The Liquidity-Augmented Model of Macroeconomic Aggregates

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FREQUENTLY ASKED QUESTIONS

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We use this space to answer questions that are too specialized, or that require too much detail, to be answered in the main text of the paper. They are actual questions from actual people: colleagues, seminar participants, referees, etc. Some are paraphrased.

1. **The most interesting questions in economics are not really what is the optimal level of inflation in steady state, or how to deal with liquidity traps in steady state, but rather how to react to those traps and to fluctuations in a stochastic equilibrium.**

    Readers will disagree on what they find "interesting". However:

    – The question of the optimal level of inflation in steady state fills a long and distinguished chapter in monetary economics;

    – On the contrary, why would anyone think a stochastic model is the best way to look at a liquidity trap? The well-known zero-lower-bound episodes went on for years;

    – How policy should react to fluctuations is certainly something the LAMMA can be used to study. We are working on it, and we expect the answer to fill one or more papers on its own.

2. **Is there such a great need for a new textbook model of liquidity traps?**

    We think so! Not counting the less formal treatments of Old Keynesian days, existing models come in two kinds: the New Keynesian model where the zero lower bound matters because of sticky prices, and various liquidity-based approaches where the zero lower bound indicates a shortage of liquid bonds relative to their demand. As we explain in the paper, we find the former unsatisfactory both on empirical and conceptual grounds. Our proposal is to augment the latter with a role for liquid capital, obtaining a model that is tractable, intuitive, and in line with the evidence (liquidity traps can be arbitrarily persistent, they do not cause disinflation, and expansionary supply shocks are still expansionary).

3. **Several recent papers have successfully modeled imperfect substitution between assets by assuming that they all serve as media of exchange (or collateral), but to different degrees. For example, to make a purchase you can spend 20% of your capital, 50% of your bonds, and all of your money. Instead, you assume that money is the only medium of exchange but other assets can be liquidated in a secondary market. Why?**

In previous work, we have referred to these ideas as the "direct liquidity" and "indirect liquidity" paradigms. (See our literature review in the paper.) We agree that both are valid and useful. For our purposes, we prefer indirect liquidity because:

– In terms of ease of modeling, indirect liquidity is no harder.

– In terms of empirical relevance: many assets do serve as media of exchange in some context. But *practically every* asset can be sold – or pawned – when money is needed.

– Introducing a more complex secondary asset market into our general equilibrium framework is plug-and-play, because the value functions of AM participants are linear and the timing is straightforward. Banking? Brokers and dealers? Some market segmentation? More assets? Noise traders? Please be our guest.

4. **Would it not be more realistic to model portfolio reallocation via a banking sector rather than an asset market?**

Perhaps? We prefer the modeling device of a competitive asset market because it is transparent and easy to extend with additional market frictions. But if the reader thinks that a model with an imperfectly competitive banking sector, monetary policy being implemented in the interbank market, is a superior approach, we would be happy to collaborate on finding out.

5. **Why are you assuming that capital is less liquid than bonds ($\eta < 1$)? Is that not putting the thumb on the scale in favor of your results?**

Not really; on the contrary, our main points require that η be *high enough*. Only the corner $\eta = 0$ (capital can never be traded) would be a serious problem for our argument, as we explain on pages 26-28. But this is not a realistic case, for two reasons. The macro reason is that bonds and capital must be substitute assets, because lower bond interest rates stimulate investment rather than depress it. The micro reason is that we know capital can be sold (or used as collateral) to obtain money when needed, with probability (i.e., trading speed) maybe not equal to one, but certainly above zero.

If, on the other hand, you prefer to read our paper with $\eta = 1$ in mind (capital and bonds are equally tradable), that is fine with us. All the interesting results survive – with the

exception of the comparative statics of η itself, which we find interesting, too.

6. **What about credit and collateral in this economy? Instead of selling capital at a disadvantage with respect to bonds, why not use it as collateral instead?**

   We agree that many real-world assets are liquid not because they can be sold, but because they can be used as collateral to obtain a loan. Indeed, our model is mathematically isomorphic to one where bonds can be used as collateral up to their face value, whereas capital collateral is subject to a $(1 - \eta)$ haircut. (See page 9 in the paper.)

   Hence, we would not say that capital is sold "at a disadvantage", which makes it sound like a capital seller gets a worse deal than someone selling bonds. This is not the case. Capital is "harder to sell" – either in the sense of a low sale probability or a low fraction that can be sold, which are again mathematically equivalent interpretations of $\eta < 1$ – but the seller gets full market value for (the sold portion of) their capital.

7. **Is this a cash-in-advance model?**

   Extensionally, yes; intensionally, no. On the one hand:

   – The model includes a constraint whereby shoppers need to pay for goods with a medium of exchange, and only money can fulfill this role.

   However:

   – "Cash-in-advance" is not only the name of a constraint, but of a *literature*, which comes with connotations. We call our model "New Monetarist" because the frictions that make money *emerge* as the only medium of exchange, albeit simple in our model, are made explicit. (We are also open to criticism that they are too simple, and to deepening them in future work once the macroeconomic validity of the model is established.)

8. **Is there Ricardian equivalence when introducing and taking out bonds to manage the interest rate?**

   No. The government in our model is the unique agent who can issue *liquid* debt, so it (generally) faces lower borrowing costs than any private agent would. This is not far from reality: yes, many institutions issue short-term liquid debt (e.g., banks do), but they do not do this for free, and in many cases they hold government assets as a liquid reserve.

   This should not be too surprising in a monetary model. After all, Ricardian equivalence does not apply to the form of government debt we call "money".

9. **Do any new mechanisms of monetary policy implementation or consequences of such policies come out of your paper?**

Certainly. Papers exist that model monetary policy as setting the yield on a highly liquid short-term bond as the main policy instrument, but they can be counted on one hand. (See the citations in the paper.) This modeling choice has major advantages. Among them: (a) the tight link between inflation and the policy rate (present in most New Monetarist models) is broken; (b) it is clear that monetary policy control over the policy rate does not require the assumption of sticky prices (in contrast with the New Keynesian model); (c) the model is stylized enough to be tractable in general equilibrium; thus (d) more details about implementation (e.g., profit making intermediaries) can be added as plug-and-play.

10. **You claim that monetary policy sets the target rate for "overnight loans needed to meet short-term business needs". But in the model, shoppers are converting bonds for cash in the asset market with the express intent of buying consumption goods.**

The model is still an abstract macro model where a "shopper" could be anyone, including a business. Note that shoppers in the model buy *output* goods, not consumption goods, and only allocate output between consumption and investment uses in the following subperiod.

All we claim is that monetary policy works by setting the interest rate on a highly liquid short-term asset, and that this asset (whatever it is in a particular country, at a particular time) could *not possibly* correspond to the illiquid bond which is priced by the familiar equation: $1 + i_t = \phi_t u'(c_t)/\mathbb{E}_t\{\beta\phi_{t+1}u'(c_{t+1})\}$.

11. **You keep using that word, "overnight loans". Do you seriously wish me to interpret a period in the model as a day (or the difference between sub-periods as overnight)?**

We interpret a period as a month or thereabouts, like in most DSGE models. However, we do indeed think of the time between subperiods as a day or maybe two. We named the markets AM and PM for a reason.

12. **The paper captures many elements dispersed in the literature, but I am afraid the contribution is then pedagogical and expositional more than conceptual or formal.**

We absolutely intend to make a pedagogical contribution with this paper, and we are not sure why this should not 'count'. An argument that has been latent in previous work but underappreciated is an argument worth making again – ideally in a simple and tractable model that makes the argument, including its limitations, transparent.

That said, our contribution is not only pedagogical. 'New' results include: (a) a tractable model of a monetary authority setting the yield on a highly liquid instrument via intervention in secondary asset markets – i.e., the way monetary policy *actually happens*; (b) a formula for the optimal long-run combination of interest rates and inflation; (c) a liquidity trap where the return on capital is stuck at a lower bound, yet still too high for the first best, without sticky prices.

13. **As with most New Monetarist models, a number of special assumptions make the model extremely stylized and thus far from being useful for quantitative analysis.**

    As the Euler equations (7)-(9) show, the LAMMA nests the standard neoclassical model and *augments* it with a theory of liquid assets. Extensions can be added as needed. Our intention was very much to construct a DSGE model both consistent with monetary theory and ready for quantitative analysis.

14. **The best way to leverage this framework is to show how the model performs quantitatively, study realistic policy interventions in asset markets, and compare the model to its RBC and New Keynesian counterparts.**

    We could not agree more – stay tuned.