Frequently Asked Questions About and Comments On "Supply Constraints Do Not Explain House Price And Quantity Growth Across U.S. Cities" *

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1. **Are you saying that housing supply does not matter?**
   A: No. We employ a standard demand-supply framework in which prices and quantities depend equally on both demand and supply. What our results suggest is that empirical measures of variation in housing supply across MSAs do not matter. Equivalently, housing supply functions across MSAs look pretty similar.

2. **Are you saying that expansions in housing supply do not matter?**
   A: No. If housing supply shifts out for an exogenous reason (for example, if a new technique reduced the cost of construction significantly) then we would expect housing quantities to increase and prices to fall. What our results suggest is that housing supply functions do not seem to depend on empirical measures of elasticities, regulations, or the cost of land.

3. **Hasn't your paper been debunked already? Twice??**
   A: No, not to our knowledge. Wiebe (2025) and Furth (2025) have both released critiques of our paper, but we have also released responses (Louie, Mondragon and Wieland (2025b) and Louie, Mondragon and Wieland (2025c), respectively) that we believe address all of their substantive concerns. In our view, the claim in Louie, Mondragon and Wieland (2025a) that supply constraints do not explain growth in prices or quantities across U.S. cities stands.

4. **How can this be consistent with evidence showing that new construction lowers prices?**
   A: There is no conflict. Those studies examine the effects of shifts in supply on local outcomes, but shifts in supply curves do not tell us anything about the supply curve, they tell us about the shape of the demand curve (picture a standard demand-supply graph). We test if housing supply functions depend on measures of local constraints and find that they do not, but this has no implication for the shape of demand curves.

*The views expressed here are those of the authors and do not necessarily reflect those of the Federal Reserve Bank of San Francisco or the Federal Reserve System.

Studies that look at how housing supply responds to regulatory changes are more closely related to our results and are broadly consistent with the claim that regulatory constraints are not very important (Freemark, 2023).

5. **How can this be consistent with evidence that there is a large housing shortage?**
   A: The evidence on the housing shortage is not without controversy. For example, McClure and Schwartz (2025) find no evidence of a housing shortage in aggregate and only limited evidence in a few localities and even those are not the usual suspects. In our own data, we also find that the growth of housing units outpaced population growth from 2000 to 2020, consistent with their conclusion.

6. **Are you biasing your analysis by grouping cities into two groups?**
   A: No. We check for this by we grouping cities into quartiles and running continuous interaction specifications and all of these give the same results. We also discuss this issue in more detail in Louie et al. (2025a), Louie et al. (2025b) and Louie et al. (2025c). Also, this binning approach is standard in the literature (Glaeser, Gyourko and Saks, 2006; Ganong and Shoag, 2017).

7. **Does this mean that geographically constrained locations like San Francisco are able to just create land for development?**
   A: Definitely not. This question is beyond the scope of our paper, but there are numerous possibilities. For example, it may be the case that there is enough substitution between land and capital *at the MSA level* to offset variation in land prices across MSAs.

8. **Most of your regressions are non-causal (meaning there is no exogenous variation!), how can that be informative about anything?**
   A: This is a key point and it follows from the claim (which did not originate with us) that the measures of supply constraints in the literature actually measure differences in the slopes of supply curves. Then, as long as we are assuming a standard demand-supply framework we do not need plausibly exogenous shifts in demand to be able to observe differences in supply. Instead, all we need is that unobserved shocks to supply are not differentially correlated with demand in more- and less-elastic areas. The intuition is that differences in the slopes of supply curves will be apparent in the combination of prices and quantities. The only threat to this intuition is from unobserved supply shocks that are more positively correlated with our measure of demand in inelastic cities, which we argue would be surprising and also imply that supply constraints do not explain house price growth and housing quantity growth across cities.

9. **Why don't you just use causal estimates like everyone else?**
   A: First, we think it is important to point out that such variation is not necessary. Second, our causal estimates using remote work and, in our updated version of the paper, using standard instruments from the literature give the same results.

10. **Why are your results so different from the rest of the literature?**
A: There are probably two important differences. First, we examine both prices and quantities and many studies focus only on prices. Second, because we look at prices and quantities, we are able to use a broad measure of housing demand and a non-causal research design. This reduces the risk that we pick up a treatment effect that is unique to a specific shock. However, some of our results have been anticipated in the literature (Davis and Ortalo-Magné, 2011; Davidoff, 2013, 2016; Howard and Liebersohn, 2021) as well as Rodríguez-Pose and Storper (2020).

11. **Are you saying that San Francisco is not more expensive than Houston??**
A: No. San Francisco is obviously expensive, but it is not clear that it is expensive relative to incomes. From 2000 to 2020, real house prices in San Francisco grew annually by about 2.4%, compared to 1% for Houston. This puts SF in the 90th percentile and Houston a bit below the median of the distribution of house price growth across MSAs. However, real per capita income in SF grew annually by 2.2% (the 99th percentile!), while Houston's real per capita income grew by just 0.83% annually (slightly above the 10th percentile). In both cases, house price growth was just a bit more than per capita income growth, which is not what one would expect if these cities have different supply elasticities. Our estimates suggest per capita income growth translates into house prices a bit more than one-for-one, so these numbers are exactly what one would expect if they have the same supply elasticity! In other words, the difference between San Francisco's and Houston's house price growth was about what one would expect given the differential income growth in these two areas.

12. **Are you saying that regulations are completely irrelevant?**
A: No. What seems clear from our paper is that regulatory differences across *metro areas* do not seem to matter for differences in house price or quantity growth. But this does not imply that regulations do not matter anywhere or that they do not matter at different levels of aggregation. It is obvious that some localities or neighborhoods do not allow certain kinds of development and this likely affects prices and quantities at that geographic level (Baum-Snow, 2023; Baum-Snow and Han, 2024), but our results suggest that this does not matter for affordability at the metro level. This might be because there is enough scope for substitution across locations or even between land and capital (i.e. by building up) within the metro area. Importantly, there may also be other reasons unrelated to affordability that a municipality might want to change housing regulations and our paper has nothing to say about those discussions.

13. **You look only at house prices, but don't rents matter more for affordability?**
A: In our updated version of the paper we include a measure of rents and find the same results. Our measure of housing quantities captures both rental and purchase housing, so the rental market was already reflected in the quantity results. It would be surprising, although not impossible, for rents to show very different results than house prices in the long run. But our results suggest there is no difference across these markets: housing supply constraints do not seem to matter for growth in rents or prices.

14. **There is a gap in house price growth between more- and less-constrained house prices and the constraint measures are correlated with differential house price growth, isn't this evidence that you are wrong and housing supply constraints do explain housing market dynamics?**
A: No. In the paper we show that this correlation is generally quite small, but even setting this aside it is not evidence for the standard view. In an appendix of Louie et al. (2025a), we show that this correlation actually points to implausibly large, ad hoc shifts in housing supply functions. Intuitively, this is because the constraints are not correlated with differences in housing quantity growth while the supply-centric view requires any difference in prices to translate into differences in quantities proportional to the supply elasticity. Instead we think this correlation is easily explained by differences in demand for housing quality (including amenities like location) relative to demand for quantity.

15. **In some of your figures (e.g. Figure 7a), wouldn't a quadratic line fit the constrained cities better than the linear line? Isn't this a problem?**
A: This is not a problem. The region of the data where both groups of cities have very similar house price growth are areas that are not growing or growing very slowly. These areas are what generates the slight non-linearity, but they should not be informative for the question at hand because the shape of the housing supply curve will not matter for cities with declining housing demand (Glaeser and Gyourko, 2005). It is obvious from the figures that cities that are growing have the same slopes regardless of the measured constraint. We include these low-growth cities to avoid the appearance of cherry-picking the sample, but when we drop them in robustness checks our results are the same.

16. **Your model abstracts from important channels of housing demand, such as expectations or demand from people in other markets, isn't that a problem?**
A: No, we allow for any unobserved shifts in demand. Our model's housing demand equation is

$$\widehat{H}_i^D = \epsilon_y \widehat{Y}_i - \epsilon_p \widehat{P}_i + \widehat{\theta}_i.$$

The correlation between the residual demand $\widehat{\theta}_i$ and the other variables $\widehat{Y}_i$ and $\widehat{P}_i$ is unrestricted. Thus, the model can capture any of those mechanisms through residual demand $\widehat{\theta}_i$.

17. **Your income measure is correlated with other demand shocks, such as amenities, income expectations, and spatial housing demand, won't that bias your results?**
A: Yes, it is possible (even likely) that total income is correlated with other demand shocks, but it does not cause a problematic bias. Those other factors only shift housing demand so they are valid variation for identifying the relative housing supply curves across cities.

18. **Your income measure may be correlated with other supply shocks, wouldn't that cause a bias that prevents you from estimating the supply curve?**

A: If the correlation is the same across inelastic and elastic cities, then the bias is the same for both types of cities and we would still uncover the correct relative difference in supply curves.

(a) **What if the correlation is different?**
A: To explain our results, it would have to be that supply shocks are relatively more important in inelastic cities. But if this were the case:

I. It is still true that supply constraints do not explain differences in housing quantity and house price growth across cities because the importance of supply constraints is offset by the supply shocks.

II. It implies that once we compare high-income growth inelastic and elastic cities, then the inelastic cities have benefited relatively more from expansionary housing supply shocks. Again this is to obscure the effects of the low underlying supply elasticity. But the supply-centric view is that supply has been relatively tight in high-growth, inelastic cities, not that supply has been expanding in these areas.

III. If there is a structural mechanism that links inelastic supply elasticity with more supply shocks in this way, then our estimates of supply elasticities cannot help us forecast housing price and quantity growth going forward or even help us understand the counterfactual effects of changing housing regulations.

IV. Our causal estimates suggests that the correlation is not different.

19. **Your measure of total income is not valid because it contains total population, which is an outcome of the housing market equilibrium and depends on the supply elasticity.**
A: It is true that total income depends on the housing supply elasticity, but that does not mean our empirical approach is invalid. In Louie et al. (2025c), we use standard local labor market models to show that regressions of prices and quantities on total income are valid ways to gauge the empirical importance of supply constraints and in Louie et al. (2025a) we use growth in per capita income and population separately and find the same results. To see why there is no problem in principle, consider the special case in which total housing demand is equal to total income (including population),

$$\widehat{H}_i^D = \widehat{Y}_i,$$

and supply curves differ across regions,

$$\widehat{H}_i^S = \psi_i \widehat{P}_i.$$

In this case, the equilibrium price is

$$\widehat{P}_i = \frac{1}{\psi_i}\widehat{Y}_i$$

So the regression of house prices on income exactly reveals the relative supply elasticities. While this is an odd model, it demonstrates the core idea of our empirical

approach: if supply curves are truly different across cities, then there will be some observable difference in the growth of prices and quantities given changes in observed demand.

(a) **This model is weird because with inelastic demand, population is not really endogenous.**
A: With our benchmark demand curve,

$$\widehat{H}_i^D = \epsilon_y \widehat{Y}_i - \epsilon_p \widehat{P}_i + \widehat{\theta}_i,$$

the same argument applies. If supply is

$$\widehat{H}_i^S = \psi_i \widehat{P}_i$$

then our methodology identifies differences in supply elasticity. This is because there are only demand shocks in this model hence, the argument in 17 applies: we can always identify the relative supply curve using demand shocks. This shows that just because population is endogenous, this does not cause a problem for our analysis.

(b) **What if there are also supply shocks?**
A: We address this in 18, but that point applies regardless of whether income growth is measured including population growth or not.

20. **Your instrument does not satisfy the exclusion restriction so your estimates are invalid.**
A: Endogeneity of the instrument with demand shocks is not a concern, while endogeneity with respect to supply shocks would have to be very specific and would ultimately cast doubt on the validity of measured supply constraints. See points 17 and 18.

21. **Your results do not make any sense, because your estimated supply elasticity is the same across elastic and inelastic areas.**
A: We agree that this result is surprising. One interpretation of this result is that the differences in supply elasticities is much smaller than what existing measures in the literature suggest.

22. **What if the supply elasticity measures you use are just noise?**
A: This interpretation would imply that it may be very difficult to measure underlying differences in supply elasticities (e.g., by measuring differences in regulation), and therefore to find ways that make supply more elastic. If our best measures of housing supply are complete noise, then it suggests we do not know very much about differences in housing supply elasticities or how regulations affect them.

23. **In your derivations, you implicitly assume that the supply elasticity is the same for all cities i in subgroup j.**
A: Yes, this simplifies the derivation of the model. In practice, the covariance between the supply elasticity measures and income growth are always small and generally slightly negative and statistically insignificant, which justifies this choice. We show that this is not a practical or theoretical issue in Louie et al. (2025b).

24. **So what explains differences in house price and quantity growth across cities?**
    A: That's a good question! We are currently working on a number of papers that we think will make useful contributions to answering this question. But we think it is important to first help establish that this is an open and not a settled question.

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