

# A quantitative analysis of the countercyclical capital buffer



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*One of the major reforms to financial regulation introduced by Basel III was the Countercyclical Capital Buffer (CCyB), which allowed financial regulators to raise bank capital requirements in anticipation of increases in systemic risk and the probability of financial crises. I use a dynamic general equilibrium model with endogenous financial crises to study the quantitative effects of the introduction of this policy. I find that the CCyB generates both ex-ante and ex-post benefits: not only it reduced the probability of financial crises, it also reduces the intensity of recessions conditional on a crisis. I then combine the model with data and find that a CCyB-like tool could have prevented a financial panic in the US, but not the subsequent recession.*

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<sup>1</sup> The views expressed are those of the author and do not necessarily reflect official positions of the Federal Reserve Bank of St. Louis or the Federal Reserve System. July 8, 2021. Contact: [Miguel.fariaecastro@stls.frb.org](mailto:Miguel.fariaecastro@stls.frb.org).

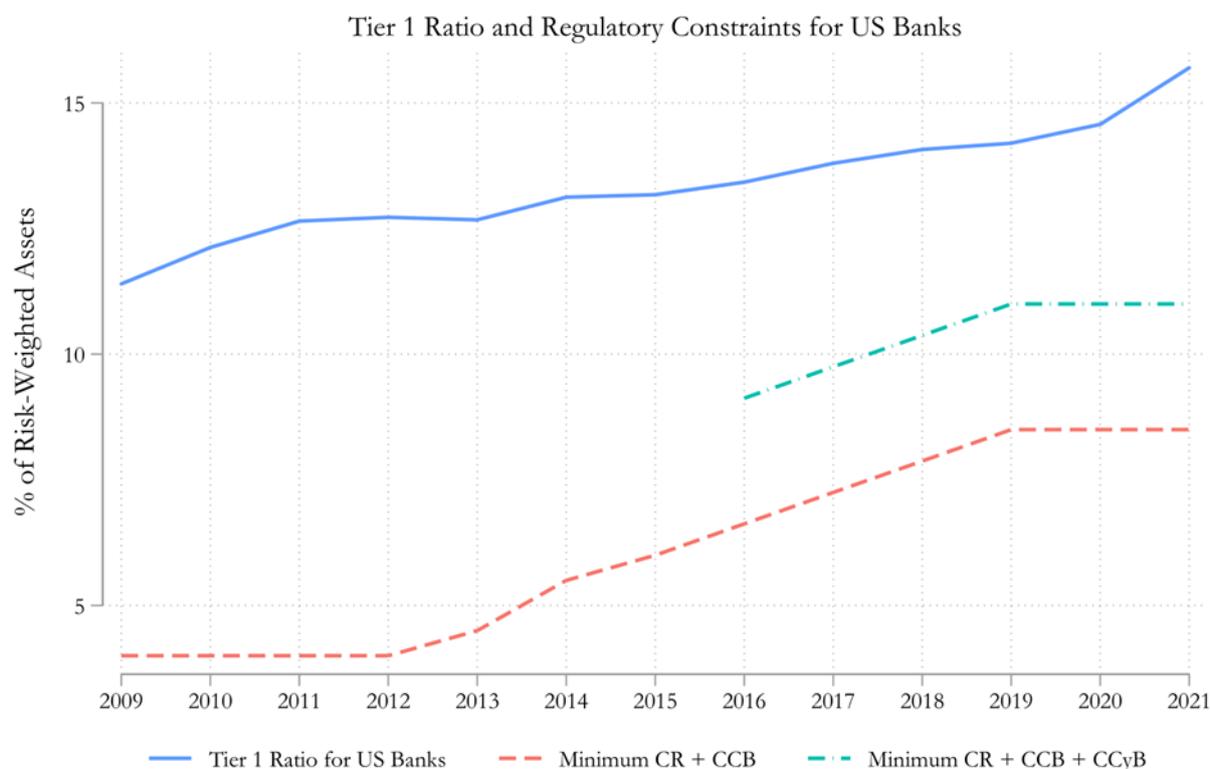
In response to the global financial crisis of 2007-08, national authorities from all over the world agreed on a new set of rules aimed at better regulating the financial system, collectively known as Basel III. One of the pillars of this new global regulatory standard is the so-called Countercyclical Capital Buffer (CCyB).

### What are capital buffers?

One of the main tools of financial regulation is bank capital requirements: rules that force banks to hold a minimum level of capital as a fraction of the value of their own assets. In order to make loans and acquire other assets, banks use deposits and their own capital. Since the value of the assets may fluctuate, but deposits involve fixed repayments, capital requirements help prevent banks from becoming insolvent when assets lose part of their value. If there is the risk that the value of bank assets may fall below that of deposits, this may trigger a run on bank deposits that can make the bank fail (and this can potentially spread to the rest of the financial system, causing a crisis).

Most types of bank capital regulation apply to Tier 1 capital, which typically includes common stock, retained earnings, and some types of preferred stock. Figure 1 plots the evolution of the Tier 1 capital ratio for the US banking system since 2009 (solid blue line), along with minimum regulatory levels (dashed red line). These minimum levels consist of the minimum capital ratio and capital conservation buffer, and have been raised in recent years as part of the US implementation of Basel III.

The current Basel III level of capital requirements is 8.5% of (risk-weighted) assets.<sup>2</sup> The US implementation of the CCyB empowers the Board of Governors of the Federal Reserve System to require an extra amount of capital of up to 2.5% (of risk-weighted assets). Capital requirements plus the maximum level of the CCyB are also plotted in Figure 1 (dash-dotted line). The Board of Governors has voted four times on the level of the CCyB since 2016. It has always decided to keep it at 0%, with the latest vote having been cast in December 2020.



<sup>2</sup> This refers to the so-called minimum capital requirements (MCR) plus the capital conservation buffer (CCB), an extra requirement introduced by Basel III that is less stringent. See Occhino (2018) for a more detailed explanation.

## What is the point of the CCyB?

The CCyB is supposed to be raised during periods of “excess aggregate credit growth”, which many economists argue helped contribute to the global financial crisis of 2007-08, and subsequent Great Recession. The objective is to force banks to hold more capital when their assets grow rapidly, so that their solvency is better insured should these assets experience a sudden loss in value (and the value of bank liabilities tends to be stable over time). In other words, the CCyB is designed to be raised during “good times”, when banks are lending a lot. This can potentially generate two types of benefits: (i) *ex-ante*, by forcing banks to hold more capital per dollar of assets, it can help slow credit growth and avoid a financial crisis, and (ii) *ex-post*, should a crisis materialize, it ensures that banks face the crisis with more capital, which can potentially reduce the magnitude of said crisis.

## Modeling the Effects of the CCyB

One way to assess whether the CCyB can be a useful tool to help prevent the next financial crisis is to look back at the past and ask the following question: could the CCyB have helped prevent or moderate the 2007-08 financial crisis? In a recent paper (Faria-e-Castro, 2020), I try to answer this question by combining US data and a rich model of financial crises. The model features borrowers, savers, and banks. Borrowers are homeowners who finance their house purchases with mortgages. These mortgages are originated by banks, who finance them with their own capital and deposits, supplied by the savers. Banks are subject to occasional crises: if the value of their mortgage portfolio falls below a certain threshold, this may cause savers to become worried about whether the bank will be able to repay their deposits. This can trigger a panic in which savers run to withdraw their deposits from the bank, causing it to fail.<sup>3</sup> A collapse of the banking system prevents homeowners from borrowing, forcing them to cut back on their consumption and causing a demand-driven recession.<sup>4</sup>

The model can be calibrated to the US economy, and simulated with and without the CCyB. These simulations allow us to tease out the differences between an economy without the CCyB, and an economy where the regulator raises bank capital requirements when bank leverage is high. This comparison highlights the *ex-ante* and *ex-post* benefits of the CCyB as a policy tool: in the CCyB economy, the frequency of crises falls by more than half, and the severity of those crises (measured by the median drop in GDP) is also significantly reduced.

## Measuring the Effects of the CCyB

The model can also be estimated to replicate the behavior of the US economy between 2000 and 2015. This encompasses the pre-, during, and post-crisis periods, and importantly corresponds to a time period when the CCyB had not yet been introduced. I then use the model as a laboratory to ask the following question: what would have happened to that same economy, if a regulator was able to implement a version of the CCyB, where capital requirements are raised when bank leverage is high?

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<sup>3</sup> The panics are therefore self-fulfilling, in the tradition of Diamond and Dybvig (1983).

<sup>4</sup> This is consistent with the view of many economists that the Great Recession was primarily driven by depressed aggregate demand, i.e. Mian and Sufi (2015).

In this counterfactual economy where the regulator is endowed with the CCyB, a run on the financial system does not happen. While, through the lens of the model, the run is responsible for the sharp drop in consumption that we saw in the data, the model counterfactual still predicts that the US economy would have entered a slump due to other forces/shocks. In other words, the use of CCyB could have prevented the crisis but not the subsequent Great Recession. Rather, it would have allowed the US economy to experience a “soft landing”. Still, the cumulative gains from this policy are substantial: the model predicts that a cumulative drop in aggregate consumption of 23% could have been avoided.

One interesting prediction of the model is that, even if the policymaker had access to the CCyB, it would not have activated this policy in 2008. The reason is that banks, anticipating that the CCyB could be activated, chose not to increase their leverage by as much, which in turn helped the US economy avoid a large crisis.

### Conclusion

My analysis shows that the current CCyB framework in the US can be a useful to prevent crises or at least attenuate the effects of recessions. It also shows that the policy is truly macroprudential in nature: it does not need to be explicitly activated in order to have positive effects. This is a potential reason for why the Board of Governors has chosen not to activate the CCyB since its introduction in 2016. There are also other arguments against raising the CCyB: by constraining bank lending, this policy may reduce corporate investment and economy growth. Another, unintended, consequence is that by tightening bank regulation, it may induce intermediation activity to migrate to the unregulated, “shadow banking” sector. ■

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