
The Housing Boom and Bust: Frequently Asked Questions

(Our views on the dynamics of house prices, consumption and related variables around the Great Recession, as developed in our paper *The Housing Boom and Bust: Model Meets Evidence*, forthcoming in *Journal of Political Economy*)

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1. *What's this all about?*

The starting point: a “demand-driven” recession, so a focus on consumption.

The story starts with the massive decline in employment during the Great Recession and the common view that this decline was in part, if not entirely, due to a fall in aggregate demand, i.e. a fall in consumption. One observation that is consistent with this view is that aggregate expenditures on both durables and non-durables increased substantially in the period leading up to the recession, then fell sharply at the onset of the recession and stayed low relative to trend during the recovery. Of course, the co-movement of aggregate expenditures and employment doesn't tell us very much on its own: it's possible that a common factor was the fundamental driver of both employment and consumption dynamics over this period. For example, the Great Recession might have been due to a sudden decline in productivity (perhaps as a result of capital misallocation induced by financial frictions), which led to a fall in employment and consumption. Let's call this view, in which the consumption decline is a consequence, rather than a cause, of the drop in output, the *productivity view*.

2. *So what do house prices have to do with it?*

Regional house price dynamics closely followed regional consumption dynamics, casting doubt on the productivity view, i.e. the view that the fall in output caused the fall in consumption, rather than the other way around.

In a series of influential papers and a popular book, Atif Mian and Amir Sufi cast serious doubt on the productivity view. In Mian, Rao and Sufi (QJE, 2013), they showed that the bust in house prices that immediately preceded the Great Recession, was much more tightly connected with the dynamics of consumption, than were plausible measures of productivity. They used geographic evidence to make this point: regions of the United States that experienced the largest booms and busts in housing net worth were also the regions that experienced the largest booms and busts in consumption. They used an instrumental variables strategy to argue that differences in regional productivity growth or differences across regions in their exposure to an aggregate productivity shock, were unlikely to explain their findings. The regional dynamics of other variables, such as financial wealth and labor income, also support this conclusion.

We find these arguments against the productivity view convincing. The evidence in Mian, Rao and Sufi (2013), strongly suggests that regional productivity shocks were not the joint determinant of regional house price and consumption dynamics, and that the causation runs mostly from house prices to consumption rather than the other way around.¹

In fact, we view these empirical results as so important for understanding the Great Recession that we replicated them with easily accessible data so that we, and other researchers, could better understand the evidence for ourselves. We used different data on non-durable expenditures and different data on house prices, and we explored many controls and alternative specifications. Our findings confirmed those of Mian, Rao and Sufi (2013), both qualitatively and quantitatively. We estimated that over the Great Recession period, the elasticity of real non-durable expenditures to regional house-price induced changes in housing wealth was around 8 percent. Over this period, total housing wealth fell by around 50 percent. Thus, our estimates imply that, all else equal, the decline in housing wealth directly led to a roughly 4 percent decline in expenditures (around half of the actual decline) – easily sufficient to catalyze the fall in demand that sparked the Great Recession.

3. *Ok, so we are done, right? House prices collapsed, and this led to a fall in consumption and a demand-driven recession.*

Not so fast. There are still two key questions left unanswered.

Q1: What caused the boom and bust in houses prices?

Q2: Why did the movement in house prices lead to movements in consumption?

Here are our short answers. Keep reading for the longer answers.

A1: Shifts in beliefs about future house price growth, not changes in credit conditions², were the most important factor driving house price dynamics over this period.

A2: Household consumption followed house prices because of **wealth effects**, not because of collateral effects, forced deleveraging or other credit market disruptions.

4. *Wait! Isn't the idea that a relaxation of credit conditions caused the boom in house prices? And the subsequent tightening of these conditions caused both the bust in house prices and a fall in credit-fueled consumption?*

This *credit conditions view* is indeed an appealing, and once widely-accepted, narrative to explain the house price and consumption dynamics around the Great Recession. It offers a single explanation to answer both Q1 and Q2: changes in credit conditions.

¹ Mian and Sufi also make other claims about the causal connection between credit market conditions, house prices and consumption which, as we explain below, are much less persuasive. But we are convinced by the basic empirical finding of a correlation between housing net worth and consumption dynamics, and that this correlation is unlikely due to differential productivity dynamics across regions.

² We use the term *credit conditions* as a general term to refer to features of households' borrowing and lending environment, both for mortgage borrowing and unsecured borrowing. These include interest rates, maximum loan-to-value ratios, maximum payment-to-income ratios, underwriting standards, rationing in credit supply etc.

Early on in the housing bust there was a widely-accepted narrative that proposed an answer to these two questions, thus providing a (nearly) complete narrative of the Great Recession period: innovations and disruptions in credit markets. The story goes that house prices boomed because of a relaxation in lending standards coupled with an inflow of credit to the mortgage market (driven by investor demand for safe assets and advances in securitization). This led to an increase in demand for houses, which pushed up house prices. As house prices rose, so too did housing collateral, which allowed households to increase their consumption by borrowing against their home equity. When house prices fell, households could no longer access this collateral, and were forced to de-lever or default. Consequently, consumption fell.

This credit conditions view is an appealing narrative because it fits, at least in terms of the words being used, with the idea that the Great Recession was all about disruption in financial markets. After all, data confirms that credit conditions *did* loosen prior and during the house price boom, and *did* tighten around the time that house prices collapsed. This happened in both mortgage markets as well as in markets for unsecured consumer credit. It's also an appealing narrative because of the unexpected nature with which the financial crisis hit – the freeze in institutional financial markets, particularly mortgage-backed securities, happened quickly and with little warning. It's thus plausible to interpret the tightening of credit conditions as an unexpected 'shock'.

5. *Sounds like a reasonable story. What's wrong with it?*

There are several elements of the theory underlying the credit conditions view that don't stack up quantitatively, and there are several pieces of empirical evidence that are inconsistent with this view.

Obviously, we don't dispute that there was indeed a relaxation and subsequent tightening in credit conditions.³ It's just that we don't think these changes in credit conditions were *quantitatively* very important as a causal explanation for the boom and bust in house prices, nor for the associated dynamics of consumption. We do think, however, that they were important for understanding several other features of the data over this period, such as the dynamics of homeownership, foreclosures and household leverage. In our paper, we present a quantitative general equilibrium model of the US economy that matches key features of household portfolios, home ownership, mortgages and consumption behavior. We show that once a model is consistent with these features of the data, changes in credit conditions have only a very small effect on aggregate house prices. Existing models that generate large effects of credit conditions on house prices, do so only because they are inconsistent with one or more of these features of US data.

³ Although, as we explain in the paper, there is some disagreement in the profession over which types of households were most affected by these changes in credit conditions.

6. *Let's start with the theory. Isn't there a long list of papers that show theoretically why an unexpected tightening of credit conditions can cause a fall in house prices and consumption?* Yes, there are many such papers.

6.1. Are you saying those papers are wrong? What's different in your theory?

Two important features of reality are absent from those models: long-term mortgages and a housing rental market.

Let's start with a general point. To get a big effect on behavior from a change in a constraint (any constraint, really), it must be that prior to the change, many households are either on, or very close to, that constraint.⁴ Think about the effect of relaxing mortgage borrowing limits on the demand for housing. For this relaxation to have a large effect on housing demand, it must be that many households are currently constrained in the amount of housing they consume. In other words, it must be that if it were not for the constraint, these households would be consuming more housing. This could either be because of the intensive margin (i.e. some homeowners are constrained from living in a bigger house) or because of the extensive margin (i.e. renters are constrained from buying a bigger house than the one they're renting).

First, consider current homeowners, i.e. the intensive margin. Before the start of the housing boom, very few homeowners appear to be constrained (or close to constrained) in the amount of housing that they were consuming. One way to see this is through data on household leverage. At the time of the boom, median leverage was around 35 percent, and fewer than 10 percent of homeowners had leverage above 90 percent. Thus, the vast majority of homeowners had sufficient equity in their current homes to afford the down-payment on a much larger house if they had wanted one. But they chose not to. Making mortgage credit cheaper or more easily accessible for those households could have at most a small (second-order) effect on their housing demand.

Next, consider current renters, i.e. the extensive margin. This is where the existence of rental markets is crucial. If it were not possible to rent houses, poor households would be constrained in the amount of housing they consume because loan-to-value and payment-to-income ratio constraints would limit the size of the houses that they could buy. A relaxation in either of these constraints would then indeed have a large effect on housing demand. But this type of world without rental markets would have a leverage distribution that looks very different from the distribution in the United States: far too many households would have close to 100% loan-to-value ratios. And the home-ownership rate in such a world would be 100%, whereas in the United States 35% of households rent their homes. When we allow for the existence of rental housing, however, those poor households who have a strong desire to live in a large house (say, because they have a big family) typically rent a house that is close to their desired size, as in the data.

⁴ Or, anticipate being close to the constraint in the future. If not, there is no first-order effect of a change in the constraint on behavior.

6.2. Wait - of course very few homeowners are very close to their borrowing constraints. Since house prices are risky, that would imply very volatile consumption, which households don't like. So looking at the distribution of leverage is not that informative.⁵

This would be correct if mortgages were short-term borrowing contracts that had to be frequently re-negotiated or marked-to-market, as is assumed by much of the existing literature. With short-term borrowing, households are indeed very exposed to fluctuations in house prices. When house prices fall, households must come up with the cash to pay for the drop in the value of their house, so changes in house prices translate into changes in consumption. Since households don't like being exposed to consumption fluctuations, a shift in credit conditions that makes consumption less sensitive to house prices (like an increase in the maximum loan-to-value ratio) can lead to a large change in demand for housing.

The problem with this mechanism is that mortgages are typically not short-term contracts. Most mortgages are very long-term – the most common mortgage is a 30-year fixed-rate contract. With long-term mortgages, households are not *forced* to change either their housing, or their non-durable consumption, when house prices change. With long-term mortgages, a household's short-term budget constraint is completely unaffected by house prices. As long as the household continues to make its (fixed) mortgage payment, it doesn't matter whether it is underwater on its mortgage. The household might *choose* to adjust consumption, but it certainly doesn't have to.

A similar logic explains why a tightening of credit conditions is unlikely to have caused the bust in house prices. Loan-to-value limits, payment-to-income ratios and credit supply only affect the origination of *new* mortgages, not existing ones (whose terms are locked in). With long-term mortgages, existing homeowners are not forced to downsize when credit conditions tighten, so housing demand is not much affected.

6.3. Ok, this makes sense for existing homeowners, but what about renters? Surely they are constrained by credit conditions, since they're stuck renting after all! And didn't homeownership go up a lot during the boom?

It's correct that many renters would prefer to own if they could satisfy lending standards and obtain a mortgage. But, what the theory and data tell us is that these households are constrained in their *tenure* choice (i.e. whether they rent or own), not their *housing* choice (i.e. the size of the house they live in). Both theory and data suggest that when a household can't obtain a mortgage to buy a house of the size it would like, it tends to rent a house of that size, rather than to buy a smaller house. So renters are constrained by credit conditions

⁵ Or put the nerdy way: *Sure, the effects of tightening a constraint are only second-order. But second-order doesn't mean small. Maybe the second-order effects are actually really big, particularly if house prices are risky.*

in the sense that they would rather own than rent, but few are constrained in the actual size of the house that they live in.

What this all means is that when renters become homeowners as a result of a credit relaxation, we see an increase in homeownership without a corresponding increase in the overall demand for housing. From the point of view of the aggregate housing market, it's effectively as if these households are buying the same house that they were previously renting. This is why credit conditions were important for explaining the increase and subsequent decline in homeownership over this period; but this change in ownership did not have a large effect on house prices because it did not have a large effect on aggregate housing demand.

This logic implies that there should have been large flows between rental and owner-occupied housing units during the boom and bust, which is exactly what we see in the data. There was a large increase in the number of housing units that switched from rental to owner-occupied during the boom, and then a subsequent reversal during the bust. Moreover, for a substantial fraction of the housing units, the tenure status changed even though the same household was living in the unit! This is exactly what the theory described above suggests and underscores the importance of considering renting when trying to understand the boom and bust.

7. So if shifts in credit conditions weren't the main driver of the boom and bust in house prices, what was?

We argue that a shift in beliefs about future house prices was the main driver of the boom and bust in house prices.

Here is the idea. A house is an asset, so people own houses for two reasons. First, being a home-owner pays a dividend in the form of housing services, both because owning is just nicer than renting, and also because some types of houses (bigger, nicer, more expensive houses) are hard to find on the rental market. Second, people might buy a house because housing provides an excess return relative to other saving instruments available to them. Houses, unlike most other investment opportunities households have, can easily be used as collateral, making it easy for households to lever up to magnify returns on expected house price growth. In equilibrium, however, the price of housing will adjust to equate returns across different assets.

If people become more optimistic about future fundamentals that impact house prices (for example, they believe housing will be more desirable in the future, or they believe land will become scarcer), then housing becomes a relatively more attractive asset because of the expected price appreciation. This leads to an increase in current demand for owner-occupied housing, which pushes up house prices until the returns on housing and other assets are equilibrated. Similarly, if people become more pessimistic about future fundamentals, house prices fall.

In the paper, we explain why it is the beliefs of current homeowners, rather than current renters, that are therefore the main driver of the dynamics of house prices and the rent-price ratio. But beliefs don't tell the whole story – for beliefs can't explain the dynamics of home-ownership, leverage or foreclosures over this period. For these variables, the relaxation and subsequent tightening of credit is indeed important.

8. *Wait, aren't beliefs about prices endogenous? They can't just move around exogenously. Why do they move?*

Absolutely. Beliefs about house prices are endogenous in our theory. What moves around exogenously in our theory are beliefs about exogenous features of the environment, like preferences and technology.

In our theory, beliefs about prices move around because beliefs about exogenous fundamentals that are important for prices move around. It turns out that it's not too important exactly what these fundamentals are. We think of the beliefs as being over future preferences for housing services vis-à-vis non-durable consumption. But they could equally be over the future supply of available land. What is important is that beliefs are over some change in a fundamental, which, were it to actually change, would have an effect on equilibrium house prices.

So, for example, if people suddenly valued housing services more than non-durable consumption, this would increase demand for housing and would push up house prices. It follows that if people suddenly believed that *in the future* people will value housing services more than non-durable consumption, they will also believe that *in the future*, house prices will be higher. Since houses are an asset, this increases demand for housing, and hence house prices, today.

It's important, however, that only beliefs about future preferences change, rather than actual preferences. In the above example, if people actually started to value housing services more than non-durable consumption, then not only would house prices increase, but non-durable consumption would fall. This is inconsistent with the co-movement between consumption and house prices over the boom and bust. Similarly, if the availability of land fell, rather than beliefs about the future availability of land, then house prices would increase, but housing investment would fall, which is also counterfactual.

9. *That's all very well and good, but credit conditions were relaxed. You said that above. So if the house price boom and bust was all about beliefs, what's the role of credit conditions in all this?*

Credit conditions were still important. Two things:

1. The belief theory actually predicts a relaxation and then tightening in credit conditions, with the causation running from house prices to credit conditions, rather than vice-versa.

2. As we have already alluded to, credit conditions were important for the dynamics of home ownership, foreclosures and leverage.

In our model, households and lenders share the same beliefs about the dynamics of house prices, and this leads to *endogenous* movements in credit conditions when beliefs change. Here is the idea. When lenders believe that house prices are increasing, they are more willing to make loans to high-risk households than they would be if they believed that household prices were falling. This is rational behavior on the part of lenders: households who may appear risky because of low income or low down-payments, are much less risky if lenders believe that house prices will increase. This is because when house prices are rising, a household who cannot afford to make its mortgage payment, can always sell the house and repay the mortgage. The belief shock thus endogenously generates what some economists refer to as a “credit supply shock”: an expansion of lending to high-risk households.

10. *You never answered your second question – if it wasn't the changes in credit conditions then why did the change in house prices lead to change in consumption?*

That's just a wealth effect, it has nothing to do with the use of houses as collateral for borrowing to finance consumption.

See the paper for details.

11. *Your model assume that rental properties are supplied by risk-neutral foreign landlords with deep pockets that are not affected by the relaxation and tightening of credit conditions. Isn't this the reason why you find such small role for credit conditions in affecting house prices?*

No. What matters is the existence of a rental market, and that the dynamics of the rent-price ratio in the model are consistent with the data. Specific assumptions about the owners of rental units or how they are affected by credit conditions are not important.

See the paper for details. The intuition is that frictions (credit or otherwise) among landlords or in the rental market can indeed generate the observed dynamics of the rent-price ratio. But absent a shift in beliefs, this only occurs through a decline and subsequent rise in rents, rather than a rise and subsequent fall in prices.

12. *Is there any evidence in support of the beliefs view over the credit conditions view?*

Yes.

See the paper for details.

13. *If the US housing boom and bust of the 2000's was caused by a shift in beliefs about fundamentals affecting future house price growth, not a shift in credit conditions, what caused the shift in beliefs? And shouldn't that be the focus of future research?*

Yes! Future work should explore this question. Our paper does not offer an explanation for why there was a shift in beliefs about future house price growth. One possibility is that it

was widespread erroneous views on the consequence of the shift in credit conditions on future housing demand that led to the self-fulfilling shift in beliefs. Although we do not have any direct evidence for this, it would reconcile both the credit view and the beliefs view of the housing boom and bust.

The reality is that we don't know why everyone (households, banks, firms) started thinking in 2001 that housing demand would be higher in the future, nor why in 2007 they stopped thinking this. But here is one possibility. The arguments above for why relaxed credit conditions do not have a strong direct effect on house prices are rather subtle, and maybe were not fully appreciated. Indeed, many good economists have argued vociferously that a relaxation in credit conditions *does* directly generate an increase in housing demand. Many papers have been published in top journals arguing for this link. We have demonstrated the fatal flaws in these arguments - but we think that it is safe to say that they are not widely understood.

So perhaps households, landlords and lenders all thought that the change in credit conditions would lead households to want to consume more housing services vis-à-vis non-durable consumption in the future. Perhaps people saw the small initial relaxation in lending standards, reasoned (incorrectly) that future housing demand would increase, and hence believed house prices would grow. This impulse set off a self-fulfilling cycle of higher beliefs about future house prices, faster actual house price growth, and further relaxation of credit conditions.

This idea is highly speculative. But if correct, it would reconcile the credit and beliefs views of the housing boom and bust. It would imply that the credit relaxation and subsequent tightening is ultimately responsible for the housing boom and bust of the 2000's. But only because the shift in credit conditions served as a coordinating signal to shift widespread beliefs about the path of future house price growth.

This note is a non-technical explanation of ideas developed in our paper, "The Housing Boom and Bust", forthcoming in the *Journal of Political Economy*
