Combining Price Indices in Temporal Hierarchies

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There is a growing demand from central banks, governments, banks, real estate developers, and households for reliable and more timely house price indices. Hill et al (2018) estimated a number of weekly hedonic imputed indices and found there are larger discrepancies in the resulting indices obtained from alternative modelling strategy at this higher frequency than that found when the index is constructed for lower frequencies (e.g. quarterly). Hyndman et al. (2011) and Athanasopoulos et al. (2017) develop a method for optimally combining time series in temporal hierarchies. In this paper we extend this approach to the case of price indices. In this case we have to relax the assumption that the time series at the top of the hierarchy is equal to the sum of the bottom time series in the hierarchy. This paper considers the case of reconciling year-on-year indices at different frequencies and under a number of alternative weighting schemes. It draws also a comparison with the multilateral price index literature. The empirical example presents temporal hierarchies for hedonic property price indices in Sydney, Australia. The frequency of the indices considered are annual, quarterly, monthly, and bimonthly. The two latter frequencies are of special interest to central banks. For example, the ECB meets bimonthly, while the Reserve Bank of Australia meets monthly. Real time high frequency indices can provide a timely indication of the state of the real estate market. We consider hedonic imputed indices constructed from semilog hedonic models which control for property location using either postcode dummies or a non-parametric geo-spline, and construct volatility measures to compare the unreconciled and reconciled indices. The results presented are preliminary.