the pipeline

ANDREW DAVIDSON & CO

FLOOD INSURANCE SPIKE IN FLORIDA: EFFECT ON HOME PRICES AND THE ECONOMICS OF LOAN GUARANTEES

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Summary

As part of a larger initiative underway at Andrew Davidson & Co., Inc. (AD&Co) to incorporate the impacts of climate change risks into several of our models and economic analyses, we use inputs from risQ (now part of Intercontinental Exchange, Inc. and hereinafter referred to as ICE) on underinsured flood risk for the state of Florida. Assuming a fair hike in insurance premium, we convert it into a change in the economic cost of borrowing and home price outlook. In search of economic consequences for our industry, we focus on loan guarantees: premium rate and economic capital.

We estimate that the effect we study is in a 32% to 48% increase range, measured across FICO and origination's loan-to-value ratio (OLTV) values that are typically utilized for credit analyses of government-sponsored enterprise (GSE) loans.

Methodology

This study is a subset of AD&Co's wider "Climate Initiative"—a set of projects aimed at gauging the effects of climate changes on the mortgage industry. The directions we can follow are numerous:

1. Effect of increasing property insurance caused by climate change;
2. Effect of uninsured or underinsured properties; and
3. Effect of population attrition and falling demand of housing in the affected areas.

Inputs

In this article, we limit our attention to factors 1 and 2 above, using flood insurance underpricing/underinsurance in the state of Florida. According to the ICE's data, average collected property premium rate for flood insurance is 0.23% - measured relative to replacement value. This level includes all properties, both insured and uninsured. Per risQ's estimation, the objective evaluation of expected annual damages should be around 1.1%; the actual fair premium to be collected is expected to be even higher. For the purpose of our analysis, we assume a 1% flood insurance premium hike measured as an additional annual interest on a loan. This will offset various risk-reducing effects (e.g., replacement values being typically lower than loans).

Conversion into an HPI Outlook

AD&Co's HPI model accepts economic cost of borrowing as its driver. That cost includes mortgage payments, down payment (viewed as an expensive loan), and mortgage insurance (if any). While we don't explicitly consider the cost of property insurance, we can handle it indirectly. For example, we can bump mortgage rate by the amount approximately equivalent to an increase in the cost of property insurance. Even if we are off, the results are likely to be easily scalable to more accurate assumptions.

A critical element of feasibility in this study is the ability to simulate an increased insurance cost scenario without disrupting other aspects of modeling and re-coding the existing AD&Co models and applications. For example, while a bump in mortgage rates will alter home price outlook the way in which we need, it will also change projected prepayments, thereby causing an unintended alteration of the loan's credit analysis.

To illustrate the cost-conversion (tuning) process, Figure 1 depicts three lines for Florida home price index (HPI) and home price appreciation (HPA) rate.

Figure 1. Projected HPI and HPA for Florida
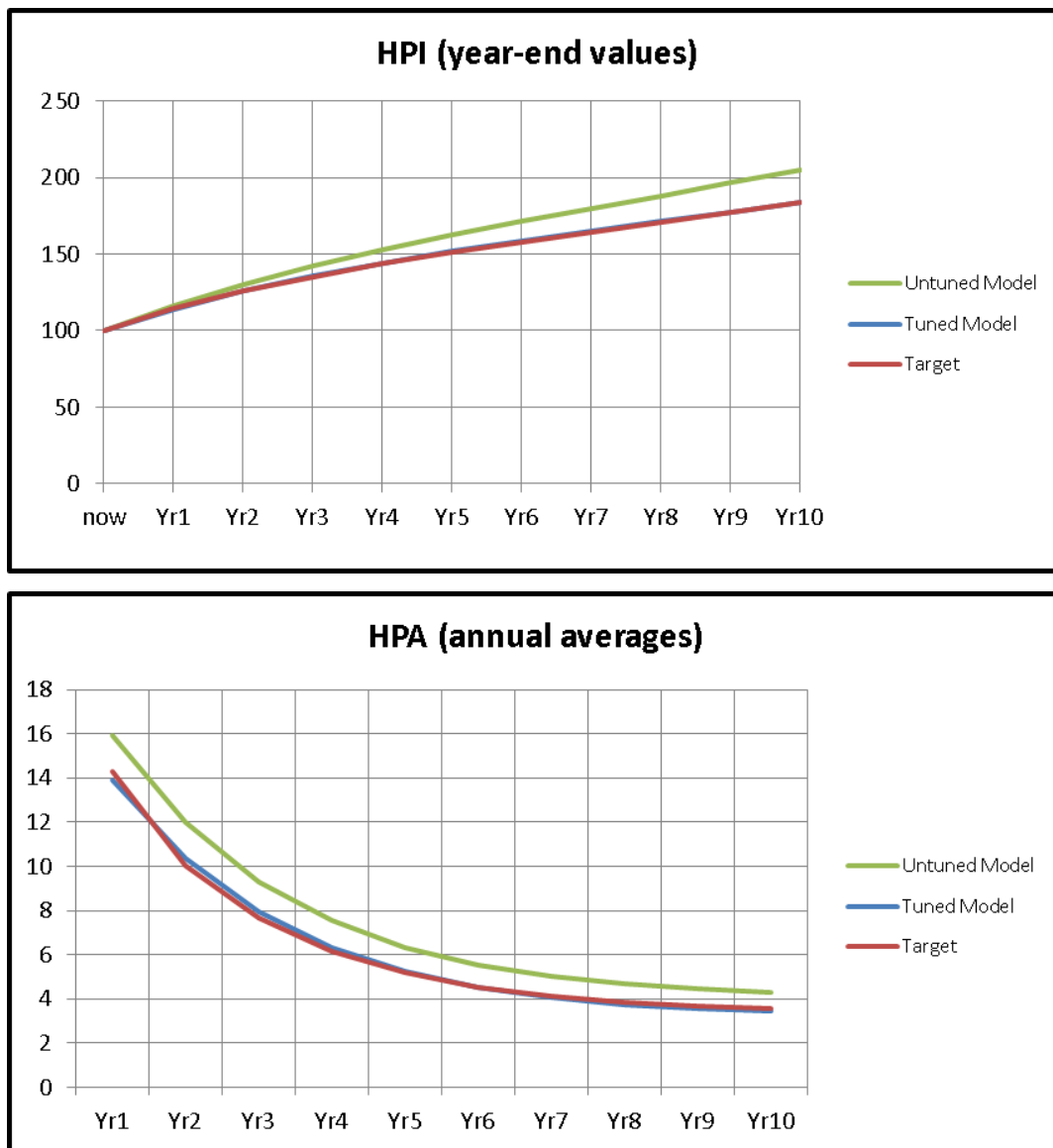
The green lines are from the AD&Co HPI3 model. The red lines are the "depression" coming from the properly increased cost of borrowing (that is equivalent to the increased cost of flood insurance). The blue line approximates the red line via HPI3 model's tuning. For this example, we tune short-term HPA down 1.77% and long-term HPA down 0.71%. The approximation is evidently very accurate for the next 10 years (the dominant period of borrower performance), with indistinguishable red and blue HPI lines.

Economics of Loan Guarantees

Finding a large effect on base-case economics is not expected, given the strong present trend in the housing market. The two projected HPI lines (Figure 1) point to significant appreciations, even if they differ by 7% in 5 years and by 11% in 10 years. On the other hand, in a strong downturn, the same relative depression may matter in estimating loan performance.

We apply our Capital Charge method to solve for guarantee fee and economic capital.[1] The method requires two inputs: return on equity (ROE) taken as 8% and protection confidence set to 99%. We solve two linear equations:

1. Equation that states that the expected ROE computed from all cash flow components (premium, losses, release of capital) should be equal to the given target, and

2. Equation that limits capital's erosion at worst scenario, given the confidence.

The method is implemented on the AD&Co standard 20-scenario grid,[2] and available in our LoanKinetics system. The equivalent short-term HPA and long-term HPA dials get added to the already existing dials that define the 20 scenarios. Note that the base-cases loss expectation contributes minimally to the guarantee fee which depends mainly on unexpected losses and is computed concurrently with economic capital.

Results

For a range of FICO and Original LTV typically utilized for credit analyses of GSE loans, Figure 2 depicts economic capital and annual guarantee fee, both stated relative to the ones obtained for the current cost of flood insurance. Note that standard private mortgage insurance (PMI) is assumed for above-80 OLTV loans.

The perceived spike in the cost of flood insurance results in a 32% to 48% increase in the cost of GSE guarantees as well as economic capital. Within this range, the relative increase is somewhat stronger for high-FICO loans and also for high-LTV loans. This dependence on FICO is consistent with the observation that lower-quality borrowers are less sensitive to economic drivers, in general. Given the FICO level, higher-LTV loans tend to be more sensitive to HPA, even if they carry PMI (which provides limited protection).
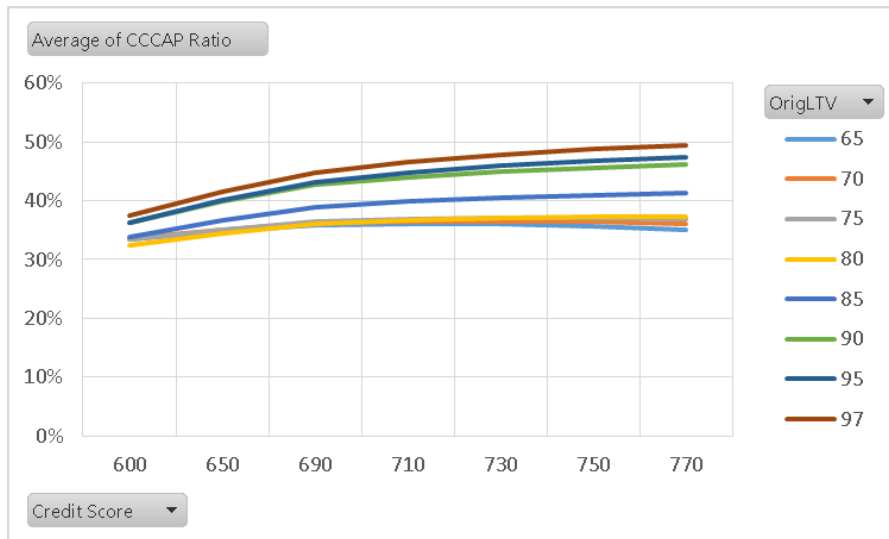
The dependence of these ratios on the chosen levels of ROE and Confidence is very modest and does not warrant a separate review.

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[1] See A. Davidson and A. Levin, *Mortgage Valuation Models: Embedded Options, Risk and Uncertainty*, Oxford University Press, 2014.
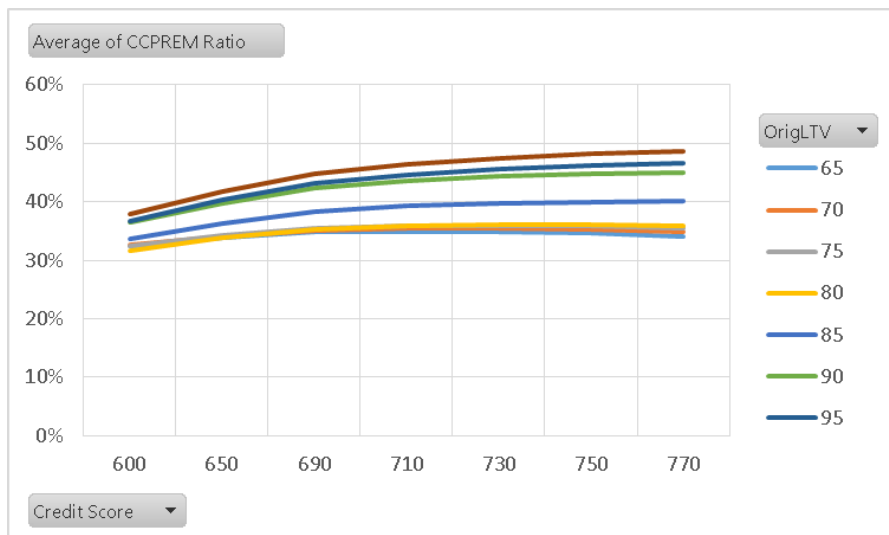
[2] The method is explained in many of the AD&Co publications available at www.ad-co.com.

Figure 2. Guarantee Fee and Capital Increase from a Spike in Flood Insurance Premium

Economic Capital

Guarantee Fee