

Discussion of the Lagos-Zhang paper

**On Money as a Medium of Exchange  
in Near-Cashless Credit Economies**

by Randall Wright

UW-Madison and FRB Minneapolis

- This paper continues the long tradition of work in Minneapolis at the U and the Fed on monetary economics.
- That tradition has rigor and creativity I find all too rare in macro:
  - general equilibrium theory
  - mechanism design
  - search theory
  - bargaining theory
- Inspiration comes from Wallace, Sargent, Townsend.
- And let's not forget Kiyotaki and Kocherlakota.
- Or Hurwicz!
- And perhaps most importantly, Lagos (more on this below).

- The HWT approach: institutions should arise endogenously, including monetary exchange, credit arrangements, and financial intermediation
- For many questions, it is bad economics to impose missing markets, CIA constraints, nominal or otherwise incomplete contracts, etc.
- **Market structure – i.e., trading arrangements – should be an outcome of, not an input to, our models**
- Examples:
  - if agents in a model want to use cash we should let them (as in LZ)
  - if they prefer not to use cash we should not force them
  - if they want indexed contracts we ought not preclude them
  - if they prefer deposit contracts that prevent bank runs, we go very, very wrong by disallowing them

- Like LZ, I use search theory because it builds on the idea missing from GE (Debreu) that **agents trade with each other**
- That is (I think) necessary for asking *how* agents trade – do they use barter, money, secured/unsecured credit, intermediaries ...?
- It's not about spatial separation per se – the issue neglected is GE is **how do we pay for stuff?**
- CIA models (trivial perturbations of GE) are useless in this regard
- Kehoe-Levine credit models are better, although some of us prefer versions that are not so "Walrasian"
- Even more important for banking (Gertler-Kiyotaki; Christiano)

- Monetary theory is hard because exchange patterns are endogenous:
  - who trades with whom? when? where? how do they pay?
  - how do they determine terms: bargaining, price posting, auctions ... ?
- Equilibrium search theory (Diamond) speaks to these issues, but, when agents trade with each other:
  - models can be computationally intense (Molico; Krusell-Smith)
  - competitive price taking is not so appealing
- Question: Is that why search-based monetary economics is sometimes disparaged/despised by some Minnesotans?
  - I don't take it too personally (recall Trejos, Lagos, Menzio...)
  - Wallace certainly embraced it (recall sequential service)

- Serious monetary economics has traditionally been somewhat unpopular outside Minnesota, too.
- Azariadis: “Capturing the transactions motive for holding money balances in a compact and logically appealing manner has turned out to be an enormously complicated task. Logically coherent models such as those proposed by Kiyotaki-Wright tend to be so removed from neoclassical growth theory as to seriously hinder the job of integrating rigorous monetary theory with the rest of macro.”
- Kiyotaki-Moore: “The matching models are without doubt ingenious and beautiful. But it is quite hard to integrate them with the rest of macroeconomic theory – not least because they jettison the basic tool of our trade, competitive markets.”

- Then along comes Lagos, bringing some competitive markets back on board with his CM-DM structure
- This hugely simplifies the analysis, plus it integrates pure monetary theory with mainstream macro
  - Kyland-Prescott is a special case, which I find useful, but maybe not everyone agrees
  - but relative to that special case there are many new elements
  - some quibble with functional forms, although these emerge endogenously in Rogerson-Hansen economies
- Anyway, Lagos' idea provides a benchmark for monetary economics, like neoclassical growth theory is a benchmark in mainstream macro

- Question: Why bother with (relatively-well) microfounded models?
- Neil says there are two reasons:
  - to check the consistency or correctness of claims
  - to derive new insights
- This LZ paper concerns the first
- **The claim:** because money is a small part of life in the good old USA, it is ok to ignore it when analyzing Fed policy
  - Aside 1: is it ok to also ignore banking, asset markets, credit arrangements? (Woodford did worry about this)
  - Aside 2: the idea is subject to the Bob Hall critique

- In any case, LZ **prove the claim false**: the limit of a monetary economy, as money gets used less and less, is **not** the nonmonetary economy people have been studying
- They show this in several versions of the benchmark monetary model (and other models)
- Is this discontinuity surprising?
  - in many models of money, or credit,  $\infty$ -horizon economies are not well approximated by  $T$ -horizon economies for big  $T < \infty$
- Whether or not surprising, it is profound and important
  - perhaps especially for those who work at the Fed with its mandate to analyze and implement monetary policy

- Here are some related results:
  - a credit crunch that is very painful in a nonmonetary economy is neutral in the same economy with valued fiat currency – similar to LZ
  - financial intermediaries have positive strategic effects – also similar to LZ – when agents are not satiated in liquidity
  - agents/markets that do not use cash are affected by inflation if other agents/markets do
  - we use credit too much and cash too little
  - models of secured credit are isomorphic to monetary models – another Lagos idea, but I want to write it up so I can use the title:

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*Is Kiyotaki Right to Think there's More in  
Kiyotaki-Moore than Kiyotaki-Wright?*

- The point of these examples is not to minimize the LZ result, but to emphasize that there are many other interesting implications of their framework
- I also emphasize that the issues LZ are studying in general concern not only fiat currency
  - we can add banks and interpret money as M1
  - we can replace currency with real assets
  - we can have multiple assets that may or may not be perfect substitutes as payment instruments
  - acceptability and pledgeability can be (relatively solidly) microfounded using private information
  - assets can be interpreted as serving either as media of exchange or as collateral in secured credit
  - we can add (endogenously or exogenously limited) unsecured credit

- In closing, on monetary methods and models, consider Hahn, who begins with: “The natural place to start is by taking the claim, that money has something to do with the activity of exchange, seriously.”
- Then concludes with: “I should like to end on a defensive note. To many who call themselves monetary economists the problems which I have been discussing must seem excessively abstract and unnecessary. Will this preoccupation with foundations, they may argue, help one iota in formulating monetary policy or in predicting the consequences of parameter changes? *Are not IS and LM sufficient unto the day?* It may well be that the approaches here utilized will not improve our advise to the Bank of England; I am rather convinced that it will make a fundamental difference to the way in which we view a decentralized economy.”

- These days I am less defensive
- An issue the Bank of Canada, e.g., *really* cares about right now concerns CBDC, reminiscent of the bimetallism debates that were a huge issue historically in US monetary policy discussion
  - as a policy option, OMO's and even QE **pale by comparison**
  - the **only** models that can inform these discussions are ones like LZ
- Thus LZ are carrying on the Minnesota tradition of developing new approaches to monetary economics (as in business cycle theory, econometrics, etc.) that ultimately may have big policy implications
- That tradition flourishes here in Minneapolis in large part due to the cooperative arrangement between the U and the Fed