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Research Statement

The central theme of my research is the role of information frictions across multiple applied settings, including corporate finance, bank regulation, and financial intermediation. Specifically, I investigate the economic forces that govern strategic interactions in dynamic environments where parties possess either unverifiable or verifiable information. In classical settings with unverifiable private information, revelation occurs through credible actions; by contrast, verifiable information creates opportunities for strategic disclosure via informative tests, reports, or raw data. My emphasis on verifiable information reflects the increasingly evidence-driven nature of decision-making across the economy and underscores the importance of understanding how such information should be managed. This work contributes to the literature on information economics, with a focus on applied dynamic models featuring games, contracts, and mechanisms. My research has been published in the *Journal of Political Economy* and the *Review of Financial Studies*, with two additional papers currently under revise-and-resubmit at the *Review of Financial Studies*.

Description of Completed Research

Dynamic Information Design and Real Options

Extensive literature on agency theory and contracts has examined how dispersed information and misaligned preferences shape organizational structure and drive firm decisions. A recent strand of this literature, known as Bayesian persuasion, investigates how agents strategically manage verifiable (hard) information to influence outcomes.

My paper, **"Persuading the Principal to Wait" (Journal of Political Economy, 2020)**[1], with Dmitry Orlov and Andrzej Skrzypacz, studies Bayesian persuasion in the context of delegated real options, a setting common in corporate finance. In our model, a principal decides when to exercise a real option while a biased agent influences this decision through strategic information disclosure. We show that committing to disclose all information with delay optimally persuades the principal to postpone option exercise. However, when the agent lacks dynamic commitment, this promise is credible only if his bias is small relative to the principal's. With larger bias, the equilibrium features information pipetting, where the agent probabilistically delays the principal's action. Such gradual information revelation offers a stark contrast to settings with unverifiable information. We further demonstrate that when the agent seeks to accelerate option exercise, his inability to commit to silence leads to immediate disclosure. Surprisingly, such disclosure can harm the agent relative to having no information at all, as it may cause the principal to delay exercise even further. We establish an equivalence between dynamic information design and granular disclosure of hard information, even when the agent is privately informed, highlighting our findings' relevance to firm investment and entry/exit decisions. From a theoretical perspective, our paper develops new techniques for analyzing dynamic information design directly in continuous time, naturally embedding it within the classic real options literature.

[1] This paper is included (since 2018) in the Syllabus of PhD level BUSN 33914: Topics in Information Economics taught by Emir Kamenica at the University of Chicago.

This paper has been presented at FTG, SITE, and Econometric Society NASM conferences among others.

Dynamic Information Design and Financial Regulation

The Great Financial Crisis of 2007-2009 presented novel challenges for financial regulators. Stress testing, the practice of subjecting bank portfolios to hypothetical adverse scenarios, emerged as a critical regulatory tool for restoring investor confidence in the financial system. Following the crisis, stress tests were institutionalized through the Dodd-Frank Act as annual exercises designed to identify potential systemic risks and prevent future financial crises. The design of these tests, including the choice of stress scenarios, the extent of information disclosure, and the translation of test results into supervisory actions, continues to be the subject of extensive debate in both regulatory and academic circles.

In **"The Design of Macro-prudential Stress Tests" (The Review of Financial Studies, 2023)**[2], with Dmitry Orlov and Andrzej Skrzypacz, we develop a novel theoretical framework that characterizes stress tests as dynamic mechanisms in which a financial regulator can select both stress test scenarios, which implement different information structures, and capital requirements contingent on test outcomes. In our static benchmark, we demonstrate that the optimal single-period test employs an adverse scenario calibrated to fail all weak banks and a subset of strong banks, thereby mitigating the stigma associated with failure. We further establish that dynamic, sequential testing offers substantial advantages over static approaches. Under natural conditions, the optimal sequential policy consists of precautionary recapitalization followed by a test designed to fail only weak banks - a structure that resembles the timing of the Troubled Asset Relief Program (2008) followed by the Supervisory Capital Assessment Program (2009). In contrast, when markets exhibit limited liquidity, we prove that the global optimum can be achieved through two sequential tests, providing theoretical justification for the Federal Reserve's dual stress testing approach during the 2020 COVID-19 pandemic. Our paper constitutes the first analysis of stress tests as dynamic mechanisms incorporating joint design of informational environment and contingent capital requirements, thereby providing an insight into the interaction of these two commonly used regulatory tools.

This paper has been presented at FTG, WFA, FIRS, and Wharton Liquidity conferences among others.

Asymmetric Information, Investment and Debt Maturity

Extensive literature on capital structure has examined the relationship between firms' financing choices and investment decisions. Prior work demonstrated how excessive leverage leads to underinvestment (debt overhang) through conflicts of interest between equity holders and debt holders in complete information settings. Modern firms, however, often possess superior private information when making substantial investment decisions, whether through internal R&D for product development or due diligence for acquisitions. How such information asymmetries shape the joint determination of capital structure and investment remains poorly understood.

My paper **"Short-Term Debt Overhang" (revise and resubmit at The Review of Financial Studies)**[3], joint with Giulio Trigilia and Kostas Koufopoulos, addresses this gap by analyzing the interplay between capital structure and investment incentives under persistent private information. We consider a firm that is privately

[2]This paper was included in the Syllabus of PhD level FIRN Masterclass: Recent topics in corporate finance (Agency problems inside and outside the firm) taught by Andrey and Nadia Malenko in 2024.

[3]This paper was included in the Syllabus of PhD level BUSN 34903: Corporate Finance I taught by Zhiguo He at the University of Chicago in 2023.

informed about investment quality and makes two sequential, externally financed investment decisions. Our analysis reveals a feedback loop between the capital structure chosen for the initial investment (assets in place) and the subsequent one (growth opportunity). Under asymmetric information, strategically underinvesting in growth options can credibly signal positive information about assets in place to the market. Anticipating this signaling opportunity, firms optimally finance assets in place primarily with short-term debt, deliberately underinvest in growth options, and subsequently roll over debt at favorable terms. We demonstrate that this strategy is optimal when reduced funding costs for assets in place outweigh foregone value from positive-NPV growth options. Thus, our paper identifies a novel, time-consistent channel linking short-term debt to underinvestment. Furthermore, we establish that such underinvestment cannot be eliminated through alternative financing arrangements alone (such as long-term debt or equity issuance among others) because it implements the optimal Miyazaki-Wilson-Spence allocation.

This paper has been presented at FTG, Cambridge Corporate Finance Symposium, WFA, and EFA conferences among others.

Asymmetric Information and Financial Intermediation

The rise of fintech lenders, fueled by their use of non-traditional data and novel algorithms to assess borrower creditworthiness, has posed significant challenges to traditional banks. Since the Great Financial Crisis of 2007-2009, fintech firms (and shadow banks more broadly) have captured dramatically increased market share across multiple loan categories, crowding out traditional bank lending. Paradoxically, while competing directly with banks in lending markets, these fintech firms often obtain their primary financing through credit facilities from the same incumbent institutions. The implications of such partnership funding arrangements for lending market competition remain poorly understood.

My paper **"Lending Competition and Funding Collaboration" (revise and resubmit at The Review of Financial Studies)**, joint with Yunzhi Hu, addresses this paradox by examining how partnership funding affects competition between banks with funding cost advantages and fintech firms with superior screening technology. We demonstrate that these arrangements generate two potentially opposing effects. First, partnership funding provides banks with an alternative profit source, reducing their incentive to compete aggressively in direct lending. While banks' lending share declines, their overall profits increase as partnership revenues more than compensate for lost market share. Second, partnership funding lowers fintech firms' effective funding costs, with heterogeneous competitive effects depending on borrower pool quality. In high-quality markets where screening advantages are minimal, reduced fintech funding costs force banks to lower interest rates, intensifying competition. Conversely, when screening advantages are substantial (in medium- and low-quality borrower pools), lower funding costs exacerbate adverse selection problems for banks, leading them to raise interest rates and reduce overall competition. This mechanism creates a redistributive effect: partnership funding benefits borrowers in high-quality markets while harming those in lower-quality segments. Furthermore, we establish that while increased interbank competition for partnership arrangements may reduce borrower surplus, shifting funding sources from competing to third-party banks (without altering funding market competitiveness) unambiguously enhances borrower welfare.

This paper has been presented at FTG, AEA, and WFA conferences among others.

Current and Future Research

My future research agenda focuses on examining the effects of asymmetric information and strategic information management in settings where information frictions are of first-order importance to investors and regulators. These settings include bank lending and the emerging secondary loan markets, venture capital markets for early-stage financing, and the rapidly expanding markets for data. I briefly outline these ongoing projects below.

In my new working paper, titled **"Data versus Information Sales under Financial Constraints"**, with Dmitry Orlov and Andrzej Skrzypacz, I study markets that allocate data and information across the economy, motivated by the increasing importance of data for economic activity and the emergence of data providers and data brokers. The paper demonstrates that financial constraints, combined with the lack of commitment, shape the optimal approach to data sales. Sales of raw data can lead to misallocation in the form of partial data sales despite the ex-ante existence of gains from trade. In contrast, sales of processed data in the form of properly designed statistics or reports can achieve efficiency despite financial constraints. This work is closely related to my earlier research on dynamic information design and highlights the unique properties of information that differentiate it from other productive inputs such as capital.

In a related paper, titled **"Exchanging Information"**, with Dmitry Orlov and Andrzej Skrzypacz, I examine the efficiency of dynamic information exchange between two informed agents operating under limited commitment. We provide general conditions under which efficient exchange can be sustained in dynamic equilibrium and characterize the properties of optimal dynamic communication that achieves this goal. Our novel insight is that free riding on others' information can be overcome through appropriately designed dynamic communication protocols, even when agents lack dynamic commitment. These results have significant implications for multi-agent communication settings, including technological collaborations and investment syndicates.

In another ongoing project, **"Secondary Market Liquidity and Lending Standards"**, with Yunzhi Hu, I study the role of secondary market liquidity on bank lending standards, motivated by the staggering rise of the CLO market. The standard view in the literature is that increased secondary liquidity reduces banks' incentives to screen loans due to lower skin-in-the-game. While this holds from an individual lender's perspective, we argue that secondary market liquidity reallocates lending activity across institutions. The ability to sell loans on the secondary market allows more sophisticated lenders with superior screening technology to scale up their portfolios and increase their market share in the primary lending market. As a result of such reallocation, we show that overall lending standards can improve.

Finally, my solo project, **"Dynamic Adverse Selection: Time Varying Market Conditions and Endogenous Entry"**, is currently undergoing significant revision. The updated version examines how anticipation of relatively small changes in exogenous market conditions can lead to disproportionate market responses through the amplifying mechanism of asymmetric information. This research contributes to our understanding of market fragility by demonstrating the conditions under which information asymmetries can lead to potentially destabilizing feedback effects.