

Discussion on

Wu and Xia (2016)

“Measuring the macroeconomic impact of monetary policy at the ZLB”

Santiago García-Verdú

CEMLA and Banco de México

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Summary

- Prior to GFC, the ZLB was for, the most part, an academic peculiarity. In the GFC's aftermath, the ZLB attracted a lot of attention from scholars and policy makers.
- Researchers soon recognized that the more common interest rate models were not going to be adequate.
- To be fair, while several models ignore the ZLB (eg, NATSM), others models such as the Cox-Ingersoll-Ross, which impose a bound (ie, Feller condition).
- A key idea in this strand of the literature is based on Black (1995), as Professor Wu explained.

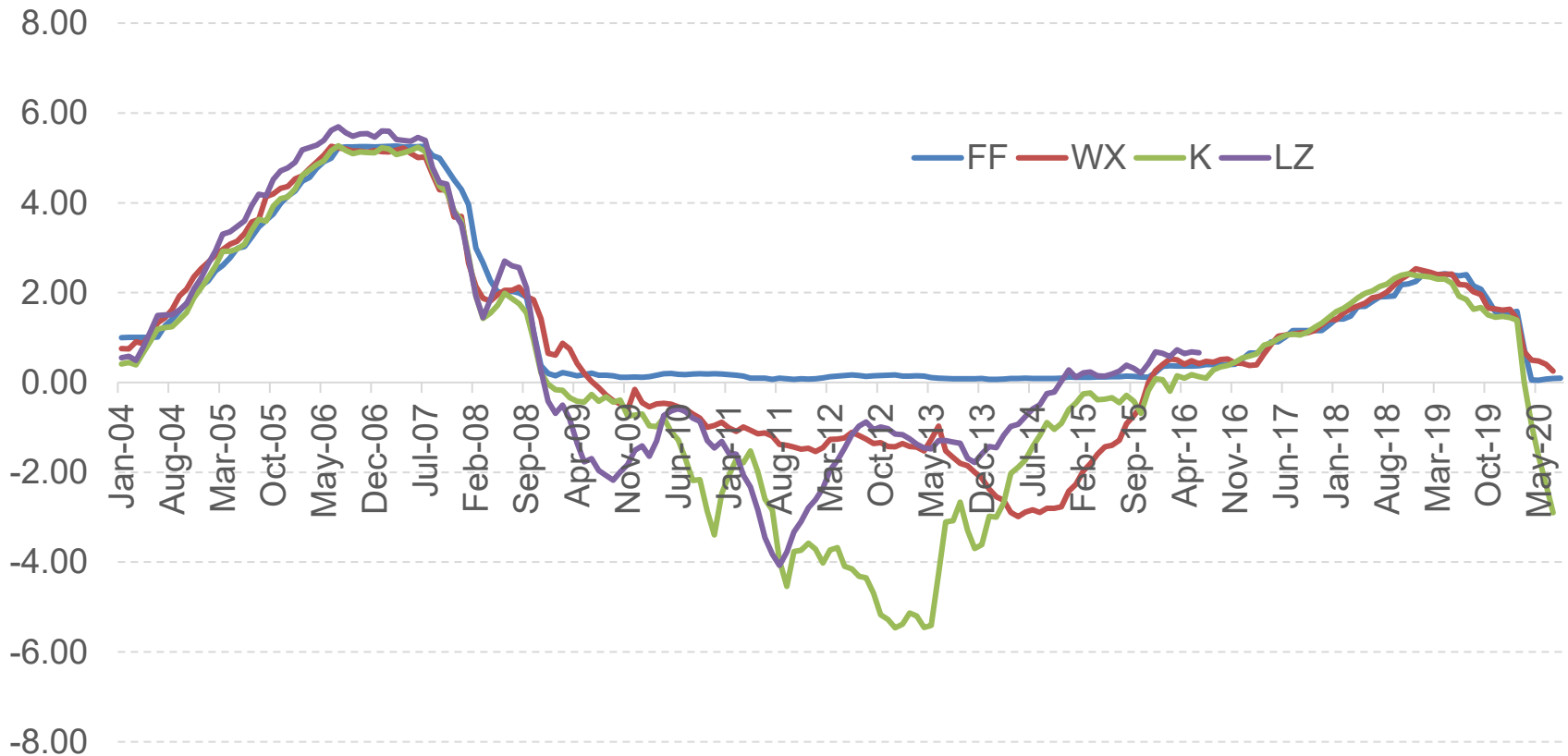
$$\textit{Nominal short_rate} = \max(\bar{s}, s_t)$$

- Wu and Xia develop a shadow rate to measure the MP stance
 - ✓ *Propose a model, forward rates' approximation.*
 - ✓ *They also consider $E(\tau)$ an expected "hitting time".*

Some alternatives to Wu and Xia's shadow rate

- Ueno et al. (2006)
 - ✓ *Based on Black (1995)*
 - ✓ *Japan's ZIRP*
- **Krippner (2013)**
 - ✓ *Proposes a model. Numerical integration.*
 - ✓ $E(\int_0^{\tau} K(t) I_{K(t)<0} dt)$.
- **Wu and Xia (2016)**
- Garcia and Skaperdas (2017)
 - ✓ *Statistical approach*
 - ✓ *Focuses on real variables.*
- **Lombardi and Zhu (2018)**
 - ✓ *Statistical approach*
 - ✓ *Lots of data.*
- Rezende and Ristiniemi (2018)
 - ✓ *ZLB not necessarily binding.*

The Federal Funds Rate, Wu and Xia, Krippner, and Lombardi and Zhu Shadow rates



Note: FF stands for Federal Funds Rate, WX for Wu and Xia shadow rate, K for Krippner and LZ for Lombardi and Zhu. **Sources:** Krippner, Wu and Xia, Lombardi and Zhu (not publicly available) and FRED.

Remarks on Wu and Xia

- A central exercise in the paper is based on Bernanke, Boivin, and Eliasch's (BBE) paper (2005).
- BBE is well-known, which in a way makes it a good benchmark. But BBE use a FAVAR, to reduce dimensionality.
- Thus, on the one hand, you have solved a non-linearity problem in your paper. If anything, GFC showed that non-linearities can very important.
- Yet, PCA is used in FAVARs, I then have two issues with using BBE to provide support to the model; in particular, around a crisis.
 - ✓ *Algebraically, PCA might miss non-linearities.*
 - ✓ *Probabilistically, PCA can be problematic using small samples and time series with fat tails.*
- After all, modelling crises' periods was not a concern in BBE (2005).

Final Remarks

- This paper is an important contribution. The shadow rate is (once more) a relevant measure.
- Of course, Krippner (2013), Wu and Xia (2017), Lombardi and Zhu (2018), and other researchers have defended their approaches. But it might be desirable to have some consensus. Policy makers prefer one, if feasible.
- Wu and Xia's (2017) shadow rate and other indicators summarize information. They attempt to measure several UMPs and their features.
- Perhaps, the underlying problem is that a one-dimensional indicator is not a sufficient statistic in a crisis.
- The use of complementary linear models, which perform well for distributions with thin tails **could** be favoring its macro-financial performance.

References

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