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Office of Policy Analysis and Research
400 7th St., SW, Ninth Floor
Washington, DC 20024

RE: **Fannie Mae and Freddie Mac Guarantee Fees: Request for Input**

Ladies and Gentlemen:

Thank you for the opportunity to respond to the FHFA request for information regarding Guarantee Fees. Andrew Davidson & Co., Inc. was established in 1992 and is a leading provider of analytical tools to the mortgage industry. These tools include models of borrower prepayment, default and loss, home price and interest-rate simulation models as well as models of loan and securities risk. Oxford University Press recently published a book entitled, *Mortgage Valuation Models: Embedded Options, Risk and Uncertainty* authored by Andrew Davidson and our Director of Financial Engineering, Alexander Levin. The response to the RFI reflects the analysis of guarantee fees in that book.

The Guarantee Fees (g-fees) collected by Fannie Mae and Freddie Mac (the GSEs) represent compensation for three related, but separate, activities: (1) bearing loan-level credit risk, (2) mortgage-market operations, and (3) government-supported bond insurance for mortgage-backed securities. Segregating compensation for these three activities may lead to clearer policy determination, than if these are viewed as a combined activity with a single income stream. We further recommend the use of capital requirements, cost of capital, and transfer pricing to guide management decisions with respect to g-fees.

The Three Activities

Bearing loan-level credit risk is the Mortgage Insurance business of the GSEs. It involves establishing underwriting criteria, negotiating contracts with sellers/originators, quality control, overseeing servicers, and loss mitigation. Similar functions are performed by other insurance companies. In particular, mortgage insurance companies perform many of the same functions, in conjunction with the GSEs for high loan-to-value (>80 LTV) loans. The Federal Housing Administration (FHA) also performs a similar function for the loans they guarantee.

Mortgage Market Operations are the second activity. Due to the size and scope of the GSEs guarantee and purchase activities, the GSEs have also become the *de facto* center of operations for the entire

mortgage market. Fannie Mae and Freddie Mac set standards for loan documents, data transfer and importantly, the transfer of funds from investors to originators and from borrowers back to investors. Without what many people call the "plumbing," the US mortgage market would not function. Indeed, the centrality of these functions was one motivation for the establishment of the Common Securitization Platform (CSP).

Bond Insurance for MBS is the third activity. The impact of the agency wrap is to create securities that trade at lower yield than highly credit enhanced non-government securities. This is a direct result of government involvement and cannot be replicated by increasing capital levels. It can be provided at very low cost by the government, as long as the GSEs are adequately capitalized. Estimates of the benefit of the government support on MBS rates vary between 10 and 25 basis points during normal periods but can be several hundred basis points during periods of stress. The bond insurance function is very much like the role played by GNMA, but differs significantly from the role of private bond insurers who cannot replicate a government guarantee.

Determining: Capital and Cost for the Three Components

According to FHFA in the request for input: "The Enterprises charge g-fees to cover three types of costs that they expect to incur in providing their guarantee: (1) the costs that the Enterprises expect to bear, on average, as a result of failure of borrowers to make their payments; (2) the costs of holding economic capital to protect against potentially much larger, unexpected losses as a result of failure of borrowers to make their payments; and (3) general and administrative (G&A) expenses. Collectively these three costs are the estimated cost of providing the credit guarantee."

The approach described by FHFA g-fees focuses primarily on the first activity: mortgage insurance and blends the second and third activities of mortgage market operations and bond insurance into the general and administrative expenses. However, each of the three activities deserves to be considered separately. (Note the GSEs also have portfolio activities, the so-called retained portfolio, but compensation and capital requirements for these activities should be addressed outside of the g-fee structure.)

Mortgage Insurance

In our book, we derive formulas relating to the provision of mortgage insurance. In a similar fashion to FHFA, we relate the required g-fee to expected and unexpected losses as well as the cost of capital. However, unlike FHFA, we do not assume that all of the risk associated with unexpected losses must be borne by capital. G-fees and investment income from cash balances generated by g-fees in excess of expected losses can be used to offset unexpected losses. That is, in the Davidson/Levin framework g-fees and capital are determined simultaneously to cover expected and excess losses. For example, at a high enough cost of capital, it is more economical to cover unexpected losses with a higher g-fee rather than with very expensive capital.

For this analysis, we assume that a GSE-independent market that allows prices the credit risk found in conforming loans does not exist. Therefore, we develop our formulas using a "capital charge" approach.

(If such a market did exist, we would apply a "risk-neutral" framework.) We utilize the twin financial goals of maintaining a targeted *expected* return on capital while ensuring solvency with some initial confidence (taken as 95% in the analysis). We present the method in two steps: a single-period model and a multi-period model.

Single-Period Model

An insurance company faces expected losses (l) and maximal losses (l_{max}), within one investment period; losses are realized at the period-end. At the beginning of the period, the insurer collects unknown premium (p), allocates unknown capital (c) and reinvest them at a risk-free rate r. The two unknowns found from two conditions:

1.   Expected return on equity (ROE) is equal to target R.
2.   Capital + premium are sufficient to cover the maximal loss, but do not exceed that minimal level.

The solution is

$$p = \frac{l + c(R - r)}{1 + r}$$

$$c = \frac{l_{max} - l}{1 + R}$$

Insurance premium is therefore comprised of two terms, expected loss and capital cost (charge), both discounted at a risk-free rate. The required capital can be interpreted as unexpected loss discounted at the equity rate.

Capital is proportional to and insurance premium is linear in unexpected loss $l_{max} - l$. With higher R, capital gets smaller, but premium is higher. For a theoretical infinite ROE, capital becomes zero with premium covering maximal loss by itself. If ROE is assumed to be the same as risk-free rate, capital is required, but its cost is zero; the premium covers only expected loss. All these conclusions are easy to understand and trace from the solution.

Multiple-Period Model

Real-world circumstances differ from the single-period model. First, a loan insurer or a GSE is not given *periodic* loss limit l_{max}. Second, the capital release process is hard to model. It is logical to assume that when a capital needs to be added as a result of economic deterioration or a crisis, the entity will not be able to do so; however, the entity can plan a capital release process.

In order to derive a closed-form solution and express p and c in terms of market measures or modeled MBS values, we made several assumptions. We assume that the capital is released gradually, in proportion to the remaining balance for the book of business; no recapitalization is possible. We also assume that the insurance-premium (or G-fee) stream can be sold at an observed IO Multiple price P

known (or modeled) for similar conforming-loan pools. The collected cash account will then be released to the business at the same balance amortization rate as capital.

Under these simplifying assumptions, some of which could be relaxed, our solution to the G-fee/capital problem is given below:

$$P = L_{ES}(r)(R-r)IOM(R) + L(R)$$

$$c = L_{ES}(r) - P$$

where $L_{ES}(r)$ is the "expected shortfall" (maximal lifetime loss given confidence) discounted at the risk-free rate, $L(R)$ is expected loss and $IOM(R)$ is IO Multiple, both discounted at the equity rate. Periodic premium rate p is related to P as $p = P/IOM(r)$.

In their book, Davidson/Levin estimated some values for these formulas using AD&Co's internal Monte Carlo-based Credit OAS model combined with a scenario-grid analysis allowing to gauge expected shortfall more accurately, using theoretical ("3-Group Vasicek") loss distribution instead of simulations. Defaults and losses were forecasted by a credit model, called LoanDynamics Model (LDM). For a practical exposition of results, interest-rate risk and prepayment-model risk were considered to be hedgeable. As a result, risk-free rate r was assumed to be Libor and no additional capital was required for these risks.

Results are shown in the book for a combination of FICO (700, 725 and 750) and LTV (70, 75 and 80). The total premium was found to be, at least, thrice the expected loss. The difference between R and r was set to be constant, at 18% pre-tax. Using the February 2013 market conditions, the annual premium p was found to be in the 8 to 47 basis-point range before any operational expenses or compensation for the government wrap. Expected shortfalls $L_{ES}(r)$ were 0.6% to 3.6% and upfront capital c between 12 to 70 basis points, with the rest of the unexpected loss covered by the value of the g-fee. A lower return on equity would increase upfront capital and decrease premium.

Variations of the method have also been considered with appropriate results computed. For example, if the g-fee stream is not sold as an IO, but paid to the business as it is collected, the required capital would be approximately 50% higher, but the premium would be 20% lower. In addition, the method could be adjusted for non-credit risks, such as interest-rate risk and prepayment risk that are not hedged and require additional capital.

While these formulas provide a conceptual framework for assessing g-fees, the GSEs do not operate in a vacuum. Similar insurance functions are provided by a variety of private entities including banks, insurance companies and private-label securitization structures. Each of these industries uses different methodologies to address the obligations for expected and unexpected losses. Bank and insurance companies use a variety of essentially *ad hoc* capital requirements that have developed over time including leverage ratios and stress tests to determine capital requirements. They also allow a range of financial instruments and balance sheet items to be included as capital. FHFA should evaluate its

approaches and results in the context of these methodologies in order to better understand the competitive position of the GSEs and to reduce regulatory arbitrage between the players.

Capital markets transactions create another view of g-fees. These transactions are priced by the market outside of the framework of regulatory capital requirements and an assumed cost of capital. In capital markets transactions, the cost of capital varies significantly with the amount of subordination and the structure of the risk transfer. Moreover, capital markets transactions, as fully funded guarantees on a specific pool of loans, are very different from guarantees utilizing general corporate resources across a diverse book. Even though the analytical framework is substantially different, FHFA should evaluate g-fees relative to these capital markets transactions as well. This is particularly important for FHFA to determine how to utilize the pricing information in the capital markets transactions to assess the economics of g-fees.

In addition to overall capital requirements and returns, risk-based pricing is also important for the GSEs for two main reasons. First, risk-based pricing helps to limit adverse selection that could occur if high-risk insurance is offered at the average price. Second, risk-based pricing allows revenues to adjust naturally to a changing mix of business. However, as long as the GSEs are the dominant provider of credit risk within the scope of their operation, risk-based pricing is not as important as the overall risk in determining g-fees.

Mortgage Market Operations

Mortgage Market Operations present very different risks to the GSEs, and hence, to the taxpayer. These operations are capital intensive, and also require a dedicated work force. FHFA has estimated that the costs to maintain and develop these capabilities is extensive and therefore seeks to minimize the cost and free the market from dependence on the individual GSEs by establishing the CSP. The costs of maintaining the legacy systems and establishing the CSP should be evaluated independently from the economic costs associated with expected and unexpected loan losses. This component of g-fees should also cover the risks associated with operational failures and should therefore probably envision some level of minimum capital as well.

There is a growing body of work on Operational Risk and these concepts should be incorporated into the capital requirement and g-fee determination process.

Government-Supported Bond Insurance

The Bond Insurance function presents an interesting challenge from the g-fee perspective. While the wrap is provided in the name of the GSEs, the true benefit derives from US Government support. The US Government can provide the wrap at little direct cost, if the loan level mortgage insurance is adequately capitalized by both the GSEs and the mortgage insurance companies. The GSEs reap a large economic advantage from the presence of government support. Without the implied, and now to some degree direct, support of the US Government, Agency MBS would not trade at current levels.

To the extent that the GSEs can maintain low capital levels, or accept a lower expected return on segments of their business, it is due to the advantages provided by the government support of the bond insurance function. Because government support of the GSEs' Bond Insurance is the main source of economic advantage for the GSE MBS, this component should also be the main tool of government policy.

The 10 basis point fee currently paid to Treasury under the Temporary Payroll Tax Cut Continuation Act of 2011 (TCCA) is best understood in this context. Congress (although maybe not consciously) felt that GSE status produced an economic advantage through the wrap of the MBS and the 10 basis points of that advantage that could be used for budget purposes.

Going forward, increases in this component of the g-fee could be used to encourage the growth of the private label mortgage market while decreases could be used to further spur housing consumption. Changes in this component of the g-fee should probably not distort the economic analyses of the mortgage insurance and operations activities of the GSEs. Explicit transfers of revenue could be used to subsidize various preferred activities in a transparent fashion.

The confounding of the Bond Insurance function and the Mortgage Insurance function has been the source of much confusion over the economics of the GSEs. While the GSEs may enjoy greater diversification and operational advantages due to their size and scope, it is the government support of the Bond Insurance function that provides them with an advantage that no private entity can obtain.

Bringing it all together

Consideration of these components separately will facilitate the determination of g-fees and g-fees policy. However, we believe that an additional step should be taken as well. Although the GSEs current book capital is zero and all of its profits are swept to Treasury, it may make sense to create a transfer pricing system, if one doesn't exist already, that establishes capital requirements and cost of capital for each of these segments.

Such a transfer pricing system will allow better analysis of the adequacy of g-fees and the quality of management. We would recommend that the capital levels and target return on equity, be set at levels that encourage risk sharing that truly reduces taxpayer risk, while providing fair pricing to borrowers.

A well-constructed transfer pricing system will naturally address the need for risk-based pricing, as it will address both adverse selection and overall return levels. An important component of the transfer pricing system will be how it utilizes external guarantees from either risk transfer transactions or mortgage insurance to reduce GSE capital requirements. (For example, the reduction in GSE capital in third party insurance transactions might be limited by the amount of liquid capital at risk in the transaction, not just the terms of the transaction.

Within the transfer pricing system, costs associated with operations should reflect ongoing expenditures as well as capital to bear operational risk. Such a transfer pricing mechanism will allow an assessment of the cost and quality of the CSP and other aspects of operations.

The transfer pricing system should also provide for a specific fee associated with the MBS wrap. The 10 basis point fee under the TCCA should certainly flow through this component. Additional wrap fees used to subsidize particular market segments should also be included in this component. (Higher and lower fees for different market segments due to cross subsidization should not be treated as a part of this function. Rather, they are part of the risk-based pricing decision process.) The Bond Insurance component should also be the place where government policy operates to make wrapped MBS more or less competitive with other alternatives or to raise funds for other affordable housing goals.

As we have described above, it is important to consider these functions independently to make sure that each is addressed in its own framework. It is also important to segment these functions since the eventual GSE reform may separate these functions into different entities. Assessing and managing these functions now may facilitate discussions of GSE reform.

Specific Questions

1. Are there factors other than those described in section III – expected losses, unexpected losses, and general and administrative expenses that FHFA and the Enterprises should consider in setting g-fees? What goals should FHFA further in setting g-fees?

Please see the discussion above.

2. Risk to the Enterprises increases if the proportion of higher-risk loans increases relative to the proportion of lower-risk loans. This change in mix can occur if lower-risk loans are retained on bank balance sheets instead of being sold to the Enterprises, if more higher-risk loans are sold to the Enterprises, or if the overall mix of originated loans changes. What alternatives, other than risk-based pricing, should be considered? What are the pros and cons of each alternative?

Please see the discussion above. We recommend the utilization of a transfer pricing system, with allocated capital and costs to address this issue.

3. Currently, target return on capital and the amount of capital largely determine required g-fees. What factors should FHFA and the Enterprises consider in setting target return on capital and amount of capital required? How should the Enterprises allocate capital across risk buckets?

See the discussion above. We recommend the use of an analytical framework that addresses these issues in the context of the regulatory treatment of similar functions at other institutions and the pricing mechanisms of the capital markets.

4. At what g-fee level would private-label securities (PLS) investors find it profitable to enter the market or would depository institutions be willing to use their own balance sheets to hold loans? Are these levels the same? Is it desirable to set g-fees at PLS or depository price levels to shrink the Enterprises' footprints, even if this causes g-fees to be set higher than required to compensate taxpayers for bearing mortgage credit risk and results in higher costs to borrowers?

Please see the discussion above. The competitiveness of the PLS market should be viewed in the context of the GSE Bond Insurance function, which facilitates the pricing of the guaranteed MBS, not in the context of the Mortgage Insurance function.

5. If the Enterprises continue to raise g-fees, will overall loan originations decrease? That is, will Enterprise loans decline without a commensurate increase in private capital?

Our belief is that within a reasonable range of g-fees, loan origination volume is more related to the level of interest rates than the level of g-fees. For larger changes in g-fees, the impact is difficult to predict

6. Is it desirable for the Enterprises to charge higher g-fees on low credit score/high LTV loans if it causes these loans to be insured/securitized through FHA/Ginnie Mae rather than through the Enterprises?

If the GSEs cannot meet their overall return capital and return targets due a segment of loans and there is not a specific decision to subsidize those loans from the Bond Insurance income, then the GSEs should raise their g-fees on that segment. If that causes unacceptable risks to FHA, then those risks should be addressed by FHA.

7. Is it desirable for the Enterprises to (a) charge higher g-fees on high credit score/low LTV loans if it causes these loans to be insured/securitized through PLS or (b) held on depository balance sheets, rather than guaranteed by the Enterprises?

The GSEs could charge higher Bond Insurance fees on certain segments of their business. We would favor raising these fees first on high home price loans. This would include high balance loans as well as some loans with lower LTVs and higher credit scores. The added fees from these activities should be viewed as separate from the Mortgage Insurance fees.

8. What approaches or alternatives should FHFA consider in balancing increased use of risk-based pricing with the HERA mission requirements of (1) liquid national housing markets and (2) acceptability of lower returns on loans made for low- and moderate-income housing?

See discussion above. Specific subsidies to segments of the market should be provided by transferring income from the Bond Insurance function, rather than by altering risk or return requirements of the Mortgage Insurance function.

9. Are the ranges of credit score and LTV cells in the proposed credit score/LTV grids used to set upfront delivery-fees and loan level pricing adjustments appropriate? Should any of the ranges be broader or narrower and, if so, why?

See discussion above. These decisions should flow from a transfer pricing system.

10. Should risk-based pricing be uniform across the Enterprises or should each Enterprise manage its own pricing?

Each GSE should be subject to the same pseudo-capital charges, in the absence of actual capital, but should then be able to manage its own pricing.

11. Taking into consideration that FHFA has previously received input on state-level pricing adjustments, do the g-fee changes proposed in December 2013 have any additional implications that should be considered in deciding whether to price for the length of state foreclosure timelines, unable to market periods or eviction timelines? Are there interactions with other pricing components under consideration that FHFA should consider in making decisions on the state-level adjustments?

FHFA should recognize that the volatility of home prices varies by State and MSA and therefore impacts the risk of loss.

12. Are there interactions with the Consumer Financial Protection Bureau's Qualified Mortgage definition that FHFA should consider in determining g-fee changes?

No comment.

Again, we appreciate the opportunity to respond to the FHFA request for information. Please feel free to contact us with any questions.

Sincerely,

Andrew Davidson
President