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Cost of Housing Finance Reform

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Efforts to reform the housing finance system have taken on new life. Two pieces of legislation, each with a different vision of the future system, have been drafted in the Senate and the House, and the Obama administration has recently weighed in on the issues. More legislative efforts are on the way.

Propelling the reform efforts is the renewed profitability of Fannie Mae and Freddie Mac. The two housing finance agencies' finances have been lifted by the much-improved housing market and their dominant position in the still-troubled mortgage market. Fannie and Freddie are close to repaying the \$188 billion they received during the financial crisis to maintain their solvency. If their profits become an important source of revenue for the Treasury, lawmakers could find it more difficult to reform these institutions without adding to future federal budget deficits or forcing changes in other government spending and tax policies.

No matter how the housing finance system is ultimately structured, mortgage rates will be higher than they were prior to the housing crash. How much higher depends on numerous factors, including the sources and cost of private capital supporting the system and the extent and nature of any government backstop.

This brief note considers the impact on mortgage rates from various potential reforms to the housing finance system. The cost of operating the system includes (1) the cost to cover "normal" or expected losses on loans during typical economic conditions; (2) the cost of capital needed to insure against stress losses during extreme economic conditions; (3) the cost of any subsidies that might be provided to promote homeownership among disadvantaged groups; and (4) administrative costs.

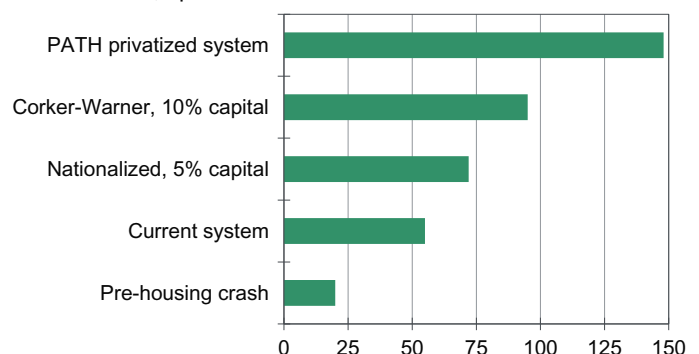
The largest cost, for capital needed to prepare for potential future losses, depends on numerous assumptions. To determine how these assumptions affect the cost of capital, a simple calculator is provided along with this note.

Pre-crash system

Prior to the housing crash, Fannie and Freddie covered their costs by charging a guarantee fee of 20 basis points to insure mortgage loans (see Chart). The agencies were required by their regulator to maintain a minimum leverage ratio of 45 basis points, which translates into a 0.9% bank-like capital ratio assuming a 50% risk weight for prime single-family mortgage loans comparable to current Basel III rules. Fannie and Freddie were thus holding capital sufficient to withstand a loss rate of less than 1%. Of course, this thin capitalization was wiped out during the Great Recession, and the agencies wound up in conservatorship.

The Cost of Housing Finance Reform

Minimum cost, bps



Source: Moody's Analytics

The Mortgage Rate Impact of Housing Finance Reform

Bps

Pre-Crash GSE System	20
Current System	52
Cost of capital @ 2.5% capitalization and 20% before-tax ROE	22
Administrative costs	10
Expected loss	9
Payroll tax surcharge	10
Nationalized System	69
Cost of capital @ 5% capitalization and 20% before-tax ROE	50
Administrative costs	10
Expected loss	9
Corker-Warner	94-119
Cost of capital of first 5% capitalization and 20% before-tax ROE	75
Cost of capital for next 5% capitalization from capital markets	5-20
Administrative costs	10
Expected losses	9
Mortgage Insurance Fund	0-5
Market Access Fund	5-10
More efficient system	-10
PATH	146-156
Cost of capital @ 5% capitalization and 25% before-tax ROE	92
Administrative costs	10
Expected losses	9
Liquidity premium	10-15
Financial market risk premium	25-30
Difference between Corker-Warner and current Fannie g-fee	42
Difference between PATH and Corker-Warner	52
Difference between PATH and current Fannie g-fee	94

Notes:

Corker-Warner g-fee is in the long run; Mortgage Insurance Fund would be 10-15 bps in the first 15 yrs as the MIF is built up.

Payroll tax g-fee surcharge expires in 2022 and is not included in the Corker-Warner and PATH g-fee calculations.

PATH cost of capital assumes bank-like capital standards.

These cost estimates are for the typical 30-yr fixed-rate mortgage borrower with an 80% loan-to-value ratio and 750 credit score.

Source: Moody's Analytics

Current system

Since being placed in conservatorship, the government-sponsored enterprises have significantly increased the guarantee fees they charge to insure the credit risk on mortgages. Fannie's fees are several basis points higher than Freddie's, given the greater liquidity of Fannie's mortgage securities, but on average, the agencies are charging 55 basis points. It is important to note that 10 basis points of this is earmarked to partially

pay for the 2011-2012 payroll tax holiday, part of the fiscal stimulus passed to support the weak economy. This added fee will be in place until 2022 (see Table).

While in conservatorship, the GSEs do not hold capital, but their current guaranty fees would be consistent with a capitalization that could withstand losses of approximately 2.5% on defaulting mortgages.

To date, the higher g-fees have had little ostensible impact on mortgage rates, which

have been held down by the Federal Reserve's quantitative easing policy. As part of its current QE program, the Fed has been purchasing \$40 billion per month in agency mortgage-backed securities, and is likely to amass close to \$1.5 trillion of these agency MBS along with \$2.5 trillion in Treasury securities. QE has reduced fixed mortgage rates by an estimated 150 basis points relative to what they would be otherwise.¹ That is, without QE, mortgage rates would currently be closer to 5.5% than their actual 4%.

Nationalized system

As QE winds down and the future housing finance system takes shape, mortgage rates will rise. How much depends in part on the system and its capitalization. One possibility is a nationalized system is similar to the current de facto model, with government-run institutions similar to Fannie and Freddie but capitalized to withstand greater losses.

A 5% capitalization rate would be plausible, since this is comparable to the losses the GSEs and the private mortgage insurers suffered during the Great Recession. It is also consistent with the capital the nation's largest banks need to hold against their prime single-family mortgages. This assumes that under current Basel III capital rules, banks will be required to have a 10% Tier 1 capital ratio and that prime mortgage loans have a 50% risk weight.

The g-fees needed in this future nationalized system would depend on the return the descendants of Fannie and Freddie would require. Assuming they would require a 20% before-tax return on equity—similar to private financial institutions with similar risk profiles and approximately what private mortgage insurers currently expect—then the g-fee in the nationalized system would be 69 basis points (see Table)². This also assumes that the government-run insurers' capital would be composed of paid-in capital and the present value of future g-fees after accounting for 5% losses.

Moving from the current system in which the GSEs are capitalized to a 2.5% loss rate to a nationalized system capitalized to a 5% loss rate, would increase g-fees by an estimated 14

basis points (69 bps – 55 bps). This translates into a \$17 increase in the monthly mortgage payment of the typical borrower, a 2% increase. This does not consider costs associated with efforts to promote affordable housing, which many current reform proposals include, or costs borne by taxpayers if another financial crisis resulted in losses greater than 5%.

Corker-Warner hybrid system

Nationalization has its advocates, but a hybrid housing finance system currently has the broadest political backing. Senators Bob Corker (R-TN) and Mark Warner (D-VA) introduced legislation this summer with bipartisan support to establish such a system, and President Obama is supportive.³

In a hybrid system, private capital would be responsible for losses due to mortgage defaults. Taxpayers would backstop the system if it were overwhelmed by losses in a financial crisis, but the system would be designed so that lenders and borrowers bear the ultimate cost. A hybrid system would preserve the long-term fixed-rate mortgage as a mainstay of U.S. housing, and would ensure that affordable mortgage loans remain available to most middle-income Americans through good and bad times.

Under the Corker-Warner legislation, the housing finance system is required to have sufficient private capital to withstand losses of 10% before the government's backstop kicks in. The legislation allows for capital to come from a range of private sources including mortgage bond guarantors and capital markets.

The protection to taxpayers is even greater at 12.5%. This comprises the 10% in private capital and 2.5% in a mortgage insurance fund, or MIF, that is built up through higher g-fees in the system's first 15 years. In other words, losses on mortgage securities backed by the government would have to exceed 12.5% before taxpayers would be called upon to support the system. Such losses would be almost three times greater than those suffered in the Great Recession, so this would occur only in the rarest of financial calamities.

While the chance of losses this large is remote, capitalizing the housing finance system to withstand such large loss would provide a fortress foundation for the housing finance system. It would all but eliminate taxpayers'

exposure to risk, and should allay any concern about the government charging too little for its guarantee.

The high level of capitalization should also dispel concerns that private financial institutions might lower underwriting standards and take on too much risk, assuming the government guarantee would bail them out. It is hard to imagine that as a problem in the Corker-Warner housing finance system, since private capital has so much skin in the game. The government guarantee would be needed only if private investors had already suffered devastating losses.

Requiring a strong base of capital has costs. This cost significantly depends on the sources of additional private capital and their required rates of return. Suppose the first 5% of the required 10% in private capital is provided by mortgage bond insurers and the second 5% by capital markets. This seems a plausible capital structure under Corker-Warner, as it combines the stability provided by bond insurers with the lower cost that capital markets can provide in most economic scenarios.

The first 5% of capital from mortgage bond insurers will cost 75 basis points (see Table). This assumes that mortgage bond insurers will require a 20% before-tax return and that their capital is composed of paid-in capital and one-half the present value of the stream of future g-fees after accounting for 5% in losses.

The cost of the second 5% of capital is more uncertain, and will vary between 5 and 20 basis points. It is much less expensive than the capital provided by the bond insurers, in part because the likelihood of losses greater than 5% is so low. Investors should thus be willing to invest in a security covering the additional 5% of required capital at a low interest rate, say 100 to 400 basis points above risk-free 10-year Treasury yields. A spread of 100 basis points would mean the cost of the additional 5% of capital will be only 5 basis points (.01 x .05).

For context, the average historical spread between yields on Fannie Mae securities and Treasuries is just over 100 basis points. This spread is necessary to compensate investors for the prepayment risk in mortgage securities that does not exist in a Treasury bond. How much larger the spread must be

to attract investors to the new mortgage credit bonds under Corker-Warner depends on many factors, including: how much data will be made available to investors to assess the risk; whether some average market risk is sold or whether the risk is sold bond by bond; the consistency and approach to origination standards and representations and warranties; and perhaps even the strength of the underlying issuer if the ultimate credit performance of the bond is affected by the repurchase of individual mortgages found to have been underwritten improperly.

There will certainly be an adjustment period with higher spreads until it is clear how reforms to the system are working out and liquidity for these bonds is fully established. The guarantors need to be sufficiently capitalized, and the capital markets need to be open so that the security can be placed. These factors are co-dependent and it is difficult for the guarantor to price for risk that the security markets will price appropriately, and vice versa.

Also adding to the cost of Corker-Warner is the cost of a government-run mortgage insurance fund, to be used if private capital is overwhelmed in a financial crisis. The cost of the MIF could be as much as 20 basis points in the period just after reform begins as the fund is being established, but could eventually decline to a zero cost as the MIF becomes fully funded and prospects of tapping it remain low. Corker-Warner also includes a fund to finance affordable housing initiatives, the Market Access Fund, which will cost an extra 5 to 10 basis points.

The Corker-Warner legislation contains a number of provisions that should help to reduce mortgage costs. The common securitization platform in the legislation should result in greater transparency to investors and an even more liquid mortgage securities market. Consistent regulation of the housing finance system should also reduce administrative costs. Also, because the mortgage securities will receive an explicit guarantee from the federal government, spreads over Treasuries should narrow a bit, coming closer to those currently between Ginnie Mae securities and Treasuries. Altogether, these factors will reduce the costs under Corker-Warner by an estimated 10 basis points.

The total cost of Corker-Warner is expected to ultimately range from 94 to 119 basis points. Corker Warner will thus add at minimum 42 basis points to current mortgage rates (94 – 52). This translates into just over \$50 more in monthly mortgage payments for a typical borrower, an almost 5% increase. While meaningful, for context, fixed mortgage rates rose by well over 100 basis points in just a few weeks this past summer after Federal Reserve officials first publicly discussed the possibility of tapering their quantitative easing policy.

It is important to note that these cost estimates apply to a typical 30-year fixed-rate mortgage with an 80% loan-to-value ratio and a 750 credit score.⁴ The cost will be greater for loans to less creditworthy borrowers who are still eligible for a government guarantee, particularly during recessions when investors demand higher returns to provide capital for residential mortgage lending.

PATH privatized system

Another, less likely outcome of housing finance reform is a privatized system. While most proposals for such a system retain the Federal Housing Administration as a source of mortgage credit, they allow for no additional government support to the mortgage market. This is the system envisaged in the Protecting American Taxpayers and Homeowners Act introduced by Republicans on the House Financial Services Committee in the summer.

A privatized system has some potential advantages, but its disadvantages are significant, including much higher mortgage rates and a much less stable source of mortgage funding through the economy's ups and downs. The 30-year fixed-rate mortgage, the bedrock of mortgage lending since the Great Depression, would be significantly less available.

A privatized U.S. market would come to resemble those in other countries, which primarily offer adjustable-rate mortgages. Based on the experience overseas, the fixed-rate mortgage share in the U.S. would decline to between 10% and 20% of the market, from a historical average closer to 75%.⁵ ARMs are not inherently bad loan products, but they shift interest-rate risk to

homeowners. This would be a very significant adjustment for many U.S. homeowners who are not well-equipped to handle such risk.⁶

Cost estimates for privatization depend on several important assumptions. The first assumption is that the system will be effectively capitalized to a 5% loss rate. Banks would likely be the predominant source of capital, and under Basel III capital rules banks need to capitalize their single-family prime mortgage loans to 5%. Their capital will be composed of paid-in capital and one-half the present value of the stream of future *g*-fees after accounting for 5% losses.

Second, it is assumed that financial institutions providing capital to a privatized system will require a 25% before-tax return on equity. This is greater than the 20% ROE that the private mortgage insurance industry has typically obtained during times of normal market conditions with a government backstop, but less than the 30%-plus return that unsecured credit-card issuers have traditionally sought. Investors providing capital to a fully privatized system will need a higher return to compensate for greater risks when the government backstop is absent.

A third assumption is that investors in a privatized market will assess a liquidity risk premium of 10 basis points. A private system will likely feature a greater variety of securities, resulting in a smaller, shallower market. The benefit of a deeper market is evident in the typical interest-rate spread between jumbo and agency-backed mortgage securities, which has ranged from 10 to 30 basis points in normal periods. In times of stress, the spread has been much greater.

If anything, a 10-basis point liquidity premium is too low, as it is hard to see how the to-be-announced market would function in the absence of some form of a government guarantee. The TBA market is critical to liquidity in the current market for Fannie and Freddie securities, and depends on the willingness of investors to accept any security backed by a pool of loans delivered with a given coupon and maturity.⁷ This is acceptable, as the government guarantee gives all pools the same credit risk, leaving prepayment behavior as the only potential difference. Without a government guarantee, investors would be required to analyze the credit risk of each mortgage pool,

including differences in their credit-enhancement structures. Some investors are not able to take on any credit risk—global central banks for example—and many others are not well-equipped to do so. As a result, the TBA market would likely fall apart.

A fourth assumption is that investors in a privatized market would require a financial market risk premium of 25 basis points. Investors would want some compensation for the additional risks of investing without a government backstop. Just how much compensation is difficult to determine, but it is instructive that the TED spread—the difference between three-month Libor and Treasury bill yields—surged from 25 basis points just prior to the financial crisis to a peak of almost 400 basis points at the height of the financial panic when investors were seriously questioning whether the government would support the financial system.⁸ After the Trouble Asset Relief Program and other government interventions, the TED spread came full circle, reflecting the widespread belief that the government would not allow major financial institutions to fail.

To further test this assumption, a vector autoregressive model of the 30-year fixed mortgage rate was constructed.⁹ The mortgage rate is explained in the model by the 10-year Treasury bond yield, house price growth, and the TED spread. The model was simulated under the assumption that the TED spread narrows by 100 basis points, which is not quite the average TED spread over the model's estimation period back to the mid-1970s. The exercise effectively simulates the impact on mortgage rates of the counterfactual in which the entire financial system is nationalized. Since money-center banks are part of the government in this scenario, they are willing to lend to each other at the risk-free Treasury interest rate. The 30-year fixed mortgage rate narrows by an average of nearly 50 basis points in this simulation. The assumption that investors will require only a 25-basis point financial market risk premium in a fully privatized system seems conservative.

The total cost of PATH is thus expected to ultimately range from 146 to 156 basis points. Thus, at a minimum, PATH would add 94 basis points to the current price of

a mortgage (146 – 52 bps). This translates into \$117 more in monthly mortgage payments or 12% for the typical borrower.

This assessment of the rate impact of privatization is probably conservative, as it does not account for institutional constraints affecting investor demand in global fixed-income markets. Some institutional investors, mutual funds and pension funds are barred from investing in assets with credit risk by their charters or even by law. These investors, who currently are willing buyers of government-backed mortgage securities, would be unable to purchase mortgage securities in a fully privatized system. Such barriers may or may not come down in the future. To the degree they do not, mortgage rates would be necessarily higher in a privatized system, particularly during the transition period from the current system to the PATH.

A fully privatized mortgage finance system will also experience difficulty providing stable mortgage funding during difficult financial times. Mortgage securities markets are prone to investor runs, much like the bank runs that occurred before FDIC deposit insurance.¹⁰ All too familiar is the pattern in which investors are willing providers of capital in good times, but run for the door in bad times. Risk premiums and interest rates spike in times of financial crisis. Credit is provided only by lenders making the highest quality loans for

their own portfolios. The resulting crunch further undermines housing demand, prices, and the broader economy, setting off a vicious cycle.¹¹

The PATH Act attempts to address this concern by allowing the FHA to expand its lending in times of crisis. But this would likely happen only after significant damage has been done to the housing market and to the broader economy, and it is unclear whether the FHA could quickly fill the void. Allowing the FHA to step in too quickly or broadly would encourage the very moral hazard that advocates of PATH warn against.

Conclusion

Before the housing crash, mortgage borrowers received significant implicit subsidies. Fannie Mae and Freddie Mac did not adequately charge for the risks involved in mortgage lending. Through their affordable housing goals, the GSEs also provided help to members of disadvantaged groups who might not otherwise have been able to afford mortgage loans.

In the current housing finance system, with Fannie and Freddie operating in conservatorship, subsidies to mortgage borrowers have been significantly reduced. The GSEs charge higher fees to compensate for lending risks and they do not appear to be providing the same support to disadvantaged groups. Nevertheless, mortgage borrowers are still not paying the full cost of credit.

Most visions for the future housing finance system eliminate the taxpayer subsidy, forcing mortgage borrowers to pay the full cost of getting loans. As a result, mortgage rates will be meaningfully higher on average than in times past. How much higher depends on the structure of the future system.

Moving from the current system to a more highly capitalized nationalized system will add at minimum 17 basis points to the cost of a mortgage loan. Moving to a hybrid system such as that proposed by Corker-Warner will add 42 basis points. Moving to a privatized system like that proposed in the PATH legislation will add 94 basis points.

This is not exactly an apples-to-apples comparison, as Corker-Warner constructs a system that provides much greater protection to taxpayers than exists in a nationalized system. Corker-Warner also preserves the 30-year fixed-rate mortgage loan as a mainstay of the U.S. housing market, unlike the PATH system in which the 30-year fixed-rate loan will quickly fade. Corker-Warner is also the only system considered that explicitly pays for subsidies to support affordable housing.

The housing finance system is in desperate need of reform, but while all reform plans raise mortgage rates, which road is ultimately taken will make a significant difference to mortgage borrowers, the housing market, and the broader economy.

Appendix: Description of Guarantee Fee Model

Guarantee fees are determined through a net-present-value computation of cash flows, in order to meet conditions for both solvency and return on equity.

Under the solvency condition, the capital held by the insurer plus the guarantee fee (or premium) income paid by the insured entity must be greater than or equal to a specified level of stress losses in each and every period of a loan's life:

$$\sum_{t=1}^T \beta^t UPB_t^S \times \frac{\phi}{1200} + K \geq \sum_{t=1}^T \beta^t SL_t$$

For all time periods i ranging from origination ($i=0$) to the end of the loan term ($i=T$)

Where

$$\beta^t = \left(\frac{1}{1+r_t} \right)^t$$

t = age of loan in months

T = term of loan in months (for example, 360)

r_t = discount rate at time t (for example, Libor)

UPB_t^S = unpaid principal balance at time t (in stress loss case)

UPB_t^E = unpaid principal balance at time t (in expected loss case)

K = initial capital

γ = proportion of collected guarantee fee assumed to be available to offset stress losses

ϕ = annualized guarantee fee

EL_t = expected loss at time t

SL_t = stress loss at time t (that is, selected loss capitalization level)

ROE = pre-tax return on equity demanded by insurer (providers of capital)

tax = marginal tax rate of insurer

Investors in the guarantor provide capital to guard against stress losses, demanding a certain return on equity to compensate them for their risk. The guarantee fee must cover expected losses as well as this cost of capital:

$$\phi = K \times \frac{ROE}{(1 - tax)} + \frac{\sum_{t=1}^T \beta^t EL_t}{\sum_{t=1}^T \beta^t UPB_t^E}$$

Models for expected and stress losses can be estimated based on the historical default performance of previous mortgages. Expected losses may be derived based on the historical distribution of losses or, alternatively, may be simulated based on the distribution of economic drivers in the loss models (for example, house prices, interest rates, unemployment, etc.).

A level of stress losses must be chosen, against which the insurer must capitalize. This selection may be guided by historical experience or through simulation exercises, though neither of these processes ensures that they represent the true underlying distribution of losses. If the realized economic draw exceeds the stress loss assumption, the insurer will have capital reserves insufficient to cover losses and become insolvent.

Given parameterization of r_t , ROE and tax along with expected and stress loss estimates, the guarantee fee is derived by iterating on a solution that meets both the solvency and return criteria.

We note that the discounted cash flow approach taken in this analysis is highly simplified and stylized. A more complete analysis would consider a wide variety of mortgage products in a portfolio subjected to multiple economic stress environments. That said,

the approach can provide meaningful comparisons of the relative magnitude and impact of the proposed models of housing finance.

The guarantee fee model is operationalized in the calculator provided along with this note. The calculator allows the user to change the various assumptions involved in determining the appropriate gfee. The g-fee calculation for each of the housing finance systems discussed in this note is also provided.

Assumptions on conditional default and prepayment rate are specified within the calculator along with assumptions on the return on equity and corporate tax rate. Assumed values were selected to mimic a "steady state" market based on long-run average values, but users are free to explore the sensitivity of any of these assumptions by altering any of the shaded values and clicking on the "Solve" button to obtain updated fee and capital estimates.

Users of the calculator will also note that the guarantee fee is calculated under two scenarios: (1) wherein collected guarantee fees are treated as capital to offset future stress losses; and (2) wherein the guarantee fees are assumed to be unavailable such that the total amount of stress capital specified must be available on day one. This second option is analogous to the capital treatment for banks. A third column is provided wherein it is assumed that some portion (50%) of guarantee fee income will be available to offset stress losses under the assumption that regulators would allow insurers to pay out some (but not all) of the collected guarantee fees in dividends throughout the life of the loan.

Endnotes

- 1 This is a Moody's Analytics estimate based on an event study of the impact of QE on interest rates and a vector autoregressive model of the U.S. economy. The study is available upon request.
- 2 Nationalized guarantors could require only the Treasury's cost of capital. In an economy operating at full employment and growing at its potential, this is estimated to be equal to a 10-year Treasury yield of 4.75%. However, assuming a lower cost of capital would not necessarily lead to a lower guarantee fee if the guarantors are required to use fair value accounting. Fair value accounting has become more commonplace in the CBO's treatment of the government's credit activities.
- 3 A detailed assessment of the Corker-Warner legislation is provided in "Evaluating Corker Warner," Zandi and DeRitis, Moody's Analytics white paper, July 2013. <http://www.economy.com/mark-zandi/documents/2013-07-08-Evaluating-Corker-Warner.pdf>
- 4 The average credit score for all Americans with scores is closer to 700.
- 5 This is based on data from the Federal Housing Finance Agency available since 1985.
- 6 The implications of this lack of experience are evident in the extraordinarily high default rate on subprime mortgages, most of which were two-year ARMs. According to Equifax credit file data, nearly one-fourth of subprime loans originated in 2005 defaulted when they hit their first payment resets two years later. These defaults ignited the financial crisis and Great Recession.
- 7 See "TBA Trading and Liquidity in the Agency Market," Vickery and Wright, Federal Reserve Bank of New York Staff Report 468, August 2010. http://www.ny.frb.org/research/staff_reports/sr468.pdf
- 8 Libor is the interest rate large money-center banks charge for borrowing and lending to each other. The TED spread is a good proxy for anxiety in the global banking system. The 25-basis point TED spread that prevailed just prior to the crisis was a record low, as the period was characterized by substantial euphoria and even complacency regarding global financial conditions.
- 9 A description of this VAR model can be found in "Evaluating PATH," Zandi and DeRitis, Moody's Analytics white paper, July 2013. <http://www.economy.com/mark-zandi/documents/2013-07-17-Evaluating-PATH.pdf>
- 10 See "An Analysis of Government Guarantees and the Functioning of Asset-Backed Securities Markets," Hancock and Passmore, Federal Reserve Board Finance & Economics Discussion Series, 2010-46, August 2010. <http://www.federalreserve.gov/pubs/feds/2010/201046/201046abs.html>
- 11 This concern is well articulated in "The Future of Mortgage Finance in the United States," a speech given by Fed Chairman Ben Bernanke at the University of California Symposium "The Mortgage Meltdown, the Economy, and Public Policy," Berkeley CA, October 31, 2008. <http://www.federalreserve.gov/newsevents/speech/bernanke20081031a.htm>

About the Authors

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Mark M. Zandi is chief economist of Moody's Analytics, where he directs economic research. Moody's Analytics, a subsidiary of Moody's Corp., is a leading provider of economic research, data and analytical tools. Dr. Zandi is a cofounder of Economy.com, which Moody's purchased in 2005.

Dr. Zandi's broad research interests encompass macroeconomics, financial markets and public policy. His recent research has focused on mortgage finance reform and the determinants of mortgage foreclosure and personal bankruptcy. He has analyzed the economic impact of various tax and government spending policies and assessed the appropriate monetary policy response to bubbles in asset markets.

A trusted adviser to policymakers and an influential source of economic analysis for businesses, journalists and the public, Dr. Zandi frequently testifies before Congress on topics including the economic outlook, the nation's daunting fiscal challenges, the merits of fiscal stimulus, financial regulatory reform, and foreclosure mitigation.

Dr. Zandi conducts regular briefings on the economy for corporate boards, trade associations and policymakers at all levels. He is on the board of directors of MGIC, the nation's largest private mortgage insurance company, and The Reinvestment Fund, a large CDFI that makes investments in disadvantaged neighborhoods. He is often quoted in national and global publications and interviewed by major news media outlets, and is a frequent guest on CNBC, NPR, Meet the Press, CNN, and various other national networks and news programs.

Dr. Zandi is the author of *Paying the Price: Ending the Great Recession and Beginning a New American Century*, which provides an assessment of the monetary and fiscal policy response to the Great Recession. His other book, *Financial Shock: A 360° Look at the Subprime Mortgage Implosion*, and *How to Avoid the Next Financial Crisis*, is described by the New York Times as the "clearest guide" to the financial crisis.

Dr. Zandi earned his B.S. from the Wharton School at the University of Pennsylvania and his PhD at the University of Pennsylvania. He lives with his wife and three children in the suburbs of Philadelphia.

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Dr. deRitis' recent consulting work has included an evaluation of the efficacy and cost of the federal government's Home Affordable Modification Plan, and he is frequently consulted on credit risk modeling and measurement as well as housing policy. He helped develop the company's models to forecast the Case-Shiller and FHFA metropolitan house price indices and is a regular contributor to the firm's Housing Market Monitor. Dr. deRitis also gives frequent presentations and interviews on the state of the U.S. housing, mortgage and credit markets.

In his previous work at Fannie Mae, Dr. deRitis supervised a team of economists who developed models of borrower default and prepayment behavior. He has published research on consumer credit and credit modeling as well as on the costs and benefits of community mediation. He received a PhD in economics from Johns Hopkins University, where he focused on the impact of technology on labor markets and income inequality. His bachelor's degree in economics is from the Honors College at Michigan State University.

About Moody's Analytics

Economic & Consumer Credit Analytics

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