This excellent and thought-provoking paper by Buchak et al is motivated by a fundamental observation about the U.S. financial system: a substantial majority of intermediated loans—they focus on the specific case of mortgage loans—are originated not by traditional commercial banks, but rather by a variety of non-bank lenders, which the authors dub “shadow banks”. They then go on to argue that this observation requires us to rethink existing modeling approaches to the propagation and amplification of economic shocks, which have often focused on bank balance sheets as the key source of friction in the model.

Loosely speaking, one can interpret the authors’ story in two ways. A modest interpretation would be that, if non-bank intermediaries do a significant fraction of the lending in the economy, shocks to the capital of just commercial banks narrowly construed will not have as important an impact as they would in an all-bank economy. This statement is almost surely correct, and relatively unsurprising: it is analogous to saying that if banks whose names start with letters A through P do a significant fraction of lending in the economy, shocks to the capital of just the minority of banks whose names start with the letters Q through Z will not have as important an impact as would shocks to the capital of the entire banking sector.

A more aggressive, and more interesting interpretation would be that, if non-bank intermediaries do a significant fraction of the lending in the economy, shocks to the aggregate capital of the entire (bank plus non-bank) intermediary sector will not have as important an impact as they would in an all-bank economy. This interpretation would seem to reflect an assumption that there is something special about non-bank lending that makes it either less capital-reliant, or more resilient to capital shocks than bank lending, such that moving market share in origination from banks to non-banks results in a stabler and less vulnerable financial system overall.

It is a little unclear to me which of these two interpretations the authors have in mind. At least in places, they seem to hinting at the latter, more aggressive one. For example, they write:
“We show that the financial sector is much more resilient to capital shocks ex post than a bank balance sheet model would suggest” (emphasis mine).

Moreover, their modeling framework embodies precisely an assumption of the sort mentioned above, consistent with the more aggressive interpretation: they assume that while bank lending requires banks to raise expensive equity capital, non-banks manage to operate with no equity capital at all, and only originate loans for the purposes of selling them in the securitization market. Thus increasing the share of non-bank lending in the economy by assumption reduces the total amount of intermediary capital that is required to generate a given amount of credit creation.

There are two ways that this assumption might go wrong in practice: First, it may be that, as a matter of empirical reality, even non-banks that primarily originate loans in order to distribute them do require meaningful amounts of equity capital, and are in fact highly vulnerable to shocks to their capital levels. Second, as an increasing fraction of loans are sold off in the securitization market, it becomes all the more important to ask about what type of intermediary (e.g., pension fund, mutual fund, insurance company) is buying these loans, and what their capital structures and associated vulnerabilities are. In other words, even if non-bank loan originators are never in any trouble, the lending market can experience sharp contractions if the buyers of securitized loans see their own capacity for intermediation disrupted.

To illustrate the first point, consider the following facts about Rocket Mortgage, one of the leading non-bank mortgage originators in the U.S.¹ In 2021, Rocket had a record year, originating $351B of mortgage loans, or approximately 9% of all mortgage loans originated in the U.S. While Rocket does in fact rely on an originate-to-distribute model, at year-end 2021 they nevertheless held $19B of mortgages on their balance sheet, representing approximately three weeks’ worth of warehouse pipeline that must be inventoried before new loans can be packaged up and resold, in most cases to the government-sponsored enterprises (GSEs). At year end 2021, Rocket’s equity capital stood at $9.8B, or 2.8% of originations. And their warehouse pipeline also drew on significant lending from banks, in the form of $13B in bank funding facilities. These figures suggest that even the non-bank mortgage origination model requires meaningful amounts of equity capital on the part of the non-bank, as well as an indirect reliance on the health and lending capacity.

of the banking sector. Indeed, one might think of an intermediary like Rocket Mortgage as a highly leveraged mortgage originator.

Moreover, the vulnerabilities associated with this model can be seen in Rocket’s 2022 results. With interest rates rising, its 2022 originations declined sharply, to $133B—a drop of about 62%. Moreover, this interest-rate shock resulted in a major hit to Rocket’s profits, in part because of losses experienced on its warehouse pipeline: its gain on sale of loans fell from $10.5B in 2021 to $3.1B in 2022. Notably, this $7.4B drop in a key source of profits represented a large proportion—almost 76%—of start-of-year equity capital. Thus it appears that not only are non-bank originators like Rocket dependent on equity capital to run their business, but their capital levels are also highly exposed to the same sorts of shocks as the capital of traditional banks—in this case a shock arising from an unexpected increase in interest rates.

One way to reframe the issues in light of this discussion is to observe that on the one hand, non-banks like Rocket clearly have a narrower business mix than traditional commercial banks. That is, Rocket focuses exclusively on originating and selling off conforming mortgage loans to the GSEs, while banks not only do this, but also make on-balance-sheet loans to non-conforming jumbo mortgage borrowers and to a range of other firms and households. At the same time, it may be that within the one segment that the banks and the non-banks share in common, namely the originate-to-distribute segment for conforming loans, they operate with a similar technology, with similar capital and funding requirements.

This suggests that if one is building a theory of intermediation that encompasses banks and non-banks, perhaps one should focus not on making distinctions as to the type of intermediary making a given category of loan, but rather on the underlying lending technology, which may differ across loan types but may turn out to be roughly the same for a given loan type, independent of the identity of the intermediary.

Here is a sketch of an exceedingly simple model along these lines. Suppose we have two types of intermediaries, banks and non-banks. Banks do three things: (i) they make C&I loans $L$ at a rate $r_L$, with each C&I loan requiring $\theta$ units of capital; (ii) they make jumbo mortgage loans $J$ on balance sheet at a rate $r_J$, with each jumbo loan also requiring $\theta$ units of capital; (iii) they originate and sell conforming mortgage loans $C_B$ at a rate $r_C$, with each conforming loan requiring $\gamma < \theta$ units of capital for temporary warehousing. Non-banks only do one thing: they originate and sell conforming mortgage loans $C_B$ at a rate $r_C$, and as with the banks, each conforming loan
requires $\gamma < \theta$ units of capital for temporary warehousing. This formulation thus captures the idea that banks have a broader business mix than non-banks, but within the conforming-loan segment, the two types of intermediaries have the identical business model.

Suppose that banks in aggregate have equity capital $E_B$ and shadow banks have equity capital $E_S$. Suppose further that there is downward sloping demand for all loan types, that markets are perfectly competitive, and conforming mortgage loans originated by banks and non-banks are perfect substitutes. In this setting, it is easy to show that in an interior outcome where banks do some originating of conforming loans, all allocations are the same as in a model with only banks that have aggregate capital of $(E_B + E_S)$. Simply put, the existence of shadow banks does not in any way change the vulnerability of the system to capital shocks relative to an all-bank world.

At the same time, the model replicates some of the key empirical facts documented in the paper. For example, when bank capital is impaired (say due to losses on C&I loans) bank originations decline relative to shadow-bank originations. Conversely, if shadow-bank capital is impaired (say due to losses on their warehouse portfolio) shadow-bank originations decline relative to bank originations. So there can be substantial movements in the relative market shares of banks and non-banks, as well as movements in the shares of bank lending that is done on and off-balance-sheet, i.e., in jumbo vs. conforming loan volume.

A numerical example may help to drive these points home. Assume that the capital requirement on both C&I loans and jumbo mortgages is 10%, while the capital requirement on originate-to-distribute conforming loans is 5%. Initially, the banking sector has total capital of 10, and sets C&I lending to 40, jumbo lending to 40, and conforming originations to 40. The shadow banking sector has capital of 2, and sets conforming originations to 40.

Now bank capital is hit by an adverse shock, perhaps due to losses in the C&I business, so that bank capital falls to 4, and system-wide intermediary capital is cut in half from 12 to 6. Depending on various elasticities of loan demand, one outcome might be that bank C&I lending drops to 20, bank jumbo lending drops to 20, and bank conforming originations fall to 0, while shadow bank originations remain at 40. Thus in this example, all loan volumes are cut in half with the system-wide capital decline of 50%, which is exactly the same outcome that would have obtained in an all-bank economy with the same starting level of capital and the same adverse shock.

At the same time, the market share in conforming loan originations swings all the way to the shadow-banking sector, which now does 100% of these originations. But importantly, one cannot
conclude from a finding of this sort that the shadow-banking sector in any way buffers aggregate lending outcomes relative to what would have obtained in an all-bank world hit by the same capital shock.

A final observation concerns the impact of financial regulation. In the simple model above, there is no reason for shadow banks to secularly take market share in the conforming-loan segment away from traditional commercial banks, given that the originate-to-distribute business has the same economics in both organizational forms. However, in reality, Rocket Mortgage and its non-bank peers have made dramatic inroads into this market in recent years. One plausible explanation is that the heightened bank capital regulation of the post-financial-crisis era may be driving activity to more lightly regulated non-bank originators. If this is in fact the case, and if one thinks of bank capital regulation as having been roughly appropriately calibrated, one may worry that non-bank originators are currently undercapitalized relative to the social planner’s optimum, and that this migration actually may be making mortgage lending more vulnerable to shocks, rather than less vulnerable, as in the authors’ model. Either way, it is important to bear in mind that even a non-bank originate-to-distribute business relies on adequate capital and is in effect a highly leveraged operation given its thin capital cushion relative to origination volume. If one believes that the economics of the originate-to-distribute model are fundamentally similar across banks and non-banks, it is hard to escape the conclusion that they ideally ought to be regulated similarly.