

In the aftermath of the Great Financial Crisis, new financial regulations, the growth of nonbank financial intermediaries, the zero lower bound, and frequent disruptions in money markets have increased the complexity of the operational landscape of central banks. The objective of my research endeavors to better understand the economic forces underlying these developments and their consequences for the implementation of monetary policy.

**Institutional Monetary Economics.** In this stream of research, the objective is to advance our understanding of modern money markets in a landscape that is in constant evolution due to changes in regulation and financial technology after the Great Financial Crisis (GFC). Studying those markets and understanding their underlying economic mechanism and fragilities has broad practical implications for the transmission of monetary policy, the cost of financing of government, and the financial stability of nonbank institutions.

New post-GFC financial regulations, mostly applying to banks and their dealer subsidiaries, have pushed financial intermediation outside of the balance sheet of traditional banks into the one of various types of professional asset managers, such as hedge funds, lured by the concomitant opening of various arbitrage basis (such as the FX-swap basis or the Treasury cash-future basis). These nonbank financial institutions, occasionally labeled as "shadow banks," represent an entirely distinct entity compared to traditional banks. In particular, these institutions proceed to various forms of liquidity transformation without access to the central bank's lender-of-last-resort facilities, which can be a source of concern for financial stability. To a large extent, as many scholars have argued, the 2008 financial crisis has been a crisis of this new shadow banking sector, and the considerable increase in the footprint and complexity of the central bank operations ought to be understood in this context.

Thus, instead of focusing strictly on the implementation of monetary policy on banks and their interbank lending markets, as was the case in the previous literature, I extend the analysis to nonbank money markets such as the repurchase agreement (repo) market. Doing so is important as repo markets have unambiguously become the bedrock of US-dollar liquidity, with daily volumes estimated around \$4 trillions in the US, compared to fed funds market volumes only being \$100 billions, and most benchmarking indices used in deriva-

tives markets have recently migrated to repo-based metrics such as the Secured Overnight Financing Rate (SOFR). Those developments have been accompanied by frequent disruptions in money markets with implications on capital markets and the solvency of those institutions. Working towards a better understanding of the precise economic forces shaping those disruptions is, in my opinion, an important research agenda to which I do my best to contribute.

In “*Central Banking with Shadow Bank*” (coauthored with Quentin Vandeweyer), we investigate how the presence of shadow banks affects the ability of central banks to supply liquidity to the financial sector and potentially dampen a liquidity crisis. While traditional banks have direct access to central bank reserves, shadow banks rely on the intermediation of liquidity from traditional banks. In a crisis, this intermediation can be hampered by a shortage of safe collateral and higher lending margins such that shadow banks are then left without a lender-of-last-resort. Thus, we find that with a large shadow banking sector, traditional monetary policy instruments are not sufficient to mitigate a liquidity crisis, and the central bank must use unconventional monetary policy tools such as opening liquidity facilities to shadow banks and purchasing illiquid assets.

We build on that framework in “*Treasury Bill Shortages and the Pricing of Short-Term Assets*” (coauthored with Quentin Vandeweyer). In our analysis, we demonstrate that capital regulation has the potential to deter banks from *borrowing* in repo markets, consequently limiting their capacity to supply liquid assets to shadow banks such as money market funds. Consequently, even with ample reserves, liquid assets such as repos and Treasury bills can be scarce for shadow banks. Central bank operations then have an inverse effect on net liquidity provision when swapping ample reserves for scarce Treasury bills or repos. Importantly, our model can quantitatively account for post-2010 time series for repo rates, Treasury bill yields, and the Fed’s reverse repo facility usage and explains why the supply Treasury bills became a key driver of money market rates after 2010.

In a related short paper, “*Intraday Liquidity and Money Market Dislocation*” (coauthored with Baiyang Han and Quentin Vandeweyer), we focus on two key developments for monetary implementation: the introduction of intraday liquidity requirements and the decreasing relevance of the federal funds market in favor of repo markets with nonbank

participants. Our paper demonstrates how liquidity requirements can prevent banks from *lending* in repo market to shadow banks such as hedge funds. Consequently, in the event of a surge in liquidity demand, banks are unable to arbitrage between fed funds and repo rates, leading to large spikes in repo rates. We propose a simple calibration for the quantity of central bank reserves in excess of the minimum required to prevent such money market disruptions. Consistent with our theory, this metric turned negative in the summer of 2019, at the time US repo markets experienced a spike of 400 basis points.

In “*The Central Bank’s Balance Sheet and Treasury Market Disruptions*” (coauthored with Damon Petersen and Quentin Vandeweyer), we take stock of the three preceding papers and build a holistic framework to understand the economic forces driving recent Treasury markets dynamics. In the model, Treasury market disruptions arise endogenously as a joint consequence of three frictions: balance sheet costs, intraday reserves requirements, and imperfect substitutability between repo and deposits. Our model highlights the critical role of both sides of the central bank’s balance sheet as well as agents’ anticipation of shocks and policy interventions in matching recent events in Treasury markets.

In recent work, “*Duration Risk and Quantitative Easing*” (coauthored with Antoine Hubert de Fraisse, Liming Ning, and Quentin Vandeweyer, work in progress), we propose a framework to proceed to a cost-benefit analysis of large-scale asset purchase programs of long-duration government debt by the central bank. When at the zero lower bound, the central bank cannot use traditional monetary policy tools and must purchase long-term assets to stabilize the economy. Shortening the consolidated maturity of the debt through these operations reduces the output gap but at the cost of increased rollover risk for the taxpayers. We provide estimates of the level of marginal rollover risk needed to rationalize those operations ex-ante for the US, Europe, and Japan.

Finally, in “*Can Stablecoins Be Stable?*” (coauthored with Vincent Maurin and Quentin Vandeweyer), we study a recent financial innovation: stablecoins, which are cryptocurrencies issued by private institutions designed to maintain a stable value for use as alternative means of exchanges. Stablecoins are considered a credible threat to traditional currency by central banks and recent collapses of stablecoins have drawn regulators’ attention to this market. In this paper, we provide a systematic analysis of stablecoin design in order to iden-

tify sources of fragility. We show that a combination of collateralization and decentralized issuance can foster stability and avoid over-issuance. As a pedagogical contribution, our work highlights the fundamental similarity between stablecoin platforms and banks that earn seigniorage revenues from issuing money-like liabilities.

**Banking and Financial Stability.** Within this research stream, the objective is to enhance our comprehension of the business and financial stability of banks and how financial stability then impact real economic activity.

After the GFC, the slow recovery of bank equity was a major concern for policymakers, academics, and practitioners. In *“Financial Risk Capacity”* (coauthored with Saki Bigio), we present a model that explains why banks struggle to recapitalize after a financial crisis in the presence of adverse selection due to asymmetry of information between borrowers and lenders of capital. When banks make large losses, they must scale down their operations. This decline in intermediation volumes exacerbates adverse selection. In turn, heightened adverse selection lowers profit margins for banks and incentives to recapitalize. Eventually, the financial system recovers—but this only comes through retained earnings, an essentially lethargic process when volumes and profit margins are low. This mechanism delivers financial crises characterized by persistent low financial intermediation and economic growth.

A second important concern after the GFC was that market measures of leverage and bank credit risk became actually higher than precrisis levels. In *“Government Guarantees and the Valuation of American Banks”* (coauthored with Andrew Atkeson, Andrea L. Eisfeldt, and Pierre-Olivier Weill), we find that, quantitatively, about half of the decline in market values of banks after the GFC came from the loss of government guarantees. Under current regulatory limitations on leverage, the ability of banks to capture the value of government guarantees is constrained, and, as a result, market-to-book ratios are lower. Hence, the rise in market measures of leverage does not indicate a deterioration in financial stability; rather, it signifies an amelioration in the moral hazard problem inherent in government guarantees.

As demonstrated in the preceding paper, a crucial aspect of effectively regulating the

banking sector lies in comprehending the business of banks and identifying the sources of their profitability. In *“The Deposit Business at Large vs. Small Banks”* (coauthored with Andrea L. Eisfeldt, Can Huang, Richard Stanton, and Nancy Wallace), we find that deposit business differs significantly at large versus small banks. We provide a parsimonious model and extensive empirical evidence supporting the idea that much of the variation in deposit-pricing behavior between large and small banks reflects differences in preferences and technologies. Large banks offer superior liquidity services but lower deposit rates, and locate where customers value their services. In addition to receiving a lower level of deposit rates on average, customers of large banks exhibit lower demand elasticities with respect to deposit rate spreads. As a result, despite the fact that the locations of large-bank branches have demographics typically associated with greater financial sophistication, large-bank customers earn lower average deposit rates. Our explanation for deposit pricing behavior challenges the idea that deposit pricing is mainly driven by pricing power derived from the large observed degree of concentration in the banking industry.

Finally, the study of different measures of financial stability and their relationship with real economic activity lead us to discover a surprising result: Business risk, as measured by asset volatility, is an unambiguously positive signal for investment. In *“Bonds vs. Equities: Information for Investment”* (coauthored with Huifeng Chang and Andrea L. Eisfeldt), we provide a simple model and robust empirical evidence to clarify the impact of several risk measures on investment, such as asset and equity volatility and credit spreads. Because equity volatility is levered asset volatility, it contains information about both the dampening effects of leverage due to debt overhang and the option value of higher volatility for equity holders with limited liability. However, once we control for the debt overhang problem with credit spreads, asset volatility captures only equity holders’ option value of investment and is an unambiguously positive signal for investment. Thus, our finding challenges the idea that, in the presence of financial frictions, a higher level of uncertainty is necessarily worse for investment and economic activity.