

# Research Statement

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My research areas are monetary economics, macroeconomics and international economics. I use search and matching theory, information economics and others to study liquidity, frictional markets, monetary theory and policy. I have published in *China Economic Review*, and have three papers under R&R (revise and resubmit) at the *Journal of Monetary Economics (JME)*, *International Economic Review (IER)* and *Journal of Economic Dynamics and Control (JEDC)*. My current work concentrates on three sub-areas of monetary economics and macro: first, conventional and unconventional monetary policy; second, frictional capital reallocation and firm investment; third, digital currency, international portfolio choices and financial intermediation. I also do work on the Chinese economy and other interdisciplinary areas. This research statement covers them as follows.

## 1. Conventional & Unconventional Monetary Policy

This was the core part of my PhD dissertation. After the 2008-2009 Great Recession, unconventional monetary policy (i.e. Quantitative Easing) in the U.S., Japan and other advanced economies have inspired research interests. My work is motivated by how conventional and unconventional monetary policy can affect the returns on money and other assets, and further affect the real economy.

### 1.1 Liquidity, Monetary Policy and Unemployment (*R&R, International Economic Review*)

This paper was my PhD job market paper. It is joint work with Mei Dong. In this paper, we discover a consumption channel of monetary policy in a model with money and government bonds. When the central bank withdraws government bonds (short-term or long-term) through open market operations, it lowers the returns on bonds. The lower return has a direct negative impact on consumption by households that hold bonds, and an indirect negative impact on consumption by households that hold money. As a result, firms earn less profits from production, which leads to higher unemployment. The existence of such a consumption channel can help us understand the effects of unconventional monetary policy.

### 1.2 Open Market Operations (*R&R, Journal of Monetary Economics*)

This is joint work with Guillaume Rocheteau and Randall Wright. In open market operations, a central bank swaps currency for bonds. In this paper we show how injecting money in this way is different from transfers, as policy is usually formulated in similar models. For this we capture liquidity explicitly by modeling the roles of assets in frictional exchange. Under various specifications for market structure and the acceptability or pledgeability of assets, we discuss implications for the Fisher and quantity equations, the possibility of negative nominal yields, liquidity traps, and market segmentation. When liquidity is endogenized using information theory, multiple equilibria emerge with different policy predictions. We also analyze interest-bearing reserves.

### 1.3 Future Work

My future work builds upon my above two papers. In the IER paper, we discover a consumption channel of monetary policy. As it is mainly theoretical, I plan to conduct empirical work on the consumption channel for future research. In the JME paper, we study negative nominal interest rates and liquidity traps, which are big challenges for a few major economies. For future research, I am thinking about doing more work on negative interest rates, e.g., the impacts on asset returns, and the real economy.

## 2. Frictional Capital Reallocation and Firm Investment

My work on frictional capital reallocation and firms' financial and real investment is motivated by the slow recovery of investment after the Great Recession in the U.S. and other major economies.

### *2.1. Frictional Capital Reallocation I: Ex Ante Heterogeneity (R&R, Journal of Economic Dynamics and Control)*

This paper is joint with Randall Wright and Yu Zhu. It studies dynamic general equilibrium models where firms trade capital in frictional markets. Gains from trade arise due to ex-ante heterogeneity: some firms are better at investment, so they build capital in the primary market; others acquire it in the secondary market. Cases are considered with random search and bargaining, or directed search and posting. For each, we provide results on existence, uniqueness, efficiency and comparative statics. Monetary or fiscal policy are discussed at length. We also discuss how productivity dispersion can be countercyclical while capital reallocation and its price are procyclical.

### *2.2. Frictional Capital Reallocation II: Ex Post Heterogeneity (mimeo)*

This is a companion paper for the above JEDC paper (also joint with Randall Wright and Yu Zhu). In this paper, we alternatively study a formulation with ex post heterogeneity, where firms in the secondary market have similar capital stocks but different productivities due to idiosyncratic shocks. After the shocks, high productivity firms can acquire capital from lower productivity firms. Compared to ex ante heterogeneity, this paper shows higher capital investment raises buyers' outside option and thus improves their terms of trade in the decentralized capital market. It also generates procyclical reallocation, countercyclical misallocation and other results.

### *2.3. Firms' Financial vs. Real Investment: Liquidity and Capital Reallocation (mimeo)*

This is my sole-author paper. In this paper, I build micro-founded models featuring frictional asset market and frictional capital market, to address the interaction of firms' financial and real investment, and the effects of monetary policy on asset market, and on capital investment and reallocation across firms. The results show there are different types of general equilibrium, depending on the regimes of inflation and asset supply. Two types of monetary policy are discussed: one is the conventional policy, i.e., changing inflation rate; the other is unconventional policy, i.e., asset purchase by central bank. The latter is only valid when the asset constraint is binding.

## **3. Digital Currency, International Portfolio Choices and Financial Intermediation**

Digital currencies like Bitcoins are electronic tokens stored on an open and decentralized electronic payment system. In recent years, digital currencies have gained huge popularity among investors and also greatly inspired research interests, empirically and theoretically, among researchers. I have two work-in-progress on digital currencies, which are based on my work on monetary theory, but also extended to international macroeconomics.

### *3.1 Digital Currency, International Portfolio Choice and Capital Control*

This is a joint paper with Adrian Lee. As is known, it is controversial if digital currencies like Bitcoins are financial investment products, or payment methods. The price of Bitcoins is very volatile, and the recent price has reached the sky-high level of US\$7,000, which attracts more and more investors to hold or trade Bitcoins. China is the biggest market for Bitcoins, but recently the Chinese government has banned the operations of Bitcoin exchanges in China. One of the reasons cited is as a form of capital control, which is to prevent citizens from transferring assets or investments through Bitcoins, outside of the home country.

In this paper, we try to address these questions: How does digital currency such as Bitcoin change international portfolio choices of investors? Have digital currencies reduced the effectiveness of capital control? If so, what policies may governments use to contain it? To our knowledge, this paper is the first to address the issue of digital currency and capital control. It will not only enhance our understanding on the mechanism of how digital currency affects capital control, but have important fiscal/monetary policy implications for emerging economies like China, Brazil, and open economies, such as U.S., Australia, New Zealand, etc.

### *3.2 Digital Currency, Financial Intermediation and Monetary Policy*

The blockchain technology behind digital currencies has also gained popularity among financial institutions and even central banks. Some central banks are studying the feasibility to issue their own digital currencies in the future. This motivates my other work on digital currency and financial intermediation. In this project, I plan to build a monetary model with two types of money, i.e., fiat money and central-bank-digital money. Individuals can

deposit or withdraw fiat money in financial intermediaries (e.g., banks). But central-bank-digital money is based on the blockchain technology and can support payments without any financial intermediary. The purpose is to analyze the effects of central-bank-digital money on financial intermediation and monetary policy.

#### **4. Other Research & Publications**

##### *4.1. Rural-led Exchange Rate Appreciation in China (China Economic Review)*

This paper was originated from the first paper of my doctoral thesis. It became a joint paper with G. Menzies and others, and was published at *China Economic Review*, 39, July 2016. It studies the effects of factors being over-allocated to non-traded production on the movements of real exchange rate in China. The departure of a factor in excess supply in a non-traded rural sector leads to a Rural-led Exchange Rate Real Appreciation (RERA), in a dual economy setup. The RERA highlights for the first time a potential link between intra-national factor movements and real exchange rates. In China, where there is excess labor employed in the production of (largely) non-traded rural goods, we attribute around one third of the recent appreciation of the real exchange rate -- defined as the relative price of nontradables -- to a RERA effect.

##### *4.2 A Search-based Model on Sharing Economy: Taxi Industry (Work in Progress)*

In the current sharing-economy era, new technologies have entailed Uber or other companies to change the business mode in taxi industry. This paper aims to build a model to explain how the Uber business mode change search and matching between passengers and drivers. Probably novel to the existing literature on taxi industry, my paper also uses a monetary search model to show how different payment methods (money or credit) matters to the changing business modes in taxi industry.