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Housing prices and transaction volume ☆

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ABSTRACT

We use annual, quarterly and monthly data from the US to show that the correlation between housing prices and transaction volume (number of existing houses sold) differs across different frequencies. While the correlation is high at the low frequencies it declines to the levels close to zero at high frequencies. Granger causality tests for different frequencies show that the way of causality in housing market changes from region to region. Our findings provide a litmus test for the existing theories that are proposed to explain the positive correlation between transaction volume and housing prices.

1. Introduction

In this paper, we use US data to analyze the relationship between housing prices and transaction volume at different frequencies. Our analyses provide several tests to evaluate the theories offered to explain the comovement of housing prices and transaction volume documented in the literature.

The first test in our analysis utilizes the different correlations observed at different frequencies. The theories proposed in the literature generate positive comovement at higher frequencies (in the short run) but generate negative comovement or non at lower frequencies (in the long run). In this respect, we investigate the relationship between housing prices and transactions by using spectral analysis to reveal how much different frequencies contribute to the correlation. Since both theories and data have implications about the correlation at different frequencies our paper proposes a new way of testing the existing theories in the literature which generate the comovement of housing prices and transaction volume.

In addition to the correlation analysis we also explore the direction of the causality between the two series by using Granger causality test at different frequencies. This is important to evaluate the theories because the direction of causality between housing prices and transactions differs depending on the mechanism of the models.

For our analysis we use annual, quarterly and monthly housing prices and transaction volume data from the US. We use HP and band-pass filters and dynamic correlations to obtain the correlations of the two series at different frequencies. In our analysis we show that the largest part of the positive correlation between housing prices and transaction volume comes from the low frequency components. However, at higher frequencies the correlation becomes smaller and sometimes negative.

We, also, find that for the quarterly data at high frequency the way of causality between the two series is from transactions to housing prices. Our results are slightly

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different from Leung et al. (2002) findings which reveal the same relation at business cycle frequency. On the other hand, for the monthly data we do not find a way of causality dominating the other. For some cities transactions cause prices and for some cities prices cause transactions. There are also cities where both prices and transactions cause each other. While Granger causality tests provides small support for the search models, non of the theoretical models proposed passes the dynamic correlation test. Hence, our analysis poses a challenge for the existing theories.

The paper is organized as follows. In Section 2 we provide a brief summary of the literature about housing prices and transaction volume and discuss what those theoretical models imply about the correlation of the two variables at different frequencies. In Section 3 we give a brief description of the spectral method. We describe our data set in Section 4. We provide the results and explain our findings in Section 5. Section 6 concludes.

2. Housing prices and transaction volume: theory and evidence

There are numerous influential articles in the literature that document and analyze the relationship between housing prices and transaction volume in the housing market. On the empirical front, Stein (1995) finds a positive relation between the percentage change in real sales prices for existing single family homes and transaction volume for the period 1968–1992 in the US. Andrew and Meen (2003) report positive correlation for the same two variables for the UK data. On the other hand, Follain and Velz (1995) find a negative relationship between the level of house prices and the transaction volume. Hort (2000), however, does not find a robust pattern of these variables using simple regressions of housing prices on the level of transactions volume for Swedish housing market but finds a robust negative results after introducing regional and time dummies.[1]

The empirical findings we mentioned above (either positive or negative correlation) contradict with the Lucas' (1978) result which asserts that there will be no correlation between prices and transactions in an environment with rational agents and perfect capital markets. The theoretical models that are developed to explain this puzzling feature of the data can be classified into three main groups.[2] The first group is pioneered by Stein (1995) and advanced by Ortalo-Magne and Rady (2006) and uses the down-payment requirement in the housing market as an explanation of the positive correlation between the two series. Main driving force of this theory is the posit that for repeat buyers, a big portion of their down-payment is coming from the proceeds of the sale of their existing homes. The theory suggests that as housing prices increase it becomes easier to finance the down-payment requirement with an increase in the liquidity of current homeowners. Hence, transaction volume increases. The second group uses search and matching frictions to model the housing market. Berkovec and Goodman (1996) and Wheaton (1990) show that with search and matching frictions their model can generate a positive comovement in housing prices and transaction volume. Recently, Ngai and Tenreyro (2010) use a similar model to explain the seasonality in housing prices and transaction volume that they document in the US and the UK data. The third group uses behavioral approach to explain the comovement. Genesove and Mayer (2001) argue that in the data, households who experience housing price losses tend to ask higher prices compared to the others. This behavior, which is consistent with loss averse preferences, causes prices to sluggishly adjust to the equilibrium price. It is this sluggishness in the housing prices that causes the decline in transaction volume in this theory.[3,4]

The theories proposed in the literature generate positive comovement at the higher frequencies but does not generate positive comovement at lower frequencies. To illustrate our point, suppose that housing prices fall permanently in all the models discussed above. A permanent fall in housing prices corresponds to a low frequency movement in housing prices. The mechanism in Stein (1995) and Ortalo-Magne and Rady (2006) generates positive correlation in the short run but no correlation in the long run since after the initial decline in housing prices consumers accumulate enough wealth for the down-payment and then they will be able to move later. In the long run, transaction volume returns to the initial value while housing prices stay low. As a consequence, housing prices and transaction volume have no correlation at low frequencies since there will be a symmetric effect when housing prices increase. In case of the mechanism in Genesove and Mayer (2001), over time as sellers with higher prices (remember that loss averse agents post higher prices then the market prices) sell their houses their negative effect on transactions disappears. As a result, transaction volume decreases in the short run but then increases back to its earlier value implying no correlation in the long run. For the search models proposed, a decline in the housing prices at lower frequencies results in a smaller number of houses built which decreases the vacancy rate (1 minus number of households divided by number of housing units). As vacancy rate decreases, sales time also decreases, whereas transaction volume increases (see for example Figs. 1 and 2 in Wheaton (1990)).[5] Hence, for these types of search models, there is a negative correlation between housing prices and transaction volume at lower frequencies.[6] Given the high and low frequency predictions of the models we

[1] Leung and Feng (2005) shows commercial property behaves very differently from the residential property.

[2] Although the empirical evidence is mixed, the theoretical models developed so far are developed to explain the positive correlation.

[3] Leung and Tsang (2011) develops a model with loss averse agents by exploiting the idea of Genesove and Mayer (2001).

[4] Another theory that explains the relation is presented in Arslan (2013) where the rigidities in the housing and the mortgage market are the main driving forces.

[5] We specifically consider search and matching models only as in Berkovec and Goodman (1996) and Wheaton (1990).

[6] Besides these models, there are new developments in search and matching literature that models give different results. Peterson (2009) introduce behavioral inefficiency into a textbook search model to produce positive correlation between housing prices and transaction volume at lower frequencies.