Housing Spread, Borrowing Frictions, and Household Spending

Karolis Bielskis   Povilas Lastauskas

Vilnius University, Bank of Lithuania,[1] CEFER

# Outline

Importance of Household Balance Sheet

- Recent financial crisis brought huge aggregate consumption losses that were associated with the credit liberalization, its expansion and overestimated expectations about the house prices.

- House prices, not an exception, experienced substantial (over one third) declines during the Global Financial Crisis.

- These facts can be observed from the household balance sheet, where housing related assets play a crucial role.
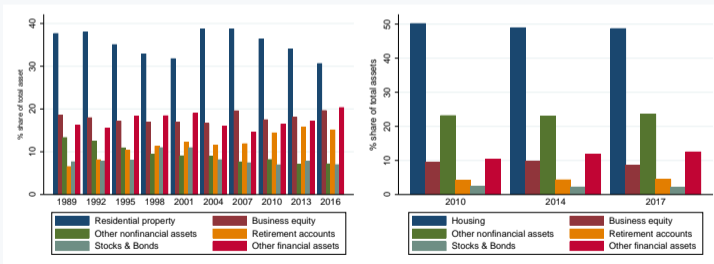
The Great Financial Crisis

- Channels at work during the Great Financial Crisis:
  - "after a sustained boom, house prices collapsed, triggering a financial crisis and fall in household expenditures which -- paired with macroeconomic frictions -- led to a slump in employment." (Mian et al., 2013; Mian and Sufi, 2014)
- Current literature identifies the following main driving forces for the boom and bust in house prices: credit conditions and expectations, (Kaplan et al., 2020), and household balance sheet channel and the disruption of financial intermediation (Gertler and Gilchrist, 2018).

The Role of Expectations

- Interactions between sentiments (expectations), shocks (e.g. credit) and the real economy are way less understood, though macroeconomic (and policy) implications are absolutely crucial (especially for the times when standard tools, such as monetary policy, do not support the economy as intended).

- Only quite recently the literature has "returned" to the role of expectations and learning for the cyclical macro behavior (Eusepi and Preston, 2011; Kuang and Mitra, 2016).
  - Learning about the dynamics of factor prices could matter quite substantially as well as about the long-run growth rate, though not really about stationary deviations from the long-run trend.

Outline

Housing and Consumption

Housing and expectations effects on consumption:

- Low income households in U.S. increased their spending in line with the rise in house prices between 2002 and 2006 and faced huge drop in income and consumption thereafter (Mian and Sufi, 2014).

- Kaplan et al. (2020) built the model with multiple aggregate shocks to generate fluctuations in equilibrium house prices and identified beliefs as the main driver for the shift in house prices. On top, boom-bust in house prices explained half of the corresponding swings in non-durables expenditures in U.S.

- Recent IMF Working Paper (Caceres et al., 2019) used U.S. micro data and supported earlier driven ideas about housing as the most relevant form of equity to affect consumption dynamics.

- Adam et al. (2011), by introducing subjective beliefs, break (temporarily) the link between house prices and the history of fundamentals. This opens ways for interest rates to play a crucial role in fueling housing boom, which, in turn, affects the collateral constraint and leads to an increase in total borrowing, leading to consumption boom.

Credit and Consumption

Credit shock effects on consumption:

- From individual credit data in U.S. between 2004 - 2014 Amromin and McGranahan (2015) identified a rapid mortgage credit expansion among low-income zip codes leading up to the Great Recession. Other markets as auto lending were dominated by the real business cycle.

- Using behavioral theories López-Salido et al. (2017) summarized how investor sentiments in credit markets can be an important driver of future aggregate economic fluctuations.

Credit spreads and cycles, and macroeconomic volatility:

- Bordalo et al. (2017) use diagnostic expectations to generate credit cycles with such credit spreads that are excessively volatile, over-react to news, and are subject to predictable reversals. They can generate aggregate macro variables volatility absent financial frictions.

Our Contribution

- **The role of housing spread,** proxying for, inter alia, wealth expectations**, on consumption** in **theory** and **evidence**.
  - Unlike traditional sentiments' measures, which are rooted in different methodologies, housing spread enables us to explore household consumption dynamics accross different countries.

- **The role of credit shock in explaining consumption** dynamics, also capturing different credit channels - domestic interest rate, U.S. interest rate, and exchange rate.
- The role of **joint effect (spread and credit shocks)** on consumption dynamics.
  - Integrated or small open economy and separate or country-specific markets.

- **State dependence**.
- **Beoynd USA: panel dimension** including 28 OECD countries over the time series of 50 years.

Outline

- Suppose household welfare is given by

$$\mathbb{E}_t \sum_{s=t}^{\infty} \beta^{s-t} \left(\frac{(C_s)^{1-\nu}}{1-\nu} + \phi \frac{H_s^{1-\nu}}{1-\nu} \right),$$

subject to

$$C_t + Q_t \left(H_t - H_{t-1} \right) + i_t B_{t-1} \leq B_t + Y_t,$$

$$B_t \leq (1 - \chi) Q_t H_t,$$

where the borrowing constraint is such that, if housing asset is purchased, a household can borrow at most $1 - \chi$ of the house value (a down-payment, equal to χ).

- Once $\chi \to 0$, the full nominal value of house can be used as a collateral to expand debt whereas $\chi \to 1$ implies that households have no access to the debt market.

$$H_t^{-\nu} = \frac{1}{\phi} \left\{ \chi \left(C_t\right)^{-\nu} + \beta \left(1 - \chi\right) \mathbb{E}_t \left(C_{t+1}\right)^{-\nu} i_{t+1} \right\} Q_t - \frac{1}{\phi} \mathbb{E}_t \beta \left(C_{t+1}\right)^{-\nu} Q_{t+1},$$

- We obtain housing consumption spending, linking a path of current and future consumption, house prices, and intertemporal consumption smoothing conditions.
- Intertemporal consumption smoothing exemplifies the importance of expectations about the future, particularly the path of interest rates and house prices

Rental rate:

$$R_t^H = \phi \left(\frac{H_t}{C_t} \right)^{-\nu}$$

Proposition

The house price, absent borrowing frictions, is equal to the rental rate and the expected discounted future price,
$Q_t = R_t^H + \mathbb{E}_t M_t^{t+1} Q_{t+1} = R_t^H + \mathcal{S}_t.$ *Iterating forward, one obtains a decomposition:*

$$Q_t = \underbrace{\mathbb{E}_t \sum_{j=0}^{T-1} M_t^{t+j} R_{t+j}^H}_{\text{fundamentals (discounted rental rates)}} + \underbrace{\mathbb{E}_t M_t^{t+T} Q_{t+T+1}}_{\text{potential bubble term}} = F_t + B_t,$$

where the stochastic discount factor (pricing kernel) is $M_t^s \equiv \beta^{s-t}(C_s/C_t)^{-\nu}$ for $s \geq t$, F_t is the fundamental price component (discounted rental rates) and B_t stands for the (rational) bubble component if the transversality condition is violated.

- The updated house price:

$$Q_t = \left\{ 1 - \mu_t \left(C_t \right)^\nu \left(1 - \chi_t \right) \right\}^{-1} \left(R_t^H + \mathcal{S}_t \right)$$
$$= \left\{ 1 - \left(1 - \chi \right) \left(1 - \mathbb{E}_t M_t^{t+1} i_{t+1} \right) \right\}^{-1} \left(R_t^H + \mathcal{S}_t \right)$$

where the second equality follows after having incorporated the shadow price of the borrowing constraint. As before, the stochastic discount factor (pricing kernel) is given by, $M_t^s = \beta^{s-t} \left(C_s / C_t \right)^{-\nu}$ for $s \geq t$.

Proposition

The house price with borrowing frictions is equal to the rental rate and a housing spread (expected discounted future price), adjusted for the shadow price of the borrowing constraint and the loan-to-value ratio. An unexpected increase in the interest rate, i_{t+1}, leads to a drop in housing prices, else (e.g., consumption growth, rental rate, or fundamental value) being constant. Note that an amplification effect over the rental rate is generated even when a spread is zero, i.e., $\mathcal{S}_t = 0$.

Household Consumption Spending

- Rearranging the house price with the borrowing frictions, we obtain:

$$C_t = \underbrace{\left((1-\chi)\,\mu_t\right)^{-\frac{1}{\nu}}}_{\text{Borrowing (credit) friction}} \underbrace{\left(1 - \left(\frac{R_t^H + \mathcal{S}_t}{Q_t}\right)\right)^{\frac{1}{\nu}}}_{\text{Relative fundamentals and spread}}.$$

$$\mu_t = (C_t)^{-\nu}\left(1 - \mathbb{E}_t M_t^{t+1} i_{t+1}\right)$$

$$= (C_t)^{-\nu}\left(1 - \mathbb{E}_t M_t^{t+1} i_{t+1}^{US} - \mathbb{E}_t M_t^{t+1} \triangle e_{t+1}\right)$$

Corollary

The bubble component may exist independently of the borrowing friction, as shown in Proposition 1. However, a rise in the interest rate, i_t^{US} and the expected depreciation, $\triangle e_{t+1}$, interact with both the fundamental and the bubble component of the house prices, and may exaggerate both of them.
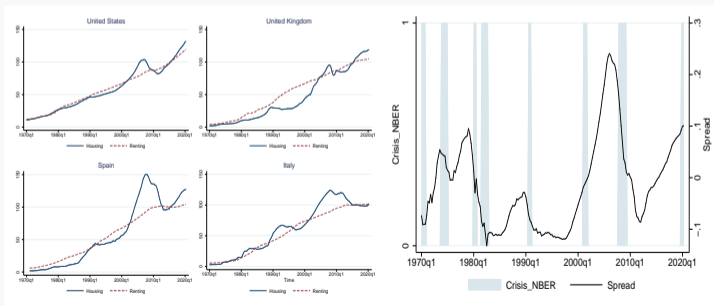
Outline

Econometric Framework

- Proxy for sentiments by using conditional predicted change in spread (Lopez-Salido et al., 2017).
- Similarly for the housing "sentiment":

$$S_{i,t} = ln(housing\ index)_{i,t} - ln(rental\ index)_{i,t},$$

- Difference between log-linearized housing and rental indexes.

Shocks Identification

- Country-by-country ARDL regression is used to identify "shocks" to housing spread and credit.
- It is based on identification idea used by Gertler and Gilchrist (2018) to capture "shocks" to house prices and indicators of aggregate financial conditions.
- In this framework, "shocks" should be interpreted as surprise movements or "innovations" in analysed variables that are orthogonal to fluctuations in consumption and to each other.

$$\mathcal{S}_{i,t} = \alpha_i + \sum_{h=1}^{4} \rho_{1,i,h} \mathcal{S}_{i,t-h} + \sum_{h=1}^{4} \gamma_{1,i,h} \triangle lnCr_{i,t-h} + \sum_{h=1}^{4} \omega_{1,i,h} \triangle lnC_{i,t-h} + \mu_{i,t}.$$

$$\triangle lnCr_{i,t} = \beta_i + \sum_{h=1}^{4} \rho_{2,i,h} \mathcal{S}_{i,t-h} + \sum_{h=1}^{4} \gamma_{2,i,h} \triangle lnCr_{i,t-h} + \sum_{h=1}^{4} \omega_{2,i,h} \triangle lnC_{i,t-h} + \varepsilon_{i,t}.$$

- $\mathcal{S}_{i,t}$, $Cr_{i,t}$, and $C_{i,t}$ stands for *housing spread, household credit*, and household consumption, respectively.
- Residuals $\mu_{i,t}$, and $\varepsilon_{i,t}$ are taken as "shocks".

Data and Local Projections

- We analyze 28 OECD economies.
- We consider housing and rental indexes, household credit, short and long term interest rates, exchange rates, and final consumption expenditure by households.
- We extract recent data from the open sources as OECD, BIS, IMF and other databases.
  - At quarterly frequency ranging from Q1 1970 to Q2 2020.
- After having identified shocks, we use them as explanatory variables in the fixed-effects panel local projections regressions Jordà (2005), thereby capturing responses of consumption changes to the housing spread and credit shocks. Our response variable is the quarterly household expenditure changes observed for the 12 quarters and projected on the shocks and control variables, allowing for the horizon-specific parameters on all of them.
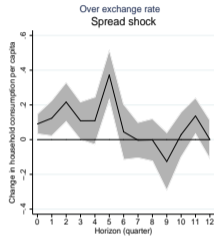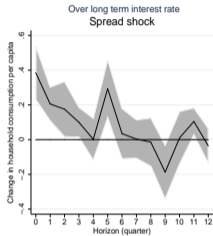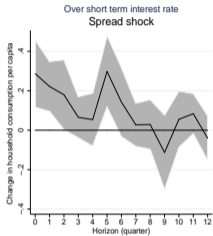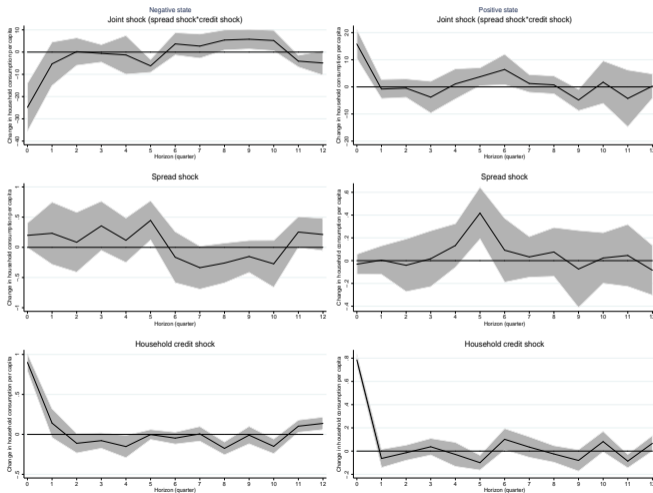
Outline

Baseline Results
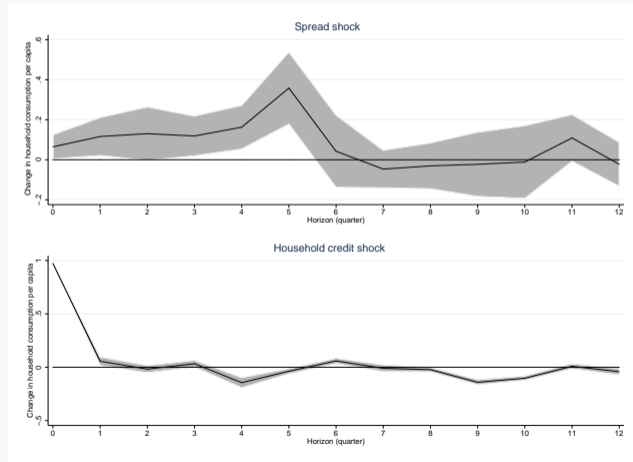
Comparison with Consumer Confidence Index
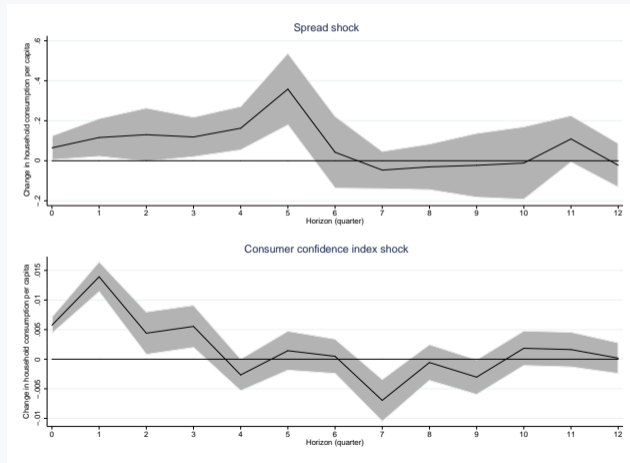
Results over Different Credit Determinants
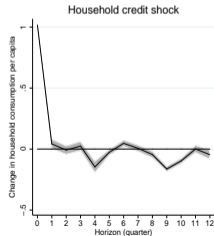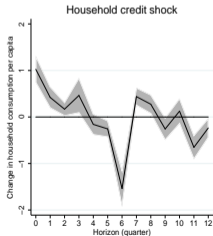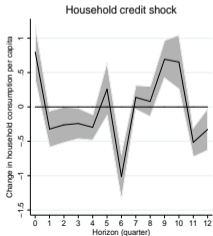
Amplification Effects over Different States

Outline

Summary of Results

- We developed a small model with the household sector, borrowing frictions, and the role for expectations about the houses' future worthiness.
- To support theory, we introduced *housing-spread* variable, defined as a deviation between house prices and fundamentals (rental rates), which enabled us explore household consumption dynamics in 28 OECD economies in the last 50 years.
- The *housing spread* variable causes a very similar response in household consumption spending to the consumer confidence index, reflecting similar phenomena behind both.
- Compared to the credit shock, the housing spread delivers considerably more persistent effects on household consumption, whereas credit produces the 'boom-bust' episodes.
- We find a huge amplification effect when both shocks (spread and credit) occur simultaneously. This result places policy recommendations in the spotlight

Future Research Directions

- Our emphasis has been on the household sector, but the production side seems as important too.
- Another reinforcing mechanism can come from income (unemployment) risk, at least partly explaining households' sentiments and the massive amplification effect.
- Adding an additional layer of firm expectations on future demand conditions and prices would also help draw more robust policy implications, enhancing our understanding of interactions between credit frictions, agents' expectations, and their joint effects on real activity.

Outline

Q&A

Bibliography

AMROMIN, G. AND L. MCGRANAHAN (2015): "The Great Recession and Credit Trends Across Income Groups," *American Economic Review*, 105(5), 147–53.

CACERES, C. ET AL. (2019): "Analyzing the Effects of Financial and Housing Wealth on Consumption using Micro Data," Tech. rep., International Monetary Fund.

GERTLER, M. AND S. GILCHRIST (2018): "What Happened: Financial Factors in the Great Recession," *Journal of Economic Perspectives*, 32(3), 3–30.

JORDÀ, Ò. (2005): "Estimation and inference of impulse responses by local projections," *American economic review*, 95, 161–182.

KAPLAN, G., K. MITMAN, AND G. L. VIOLANTE (2020): "The Housing Boom and Bust: Model Meets Evidence," *Journal of Political Economy*, 128, 3285–3345.

LÓPEZ-SALIDO, D., J. C. STEIN, AND E. ZAKRAJŠEK (2017): "Credit-market sentiment and the business cycle," *The Quarterly Journal of Economics*, 132, 1373–1426.

MIAN, A., K. RAO, AND A. SUFI (2013): "Household Balance Sheets, Consumption, and the Economic Slump," *The Quarterly Journal of Economics*, 128(4), 1687–1726.

MIAN, A. AND A. SUFI (2014): "House Price Gains and US Household Spending from 2002 to 2006," Tech. rep., National Bureau of Economic Research.