

Reviewer #1

Referee report: Houses as collateral and household debt deleveraging in an emerging economy

The paper documents that, in recent years, Korea is experiencing an unprecedented increase in households' leverage (due to housing market dynamics) and studies the macroeconomic impact of lowering the LTV ceiling. The authors provide an extension of the Iacoviello (2005) - and subsequent - general equilibrium model and calibrate it using Bayesian methods.

The paper provides new interesting insights relating them to an emerging economy. However, the paper still lacks a complete discussion of the related literature. In addition, some robustness checks and/or clarifications are still needed, in my opinion.

A. In the wake of the US financial crisis many papers have investigated the role of households leveraging and de-leveraging cycle for the macroeconomy and welfare. For instance, Justiniano et al. (2015) and Justiniano et al (2019) have analysed the contribution of leveraging and de-leveraging cycle for the US economy. Is there any relation with these studies? What are the similarities/differences between the recent Korean experience and the US pre-2007 dynamics?

B. Other papers have looked at the intersection between monetary policy and households' leverage (for instance, Cloyne et al., 2019). Again, is there any parallel between these studies?

C. Furthermore, Menno and Oliviero (2020) have recently provided a welfare analysis of the impact of spread shocks for borrowers and savers in the US Great Recession using a similar modelling framework. It would be interesting to see if the benefits/costs of LTV ceilings would benefit savers or borrowers or both in your model. This is an interesting topic also in relation to the political economy feasibility of an LTV ceiling. Who would vote for this? How the government could implement such a policy? The paper should, at least acknowledge, that it is silent (so far) about the distribution impact of LTV ceiling and its political economy sustainability/implications.

D. The paper could also benefit from a more detailed discussion about the parallel between the classical mortgage market and the Chonsei system. As far as I understood, the Chonsei model is close to a long-term mortgage. However, the model proposed features short-term loans. It would be useful to verify the validity of the results under a modelling strategy of households' loans that is closer to reality. The authors could borrow from Menno and Oliviero (2020) on how to incorporate long-term mortgages in this type of modelling framework.

References

Cloyne, J., C. Ferreira, and P. Surico (2019): "Monetary Policy when Households have Debt: New Evidence on the Transmission Mechanism," *The Review of Economic Studies*, 87(1), 102-129.

Justiniano, A., G. E. Primiceri, and A. Tambalotti (2014): "Household Leveraging and Deleveraging", *Review of Economic Dynamics*, 18(1), January 2015, pp. 3-20.

Justiniano, A., G. E. Primiceri, and A. Tambalotti (2019): "Credit supply and the housing boom," *Journal of Political Economy*, 127(3), 1317-1350.

Menno D. and Oliviero T. (2020): "Financial Intermediation, House Prices and the Welfare Effects of the U.S. Great Recession" *European Economic Review*, 2020, vol. 129, 10356

Reviewer #2

Referee report on “Houses as collateral and household debt deleveraging in an emerging economy”

Summary

This paper analyzes the macroeconomic effects of deleveraging using a DSGE model with housing sector. Because a lower loan-to-value (LTV) ceiling limits the size of household debt, the deleveraging effect caused by borrowers' re-optimization is alleviated as the LTV ceiling decreases. When the housing price is included as an additional operating target in an otherwise standard monetary policy rule, the optimal response to a housing price shock differs depending on the source of the shock. These findings suggest that deleveraging risk can be attenuated by adopting a lower LTV ceiling and maneuvering monetary policy asymmetrically depending on the source of a shock.

General Evaluation

1. Regarding the contribution, it is not very clear to me how this paper contributes to the existing studies, particularly Iacoviello and Neri (2010). If I understand correctly, the contributions can be listed as follows,

- Include housing in the DSGE model to examine its investment and collateral role
- heterogeneous households
- treats housing construction as a separate production sector

I believe all these features are already considered in Iacoviello and Neri (2010). I think the main contribution is another application of Iacoviello and Neri (2010)'s model in Korea. I think the authors should address the contribution more clearly and precisely.

2. Section 2.1: The following paragraph should be moved before this Section, as it introduces borrowers as well.

We denote the two types of households as $j = 1, 2$. These household types have different subjective discount factors ($\beta_i, i = 1, 2$), and the discount factor of type 1 households is greater than that of type 2 households, that is, $\beta_1 > \beta_2$. We refer to type 1 households as “savers” and type 2 households as “borrowers.”

3. The use of exp: in the DSGE literature, we do not normally write ‘exp’ in the paper. But in the Matlab code, such as Iacoviello and Neri (2010), we write it in a non-linear way. It would be more clear if the authors can present the model without exp.

4. There is no shock in Eqauation (26)? Can the authors justify this? The estimation results should be sensitive to the shocks you chose to add. If there is no shock to the inflation, it may enter into the related variables, causing the other type of shocks to behave differently. As you have inflation data,

5. Section 2.6: you need a subsection or another section named as ‘calibration’ where you should explain why you set those parameters. I am not very convinced with the majority of your calibration, as you only follow them from the literature. What about the targeted steady-state ratios, such as C/Y ratio? It would be better if authors can show a comparison between your calibrated ratios and data ratios, similar to Table 2 in Liu and Ou (2020).

6. At page 12, it is stated as,

The data used in the estimation are real private consumption ($c_t (\equiv c_{1,t} + c_{2,t})$), non-residential investment ($i_{s,t}$), residential investment ($i_{h,t}$), the consumer price index (CPI) inflation rate ($\pi_{s,t}$)....

I think you only use the data of inflation for estimation. If that is the case, you should remove

CPI to avoid confusion.

7. This paper investigates different policy rules, such as Section 3.4. The authors should consider adding some welfare analysis.
8. What about the data fitness? Bayesian estimation can only tell you the best way to fit data. However, it does not tell you how far your model is away from the actual data. It would be better if authors can show some moment comparison to prove the model relatively fits the model.

Reference

Iacoviello, M. & Neri, S. (2010), Housing Market Spillovers: Evidence from an Estimated DSGE Model, *American Economic Journal: Macroeconomics*, Vol. 2, pp. 125-164, American Economic Association.

Liu, C. and Ou, Z. 2020. What determines China's housing price dynamics? New evidence from a DSGE-VAR. *International Journal of Finance and Economics*.

Reviewer #1 second round

Decision: Accept.

Reviewer #2 second round

I am quite happy with the improvement of the paper by adding more empirical analysis to the paper.