Special Feature C

Risk-Centric Monetary Policy

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1 Introduction

"*So, of course, monetary policy does, famously, work with long and variable lags. The way I think of it is, our policy decisions affect financial conditions immediately. In fact, financial conditions have usually been affected well before we actually announce our decisions. Then, changes in financial conditions begin to affect economic activity ... within a few months*."

-Chair Powell's Press Conference, 21 September 2022

Monetary policy operates by changing financial conditions, which then transmit to the real economy with long lags. Since central banks reach the economy through financial markets, understanding their policy decisions and the macroeconomic consequences necessitates a framework in which central banks closely interact with markets to achieve their objectives. In this article we review our recent work that illuminates the relationships between monetary policy, financial markets, and business cycles.

2 A Dual-Absorption Problem

Our analysis starts by emphasising the dual-absorption problem faced by central banks, as depicted in **Figure 1**. The top row indicates the goods-absorption problem highlighted in macroeconomics, while the bottom row indicates the risk-absorption problem emphasised in finance. Aggregate asset prices (financial conditions) provide a bridge for spillovers across the two rows. Asset prices are primarily determined in risk markets but have a significant impact on aggregate demand. An increase in stock and house prices raises consumer wealth and spending, while higher bond prices (lower interest rates) decrease the cost of capital and boost investment and expenditure on durable goods. Moreover, a currency depreciation stimulates domestic demand through expenditure switching effects and increases the price of imported goods.

In our model, as in practice, the central bank steers aggregate demand by influencing aggregate asset prices, through both conventional and unconventional policies. Therefore, even though the central banks' objectives are stated in terms of the goods-absorption problem (to close the output gap and stabilise inflation), its tools operate via the risk-absorption channel. Thus, our framework is useful for understanding both why and how central banks affect asset prices, and why markets closely monitor the central banks' potential actions. Additionally, our framework helps to explain the interactions between the

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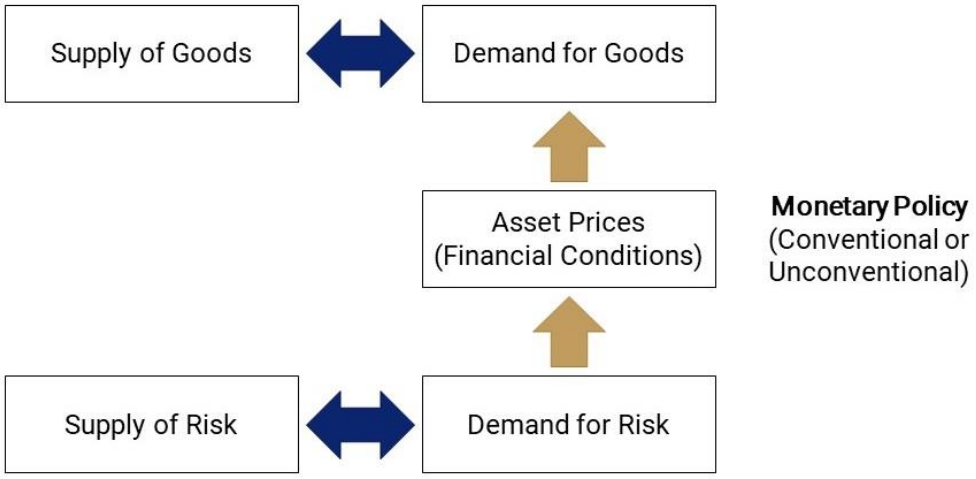
two absorption problems, specifically how changes in asset prices can induce or exacerbate macroeconomic fluctuations.

Figure 1 The Dual-Absorption Problem



3 Risk-Premium Shocks and Speculation

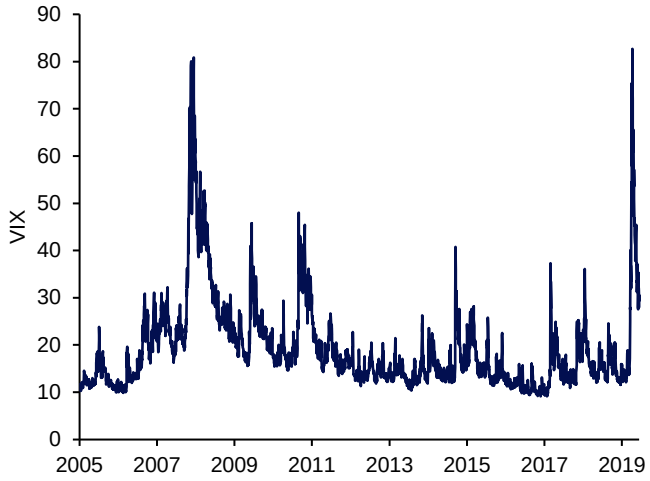
In Caballero and Simsek (2020, 2019), we outlined the broad framework and focused on how financial market risk-offs and speculation could contaminate the real economy when the central bank is constrained by an effective lower bound (ELB). To illustrate the key mechanisms in our model, consider the Global Financial Crisis (GFC), which followed a period of high asset prices. Suppose asset valuations decline, perhaps because investors recognise the risks that they previously overlooked and demand a greater risk premium. The macroeconomic impact of this shock depends on the central bank's response. If the central bank is unconstrained, it cuts the interest rate enough to stabilise asset prices, which in turn stabilises aggregate demand and protects the economy from the risk premium shock. However, if the central bank is constrained, such as by an ELB, the risk premium shock decreases asset prices, which leads to a reduction in aggregate demand and exacerbates the recession. Additionally, financial speculation during the boom phase amplifies these effects. In boom years, optimists tend to overexpose themselves to aggregate risks. When the bust arrives, optimists lose a disproportionate share of their wealth, and financial markets become dominated by pessimists. This compositional change further lowers asset prices and aggregate demand beyond the initial risk premium shock. In this context, implementing macroprudential policies that restrict speculation in boom years can mitigate the asset price declines during recessions and improve macroeconomic stability. Our analysis suggests that the housing market speculation leading up to the GFC, combined with the lack of appropriate macroprudential policies, exacerbated the recession.

Although the focus of these papers was on the constraint imposed by an ELB, their implications can be extended to other types of constraints on monetary policy. For example, the central bank might also be constrained by a managed floating (or fixed) exchange rate regime as well as financial stability concerns.

4 Financial Market Interventions

The COVID-19 shock primarily affected the real economy (the top row of **Figure 1**), with the virus and subsequent lockdowns causing significant declines in both aggregate demand and supply. However, the shock also had a significant impact on financial markets (the bottom row of **Figure 1**), with financial distress indicators spiking and reaching levels not seen since the GFC. Equally dramatic was the fast reversal of financial distress following the Federal Reserve's announcement of unprecedented financial market interventions (as demonstrated in **Chart 1**).

Chart 1 The Sudden Spike and Subsequent Reversal of VIX at the Onset of the COVID-19 Shock



Source: Federal Reserve Bank of St. Louis

To explain this episode, in Caballero and Simsek (2021a) we extend our framework to incorporate the pervasive heterogeneity in risk tolerance that we see in financial markets: we split investors into risk-tolerant agents ("banks") and risk-intolerant agents ("households"). In this environment, the "banks" naturally take on leverage and are more exposed to an aggregate shock. Thus, a sudden and large real shock such as COVID-19 disproportionately hits the "banks". As these agents scramble to unload assets, the market's effective risk tolerance falls. With a central bank constrained by the ELB, the initial decline in risk tolerance triggers a downward spiral in asset prices and risk tolerance. The decline in asset prices reduces aggregate demand and exacerbates the recession induced by the COVID-19 shock. In this context, a central bank's purchase of risky assets is an extremely powerful tool, since it reverses the downward spiral and mitigates the recession. Our results suggest that the Federal Reserve's aggressive interventions early in the recession prevented a financial crisis and set the stage for the rapid recovery that followed.

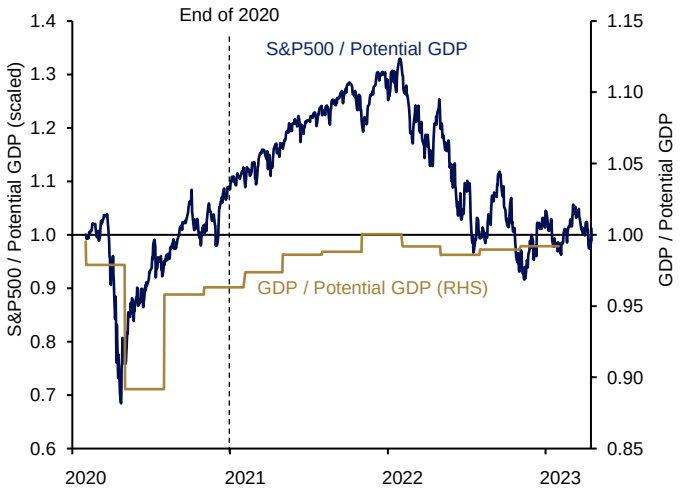
More broadly, our work highlights two key points. First, balance sheet shocks that severely impair the financial system's risk-absorption capacity warrant central bank risk-absorption interventions, even if the central bank's primary focus is aggregate demand management rather than financial stability. Second, the goal of monetary policy is to promote healthy absorption of the risk supply while maintaining asset prices at levels suitable for aggregate demand management. The central bank can use traditional interest rate policies or unconventional methods to influence the risk absorption. The selection of policy is less

crucial and depends on the circumstances that the policymakers face at the time of the intervention.

5 Aggregate Demand Inertia and Asset Price Overshooting

While the Federal Reserve's COVID-19 response prevented a financial crisis, it also caused a disconnect between the performance of the real economy and the financial markets. As depicted in **Chart 2**, by the end of 2020, US output remained substantially below its long-term potential, whereas stock prices (along with house and bond prices) significantly exceeded their pre-pandemic levels. The swift rebound of asset markets was primarily due to the aggressive support of monetary (and fiscal) policies. However, fast-forward to early 2023, and the gap between the real economy and the markets has vanished. A rapid recovery caused inflationary pressures and prompted the Federal Reserve to announce a gradual withdrawal of monetary policy support. This announcement led to a sharp drop in asset prices, reconnecting the markets with the economy.

Chart 2 The Disconnect and the Subsequent Reconnect Between Wall Street and Main Street



Source: Authors' estimates

In Caballero and Simsek (2021b and forthcoming), we demonstrate that our framework can explain these patterns when we account for a realistic friction: aggregate demand inertia. At the microeconomic level, households and firms face various adjustment costs that contribute to inertia. At the macroeconomic level, inertia means that aggregate demand tends to remain at its current level and is slow to respond to changes in asset prices. In this context, we demonstrate that when output is (or is expected to be) below its potential, monetary policy optimally induces asset price overshooting. The central bank adjusts the asset price signal to compensate for the sluggish response of aggregate demand to asset prices. While this policy creates a substantial, temporary disconnect between financial markets and the real economy, it also expedites recovery. As output rebounds, the central bank gradually increases interest rates and reverses the asset price overshooting, thereby reconnecting the markets with the economy. Thus, the observed temporary gap between asset prices and the real economy, as well as the subsequent reconnection, align with optimal monetary policy.

This policy conclusion isolates the implications of aggregate demand inertia: More inertia leads to a stronger monetary policy response, resulting in more significant fluctuations in asset prices. However, large swings in asset prices can be concerning, especially in the context of realistic behavioural biases and agency problems. In our model, these concerns induce the central bank to overshoot asset prices by a smaller amount. Nevertheless, this adjustment does not alter the qualitative implications of our findings.

6 Policy Lags: Disagreements and “Mistakes”

In our basic framework, the central bank possesses significant power when unconstrained. It has perfect information regarding the state of the economy and can immediately influence aggregate demand by adjusting asset prices. However, this power stands in contrast to the well-known “long-and-variable’’ lags of monetary policy. Such lags mean that the central bank's actions are influenced by its beliefs regarding future economic activity. The recent increase in inflation serves as a reminder that the central bank's beliefs play a crucial role in policy and macroeconomic outcomes. Specifically, the Federal Reserve was hesitant to tighten policy in 2021, anticipating a rapid recovery in aggregate supply. Unfortunately, the supply recovery was delayed, and demand was more robust than it had anticipated, leading to a surge in inflation.

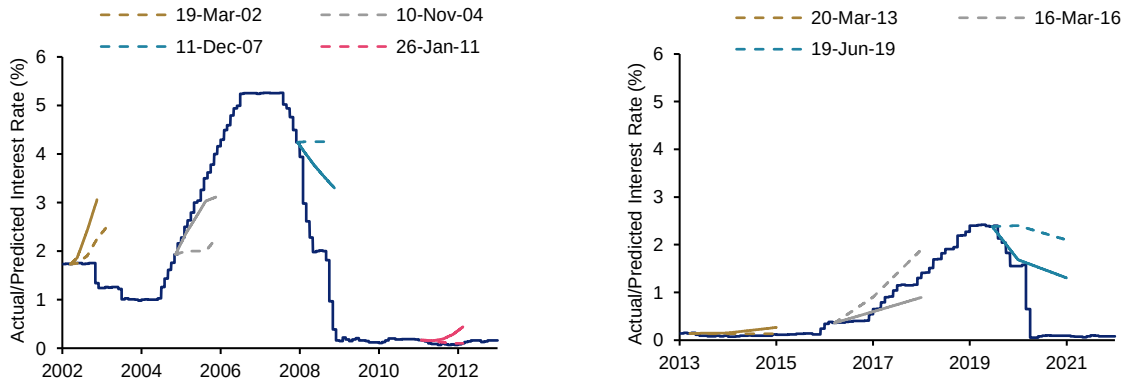
Policy lags can create tension between the central bank and financial markets when their beliefs about future interest rates differ. **Chart 3** illustrates that such disagreements between the Federal Reserve and the markets are routine. How should a central bank respond to these differences in opinion?

In a recent paper, Caballero and Simsek (2022), we developed a model that accounts for opinionated disagreements between the central bank and the market regarding future aggregate demand. The market perceives the central bank's interest rate decisions that do not align with its own beliefs to be “mistakes”. These perceived “mistakes” affect aggregate demand and prompt the central bank to partially integrate the market’s belief into its interest rate policy, despite its disagreement. The central bank plans to gradually implement its view on interest rates, waiting for the market to adjust its belief towards the bank’s before fully implementing its view.

We further show that these disagreements provide a microfoundation for monetary policy shocks. Policy announcements that reveal a surprise change in the central bank’s belief affect financial markets like textbook policy shocks, even though they are optimal under the central bank’s belief. However, more damaging tantrum shocks arise when the market misinterprets the central bank’s belief and overreacts to its announcement. We demonstrate that uncertainty about tantrums justifies further gradualism and communication policies. In our model, the central bank talks to the market not to persuade, but to clarify its own beliefs and prevent misinterpretations.

In conclusion, this paper’s main message is that optimal monetary policy cannot be designed irrespective of the market’s beliefs. This does not mean that a central bank should “surrender” to the market, but rather that the market's perceived “mistakes” have aggregate demand consequences and therefore need to be considered when designing optimal policies.

Chart 3 Disagreements between the Federal Reserve and the Market about Future Interest Rates



Source: US Federal Reserve

Notes: Dotted lines indicate the Federal Reserve's prediction for the federal funds rate for select Federal Open Market Committee (FOMC) meetings—from either the Greenbook assumptions (the left panel) or the FOMC dots (the right panel). Solid lines indicate the forward federal funds rate for the same meetings. The dark blue line indicates the federal funds rate.

7 A Monetary Policy Asset Pricing Model

In Caballero and Simsek (2023), we unify and extend the mechanisms described above to develop a monetary policy asset pricing model. The key idea is to reverse engineer the central bank's policy problem to solve for the aggregate asset price per potential output that ensures future macroeconomic balance under the central bank's beliefs ("$pystar$"). When the central bank acts optimally and without constraints, asset prices cannot deviate much from "$pystar$". For example, during the late stages of the COVID-19 recovery in the US, we saw several episodes where the markets attempted to rebound. However, these rallies were promptly reversed by a Federal Reserve speech or a policy announcement, since the Federal Reserve believed the economy needed tight financial conditions to curb inflation.

A general theme of our papers is the existence of a two-speed economy, characterised by a slow and unsophisticated macroeconomic side (the top row of **Figure 1**), and a fast and sophisticated financial market side (the bottom row). In this paper we formalise this concept by separating the macroeconomic and the financial market sides of the economy. Spending decisions are made by a group of agents ("households") who respond to aggregate asset prices, but with noise, delays and inertia. Asset pricing, on the other hand, is determined by another group of agents ("the market"), who have their own beliefs, are forward looking, and promptly incorporate economic shocks and the (likely) monetary policy response to these shocks. The central bank acts as an intermediary between these two sides to establish macroeconomic equilibrium, aiming to influence the behaviour of households while needing to navigate through the market's influence.

We demonstrate that "$pystar$" is primarily driven by macroeconomic needs as perceived by the central bank, rather than by traditional financial forces such as the market's expectations or risk premia. On the one hand, aggregate demand shocks trigger opposite fluctuations in "$pystar$". When there is a positive demand shock, the central bank reduces asset prices to counteract the positive output gap the shock would otherwise induce (and vice versa for a negative demand shock). This policy-induced "excess" volatility in asset prices may appear destabilising, but it serves a critical function in protecting the economy from shocks that would otherwise worsen business cycles. On the other hand, the central bank stabilises the asset price fluctuations caused by financial shocks, such as expectations

or risk premia ("the central bank put/call"), to safeguard aggregate demand from these financial shocks.

Considering realistic policy transmission lags, we further show that "$pystar$" is driven by the central banks' beliefs about future macroeconomic needs. Given that asset prices impact aggregate demand with a lag, the central bank effectively sets policy for a future period and targets "$pystar$" based on its forecast for future macroeconomic conditions. When the central bank anticipates an increase in aggregate supply (as in the COVID-19 recovery) or a decrease in aggregate demand, it targets higher asset prices. Conversely, when the central bank expects a rise in demand or a reduction in supply, it sets lower asset prices. Consequently, asset prices fluctuate in response to macroeconomic news that alters the central bank's beliefs. While more precise news results in less volatile output, it also increases asset price volatility.

Given that the central bank's beliefs about the future state of the economy play a significant role in driving asset prices, it is natural to ask what happens when the central bank and the market have belief disagreements, which is a common occurrence in practice. Our earlier findings are robust to allowing for belief disagreements, in the sense that the central bank still implements the appropriate "$pystar$" under its own belief. However, disagreements between the central bank and the market can impact the risk premium and the policy interest rate (as we described above) that the central bank needs to set to achieve "$pystar$". Specifically, when the market holds different beliefs from the central bank, it perceives policy "mistakes" and demands a policy risk premium. Although the central bank acts optimally under its belief, the market believes that the central bank targets the wrong asset price. With recurring belief disagreements, the market expects excessive policy-induced volatility and demands a policy risk premium, which is especially high during times of macroeconomic uncertainty and disagreements.

This paper highlights that the central bank's primary objective is to target the aggregate asset price or financial conditions, rather than the policy interest rate. The policy interest rate is merely a tool used by the central bank to achieve its asset price target. This observation has two significant implications. First, our model makes stronger predictions for the aggregate asset price than for the policy rate. The aggregate asset price is driven by the central bank's perception of macroeconomic imbalances, whereas the policy interest rate is driven by subtle details of the model, such as disagreements between the central bank and the market, the extent of aggregate demand inertia, and various forces that drive the risk premium. Second, our model supports formulating policy rules in terms of the aggregate asset price instead of the policy rate. This approach is similar to the one used in managed exchange rate regimes. By targeting the aggregate asset price directly, the central bank can achieve its policy objectives more efficiently and effectively.

8 Final Remarks

Risk-centric macroeconomics is a framework that illuminates the connections between monetary policy, asset prices, and business cycles. Although there is still much work to be done, this framework can already account for the general outlines of the monetary policy response to the previous two recessions, as well as the complex relationship between central banks and financial markets.

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