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House price expectations and inflation expectations: Evidence from survey data

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There is an increased interest in understanding the determinants for households' inflation expectations. Recent literature on salience has found that individuals focus disproportionately more on frequently observed prices and large price changes when forming their inflation expectations, even if those items have low weights in the official inflation measure. The impact of gas and grocery prices in this regard has been well-established in the literature. In our work, we find a novel channel through house prices.

We find that households tend to overweight house price expectations when forming their inflation expectations. This result is robust across several specifications and two survey data sets for the United States. We also observe a significant effect of the cognitive abilities of households as more sophisticated households overweight house price inflation less.

We model this household behaviour in a two-sector New Keynesian model and examine its monetary policy implications. In this setup, we show that to gauge the correct interest rate response, the central bank needs to be aware that some sectors are overweighted by households and that movements in expected inflation in such sectors are important for monetary policy.

The salience of large price changes

Expectations about the future course of the economy have come to play a pivotal role in macroeconomics. In this context, it has become increasingly important to understand how households form inflation expectations. For instance, Coibion et al. (2020) found that households' priors and perceptions about inflation, their shopping experience, knowledge about monetary policy, cognitive abilities, and exposure to media coverage about the economy, play a significant role.

Amidst cognitive and informational constraints, it has been observed that households rely on their personal experiences and frequently observed prices, such as groceries and gasoline, to form expectations about inflation (Coibion and Gorodnichenko, 2015 and D'Acunto et al., 2021). Additionally, insights from psychology and memory research, and studies observing household behaviour reveal that people tend to focus more on extreme experiences and large changes. So, it is not just frequently observed prices that affect expectations as posited by previous work, but what also matters is signals that are *contrasting*, *surprising*, or *prominent* to drive the attention of the households. These heuristics imply that individuals could focus disproportionately more on items that are *salient* - for which large price changes have been observed - even if those items account for low weights in the official inflation measurement. Since house prices are very salient, we investigate if they could play a role.

We find a novel channel of salience through house price expectations. Using two sets of household survey data - the Survey of Consumer Expectations (SCE) by the Federal Reserve Bank of New York (FRBNY) and the Survey of Consumers by the University of Michigan (MSC) - we find that individuals overweight from house price expectations to their inflation expectations. Subsequently, we model this household behaviour in a two-sector New Keynesian (NK) model and conduct an optimal policy exercise. We show that to gauge the correct interest rate response, it is imperative for the central bank to be aware that some sectors are overweighted by consumers and that movements in expected inflation in such sectors are important for monetary policy.

Why could house prices play a role?

The motivation for examining the salience of house prices comes from the observation that house prices have increased dramatically in the years prior to 2007 and have also received extensive media attention, especially since the global financial crisis. The preoccupation of US households with housing markets has always been strong such that it has been noticed that "house price watching has become a national pastime" (Himmelberg et al., 2005). Houses are typically the largest asset in the household portfolio and are associated with significant wealth and collateral effects. A large majority of the population in the US are homeowners and there is high geographic mobility suggesting that house prices are closely watched.[1]

It is also important to note that the Consumer Price Index (CPI) only accounts for the consumption part of houses, that is, *housing services*, through rents and imputed rents, and not houses as assets. This implies that there is no direct impact of house prices on inflation. But households, as non-specialists, may not be able to make the distinction between the asset aspect of house prices and the price of housing services. They may see house prices changing and gauge signals from that to form their inflation expectations. This could potentially lead to overweighting of house price expectations to overall inflation expectations.

[1] As per the US Census Bureau, the homeownership rate in the country stands at 66 per cent in the year 2020 and an average person moves residences more than eleven times in their lifetime.

Setting an accounting benchmark

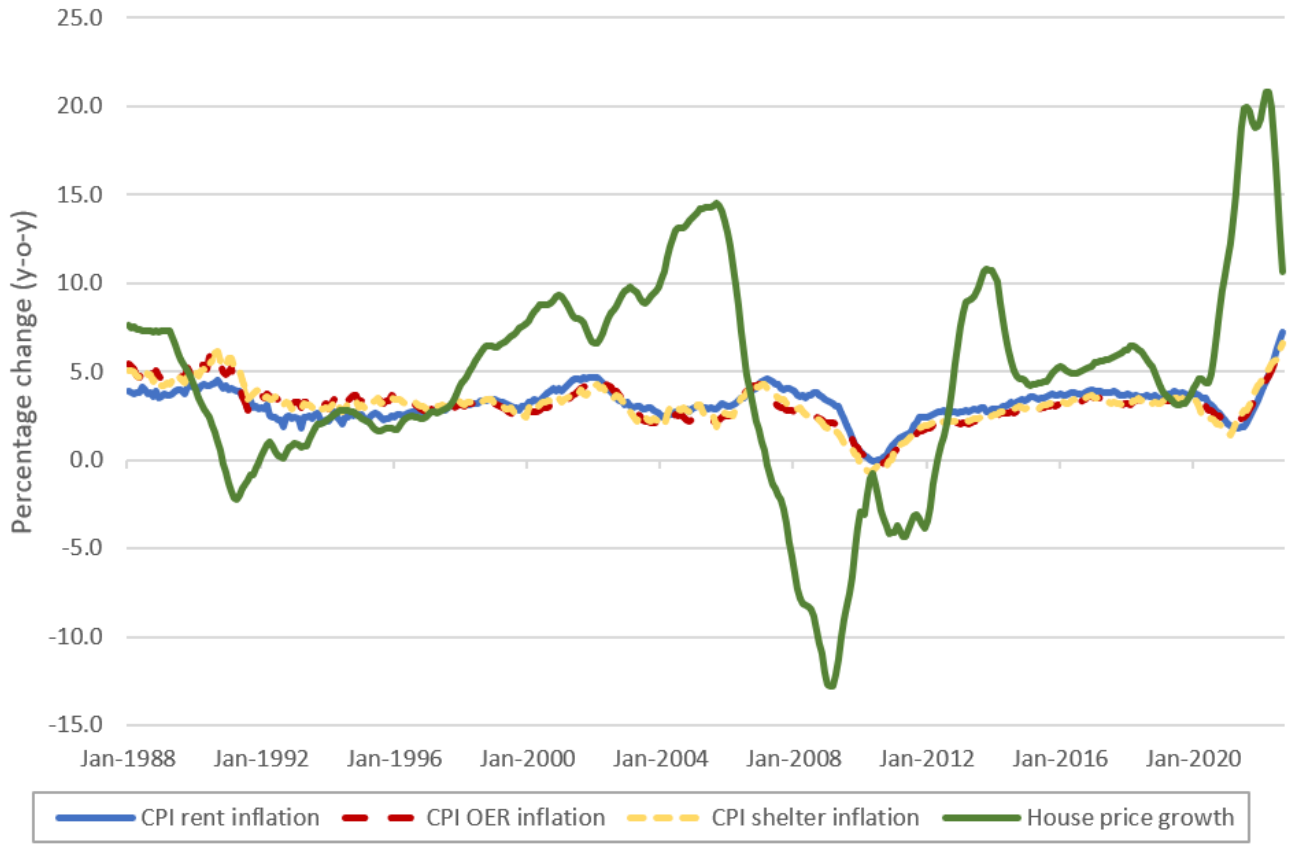
To understand whether individuals are over or under-weighting from house price expectations to overall inflation expectations, we need to set a benchmark. This is on account of one key observation that actual house prices are not directly reflected in the CPI, as previously discussed. Instead, CPI only reflects the consumption part of housing services relevant to the cost-of-living index.

In the current practice in the United States, housing services are captured through the CPI component on *shelter* which accounts for 32.706 per cent weight in the index. Shelter, in turn, has four sub-components, namely, rent of primary residence which accounts for 7.378 per cent share, owner's equivalent rent (OER) which accounts for 24.043 per cent, lodging away from home, and tenants and household insurance which account for 0.925 and 0.360 per cent, respectively.[2]

Over the period 1987 - 2022, there have been some large swings in house prices, as shown by the growth rate of the S&P/Case-Shiller U.S. National Home Price Index, while OER and other housing-related components of shelter have not kept up with these, as shown in ***Figure 1***. These large price changes could be salient to households and might distort their inflation expectations, while not being reflected in the CPI-related targets used by the central bank.

To get this benchmark, we use linear regressions of various components of CPI shelter inflation previously described on house price growth. We find that a percentage point increase in actual house price growth increases actual inflation between 0.004 to 0.04 percentage points. This serves as our accounting benchmark to gauge household behaviour.

Figure 1: House price growth and CPI components (1987-2022)



Source: Bureau of Labour Statistics.

[2] Weights in overall CPI as of October 2022 (Source: Bureau of Labour Statistics).

What does the household survey data reveal?

The two datasets we use complement each other in the questions they ask, the survey design and geographical disaggregation they permit. The SCE data consists of 109,788 observations over the period from June 2013 to March 2022, and the MSC consists of 67,924 observations from January 2007 to October 2022.

Across these two datasets, we find that a one-percentage-point increase in households' house price expectations increases their inflation expectations between 0.25 to 0.45 percentage points, keeping other things constant. Comparing this with the accounting benchmark we calculated previously, confirms there is overweighting from house price expectations. To obtain this finding, we control for individual characteristics such as demographics as well as region and time fixed effects. To bring a causal interpretation, we also use instrumental variable approach to control for possible endogeneity through common factors and/or omitted variables. The instrument we use for house price expectations is the Wharton Residential Land Use Regulatory Index (WRLURI), developed by Gyourko et al. (2019). We also use lagged expectations as instruments.

We further examine how respondent characteristics could explain differences in the extent of overweighting from house price expectations to overall inflation expectations of households. Exploring the role of cognitive abilities captured through numeracy and education reveals that high numeracy individuals overweight less from house price expectations to inflation expectations compared to their low numeracy counterparts. The same result holds for those who are graduates or higher, i.e., they overweight less from house price expectations. These results make sense as we would expect less sophisticated individuals, that is those with relatively lower numeracy or education qualifications, to be more influenced by the signals from salient prices.

Monetary policy implications of household behaviour

Our empirical analysis concludes that there is overweighting of house price expectations in inflation expectations. Coibion and Gorodnichenko (2015) and D'Acunto et al. (2021) have found a similar impact of gasoline and grocery prices. To examine the monetary policy implications of this overweighting behaviour by the households, we build a two sector NK model. The model is a stylized framework representative of any two sectors, in which households focus more on one of the sectors relative to its true weight. In this respect, our results apply more generally to the modelling and monetary policy implications of overweighting in any good, including the findings in the previous literature.

The model has two non-durable sectors, and we abstract from the effects of durable goods. In addition to allowing wider applicability, including a durable sector would make the impact of overweighting per se difficult to single out. This is because previous work has shown that durable sectors are more interest rate sensitive relative to non-durables, which introduces additional trade-offs for monetary policy. Moreover, it is also well-known that durable goods sector matters disproportionately more for monetary policy. Given this, we abstract from the channel of durability and uncover the impact of overweighting in the simplest and more general framework. This modelling choice also offers the benefit of obtaining analytical results.[3]

[3] With this framework, we are able to show that overweighting has consequences for optimal monetary policy. Extending the results of the previous work by Erceg and Levin (2006) and Barsky et al. (2007) would likely mean that an overweighted durable sector would be even more significant.

We find that this overweighting behaviour induces a wedge in the Euler equation of households. It does not introduce any additional policy trade-offs for the central bank or create any distortions in price-setting behaviour of firms, even if firms in addition to households also display overweighting behaviour. Crucially, the nominal interest rate needs to be set differently because a shock in the sector that is salient to households increases expected inflation by more. This requires the central bank to increase nominal interest rates by more relative to the case when there is no overweighting of a given sector. We find that this response is sufficient to mitigate the distortion caused by households' disproportionate focus on a specific sector.

Conclusion and policy implications

The literature has found that individuals focus disproportionately more on frequently observed prices and large price changes when forming their inflation expectations, even if those items account for low weight in official inflation measurement. The impact of gas and grocery prices in this regard has been well-established in the literature.

In our work, we find a novel channel through house prices. We find that individuals overweight house price expectations when forming their inflation expectations. Furthermore, we find that there is a significant impact of the cognitive abilities of individuals in this behaviour as more sophisticated individuals overweight by a lesser degree. Since house prices are salient, this makes a case for the central banks to monitor price developments in this sector beyond the usual, very important, financial stability concerns.

We further show that knowledge of such household behaviour has consequences for monetary policy. This is because nominal interest rates need to be set in line with expected inflation. Therefore, it is important that the central bank is aware that there is overweighting on the part of the households towards certain sectors and measure inflation expectations correctly. Once the central bank takes that into account, it is able to deliver the appropriate nominal interest rate.

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