniques can be categorized according to the type of index construction methodology

- Hedonic indexes (Rosen 1974)
- Repeated-sale indexes (Bailey, Muth, Nourse – 1963; Case, Shiller – 1987, 1989); Repeated-measurement indexes (Marcato 2005)
- Arithmetic averages; median; Weighted averages (Sale Price Appraisal Ratio – SPAR Bourassa et al. 2006)



The available data

**The type and quality of data impose actually the selected index type.
The available data (when data collection is completed):**

- Purchase price and date of the property
- 2010 appraisal (2007 appraisal available now)
- Cash-flows (rents and investment)



RMI

A simple example of how the RMI works:

$$\ln\left(\frac{V_{t+2}}{V_t}\right) = \ln(1 + \hat{\beta}_1) + \ln(1 + \hat{\beta}_2) \quad (1)$$

If no transaction occurred for a long time one can use *the latest appraisal* instead of the actual (not-known) market value

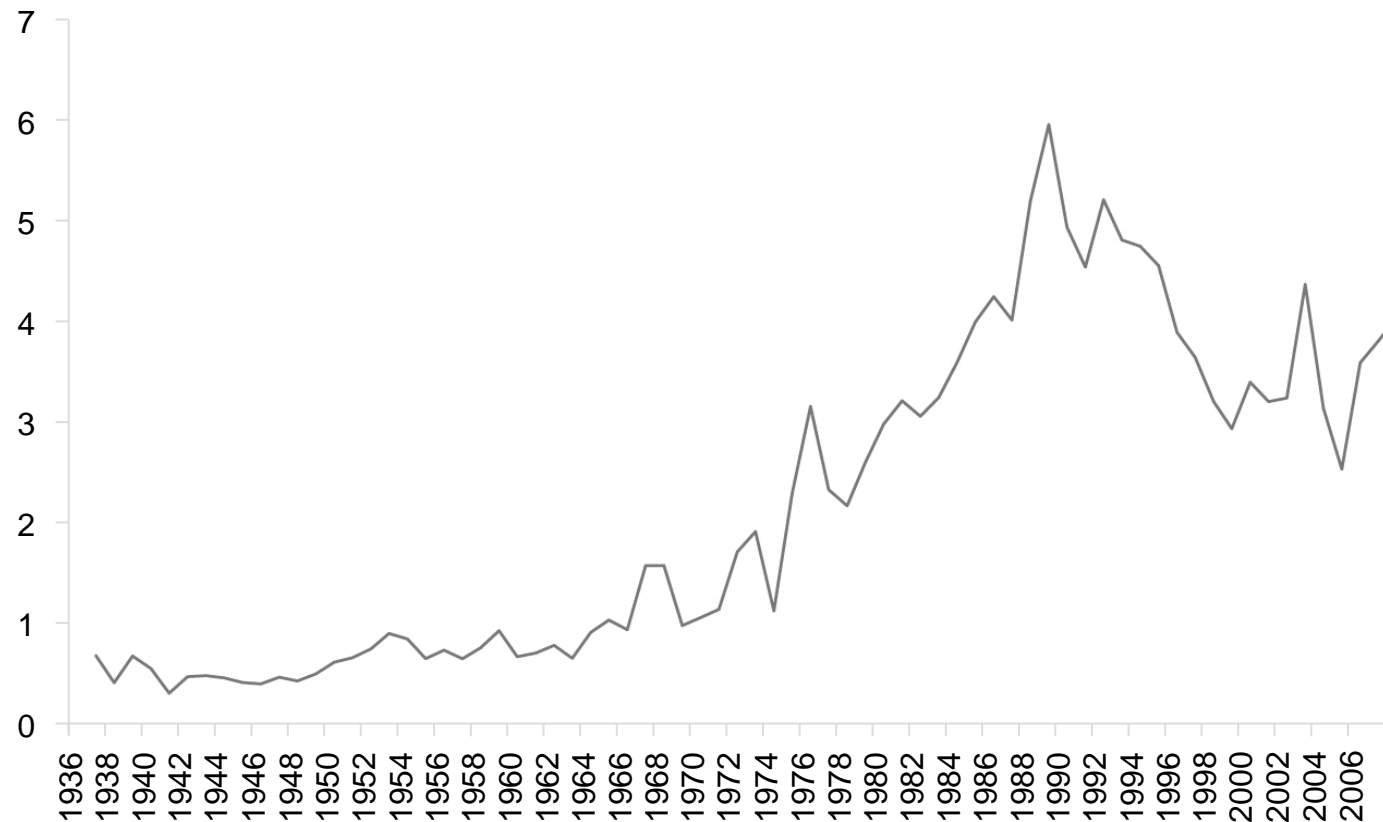
$$\ln\left(\frac{A_{t+2}}{V_t}\right) = \ln(1 + \hat{\beta}_1) + \ln(1 + \hat{\beta}_2) \quad (2)$$

How does this influence the actual index? Weren't appraisals biased?



The RMI index

Using the first transaction and latest appraisal values, the RMI is depicted below





The Inverse Sale Price Appraisal Ratio

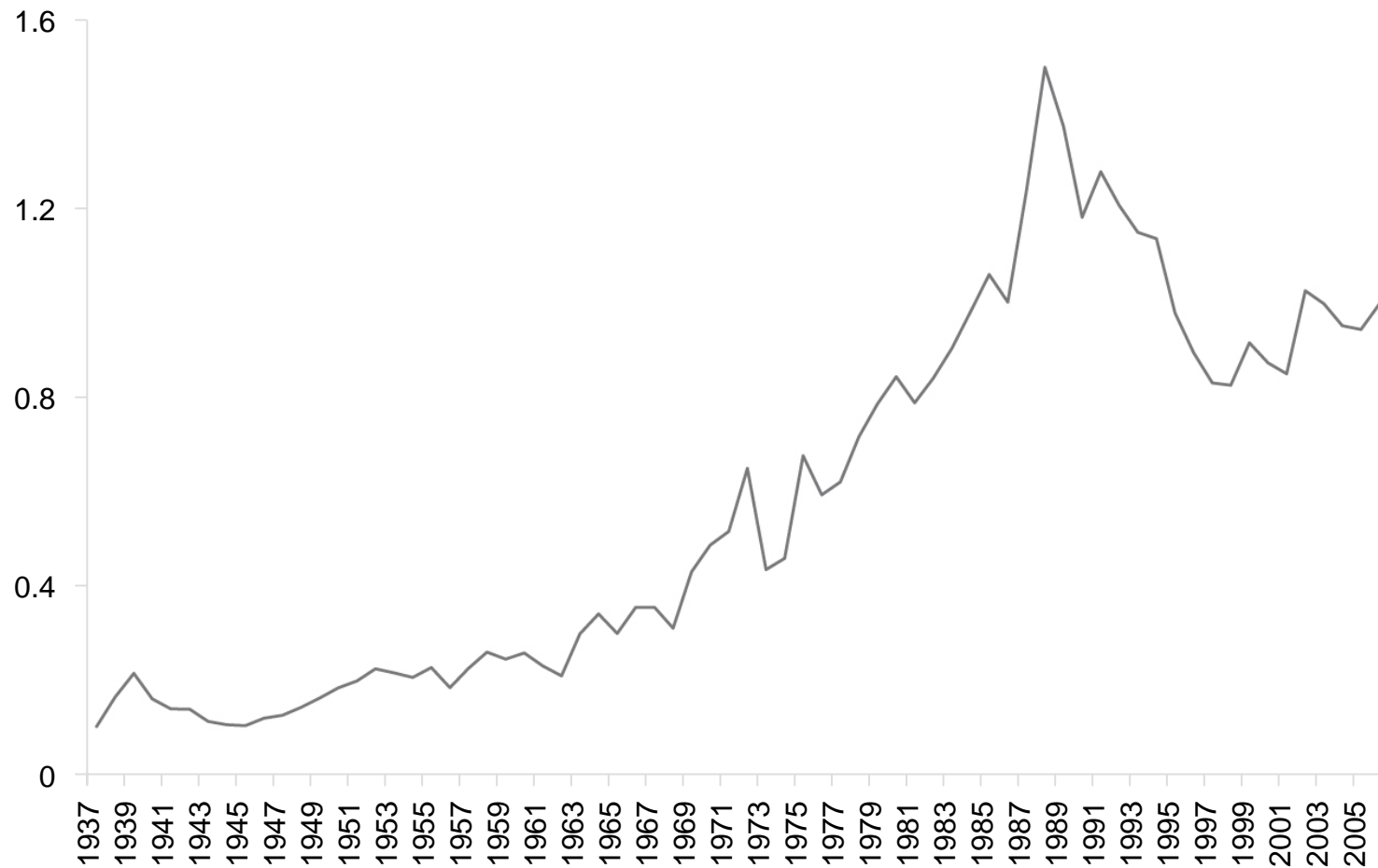
Using the same data one can use a different index calculation methodology. The SPAR

$$Index_t^{EW} = \frac{(1/n_t) \cdot \sum_{i=1}^{n_t} (S_{it}/A_{i0})}{(1/n_{t-1}) \cdot \sum_{i=1}^{n_{t-1}} (S_{it-1}/A_{i0})} \cdot Index_{t-1}^{EW} \quad (3)$$

The Inverse SPAR takes in consideration that the available data has as base year 2007 and not some year in the past

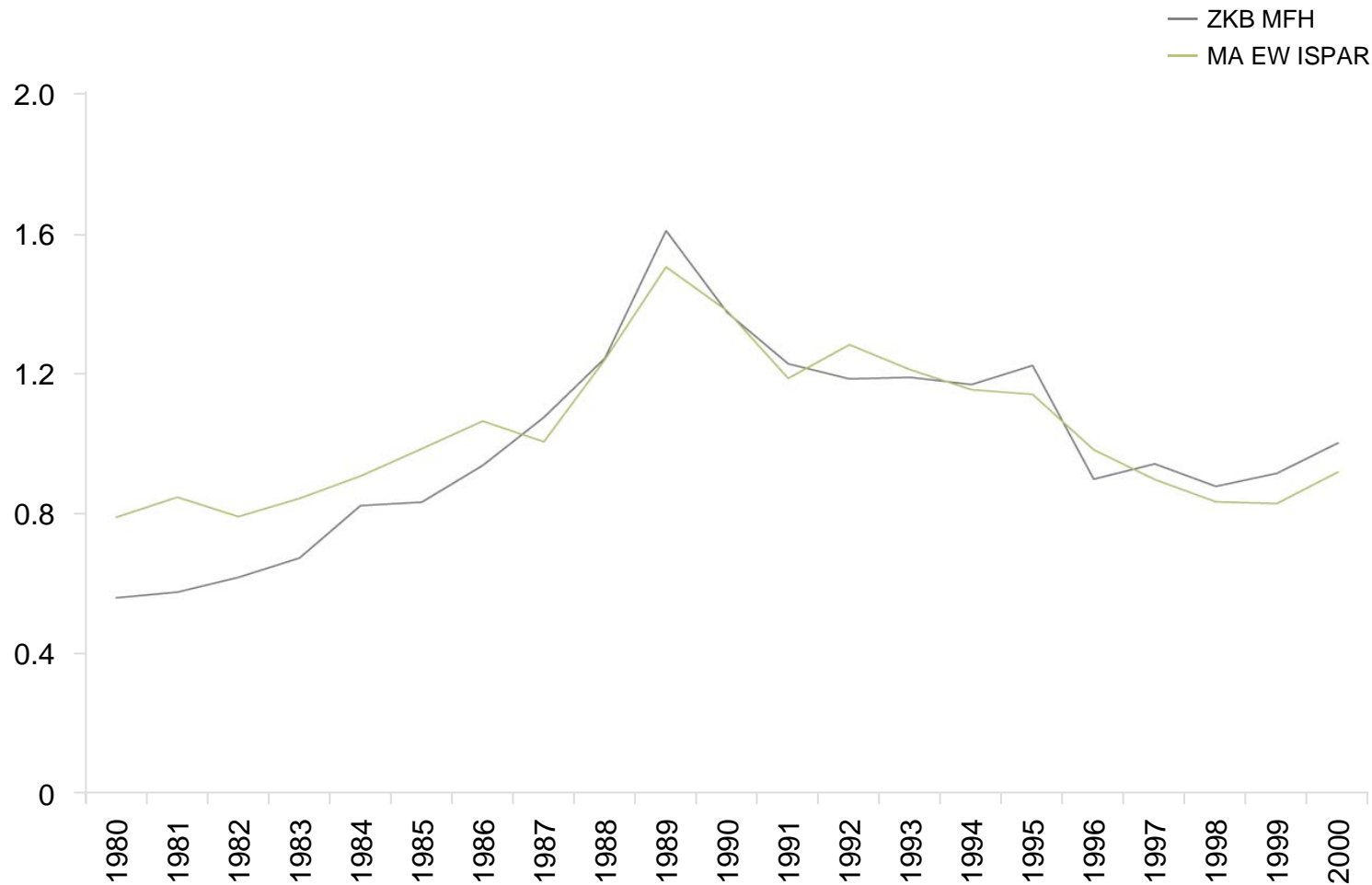


The Inverse Sale Price Appraisal Ratio





The Inverse Sale Price Appraisal Ratio





The Inverse Sale Price Appraisal Ratio

Index	Mean	Volatility	Skewness	Kurtosis
VW ISPAR 1937-2007	0.041	0.23	0.45	1.03
EW ISPAR 1937-2007	0.029	0.19	-0.21	3.06
RMI 1937-2007	0.053	0.25	0.98	2.50
VW ISPAR 1980-2000	0.004	0.12	1.11	1.61
EW ISPAR 1980-2000	0.012	0.10	0.39	-0.51
ZKB MHF 1980-2000	0.03	0.12	-0.32	0.84
RMI 1980-2000	0.006	0.12	0.67	-0.16
VW ISPAR 1988-2007	0.012	0.12	1.12	0.69
EW ISPAR 1988-2007	0.005	0.11	0.94	0.02
IAZI 1988-2007	-0.006	0.04	-0.06	-1.02
RMI 1988-2007	0.001	0.17	0.89	0.74

Table: Summary statistics of the simple yearly returns



Conclusions and further work

- The repeated-measure methodology produces sensible results even when using appraised value and not transaction values
 - 1937-2007 mean nominal yearly return: 4.1% (VW ISPAR)
 - 1937-2007 volatility of the nominal yearly return: 23% (VW ISPAR)
- The un-smoothing procedure is expected to improve the quality of the estimated returns for the most recent period
- The equally-weighted ISPAR yields an index which has similar dynamics to the ZKB MFH index over the selected period
- Work is still to be done on including cash flows in the analysis