MOODY'S
ANALYTICS

October 2014

A General Theory of G-Fees

Prepared by
Mark Zandi
Mark.Zandi@moodys.com
Chief Economist

Cristian deRitis
Cristian.deRitis@moodys.com
Senior Director
Consumer Credit Analytics

Contact Us

Email
help@economy.com

U.S./Canada
+1.866.275.3266

EMEA   (London)
+44.20.7772.5454
        (Prague)
+420.224.222.929

Asia/Pacific
+852.3551.3077

All Others
+1.610.235.5299

Web
www.economy.com

Abstract

Nearly a decade after the housing bubble burst, the nation's housing and mortgage markets are still far from normal. Lower- and middle-income households still have difficulty obtaining mortgage loans, crimping housing demand and homebuilding. House prices, which rebounded strongly after hitting bottom in the wake of the crash, have also slowed.

Key to a well-functioning housing market are the policies of Fannie Mae and Freddie Mac. The two government-sponsored enterprises, operating in conservatorship, remain the mainstay of the mortgage market, insuring more than half of all mortgage originations.[1] The current debate over the guarantee fees charged by the GSEs for the insurance they provide on conforming mortgages is thus critical to housing's prospects.[2]

A General Theory of G-Fees

BY MARK ZANDI

Nearly a decade after the housing bubble burst, the nation's housing and mortgage markets are still far from normal. Lower- and middle-income households still have difficulty obtaining mortgage loans, crimping housing demand and homebuilding. House prices, which rebounded strongly after hitting bottom in the wake of the crash, have also slowed.

Key to a well-functioning housing market are the policies of Fannie Mae and Freddie Mac. The two government-sponsored enterprises, operating in conservatorship, remain the mainstay of the mortgage market, insuring more than half of all mortgage originations.[1] The current debate over the guarantee fees charged by the GSEs for the insurance they provide on conforming mortgages is thus critical to housing's prospects.[2]

The Federal Housing Finance Agency, the GSEs' regulator, will ultimately settle this debate. The FHFA has solicited advice on the issue from stakeholders and will likely make a decision by year's end.[3]

The size of the GSEs' guarantee fees should be based on several criteria. First, although Fannie and Freddie are in conservatorship and thus do not hold capital to protect against unexpected losses, the g-fees they charge should be consistent with a level of capital large enough to protect taxpayers. That is, the GSEs should charge enough to generate sufficient capital to protect taxpayers if another downturn similar in severity and length to the Great Recession were to occur.

It is important to note that this is substantially less than the GSEs would need if they were private financial institutions, under almost any plan for a future housing finance system. They would likely be considered systemically important financial institutions, or SIFIs, and thus be required to hold enough capital to remain going concerns in the stress scenario, not just enough to re-

main solvent. This is the standard already being applied to SIFI banks and other financial institutions by the Federal Reserve.

Since the GSEs hold less capital than would be required if they were private SIFIs, they are effectively receiving subsidies from taxpayers. The GSEs receive an additional subsidy from taxpayers via their lower cost of funds, since the government guarantees their mortgage-backed securities against credit losses.

A second criterion is that any taxpayer subsidy should be used to reduce g-fees for lower- and middle-income mortgage borrowers at the edge of the credit box. Borrowers with lower credit scores and higher loan-to-value ratios should pay lower g-fees than would be necessary to fully compensate the GSEs for the greater risk of default they pose. This will expand the availability of mortgage loans to borrowers who would otherwise need to borrow at a higher rate from the Federal Housing Administration or private lenders, or be unable to obtain mortgage loans at all.

This leads to the third criterion, namely that the GSEs' g-fees should be determined in the context of the fees charged by other potential sources of mortgage credit, including depository institutions, the FHA, and other sources of private capital, including the private-label securities market. If the GSEs' g-fees are set too high or too low, they will be inappropriately marginalized or gain market share vis-à-vis these other sources of mortgage credit.

After accounting for these criteria, Fannie and Freddie's current g-fees are consistent with the current health of the housing and mortgage market, and thus should not be changed at this time. Taxpayers are well-protected, taxpayers' subsidization of less-creditworthy borrowers is appropriate, and the GSEs' g-fees appropriately account for the availability and cost of mortgage credit from other sources.

The GSEs' g-fees may eventually need to increase as they prepare to leave conservatorship and become part of a new housing finance system. But given recent legislative failures to move the GSEs out of conservatorship and into a new system, this is likely a long way off.

Guarantee fee arithmetic

Fannie and Freddie are currently charging an average guarantee fee of approximately 60 basis points across all the new loans they insure. Their g-fees are used to pay for:

- » Administrative expenses. The GSEs estimate their expenses to be 4 basis points.
- » Expected losses. The GSEs estimate the losses on their current mortgage lending to be 7 basis points.
- » Payroll taxes. By law this is equal to 10 basis points through 2022 to help pay for the 2012 payroll tax holiday.
- » Unexpected losses. This equals the capital the GSEs need to absorb losses under a stress scenario. The GSEs are

Chart 1: GSE's Appropriate Return on Capital
FDIC-insured institutions, %

- Return on equity
- ROE - 10-yr Treasury
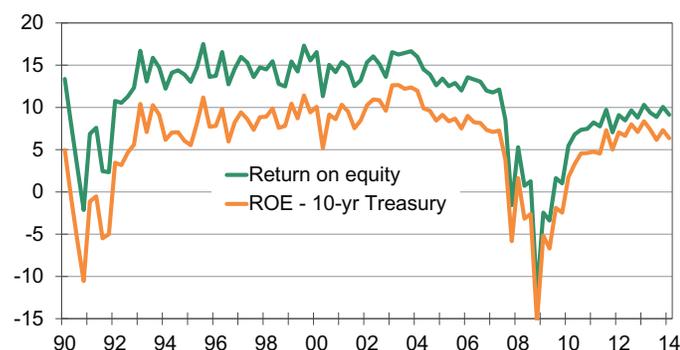
Sources: FDIC, Treasury, Moody's Analytics

holding 39 basis points of g-fee as capital, assuming they would suffer losses of just over 3% in a stress scenario similar to the Great Recession.

» Minimum capital level. This is the capital needed to ensure the GSEs remain going concerns under a stress scenario. Large systemically important financial institutions hold significant capital to avoid bank runs and panic as occurred in the Great Recession. The GSEs currently do not hold a minimum capital level since they are fully backed by the federal government and thus not subject to runs.

Cross-subsidization

Fannie and Freddie's g-fees vary considerably depending on the creditworthiness of mortgage borrowers. The g-fee is typically no more than 50 basis points for home-purchase borrowers with credit scores over 700 (about the average score across all consumers with scores) and more than a 40% down payment (see Table 1). For borrowers with scores below 700 and a 40% down payment, g-fees rise above 80 basis points. The differences largely reflect the amount of capital necessary to absorb losses in a stress scenario, as these losses will clearly be higher for less creditworthy borrowers.

Despite the variability in g-fees across the credit distribution, they do not vary as much as would be expected if the GSEs were earning equal returns on their capital. The return on capital for loans to the best-quality borrowers is above 20%, while it is

closer to 5% for the lowest-quality borrowers. This reflects cross-subsidization by the GSEs. They charge better-quality borrowers a higher g-fee in order to charge weaker-quality borrowers a lower g-fee and still earn an acceptable return on their overall lending.

The GSEs' cross-subsidization is limited by adverse selection on their lending to high-quality borrowers. If they charge bet-

ter borrowers too high a g-fee, other private lenders will be able to undercut them with lower fees and interest rates. This is already happening in some strong housing markets, where banks and even some nonbank lenders are taking some loan business away from the GSEs.

Cross-subsidization by the GSEs is also limited by the overall return on capital they are willing to accept. They currently earn 8.3% after taxes (assuming they paid taxes), which is well below the 10% return that SIFI commercial banks are currently achieving, and what they would likely require if they were private institutions (see Chart 1).[4] This is down from the 15% return earned by large banks and the GSEs prior to the housing crash.[5]

Table 1: GSE Guarantee Fees by Credit Score and LTV
2014Q1

		0-60	61-80	81-97
740+	% of unpaid balance	12	37	15
	Capital, bps	83	218	320
	Charged g-fee, bps	48	57	56
	Return on capital (g-fee), %	21	11	7
	Estimated cost, bps	29	54	73
	Return on capital (cost), %	6	10	11
700-739	% of unpaid balance	3	12	6
	Capital, bps	118	392	520
	Charged g-fee, bps	50	65	64
	Return on capital (g-fee), %	16	7	5
	Estimated cost, bps	36	89	112
	Return on capital (cost), %	8	11	11
620-699	% of unpaid balance	3	10	3
	Capital, bps	182	642	712
	Charged g-fee, bps	55	82	80
	Return on capital (g-fee), %	12	6	5
	Estimated cost, bps	50	139	152
	Return on capital (cost), %	10	12	12

Across All GSE loans:

Capital, bps	307
Charged g-fee, bps	60
Return on capital (g-fee), %	8.3
Estimated cost, bps	72
Return on capital (cost), %	10.8

Assumptions:

Tax rate, %	35
Payroll tax, bps	10
Operating expenses, bps	7
Expected loss, bps	4

Sources: FHFA, Moody's Analytics

Chart 2: Fannie and Freddie's Share Stabilizes

Share of single-family mortgage debt, %
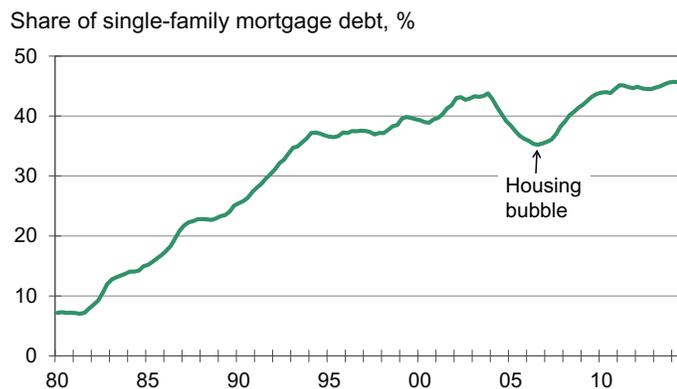
Sources: GSEs, Federal Reserve Board Flow of Funds, Moody's Analytics

This is not to say the GSEs should increase their g-fees to achieve a 10% after-tax return. Indeed, the GSEs would already be earning close to this if not for the 10 basis points in g-fee they remit to the Treasury to help pay for the 2012 payroll tax holiday. This g-fee surcharge expires in 2022.

Mortgage insurers' capital standards

The new capital standards for private mortgage insurers proposed by the GSEs add some complexity to determining the appropriate level of GSE g-fees. By law, loans insured by the GSEs with less than a 20% down payment must also have some form of credit enhancement, which more often than not is provided by private mortgage insurers. The MIs typically cover default losses up to 27.5% of the loan balance.

It is understandable the GSEs and FHFA would like to ensure that the MIs are on sounder financial ground. Three MI companies were put into statutory receivership as a result of the housing bust, and while more than 95% of the losses claimed by the GSEs will ultimately be paid by the MIs, not all the payments were made on a timely basis.

However, the MI capital standards, if adopted as proposed, would result in higher costs, including the GSEs' g-fee and the MIs' insurance premium, for less creditworthy borrowers.[6] For borrowers with scores below 700, the expected increase in MI premiums as a result of the new capital standards would be close to 30 basis points (see Table 2). For borrowers with less than a 700 score and only a 5% down payment, the MI premium increase would be closer to 40 basis points.

The GSEs could presumably lower their g-fees somewhat for these borrowers since the MIs would be stronger counterparties after implementing the new standards. But the GSEs would be limited by how much they could reduce g-fees since they will still be exposed to the same amount of risk given the MIs' coverage limits.

A preferable approach would be for the new MI capital standards to allow the MIs to use some of their future premiums toward the new requirements. For example, allowing the MIs to use only one year of future premiums would largely mitigate the impact of the standards on premiums for less creditworthy borrowers.[7] For context, under a stress scenario, MIs expect to receive four annual premiums on average from borrowers.

Assuming the new proposed capital standards for MIs are adjusted to allow MIs to count some future premiums, there would be no reason for the MIs to change their current premiums. Since the MIs will be stronger counterparties, the GSEs could lower their g-fees somewhat for loans with mortgage insurance, but any reduction should be limited so as not to result in a negative return on these loans.

G-fees in context

The GSEs' current g-fees are also consistent with the GSEs maintaining their long-term share of the mortgage market once conditions in the rest of the market normalize.

Since the late 1990s, the GSEs' share of single-family mortgage debt outstanding has been relatively stable (see Chart 2). It fell during the housing boom, as GSEs lost share vis-à-vis the bubble-fueled private-label securities market, and it rose after the housing collapse. Long run, assuming the private-label security market revives and the FHA normalizes its insurance premiums, the GSEs should maintain 40% to 45% of the market.

The GSEs will remain competitive against large SIFI banks that retain many of the loans they originate on their balance sheets. SIFI

Table 2: Impact of PMIERs on MI Premiums by Score and LTV

Bps

Current MI premiums		
	90	95
650	71	115
700	57	89
750	44	62
800	39	54
In force =		62

Impact of PMIERs as proposed change in MI premiums (bps)		
	90	95
650	43	64
700	16	27
750	2	9
800	-5	-3
In force =		15

Impact of revised PMIERs change in MI premiums (bps)		
	90	95
650	17	24
700	1	3
750	-6	-4
800	-10	-11
In force =		-0

Source: Moody's Analytics

Chart 3: FHA Will Have Room to Cut Premiums

FHA capital ratio assuming proposed new premiums, %

Current Combined Premium	170 bp	Proposed Combined Premium	120 bp
Annual Premium	135 bp	Annual Premium	100 bp
Upfront Premium	175 bp	Upfront Premium	100 bp
Current Capitalization	14.5%	Stressed Loss	9.6%
Expected Loss	21 bp	Probability of Default	16%
Operating Expenses	4 bp	Loss Given Default	60%
Return on Capital	10%		
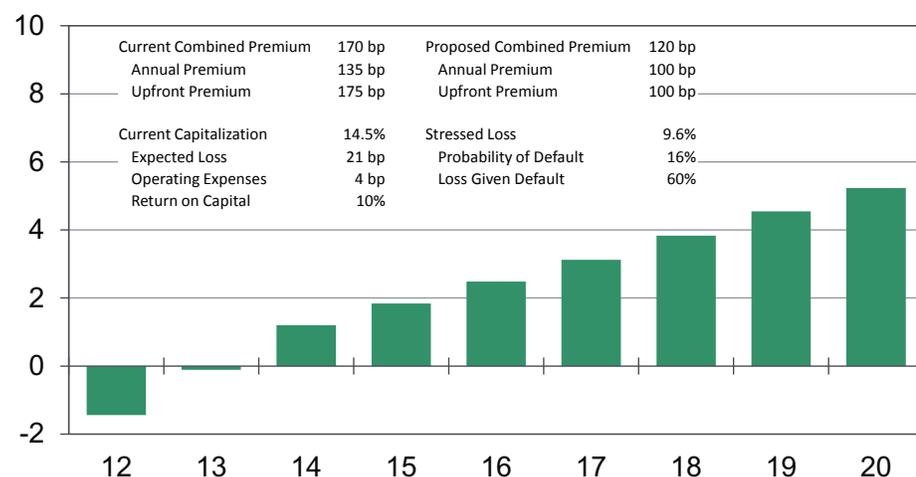
Source: Moody's Analytics

banks are currently disadvantaged because they are required to hold a substantial minimum level of capital under the Federal Reserve's stress-testing and Basel III rules (see Table 3). The GSEs are not subject to these rules and should not be required to charge g-fees consistent with a minimum capital level while in conservatorship. A minimum capital level is needed to forestall the types of bank runs that precipitated past financial crisis. There is no prospect of a run on the GSEs given the government's explicit backing of the GSEs via conservatorship.[8]

As large banks scale back, some of their business is going to smaller depository institutions and nonbanks with lower capital requirements and less regulatory oversight. The GSEs are also constrained from taking an even larger market share by their conforming loan limits and the qualified mortgage rule.[9] Long run, financial institutions that hold mortgages on their balance sheets should account for approximately 25% to 30% of single-family mortgage lending.

The GSEs are also competitive with the FHA. Given the FHA's extraordinarily high insurance premiums, implemented to replenish its hard-hit insurance fund, GSE loans with private mortgage insurance offer more attractive mortgage rates to most borrowers who put at least 5% down and have scores above 680.

However, the FHA's financial situation is improving rapidly, and it should be able to significantly reduce its insurance premiums in the next year or two.[10] Assuming the FHA must maintain insurance premiums consistent with capital sufficient to protect taxpayers from losses during the next major recession, and require an implicit return on this capital consistent with those earned by SIFIs, the FHA will soon be able to lower its premiums by approximately half a percentage point (see Chart 3).

Table 3: Capitalization of the Housing Finance System
%

	Share of origination market 2014H1	Current capitalization	Required capitalization		
			Stress loss	Minimum required	Required capitalization
Fannie/ Freddie & mortgage insurers		3.60	3.60	0	3.60
Fannie/Freddie	51	3.07	3.07	0	3.07
Mortgage insurers		2.10	2.10	0	2.10
SIFI depository institutions	26	6.25	4.00	2.25	6.25
FHA	23	14.5	9.60	0	9.60
Private-label securities	0	5-10	5-10	5	5-10

Assumptions:

The new capital standards for private MIs are adjusted based on the proposal in "Putting Mortgage Insurers on Solid Ground," Zandi, Parrott and DeRitis.

The stress loss for SIFI banks is the median loss rate for banks that undertook the 2014 CCAR stress test.

The minimum capital requirement for SIFI banks is 50% risk weight for first mortgages on the 4.5% minimum CET1 capital ratio under Basel III.

The FHA's stress loss is based on a 16% probability of default and 60% loss given default.

PLS capital requirements represent the size of the equity tranche required by credit rating agencies to protect investors in the AAA tranche.

Source: Moody's Analytics

Chart 4: House Prices Compared to Trend…
Case-Shiller® Home Price Index, 1983Q1=100
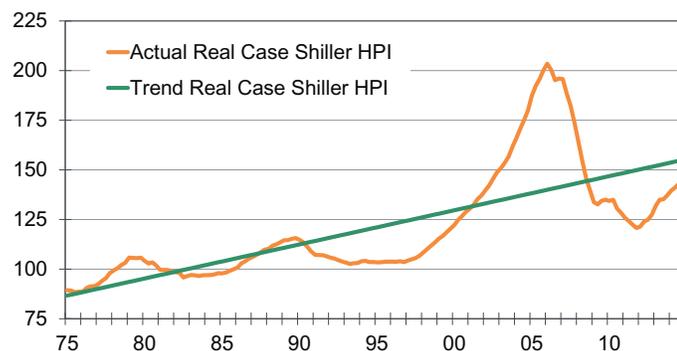
Sources: CoreLogic, Moody's Analytics

Chart 5: …Could Affect G-Fees Countercyclically
Cyclically adjusted g-fee
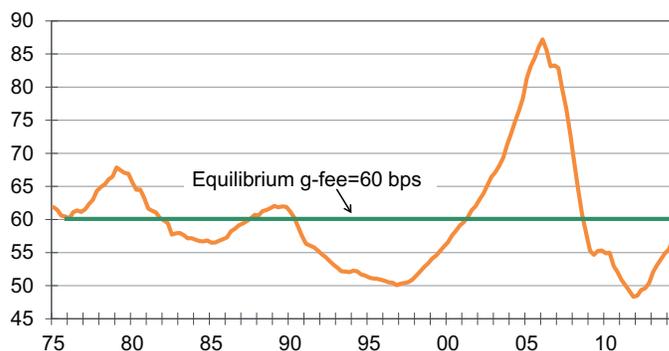
Source: Moody's Analytics

That is, the FHA's current annual and upfront premiums total 170 basis points, assuming an average five-year mortgage life. The FHA could lower its combined premiums to 120 basis points and still build the insurance fund adequately to protect taxpayers in case of another Great Recession.[11] Long run, the FHA should account for 15% to 20% of the mortgage market.

The private-label securities market has been largely dormant since the housing crash, but it should slowly revive as various regulatory and legal issues are sorted out. The last remaining major regulatory issue to be settled is the qualified residential mortgage rule, which requires PLS issuers to hold at least 5% equity in their securities. Final rules and definitions on QRM are expected by year end.[12] In a sign that the market is reviving, lenders have successfully issued MBS securities backed by nonconforming jumbo loans. While volumes have been small and loan quality has been pristine, the sale of these securities confirms that investor demand for non-agency securities does exist.

Potential investors in private-label securities are expected to eventually become comfortable with changes in how mortgages in the securities are underwritten and serviced, packaged into securities and rated by credit rating agencies. Moreover, nonbank lenders and depository institutions have limited balance sheets and will need the PLS market as an outlet for their loans. Long run, the PLS market is expected to account for the remaining 10% to 15% of the mortgage market.[13]

Next-gen g-fees

Once housing and mortgage markets have fully recovered and the private-label securities market is operative, the FHFA should consider introducing a system in which g-fees are set countercyclically. Raising g-fees as the housing market heats up will reduce the probability that it will actually boil over. Conversely, lowering g-fees when the housing market is weak will lower costs for borrowers, spurring additional activity when it is needed.

Such a system could be constructed based on house price indexes. For example, g-fees could adjust based on the growth in house prices relative to their long-term trend. The linear trend growth rate of house prices from the Case-Shiller house price index could be used for this purpose (see Chart 4). G-fees could be set using an adjustment factor equal to the ratio between the actual house price index and the trend or "equilibrium" house price level as:

$$Gfee_t = Gfee^* \times \frac{HPI_t}{HPI_t^*}$$

where $Gfee^*$ is the equilibrium g-fee based on the loan and borrower characteristics and HPI_t^* is the equilibrium trend HPI level.

Based on this simple model, the guarantee fee on an average mortgage would have risen significantly at the peak of the housing bubble to more than 80 basis points (see Chart 5). Not only would this have provided the GSEs with higher fee income commensurate with the higher risk of default due to overvaluation, but it would have sent an important signal to the rest of the market that would have discouraged marginal borrowers. Conversely, g-fees would have been significantly lower during the Great Recession helping to stimulate the recovery. With borrowers obtaining mortgages near the housing bottom, the risk of default would have been lower, justifying lower fees.

This model suggests that house prices are modestly below their long-term trend today despite the recovery in prices over the past few years. Consistent with our recommendation, the model suggests that fees should currently be approximately 5 basis points below their equilibrium levels.

While we have described a simplified approach for introducing countercyclical g-fees for discussion purposes, it can be easily enhanced and extended to account for other measures of house price equilibrium such as the price-to-income or price-to-rent ratios. We would caution against trying to over-engineer this process. To be effective, the rules should be simple, clear and easily calculated.

Conclusions

One of the more contentious debates remaining from the housing crisis is over Fannie and Freddie's guarantee fees. These are the fees the GSEs charge mortgage borrowers to pay for their operating costs, expected defaults, and a capital cushion in case of another Great Recession.

For several years after the GSEs were put into conservatorship, the FHFA directed them to increase their g-fees. The thinking was that the g-fees were insufficient to

protect taxpayers against another Great Recession, and more controversially, were so low they discouraged private lenders from making mortgage loans. Between 2008 and 2013, the average g-fees charged by the GSEs were increased from 20 to 60 basis points.

The FHFA is now considering whether the GSEs' g-fees should change again. Some argue they should be increased further, believing this will attract more private capital into the housing finance system. Others argue they should be lowered, particularly for less creditworthy borrowers, believing this will responsibly help harder-pressed households become homeowners and support the housing recovery.

The FHFA should not appreciably change the GSEs' current g-fees. The fees are high enough to appropriately protect taxpayers against losses the GSEs would face in another Great Recession. The fees vary consider-ably across the credit distribution, and while there could be some reduction in fees for borrowers with lower scores and higher LTVs, particularly as the private MIs incorporate the new Private Mortgage Insurance Eligibil-ity Requirements, any reductions should be modest. The GSEs should not make loans at a loss, and since overall g-fees are currently appropriate to protect taxpayers, any reduc-tion in fees for less creditworthy borrowers must be made up for by higher fees on more creditworthy borrowers. But any increase in fees on more creditworthy borrowers would likely lead to adverse selection, with the best borrowers leaving the GSEs and going to bank lenders.

The argument that higher GSE g-fees are necessary to entice more private capital into the mortgage market is a stretch. The revival of the PLS market depends on resolving regu-latory and legal issues that will not occur any more quickly with a reasonable increase in g-fees. And higher fees and mortgage rates run the risk of short-circuiting the already-fragile housing recovery.

GSE g-fees may eventually need to increase if Fannie and Freddie are ever privatized. They would likely be considered SIFIs and reasonably required to hold more capital. Like the private MIs, the GSEs should be allowed to use future g-fee premiums to-ward these higher capital requirements, but they may not be enough. In addition, g-fees that fluctuate in opposition to the growth of house prices would provide a powerful coun-tercyclical tool for preventing future housing bubbles from forming. However, these are discussions for another day, as bringing the GSEs out of conservatorship appears to be a long way off.

A lot more must happen before the na-tion's housing and mortgage markets are functioning well, but another change in Fan-nie and Freddie's g-fees is not one of them.

Endnotes

1   In the first half of 2014, Fannie and Freddie accounted for just over half of all mortgages originated. Depository institutions accounted for just over one-fourth of originations, and the FHA/VA accounted for the remainder.
2   Fannie and Freddie's average guarantee fees have risen from 20 basis points before the financial crisis to closer to 60 basis points today.
3   The FHFA's request for input regarding Fannie and Freddie's guarantee fees provides an excellent overview of the issue and key questions.
4   The after-tax return on capital is equal to the after-tax g-fee for unexpected losses divided by the stress loss rate. That is: (60 - 7 - 4 -10) * .35 / 307 * 100 = 8.3%. Since this is below the 10% return the GSEs would require if they were private institutions, this is arguably another source of taxpayer subsidy to mortgage borrowers. To achieve a 10% return, the GSEs would need to charge an average g-fee of 72 basis points.
5   More precisely, the appropriate after-tax return for large financial institutions like the GSEs is approximately 600 basis points above the risk-free rate.
6   The Draft Private Mortgage Insurance Eligibility Requirements or PMIERs were released on July 10, 2014.
7   This is proposed in "Putting Mortgage Insurers on Solid Ground," Moody's Analytics white paper, Zandi, Parrott and DeRitis, August 2014.
8   The GSEs also have a significant funding advantage over the banks. The GSEs' cost of funds is approximately 50 basis points over U.S. Treasuries, while the marginal cost of funds for large banks is a mix of short- and long-term debt with a spread of more than 100 basis points over Treasuries.
9   The conforming loan limits were increased during the financial crisis and remain well above the precrisis limits. The GSEs are not bound by the Consumer Financial Protection Bureau's qualified mortgage rule while they remain in conservatorship, but their lending must be QM-like.
10 The FHA's mortgage insurance fund is improving rapidly given current high premiums and other risk management changes. The fund will have close to the 2% required minimum this fiscal year. The FHA's financial prospects are discussed in "The FHA Admirably Fills the Void," Moody's Analytics white paper, Zandi, January 2014.
11 The 120 bps FHA premium is equal to the sum of 21 bps for expected loss, 4 bps for administrative expenses, and 96 bps for unexpected loss. The 96 bps for unexpected loss is the product of a 9.6% stress loss and 10% implicit return on equity, which is consistent with returns to SIFI banks. The 9.6% stress loss is the product of a 16% probability of default and 60% loss given default.
12 As assessment of the QRM rule is provided in the "The Skinny on Skin the Game," Moody's Analytics white paper, Zandi and DeRitis, March 2011, in "Re-working Risk Retention," Moody's Analytics white paper, Zandi and DeRitis, June 2011, and in "A Clarification on Risk Retention," Moody's Analytics white paper, Zandi and DeRitis, September 2011.
13 The outlook for the PLS market is considered in "The Resurrection of RMBS," Moody's Analytics white paper, Zandi, June 2013.

About the Authors

Mark Zandi

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 360º 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 BS 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.

Cristian deRitis

Cristian deRitis is a senior director in the Credit Analytics group at Moody's Analytics, where he develops probability of default, loss given default, and loss forecasting models for firms and industries; contributes to forecasts and analysis for CreditForecast.com; and writes periodic summaries of the consumer credit industry. His commentary on housing and mortgage markets, securitization, and financial regulatory reform often appears on the Dismal Scientist web site and in the Regional Financial Review.

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 indexes 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

Moody's Analytics helps capital markets and credit risk management professionals worldwide respond to an evolving marketplace with confidence. Through its team of economists, Moody's Analytics is a leading independent provider of data, analysis, modeling and forecasts on national and regional economies, financial markets, and credit risk.

Moody's Analytics tracks and analyzes trends in consumer credit and spending, output and income, mortgage activity, population, central bank behavior, and prices. Our customized models, concise and timely reports, and one of the largest assembled financial, economic and demographic databases support firms and policymakers in strategic planning, product and sales forecasting, credit risk and sensitivity management, and investment research. Our customers include multinational corporations, governments at all levels, central banks and financial regulators, retailers, mutual funds, financial institutions, utilities, residential and commercial real estate firms, insurance companies, and professional investors.

Our web periodicals and special publications cover every U.S. state and metropolitan area; countries throughout Europe, Asia and the Americas; the world's major cities; and the U.S. housing market and other industries. From our offices in the U.S., the United Kingdom, the Czech Republic and Australia, we provide up-to-the-minute reporting and analysis on the world's major economies.

Moody's Analytics added Economy.com to its portfolio in 2005. Now called Economic & Consumer Credit Analytics, this arm is based in West Chester PA, a suburb of Philadelphia, with offices in London, Prague and Sydney. More information is available at www.economy.com.

MOODY'S

MOODY'S
ANALYTICS