

Strict Bank-Like Capital Rules Needed for Fannie Mae and Freddie Mac

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The Federal Housing Finance Agency (FHFA) will soon re-propose a rule to implement a new regulatory capital framework for Fannie Mae and Freddie Mac, the government-sponsored enterprises (GSEs) that remain in government conservatorship. The new proposal would supersede the 2018 capital rule that was proposed under Mel Watt, the Obama-appointed predecessor of the current FHFA Director, Mark Calabria.ⁱ The 2018 proposal was announced prior to the FHFA's efforts to get Fannie and Freddie out of government conservatorship, and the GSEs' capital requirements remain suspended, so a new proposal is warranted. The new proposal will not represent the first time that federal regulators have imposed a risk-based capital framework on Fannie and Freddie.

The details of the new proposal remain unclear, but Calabria has frequently – and properly – drawn attention to the large disparity in capital ratios between the GSEs and the nation's largest banks, while also stating that Fannie and Freddie should “maintain capital levels commensurate with their risk profiles.”ⁱⁱⁱ Thus, it appears that the new proposal will move the GSEs' capital framework closer to the type of capital rules imposed on large U.S. banks. This letter offers suggestions for making the GSEs' new risk-based capital framework stronger. In particular, the FHFA should strengthen the framework by relying on simple metrics that force Fannie and Freddie to operate with capital ratios and reserves similar to those of the nation's largest banks and mortgage insurance companies.

Overview of Risk-Based Capital Framework

In 1988, federal banking regulators adopted risk-based capital requirements for U.S. commercial banks. These requirements were based on the first iteration of the Basel Accords, an international agreement reached through the Basel Committee on Banking and Supervision.ⁱⁱⁱ Banking regulators currently enforce the third version—Basel III—of the Basel rules, but the overall framework is essentially unchanged.^{iv} The basic idea is that banks have to meet several different capital ratios using their *risk-weighted* assets rather than their *total* assets. For instance, banks have to meet a *total capital to risk-weighted asset* ratio of 8 percent.^v

As the (simplified) example in Table 1 shows, the weights applied to various assets increase with the assets' level of perceived risk. As a result, banks have to raise relatively less capital for assets that regulators deem safer. Cash and U.S. Treasury securities, for example, are deemed risk-free, so banks do not have to raise any capital to absorb losses associated with holding either of these assets. Commercial loans, on the other hand, receive a risk weight of 100 percent because they are much riskier than either cash or Treasuries. Finally, single-family home mortgages receive a 50 percent risk weight because they are deemed to be half as risky as commercial loans.

In this example, the bank holds \$10,000 in commercial loans, so it must include the full \$10,000 in its risk-weighted assets ($\$10,000 * 1.0$). While the bank is not required to include any of its cash or Treasuries in its risk-weighted assets, the bank must include \$2,000 of its home mortgages ($\$4,000 * 0.50$) in its risk-weighted assets. As the last column of Table 1 shows, the bank then multiplies 8 percent—its minimum capital requirement—by these risk-weighted asset figures to determine how much capital it must raise (its capital charge) for each asset category.

Thus, the bank must raise \$1,040 in capital to meet its minimum requirement ($\$13,000 * 8$ percent). If, alternatively, all the assets received a risk weight of 1 (100 percent), then the bank would have to raise capital for 100 percent of its assets, requiring total capital of \$1,840 ($\$23,000 * 8$ percent). Thus, for any given required ratio, a bank has to raise less capital when regulators determine that certain assets should have a risk weight of less than 1.^{vi} This example provides the basic mechanics of the risk-

based capital framework that U.S. banks must follow, but the complete set of requirements is much more detailed.

TABLE 1

Example: How Risk Weights Determine a Bank's Capital Requirement

Assets	Amount	Risk Weights	Risk-Weighted Assets	Total Capital Required (8%)
Cash	\$1,000	0%	\$0	\$0
U.S. Treasuries	\$3,000	0%	\$0	\$0
Fannie Mae MBS	\$5,000	20%	\$1,000	\$80
Single-Family Home Mortgages	\$4,000	50%	\$2,000	\$160
Commercial Loans	\$10,000	100%	\$10,000	\$800
TOTAL	\$23,000		\$13,000	\$1,040

The framework for the largest U.S. banks, for example, includes minimum requirements based on several different measures of capital, such as tier 1 capital, common equity tier 1 capital, and tier 2 capital.^{vii} In addition to meeting minimum capital ratios based on these different measures, the largest U.S. banks have to meet (among others) a liquidity coverage ratio,^{viii} a supplemental leverage ratio (SLR) that broadly accounts for off-balance-sheet exposures, and a capital conservation buffer (CCB).^{ix} Failure to meet the SLR and CCB requirements trigger restrictions on capital distributions, so both serve as de facto *higher* minimum-leverage requirements.^x

While such a complex framework with many different risk weights gives the appearance of capital precisely tailored to match various risks, regulators have little choice but to develop weights based (at least partly) on previous loss experiences. Therefore, a framework with a single risk weight—even a weight of 1, where all assets are weighted equivalently—can be adjusted to target any desired capital level just as effectively. Still, even with the level of complexity in the FHFA's 2018 capital proposal, it is clear that bank-like capital requirements can easily be formulated to apply to Fannie Mae and Freddie Mac.

Summary of FHFA's 2018 Capital Proposal

After the federal government placed Fannie Mae and Freddie Mac in government conservatorship in 2008, the FHFA suspended the companies' regulatory capital requirements. In 2017, the FHFA implemented the Conservatorship Capital Framework (CCF), an "aligned risk measurement framework" that was designed to ensure that Fannie and Freddie would operate prudently while in conservatorship.^{xi} The FHFA then used the CCF as the foundation for its 2018 risk-based capital proposal, a plan that was released to "provide transparency to all stakeholders about FHFA's supervisory view on this topic."^{xii} In other words, the 2018 proposal is essentially a hypothetical capital framework, one that could have been implemented if the FHFA had lifted the suspension of the firms' capital requirements.

The 2018 proposal, like other risk-based capital regimes, is designed to impose risk-based capital charges tailored to the risk of specific assets. Because the majority of Fannie's and Freddie's assets are related to home mortgages, a main goal of the 2018 proposal is to tailor capital charges to the various types of mortgage loans that the companies purchase. The proposal also seeks to tailor capital charges to the companies' *market risk* (the financial risk associated with holding different types of assets in a portfolio), *credit risk* (the risk that borrowers and creditors might not meet their financial obligations), and *operational risk* (the risk of the ongoing business of guaranteeing securities). To appropriately

tailor risk, the framework uses a variety of methods to develop weights and multipliers that are then used to estimate these risk components.

The proposal establishes three approaches to determining the GSEs' *market-risk* capital. However, the FHFA gives this type of risk relatively little weight because "the Enterprises'[Fannie's and Freddie's] retained portfolio activities have been greatly limited through conservatorship."^{xiii} To determine the risk-based *credit-risk* requirement, the proposed framework starts by segmenting *mortgage credit risk* into the following three categories: *expected loss* (the borrowers' failure to meet mortgage obligations during stable housing market conditions), *unexpected loss* (the borrowers' failure to make mortgage payments during a stressful event, such as a housing market downturn or a recession), and *catastrophic loss* (any losses beyond unexpected losses that are deemed highly unlikely to occur).^{xiv} This scheme requires someone to forecast losses under stress conditions, so the FHFA does so using methods similar to those used to predict such losses for large banking institutions.^{xv} The FHFA then calculates a series of risk factors based on individual loan characteristics, such as loan-to-value and credit score.^{xvi}

For the *operational-risk* component, the FHFA uses the Basel Basic Indicator Approach to require Fannie and Freddie to take a capital charge of eight basis points times the unpaid principal balance of all assets and guarantees with credit risk.^{xvii} Independent of these requirements, the proposal includes a *going-concern buffer*, a fixed capital charge designed to require capital sufficient to support operations after "a period of severe financial stress."^{xviii} Using Fannie's and Freddie's Dodd–Frank Act stress test results, the FHFA proposes a going concern capital charge of 75 basis points times the unpaid principal balance of assets and guarantees.^{xix}

Additionally, the proposal suggests two possible leverage ratio rules that would serve as alternative minimum capital requirements. The first option would require capital equal to 2.5 percent of total assets and off-balance-sheet guarantees, regardless of the risk characteristics of those assets and guarantees. The second approach would require capital equal to 1.5 percent of certain mortgage-backed securities held by third parties (and off-balance-sheet guarantees), as well as 4 percent of the companies' remaining total assets (including off-balance-sheet assets).^{xx}

According to the FHFA, the proposed framework is "designed to establish the necessary minimum capital for the Enterprises to continue operating after a stress event comparable to the recent financial crisis."^{xxi} The FHFA estimates that, under this risk-based proposal, using 2017 financial data, the total capital required for Fannie Mae would be \$115 billion, and the total for Freddie Mac would be \$65.9 billion.^{xxii} Thus, the proposed framework would require a combined total of \$180.9 billion in capital from the companies, slightly less than the total credit (\$191 billion) that the companies have drawn from the U.S. Treasury since 2008.^{xxiii}

As discussed above, this capital level—or any other level—could be targeted just as effectively with a single-risk weight. For instance, applying a 50 percent risk weight and an 8 percent capital requirement—the same as required of banks—to Fannie's and Freddie's mortgage assets and total off-balance-sheet exposures results in a combined capital requirement of approximately \$212 billion.^{xxiv} This figure is 11 percent more than required in the 2018 proposal, evidence that a fairly simple framework would require similar capital levels to a more complex system. The next section of this letter focuses on several issues that the FHFA should address to further strengthen the safety and soundness of Fannie and Freddie outside of government conservatorship.

Factors that the FHFA Should Consider

The FHFA is moving forward with plans to end the government conservatorship for Fannie Mae and Freddie Mac, so developing a strong capital framework for the companies is a laudable goal. While safety and soundness dictates that capital requirements should be rather high, basic economic concerns,

such as the ability to earn a competitive rate of return on invested funds, dictate that firms would prefer relatively lower capital requirements.

To some extent, the FHFA will have to balance these competing factors, but the agency should err on the side of safety and soundness to better protect borrowers and taxpayers. Furthermore, the FHFA should ensure that the new capital rules mitigate the GSEs' historical funding advantage, whereby Fannie and Freddie have been allowed to operate with higher leverage than their competitors. Historically, this type of advantage has contributed to the companies' ability to grow larger than other financial institutions, thus increasing their systemic risk. The following ideas are offered to help regulators develop new capital requirements that foster a more competitive mortgage finance industry and more adequately protect borrowers and taxpayers.

Capital Is Not Equivalent to Cash. One often-overlooked issue with equity capital requirements is that they do not require the company to hold any type of asset in reserve to cover losses. Equity requirements merely compel the firm to fund its operations with a certain amount of equity rather than debt. If, for example, Fannie Mae raised \$300 billion in equity to meet its capital requirement, it would then use those funds to buy mortgages and to pay employees to run its securitization business. The company would not, however, be compelled to hold any of the \$300 billion in some type of cash reserve. For this reason, insurance companies of all kinds—even mortgage insurance companies—are typically required to hold reserves in the form of cash and liquid securities.^{xxv} Because Fannie and Freddie operate much like a mortgage insurance company, whereby their promise to make payments to investors ultimately depends on whether borrowers make their home mortgage payments, the FHFA should require cash reserves as part of any new capital framework. For comparison, as of 2018, the Mortgage Guaranty Insurance Corporation, one of the nation's larger private mortgage insurance companies, held 64 percent of its five-year average revenue as loss reserves.^{xxvi}

More broadly, most states require mono-line insurers (insurance companies that provide one specific type of insurance) to hold large contingency reserves, with as much as half of all insurance premiums held in reserve for 10 years to cover possible future losses.^{xxvii} Similarly, large banks must adhere to reserve requirements and meet a minimum liquid asset requirement. The FHFA could better protect borrowers and taxpayers by requiring Fannie and Freddie to hold a fixed portion of their guarantee fees as a cash reserve against both expected and unexpected losses.^{xxviii}

Insolvency Is Meaningless Without a Receivership Process. The amount of any company's equity funding, recorded on the balance sheet, merely represents the amount of losses a firm can sustain before it becomes insolvent. When a company does reach insolvency, equity holders can lose their investment through bankruptcy or receivership, depending on the type of company. Prior to the Housing and Economic Recovery Act of 2008, no clear receivership requirement existed for Fannie and Freddie. While clear statutory guidelines now authorize (and in some circumstances require) the FHFA to shut down Fannie and Freddie if they become insolvent, the receivership process itself remains ambiguous.^{xxix} It remains critical, therefore, that the FHFA create a clear receivership process to shut down the companies if they again become insolvent. In the absence of such a process, any capital requirements will lack the necessary enforcement mechanism to protect taxpayers from another bailout of Fannie and Freddie.

An Overly Complex Capital Framework Is Unnecessary. Risk-based capital frameworks are based on subjectively determined risk weights that are subject to error and manipulation,^{xxx} and history demonstrates that a risk-based capital framework for Fannie and Freddie can fail miserably. In 1992, the Federal Housing Enterprises Financial Safety and Soundness Act specified a minimum leverage ratio and “a highly prescriptive approach to risk-based capital requirements for the Enterprises,”^{xxxxi} as well as a risk-based capital stress test. The stress test was designed to ensure that Fannie and Freddie could survive “a ten-year period with large credit losses and large movements in interest rates,”^{xxxii} whereby the credit losses were triggered by an 11 percent drop in nationwide real estate prices.^{xxxiii}

Yet, in 2004, Fannie Mae was designated “significantly undercapitalized,”^{xxxiv} and the Office of Federal Housing Enterprise Oversight (OFHEO) required both Freddie and Fannie to maintain 30 percent more than the minimum capital requirement.^{xxxv} By March 2008, the OFHEO lowered this surplus capital requirement to 20 percent above the minimum, provided that Fannie and Freddie would “raise significant capital and maintain overall capital levels well in excess of requirements.”^{xxxvi} In May 2008, after Fannie Mae raised an additional \$7.4 billion in new capital, the OFHEO lowered the surplus requirement to 15 percent above the minimum.^{xxxvii} In September 2008, Fannie and Freddie were deemed insolvent and were placed in government conservatorship.

Thus, despite an extensive risk-based capital framework, statutory minimum requirements, and the addition of nearly \$10 billion in new capital, Fannie and Freddie still did not have adequate capital to withstand the 2008 housing downturn. Because it is impossible to know, ahead of time, what the “right” amount of capital will be to cover future losses, the best that regulators can do is set the capital level high enough to cover expected losses based on previous experiences. Thus, requiring capital sufficient to cover losses similar to those experienced in the 2008 downturn, as the FHFA’s 2018 proposal does, is a reasonable approach. To accomplish this goal, the new capital framework should be as straightforward and transparent as possible.

Risk Tends to Rise During Housing Booms. Fannie and Freddie have historically helped to fuel lending for home purchases during boom periods when housing sales are rapidly increasing and prices are rising, thus increasing the amount of relatively riskier loans in the financial system.^{xxxviii} To mitigate this problem, the FHFA could implement a capital buffer that requires Fannie and Freddie to add capital during boom periods. For instance, the firms’ capital ratio could be increased—by perhaps 1 or 2 percentage points—when home price growth breaches a fixed threshold, such as 50 percent above the long-term trend.^{xxxix} Alternatively, the FHFA could modify the Federal Reserve’s countercyclical capital buffer framework to apply to the GSEs’ operations, perhaps by tying additional capital buffers to mortgage growth in various U.S. regions.^{xl}

Fannie and Freddie Have an Unjustified Funding Advantage. Although Fannie and Freddie are somewhat unique compared to large U.S. banks, they have already demonstrated that their exposure to credit risk poses at least as much risk to the U.S. financial sector and to the economy. Thus, the FHFA’s new proposal should account for the fact that Fannie and Freddie have regularly been allowed to use higher leverage than private financial firms holding the same financial assets.

For instance, just prior to the 2008 crisis, a bank holding Fannie Mae’s mortgage-backed securities would have had a capital charge of 1.6 percent (a risk weight of 0.2 times the required capital of 8 percent), whereas Fannie Mae could have held the same asset with a capital charge of only 0.45 percent. For any mortgage held on its balance sheet, Fannie Mae would have had a capital charge of (at most) 2.5 percent, whereas a bank would have had a 4 percent capital charge (a risk weight of 0.5 times the required capital of 8 percent).^{xli} While large banks are typically leveraged at roughly a 12-to-1 ratio (for every dollar of equity, they have \$12 in debt), Fannie and Freddie have been at least five times as highly leveraged (a ratio of at least 60 to 1),^{xlii} leading to higher returns for GSE shareholders and higher risk for taxpayers, borrowers, and the broader economy.

Separate from these specific concerns, a comparison of the operations of Fannie and Freddie with other large U.S. financial institutions suggests that regulators should view these firms similarly. For instance, the largest U.S. banks and the Federal Home Loan Banks (FHLBs) are an integral part of the U.S. home mortgage financing system. For decades, each of these institutions has had to meet rigorous capital requirements that were more stringent than those required of Fannie and Freddie.

A Comparison to “G-SIBs” and Federal Home Loan Banks

For decades, federal policy has allowed Fannie and Freddie to operate with far less equity—in other words, with higher leverage—than either the largest U.S. banks or the FHLB system. While there is no doubt that Fannie and Freddie do not operate exactly like banks or the FHLBs, each of these respective institutions is involved in funding trillions of dollars in home mortgages. Therefore, it is useful to compare the operations and the capital requirements for the largest U.S. banks and the FHLBs to those of Fannie and Freddie.

The FHLB system, created in the 1930s, is a government-sponsored enterprise that, like Fannie and Freddie, supports mortgage lending.^{xliii} Unlike Fannie and Freddie, the FHLB system is a set of member-owned cooperative banks that provide loans—known as advances—to their member institutions. The system consists of 11 regional FHLBs, with nearly 7,000 members, which include some of the largest financial firms in the United States, such as JPMorgan Chase, Wells Fargo, Citigroup, and Bank of America.^{xliv}

As of December 2018, the 11 FHLBs reported a combined total of \$1.1 trillion in assets, with total advances of \$728.8 billion (66 percent of its assets). Combined, the FHLBs also held \$62.2 billion in mortgages.^{xlv} Among the individual FHLBs, the size and asset composition vary substantially. The Atlanta FHLB (total assets of \$155 billion) is the largest in the system, and the Topeka FHLB (total assets of \$48 billion) is the smallest. The ratio of advances to total assets varies from 50 percent (the Indianapolis FHLB) to 77 percent (the Pittsburgh FHLB).^{xlvi} All of the FHLBs have similar capital ratios because they are each governed by the same capital requirements.^{xlvii} In particular, each FHLB must maintain total capital equal to at least 4 percent of total assets, as well as a leverage ratio of at least 5 percent of total assets.^{xlviii} As of 2018, the system’s average regulatory capital ratio was 5.4 percent.^{xlix}

Separately, all U.S. banks—including many that are members of the FHLB system—are governed by a set of formal capital requirements. In general, these requirements are implemented by one of three U.S. regulators, and they are based on principles developed by the international Basel Committee on Banking Supervision.¹ The requirements differ for banks based on their size, with the smallest banks facing less complex capital rules and somewhat lower requirements. As of 2018, many U.S. banks with less than \$10 billion in total assets can comply with an optional *community bank leverage ratio* framework that requires a *tier 1 capital-to-asset* ratio of 9 percent.^{li} Tier 1 capital consists mainly of common stock, so it is considered the most loss-absorbing form of equity capital.^{lii}

The largest U.S. banks, referred to as global systemically important banks (G-SIBs), have to meet higher capital requirements based on the theory that their failure might pose a threat to the global financial system.^{liii} As with the FHLBs, each of the eight G-SIBs^{liv} has similar capital ratios because each is governed by the same capital requirements as the others.^{lv} As a group, the G-SIBs have an average *tier 1 capital ratio* of 14.07 percent, an average *tier 1 leverage ratio* of 8.4 percent, and an average *supplemental leverage ratio* of 6.7 percent.^{lvi} Combined, the 8 G-SIBs have total assets of \$11.5 trillion, and *tier 1 capital* of \$939 billion.^{lvii} Collectively, the eight G-SIBs hold approximately \$800 billion in residential mortgages.^{lviii}

For the past several years, the two largest U.S.-based G-SIBs were Bank of America and JPMorgan Chase, with total assets (as of December 31, 2018) of \$2.4 trillion and \$2.6 trillion, respectively.^{lix} JPMorgan’s balance sheet reveals that its single largest asset is its loan portfolio (at \$985 billion), and its second-largest asset is its securities trading book (at \$414 billion). The bank’s loan portfolio consists of loans made to firms in all kinds of industries, but its single largest exposure is \$143 billion in real estate loans.^{lx} The balance sheet shows that JPMorgan funds its operations mostly with deposits (\$1.47 trillion) and long-term debt (\$282 billion). JPMorgan also has \$257 billion in total equity available to absorb accounting losses. These equity and asset balance sheet figures result in an equity ratio of 10

percent, whereas the bank reports a (risk-weighted) total capital ratio of 15.5 percent, and a (risk-weighted) tier 1 capital ratio of 13.7 percent.^{lxi}

Bank of America's balance sheet reveals similar lending and funding operations. The bank's single largest asset is its loan portfolio of \$937 billion, an assortment of loans that includes \$209 billion in residential mortgages.^{lxii} The bank also has a trading book of \$214 billion, and it separately holds \$238 billion in debt securities, for a combined portfolio of \$452 billion. Bank of America funds its business mainly with deposits (\$1.4 trillion), while it reports long-term debt of \$229 billion and total equity of \$265 billion. These equity and asset balance sheet figures result in an equity ratio of 11 percent, and the bank reports a (risk-weighted) total capital ratio of 15.1 percent, as well as a (risk-weighted) tier 1 capital ratio of 13.2 percent.^{lxiii}

Each of the two largest G-SIBs is smaller than Fannie Mae and slightly larger than Freddie Mac. As of December 31, 2018, Fannie and Freddie had total assets of \$3.4 trillion and \$2.1 trillion, respectively.^{lxiv} For Fannie Mae, \$3.25 trillion of its total assets were mortgage loans,^{lxv} while mortgage loans accounted for \$1.89 trillion of Freddie Mac's assets.^{lxvi} Thus, a single asset category—residential mortgage loans—represents 95 percent of Fannie's total assets and 91 percent of Freddie's total assets. This level of concentration in a single financial asset is much higher than anything at either the FHLBs or the G-SIBs.

For instance, the FHLBs' total advances to member banks represent about 67 percent of the FHLBs' total assets, and JPMorgan's and Bank of America's total loans represent 38 percent and 40 percent of total assets, respectively. When the analysis is restricted to only residential mortgages, JPMorgan and Bank of America, the two largest G-SIBs, both have home loans that represent less than 10 percent of their total assets. Wells Fargo, the G-SIB that holds the largest dollar amount of residential mortgages, holds \$321 billion in single family loans, representing 17 percent of their (\$1.9 trillion) total assets.^{lxvii}

With regard to funding their operations, nearly 100 percent of Fannie's and Freddie's assets are funded by debt.^{lxviii} Fannie and Freddie issue bonds and notes, but they also issue guaranteed fixed-income securities (backed by mortgage loans), whereby they promise to repay investors a series of interest and principal payments. All of the companies' debt, therefore, is ultimately tied to the performance of a single asset class (residential mortgages).^{lxix} While banks fund their operations mainly from a single source—short-term customer deposits represent 57 percent and 58 percent of JPMorgan's and Bank of America's total assets, respectively—the main risk associated with those funds is that large numbers of customers remove their deposits at once. Consequently, banks are required to hold 10 percent of their deposits as reserves.^{lxx}

Furthermore, large-scale bank runs, where masses of customers rush to remove their money from the bank, are exceedingly rare in the U.S. due largely to federal deposit insurance.^{lxxi} In fact, banks generally saw an increase in both transaction and term deposits during the 2008 financial crisis.^{lxxii} Recently, one Federal Reserve official even noted that “banks generally provide credit, with deposits providing stable funding.”^{lxxiii} Thus, it is far from clear that the short-term nature of banks' main funding source makes their operations riskier than Fannie's and Freddie's mortgage business. Moreover, given their relatively high degree of asset diversity compared to Fannie's and Freddie's, at least one aspect of banks' operations is clearly safer—banks hold a diversified asset portfolio (many types of loans) whereas Fannie and Freddie hold essentially one asset. Combined, Fannie and Freddie had total assets—all related to home mortgages—of \$5.5 trillion in 2018, equivalent to about half of the total assets of *all* of the U.S. G-SIBs.^{lxxiv}

Given these financial conditions, there is no objective reason why regulators should allow Fannie and Freddie to be much more highly leveraged than the largest U.S. banks. In fact, given their sheer size and lack of financial diversification, to say nothing of their troubled financial history, it would be reasonable to require Fannie and Freddie to have *higher* equity capital requirements than the G-SIBs. Similarly, there is no clear reason why Fannie and Freddie should be allowed to operate with lower capital requirements than the FHLBs.

Recommendations for the FHFA

As part of an effort to usher Fannie and Freddie out of government conservatorship, the FHFA has announced that it will re-propose the 2018 capital framework that was released under Mel Watt, the previous FHFA Director. While it is unclear exactly which requirements the new proposal will include, current FHFA Director Calabria has announced that Fannie and Freddie should “maintain capital levels commensurate with their risk profiles.”^{lxxv} Calabria has also drawn attention to the large disparity in leverage between the GSEs and the nation’s largest banks.^{lxxvi} Given their similarity in terms of risk, there is no objective reason why regulators should allow the GSEs to be five times as leveraged as these banks, as prior to the 2008 crisis.

To improve safety and soundness, as well as competitiveness in the mortgage financing market, the FHFA’s new capital framework for Fannie and Freddie should:

- **Mitigate Fannie’s and Freddie’s funding advantage.** At minimum, the FHFA should require Fannie and Freddie to take the same capital charge for mortgage-related assets as is required of the nation’s largest banks (in most cases, 4 percent for home mortgages and 1.6 percent for mortgage-backed securities). Applying the same risk-weighted capital scheme—the same 50 percent weight required of U.S. banks for residential mortgages, as well as the same 8 percent minimum capital ratio—would help to equalize the funding costs between banks and Fannie and Freddie.
- **Increase Fannie’s and Freddie’s capital requirements.** The FHFA should require Fannie and Freddie to meet the same 8 percent capital ratio required of large U.S. banks, and should also require additional capital buffers similar to the SLR and the CCB required of the G-SIBs. As an example, the FHFA could apply a 50 percent risk weight to Fannie’s and Freddie’s mortgage assets, and then require an 8 percent capital ratio, a 3 percent SLR, and a 2.5 percent CCB. Based on 2019 financial data, Fannie has approximately \$3.4 trillion in mortgage assets (including \$75.8 billion in off-balance-sheet exposures), and Freddie has approximately \$2.3 trillion in mortgage assets (including \$302 billion in off-balance-sheet exposures).^{lxxvii} This framework, therefore, would require Fannie and Freddie (combined) to have \$387 billion in equity capital. This figure represents 13.5 percent of the firms’ risk-weighted assets, slightly below the average tier 1 capital ratio for the eight U.S. G-SIBs.
- **Increase Fannie’s and Freddie’s required cash reserves.** Equity capital requirements necessitate that a company funds its operations with a certain amount of equity rather than debt. They do not, however, require the company to “hold” any type of asset in reserve to cover losses. For this reason, regulators typically require financial firms to hold reserves in the form of cash and highly liquid securities. The FHFA should require Fannie and Freddie to supplement their loss-absorbing capital by holding cash reserves similar to the nation’s largest mortgage insurers. The companies could, for example, be required to hold up to half of their guarantee fees as a reserve against possible future losses for 10 years.
- **Implement a housing boom capital buffer.** Fannie and Freddie have regularly helped fuel lending for home purchases during boom periods when housing sales and prices are rapidly increasing. Because credit standards tend to ease during housing booms, Fannie and Freddie have typically helped to increase the amount of relatively riskier loans in the financial system. To mitigate this problem, the FHFA should apply a capital buffer that requires Fannie and Freddie to raise more capital during boom periods. For example, the FHFA could

require Fannie and Freddie to automatically meet a higher capital ratio—of perhaps 1 or 2 percentage points—when home price growth breaches a fixed threshold, such as 50 percent above the long-term trend.

Though it is technically not part of the capital requirement framework, the FHFA should also create a formal receivership process to wind down Fannie and Freddie if they again become insolvent. Creating this process will provide the enforcement mechanism needed to ensure that any capital requirements truly protect the housing finance system, borrowers, and taxpayers from another prolonged recession and bailout of Fannie and Freddie. Without such a process, regulators will face enormous pressure to keep the insolvent firms afloat regardless of their financial condition and the risks they pose.

Conclusion

The Federal Housing Finance Agency is expected to re-propose a new regulatory capital framework for Fannie Mae and Freddie Mac in 2020. Given the Trump Administration’s laudable goal of ending Fannie’s and Freddie’s government conservatorships, as well as the fact that the companies’ capital requirements remain suspended, a new proposal is clearly warranted. The details of the new proposal remain unclear, but FHFA Director Calabria has often drawn attention to the large disparity in capital ratios between Fannie and Freddie and the nation’s largest banks, as well as the companies’ incredibly high leverage ratios.

The FHFA should move Fannie’s and Freddie’s capital requirements closer to the type of capital rules imposed on large U.S. banks, with a basic capital ratio and additional capital buffers similar to the SLR and the CCB required of the G-SIBs. The FHFA should also require Fannie and Freddie to supplement their loss-absorbing equity capital with cash reserves and other capital buffers. Finally, in addition to the new capital framework, the FHFA should move quickly to develop a formal receivership process for winding down Fannie and Freddie if they again become insolvent. These changes will better protect borrowers and taxpayers from the kind of economic collapse that occurred in 2008.

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 - iii. Norbert J. Michel and John Ligon, “Basel III Capital Standards Do Not Reduce the Too-Big-to-Fail Problem,” Heritage Foundation *Background* No. 2905, April 23, 2014, <https://www.heritage.org/markets-and-finance/report/basel-iii-capital-standards-do-not-reduce-the-too-big-fail-problem>.
 - iv. U.S. Government Accountability Office, “Mortgage-Related Assets: Capital Requirements Vary Depending on Type of Asset,” GAO-17-93, December 2016, <https://www.gao.gov/assets/690/681647.pdf> (accessed February 8, 2020).
 - v. U.S. Department of the Treasury, Office of the Comptroller of the Currency, “Regulatory Capital Rules: Regulatory Capital, Implementation of Basel III, Capital Adequacy, Transition Provisions, Prompt Corrective Action, Standardized Approach for Risk-weighted Assets, Market Discipline and Disclosure Requirements, Advanced Approaches Risk-Based Capital Rule, and Market Risk Capital Rule,” Final Rule, *Federal Register*, Vol. 78, No. 198 (October 11, 2013), <https://www.govinfo.gov/content/pkg/FR-2013-10-11/pdf/2013-21653.pdf> (accessed February 8, 2020). Also see 12 CFR § 3.10.

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- vi. The largest U.S. financial institutions use an approach that relies on both regulators' formulas and the firms' own internal models, so risk weights can vary from those in this example. See U.S. Government Accountability Office, "Mortgage-Related Assets."
- vii. Federal Deposit Insurance Corporation, "Risk Management Manual of Examination Policies," Section 2.1, April 2015, pp. 3 and 4, <https://www.fdic.gov/regulations/safety/manual/section2-1.pdf> (accessed February 7, 2020).
- viii. U.S. Department of the Treasury, Office of the Comptroller of the Currency, "Liquidity Coverage Ratio Rule: Treatment of Certain Municipal Obligations as High-Quality Liquid Assets," Final Rule, *Federal Register*, Vol. 84, No. 108 (June 5, 2019), <https://www.govinfo.gov/content/pkg/FR-2019-06-05/pdf/2019-11715.pdf> (accessed February 28, 2020).
- ix. 12 CFR, Subpart B—Capital Ratio Requirements and Buffers.
- x. John Walter, "US Bank Capital Regulation: History and Changes Since the Financial Crisis," Federal Reserve Bank of Richmond *Economic Quarterly*, Volume 105, No. 1 (First Quarter 2019), pp. 20–25, https://www.richmondfed.org/-/media/richmondfedorg/publications/research/economic_quarterly/2019/q1/walter.pdf (accessed February 28, 2020), and DavisPolk, "Supplementary Leverage Ratio (SLR) Visual Memorandum," September 12, 2014, https://www.davispolk.com/files/09.12.14.Supplementary_Leverage_Ratio.pdf (accessed February 28, 2020).
- xi. Federal Housing Finance Agency, "Fact Sheet: Proposed Rule on Enterprise Capital," <https://www.fhfa.gov/Media/PublicAffairs/PublicAffairsDocuments/Proposed-Rule-Enterprise-Capital-Fact-Sheet.pdf> (accessed February 3, 2020), and news release, "FHFA Issues Proposed Rule on Enterprise Capital," Federal Housing Finance Agency, June 12, 2018, <https://www.fhfa.gov/Media/PublicAffairs/Pages/FHFA-Issues-Proposed-Rule-on-Enterprise-Capital.aspx> (accessed March 3, 2020).
- xii. Federal Housing Finance Agency, "Enterprise Capital Requirements," Notice of Proposed Rulemaking, *Federal Register*, Vol. 83, No. 137 (July 17, 2018), p. 33312, <https://www.govinfo.gov/content/pkg/FR-2018-07-17/pdf/2018-14255.pdf> (accessed February 3, 2020).
- xiii. According to the FHFA, "these portfolios now represent a small share of the Enterprises' overall risk exposure, and the proposed methodology for calculating market risk capital requirements is therefore simple and straightforward." Federal Housing Finance Agency, "Enterprise Capital Requirements," p. 33331.
- xiv. Federal Housing Finance Agency, "Enterprise Capital Requirements," p. 33330.
- xv. The FHFA reports that the methods are similar to those in the Dodd–Frank Act stress test rules, the Basel capital rules, and the Federal Reserve's Comprehensive Capital Analysis and Review. Federal Housing Finance Agency, "Enterprise Capital Requirements," p. 33331.
- xvi. Federal Housing Finance Agency, "Enterprise Capital Requirements," pp. 33337 and 33341.
- xvii. *Ibid.*, p. 33333. Because Fannie and Freddie charge guarantee fees "at a level to cover the lifetime cost of expected losses," the proposed framework does not require the companies to "hold capital for expected loss." Federal Housing Finance Agency, "Enterprise Capital Requirements," p. 33331.
- xviii. Federal Housing Finance Agency, "Enterprise Capital Requirements," p. 33332.
- xix. *Ibid.*, p. 33334. The charge is required of assets with credit risk or market risk.
- xx. Federal Housing Finance Agency, "Enterprise Capital Requirements," pp. 33378 and 33388.
- xxi. *Ibid.*, p. 33313. Some critics have pointed out that it is impossible to fully evaluate the proposal's models, data, and assumptions because the CCF was not publicly disclosed. See Hannah Lang, "The Latest GSE Capital Rule Is Hypothetical, But FHFA Gets Earful Anyway," *American Banker*, November 26, 2018, <https://www.americanbanker.com/news/gse-capital-rule-is-hypothetical-but-fhfa-gets-earful-anyway> (accessed February 3, 2020).
- xxii. Federal Housing Finance Agency, "Enterprise Capital Requirements," p. 33329.
- xxiii. Joel Griffith and Norbert J. Michel, "Revising the Preferred Stock Purchase Agreements of Fannie Mae and Freddie Mac May Be the Biggest GSE Bailout Yet," Heritage Foundation *Background* No. 3448, November 4, 2019, p. 5, <https://www.heritage.org/sites/default/files/2019-11/BG3448.pdf>.
- xxiv. These calculations use 2017 financial statement data to maintain consistency with the FHFA's initial proposal. The calculations are as follows: \$3.212 trillion*0.5*0.08 (for Fannie) plus \$2.093 trillion*0.5*0.08 (for Freddie). For Fannie's off-balance-sheet exposures (\$34.3 billion for credit losses and liquidity support), see U.S. Securities and Exchange Commission, "Form 10-K," Federal National Mortgage Association, for the fiscal year ended December 31, 2017, p. 123, https://www.fanniemae.com/resources/file/ir/pdf/quarterly-annual-results/2017/10k_2017.pdf (accessed February 28, 2020). For Freddie's off-balance-sheet exposures (\$223.1 billion for credit losses and liquidity guarantees), see U.S. Securities and Exchange Commission, "Form 10-K," Federal Home Loan Mortgage Corporation, for the fiscal year ended December 31, 2017, p. 192, http://www.freddiemac.com/investors/financials/pdf/10k_021518.pdf (accessed February 28, 2020).
- xxv. Loss reserve requirements for insurance companies tend to vary because they are established at the state level.
- xxvi. MGIC Investment Corporation, *2018 Annual Report*, p. 5, <https://mtg.mgic.com/static-files/03815975-995c-467a-89de-47595fec79ac> (accessed February 7, 2020).

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- xxvii. Scott E. Harrington, “The Financial Crisis, Systemic Risk, and the Future of Insurance Regulation,” National Association of Mutual Insurance Companies *Issue Analysis*, September 2009, p. 8, https://content.naic.org/sites/default/files/inline-files/topics_white_paper_namic_1.pdf (accessed February 7, 2020).
- xxviii. The Housing and Economic Recovery Act of 2008 gives the FHFA Director the authority to “establish risk-based capital requirements for the enterprises to ensure that the enterprises operate in a safe and sound manner, maintaining sufficient capital *and reserves* to support the risks that arise in the operations and management of the enterprises.” (Emphasis added.) 12 U.S. Code § 4611(a)(1).
- xxix. The FHFA may “at the discretion of the Director, be appointed conservator or receiver for the purpose of reorganizing, rehabilitating, *or winding up the affairs of a regulated entity.*” (Emphasis added.) 12 U.S. Code § 4617(a)(2). Also see Joel Griffith and Norbert J. Michel, “Revising the Preferred Stock Purchase Agreements of Fannie Mae and Freddie Mac May Be the Biggest GSE Bailout Yet,” Heritage Foundation *Backgrounder* No. 3448, November 4, 2019, <https://www.heritage.org/sites/default/files/2019-11/BG3448.pdf>.
- xxx. The original Basel capital rules for banks contributed to the 2008 financial crisis because regulators failed to properly measure risk for mortgage-backed securities. See Norbert J. Michel and John Ligon, “Basel III Capital Standards Do Not Reduce the Too-Big-to-Fail Problem,” Heritage Foundation *Backgrounder* No. 2905, April 23, 2014, <https://www.heritage.org/markets-and-finance/report/basel-iii-capital-standards-do-not-reduce-the-too-big-fail-problem>.
- xxxi. Federal Housing Finance Agency, “Enterprise Capital Requirements,” p. 33315.
- xxxii. *Ibid.*
- xxxiii. Congressional Budget Office, “Measuring the Capital Positions of Fannie Mae and Freddie Mac,” June 2006, p. 17, <https://www.cbo.gov/sites/default/files/109th-congress-2005-2006/reports/06-23-fanniefreddie.pdf> (accessed February 3, 2020).
- xxxiv. American Land Title Association, “OFHEO Classifies Fannie Mae as Significantly Undercapitalized for Fourth Quarter 2004 and Adequately Capitalized for First Quarter 2005,” May 19, 2005, <https://www.alta.org/news/news.cfm?20050519-OFHEO-Classifies-Fannie-Mae-As-Significantly-Undercapitalized-For-Fourth-Quarter-2004-And-Adequately-Capitalized-For-First-Quarter-2005> (accessed February 3, 2020), and Securities and Exchange Commission, “Office of the Chief Accountant Issues Statement on Fannie Mae Accounting,” December 15, 2004, <https://www.sec.gov/news/press/2004-172.htm> (accessed February 3, 2020).
- xxxv. Office of Federal Housing Enterprise Oversight, “Fannie Mae and Freddie Mac Capital,” Mortgage Market Note 08-2, July 17, 2008, https://www.fhfa.gov/PolicyProgramsResearch/Research/PaperDocuments/20080717_MMNote_08-2_N508.pdf (accessed February 3, 2020). The Office of Federal Housing Enterprise Oversight, created in 1992, was an independent regulator within the U.S. Department of Housing and Urban Development. In 2008, the Housing and Economic Recovery Act combined the OFHEO and the Federal Housing Finance Board (the independent regulator of the Federal Home Loan Banks) to form the new FHFA.
- xxxvi. Office of Federal Housing Enterprise Oversight, “Fannie Mae and Freddie Mac Capital.”
- xxxvii. *Ibid.*
- xxxviii. Historically, credit standards have tended to ease during housing booms. Tobias Peter and Edward Pinto, “Mortgage Default Risk: A Better Replacement for the QM Rule’s Debt-to-Income Ratios than the APOR Rate Spread,” American Enterprise Institute Housing Center, February 5, 2020, <https://www.aei.org/wp-content/uploads/2020/02/CFPB-QM-Patch-Is-the-APOR-Rate-Spread-A-Good-a-Predictor-Of-Risk-2.5.20-FINAL.pdf> (accessed February 5, 2020). As Peter and Pinto explain, federal regulators could, alternatively, mitigate this pro-cyclicality by moving to a stressed mortgage default rate (MDR) to replace debt-to-income limits.
- xxxix. At the peak of the housing market in the second quarter of 2006, the national Case-Shiller home price index was 84 percent above its long-term trend. Norbert Michel, John P. Lajaunie, Shari Lawrence, and Ronnie Fanguy, “Home Equity Lines of Credit and the Unemployment Rate: Have Unemployed Consumers Borrowed Themselves into the Next Financial Crisis?” *Journal of Banking and Finance*, Vol. 47 (October 2014), pp. 147–154.
- xl. The Basel III capital rules include a counter-cyclical capital buffer, but the Federal Reserve has yet to impose this regulation on U.S. banks. The Fed, has, however, outlined its objectives for this capital buffer and the factors that will influence the requirements. See Randall Quarles, “Frameworks for the Countercyclical Capital Buffer,” Board of Governors of the Federal Reserve System, March 29, 2019, <https://www.federalreserve.gov/newsevents/speech/quarles20190329a.htm> (accessed February 7, 2020).
- xli. By law, Fannie and Freddie had to meet the larger of a risk-based requirement or a minimum capital requirement of 2.5 percent of their total assets, and they were allowed to take a 0.45 percent capital charge for holding their own mortgage-backed securities. Congressional Budget Office, “Measuring the Capital Positions of Fannie Mae and Freddie Mac,” p. 17.
- xlii. The 60-to-1 ratio refers to year-end 2007 capital levels for Fannie and Freddie. During conservatorship, with essentially no equity, Fannie and Freddie have been operating more highly leveraged. Prior to 1992, when capital requirements were first established, Fannie and Freddie were typically highly leveraged as well, with total equity ratios less than 2 percent (approximately 60 to 1) in some years. See, for instance, Federal National Mortgage Association, “Information Statement,”

February 16, 1993, p. 14, <https://www.fanniemae.com/resources/file/ir/pdf/info-statements/infostmtfeb1993.pdf> (accessed March 2, 2020).

- xl. The system was created by the 1932 Federal Home Loan Bank Act. See 12 U.S. Code § 1421.
- xli. These four large financial institutions account for nearly a quarter of the FHLBs' total advances. See Federal Housing Finance Agency, *Report to Congress*, 2018, p. 14, https://www.fhfa.gov/AboutUs/Reports/ReportDocuments/FHFA_2018_Report-to-Congress.pdf (accessed January 27, 2020).
- xlii. Federal Housing Finance Agency, *Report to Congress*, pp. 9 and 10.
- xliii. *Ibid.*, p. 13.
- xliv. See 12 U.S. Code § 1426. Also see Federal Housing Finance Agency, "Federal Home Loan Bank Capital Requirements," Final Rule, *Federal Register*, Vol. 84, No. 34 (February 20, 2019), pp. 5308–5333, <https://www.govinfo.gov/content/pkg/FR-2019-02-20/pdf/2018-27918.pdf> (accessed January 29, 2020).
- xlv. Federal Housing Finance Agency, "Federal Home Loan Bank Capital Requirements," p. 5326.
- xlvi. Federal Housing Finance Agency, *Report to Congress*, p. 13. Though the FHLBs are required to meet certain statutory minimums, they are governed by a risk-based capital framework that accounts for credit, market, and operational risks. Federal Housing Finance Agency, "Federal Home Loan Bank Capital Requirements," pp. 5326–5333.
1. In most cases, banks are supervised and examined by more than one regulator, but the Federal Reserve oversees bank holding companies, the FDIC regulates state-chartered banks, and the Office of the Comptroller regulates federally chartered banks. See David R. Burton and Norbert J. Michel, "Financial Institutions: Necessary for Prosperity," Heritage Foundation *Backgrounder* No. 3108, April 14, 2016, <https://www.heritage.org/markets-and-finance/report/financial-institutions-necessary-prosperity>.
- ii. Federal Deposit Insurance Corporation, "Fact Sheet: Overview of the Community Bank Leverage Ratio Framework," September 17, 2019, <https://www.fdic.gov/regulations/resources/cbi/cblr-facts.pdf> (accessed February 6, 2020).
- iii. Federal Deposit Insurance Corporation, *Risk Management Manual of Examination Policies*, Section 2.1, p. 3.
- iiii. In 2011, the Basel Committee on Banking Supervision came up with a set of financial indicators to identify G-SIBs. See Basel Committee on Banking Supervision, "Global Systemically Important Banks: Updated Assessment Methodology and the Higher Loss Absorbency Requirement," July 2013, <https://www.bis.org/publ/bcbs255.pdf> (accessed January 29, 2020).
- lv. The eight American GSIBs are (1) JPMorgan Chase, (2) Citigroup, (3) Bank of America, (4) Goldman Sachs, (5) Wells Fargo (6) Morgan Stanley, (7) State Street, and (8) Bank of New York Mellon.
- lv. For the rules applied to (among others) bank holding companies that are G-SIBs (and regulated by the Federal Reserve) see 12 CFR Part 217—Capital Adequacy Of Bank Holding Companies, Savings and Loan Holding Companies, and State Member Banks (Regulation Q), <https://www.law.cornell.edu/cfr/text/12/part-217> (accessed January 29, 2020).
- lvi. Kansas City Federal Reserve, *Bank Capital Analysis*, June 30, 2019, https://www.kansascityfed.org/~/-media/files/publicat/banking/bca/bank%20capital%20analysis_june%2030%202019.pdf?la=en (accessed January 29, 2020).
- lvii. *Ibid.* For the formal regulatory definition of common equity tier 1 capital implemented by the Federal Reserve, the main component of which is common equity, see 12 CFR § 217.20(b).
- lviii. Author's calculations based on the banks' annual reports.
- lix. Bank of America, *2018 Annual Report*, p. 104, http://www.annualreports.com/HostedData/AnnualReports/PDF/NYSE_BAC_2018.pdf (accessed January 29, 2020), and JP Morgan Chase & Co., *2018 Annual Report*, p. 152, <https://www.jpmorganchase.com/corporate/investor-relations/document/annualreport-2018.pdf> (accessed January 29, 2020).
- lx. JP Morgan Chase & Co., *2018 Annual Report*, p. 114.
- lxi. *Ibid.*, p. 40.
- lxii. Bank of America, *2018 Annual Report*, p. 67.
- lxiii. *Ibid.*, p. 41.
- lxiv. U.S. Securities and Exchange Commission, "Form 10-K," Federal National Mortgage Association, for the fiscal year ended December 31, 2018, p. F-3, <https://www.fanniemae.com/resources/file/ir/pdf/quarterly-annual-results/2018/q42018.pdf> (accessed January 27, 2020), and U.S. Securities and Exchange Commission, "Form 10-K," Federal Home Loan Mortgage Corporation, for the fiscal year ended December 31, 2018, p. 215, http://www.annualreports.com/HostedData/AnnualReports/PDF/NYSE_FMCC_2018.pdf (accessed January 27, 2020). 2018 data are used to make same-year comparisons with the U.S. G-SIBs (as of this writing, not all of the 2019 annual reports are available yet), but the comparison is virtually the same using Fannie's and Freddie's 2019 financial statements.

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- lxv. U.S. Securities and Exchange Commission, “Form 10-K,” Federal National Mortgage Association, for the fiscal year ended December 31, 2018, p. F-3.
- lxvi. *Ibid.*, p. 215.
- lxvii. Wells Fargo & Company, *2018 Annual Report*, p. 51, <https://www08.wellsfargomedia.com/assets/pdf/about/investor-relations/annual-reports/2018-annual-report.pdf> (accessed February 6, 2020).
- lxviii. Fannie and Freddie were more highly leveraged than the largest U.S. banks long before the 2008 crisis. In 2004, for instance, Fannie Mae reported \$35.2 billion in total capital to more than \$1 trillion in total assets, for a 3.5 percent ratio of total capital to total assets. Bank of America’s 2004 total equity-to-asset ratio, on the other hand, was 9 percent. See U.S. Securities and Exchange Commission, “Form 10-K,” Federal National Mortgage Association, for the fiscal year ended December 31, 2004, pp. 180 and 192, https://www.fanniemae.com/resources/file/ir/pdf/quarterly-annual-results/2004/2004_form10K.pdf (accessed February 4, 2020), and Bank of America, *2004 Annual Report*, p. 31, http://www.annualreports.com/HostedData/AnnualReportArchive/b/NYSE_BAC_2004.pdf (accessed February 4, 2020).
- lxix. See, for example, Freddie Mac, “Monthly Volume Summary: December 2019,” Table 4 and Table 5, pp. 2 and 3, <http://www.freddie.mac.com/investors/financials/pdf/1219mvs.pdf> (accessed January 27, 2020). As of December 2019, Freddie is obligated to repay \$2.2 trillion in “mortgage-related securities and other mortgage-related guarantees,” and holds more than \$283 billion in “other debt” that consists of “Reference Bills® securities, discount notes, medium-term notes, securities sold under agreements to repurchase and other secured borrowings, Reference Notes® securities, Structured Agency Credit Risk (STACR) debt notes, and subordinated debt.”
- lxx. Technically, banks must hold reserves of 10 percent of their customer transaction account deposits that exceed \$127.5 million, which means that most deposits in the U.S. are subject to the 10 percent reserve requirement. Federal Reserve Board of Governors, “Reserve Requirements,” November 20, 2019, <http://www.federalreserve.gov/monetarypolicy/reservereq.htm> (accessed February 6, 2020).
- lxxi. Since FDIC insurance began in 1934, no depositor has lost a single cent of insured funds as a result of a bank failure. See Federal Deposit Insurance Corporation, “Who is the FDIC?” May 3, 2017, <https://www.fdic.gov/about/learn/symbol/index.html> (accessed February 6, 2020).
- lxxii. Christopher Martin, Manju Puri, and Alexander Ufier, “Deposit Inflows and Outflows in Failing Banks: The Role of Deposit Insurance,” NBER *Working Paper* No. 24589, May 2018, <https://www.nber.org/papers/w24589.pdf> (accessed February 8, 2020).
- lxxiii. Lael Brainard, “The Digitalization of Payments and Currency: Some Issues for Consideration,” speech at the Symposium on the Future of Payments, Stanford, California, February 5, 2020, <https://www.federalreserve.gov/newsevents/speech/brainard20200205a.htm> (accessed February 8, 2020).
- lxxiv. In 2019, the GSEs had (combined) \$5.7 trillion in total assets. As of this writing, the annual results for all of the U.S. G-SIBS are not yet available, but quarterly filings suggest the totals will be similar to those in 2018.
- lxxv. Calabria, “The Housing Finance System’s Status Quo Is Over.”
- lxxvi. Calabria, “Real Change Has Begun: Building Momentum for Lasting Housing Finance Reform.”
- lxxvii. U.S. Securities and Exchange Commission, “Form 10-K,” Federal National Mortgage Association, for the fiscal year ended December 31, 2019, <https://www.fanniemae.com/resources/file/ir/pdf/quarterly-annual-results/2019/q42019.pdf> (accessed February 28, 2020), and U.S. Securities and Exchange Commission, “Form 10-K,” Federal Home Loan Mortgage Corporation, for the fiscal year ended December 31, 2019, http://www.freddie.mac.com/investors/financials/pdf/10k_021320.pdf (accessed February 28, 2020).