

# Research Statement

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Any competitive equilibrium of an “Arrow-Debreu” economy is Pareto optimal. Yet in the real world the space of marketable claims and contracts is generally incomplete and, thus, welfare issues often arise in a competitive equilibrium.<sup>1</sup> My research builds on this basic argument of economic theory and investigates how various forms of incompleteness in financial markets and contracting translate into real economic outcomes, with a focus on the subjects including corporate finance, banking, international finance and applied macroeconomics.

In my Ph.D. dissertation, “**Essays on Incompleteness in Financial Markets and Contracts**”, which consists of five chapters, I study how incomplete markets and contracts interact with three core issues in finance: (1) liquidity, (2) debt capacity, and (3) corporate governance. In studying these questions, I employ both theoretical and empirical approaches.

## 1. Bank Liquidity

In providing liquidity insurance to households and credit to finance illiquid projects, banks are subject to liquidity problems and thus have a concern about their short-term funding conditions.

In Chapter 1 of my dissertation, “**Optimal Banking System for Private Money Creation (Job Market Paper)**”, I study how should the banking system be designed under a setting where markets and contracts are incomplete, to most efficiently create the private money in an economy (i.e., bank deposits), which need to be made both *liquid* and *safe*. I identify three market failures: 1) an incentive problem, 2) a commitment problem, and 3) a coordination problem, as consequences of the combination of a safe asset creation constraint under liquidity risks with certain markets (and contracts) being missing. A competitive banking market is shown to have a mixed effect on efficiency: It alleviates the incentive problem, which is more economically relevant when the economy is subject to idiosyncratic shocks; but it exacerbates the commitment problem, which becomes more relevant when the economy is subject to systemic shocks. Finally, I show that a coordination problem arises when banking markets become sufficiently competitive: no

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<sup>1</sup>See Geanakoplos and Polemarchakis (1985) and Greenwald and Stiglitz (1986)

private safe assets can be created in the economy without proper liquidity regulations (e.g. uniform reserve requirements) being imposed.

Two salient features of the banking sector are its heavy reliance on short-term funding and the existence of imperfect competition in banking markets. Chapter 2 of my dissertation, **“Bank Liquidity Price and Banking Market Competition”**, empirically investigates how competition in bank funding markets generates real impact through affecting the determination of short-term liquidity prices for banks. Exploiting the exogenous variation in banking market competition resulting from the US banking deregulation in 80s and early 90s, I document two novel facts. First, while banks’ loan making is generally less local than deposit taking, more competitive banking market enlarges this geographic mismatch. Second, examination of the lending dynamics of banks hit by the 1986 oil price shock reveals a mixed effect of banking market competition on economy’s resilience to unexpected shocks– it attenuates idiosyncratic shocks but amplifies systemic shocks. I provide evidences that these real effects of banking market competition are generated through its impact on how supply/demand shocks on bank short-term funding are transmitted to banks’ short-term (retail/wholesale) liquidity prices.

These two essays provide concrete examples related to the point made in Hart (1975)– that under certain market settings, introducing certain spot markets could have a mixed effect on welfare.

## **2. Corporate Debt Capacity**

Like its central position in corporate finance theory, corporate debt capacity plays a critical role in affecting the transmission and allocation of the hot money flowing to emerging market economies (EMEs), as well as the credit intermediation in these economies after the hot money leaves. However, this important role has received little attention to in the previous literature of international finance. In the two essays co-authored with Sheila Jiang, we fill this gap in the international finance literature.

The world is becoming increasingly inter-connected. In Chapter 3, **“Rise of Domestic Banks in EME Cross-border Credit Intermediation”**, we document the rise of domestic global banks in EMEs and the increasingly important role they play in channeling cross-border capital since 1990s. We show that this structural change in the cross-border credit flow to EMEs is likely to be driven by the transformation in the U.S. money market since around 1990. Importantly, we find that domestic banks from EMEs, who are replacing foreign banks’ role of channeling cross-border capital to EME firms, behave drastically differently in choosing their lending bases. We further show that due to this difference in lending technologies– that foreign lenders exhibit much higher reluctance towards lending against hard assets as collateral, the rise of domestic banks in the transmission of cross-border capital to EMEs has a far-reaching impact on these economies. In particular, we find that it reshaped industry structure of these economies and increased their susceptibility to global financing cycles.

Despite our robust empirical findings on both the time trend and cross-country patterns, identifying the exact channel through the structural changes in cross-border credit flow to EMEs generate real impact to these economies remains a challenge. For this purpose, Chapter 4 of my dissertation, **“Domestic Bank-Channeled Foreign Credit– A Blessing or a Curse: Evidence from China”**, exploits a unique cross-region heterogeneity of domestic global bank distribution in China and based on which, we investigate the real effects of the structural difference in cross-border credit across cities in China during the 2003-2009 global financing cycle. This allows us to empirically identify a “collateral channel” through which the rise of domestic banks in cross-border credit transmission to EMEs generates welfare impact on the real economy. Our empirical findings show that the enlarged flexibility in cross-border credit contracting, which is made possible by the rise of domestic global banks in EMEs, is a mixed blessing to these economies: It allows the hot money flowing to EMEs to be more efficiently allocated, but may lead to less efficient allocation of domestic credit when hot money leaves.

Echoing the results of the first two essays, the empirical finding in these two essays illustrates a similar point: under certain environments, increasing the contingency in certain dimension of the contracting space could be a mixed blessing.

### **3. Creditor Control Rights and Corporate Governance**

A large empirical literature on incomplete contracting has confirmed an active ex-post role played by creditors in the governance of corporations that are in violation of covenants.<sup>2</sup> Explicit creditor intervention on violating firms’ policy are often found to be value-adding, reflected by improved firm performance and firm value. However, identifying the real value added by ex-post creditor intervention remains challenging due to the unknown counterfactual outcomes and the lack of randomly assigned treatments.

Chapter 5 of my dissertation, **“Covenant Amendment Fee and Value of Creditor Intervention after Covenant Violations”** (coauthored with Sheila Jiang), addresses this question through examining an important form of renegotiation outcomes following covenant violations– the payment of amendment fee. We first document the prevalence of nontrivial amendment fee payment made by borrowers in violation of covenants in exchange for waivers of covenant violations. Next We find that such amendment fee payment exhibits clear exclusiveness with explicit creditor intervention– only 6.9% covenant violations are followed by both amendment fee payments and creditor intervention on firm policy. This fact suggests a time consistency issue– creditors cannot commit to intervene once being offered a side-payment for not doing so. Inspired by this, we exploit variations in creditors’ share in borrowers’ outstanding liability as a measure of creditors’ skin-in-the-game to extract exogenous variations in the treatment assignment following covenant violations– whether or not interventions are undertaken. This allows us to identify a significantly positive real value added by creditors’ ex-post intervention on the

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<sup>2</sup>See, for instance, Roberts and Sufi (2009), Nini et al. (2009, 2012), Falato and Liang (2016), etc

governance of negative-performing corporations.

Going forward, my research will continue to investigate how frictions in financial markets and contracting affect real economic outcomes and to shed insights on relevant policy design, using historical and modern data, novel theoretical frameworks, and necessary quantitative methods.