ANDREW DAVIDSON & CO., INC. the Pipeline

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Full and Partial Vega

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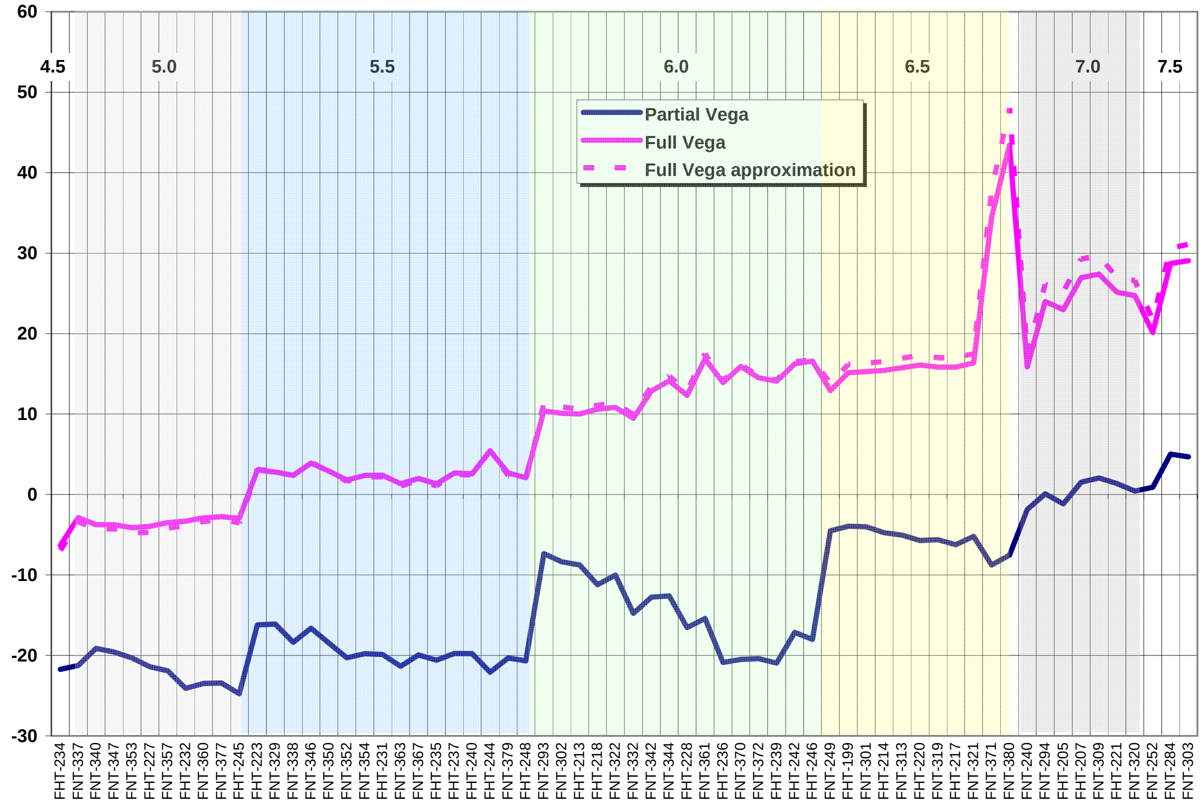
AD&Co's OAS model computes as many Greeks as one can perceive for MBS. One of them – Vega – measures price sensitivity to the overall volatility scale. For example, an MBS may have a Vega of -4.0 meaning that the price drops by 4 bps if the volatility scale inflates by 1%. This method of measurement ignores the fact that the MBS's current coupon can't remain constant with changing volatility. Hence, we measure only partial, not full, Vega.

Consider, for example, an IO. With the interest rate volatility going up, prepayments become more volatile as well, which may have a positive or negative effect on the IO's value. For an IO taken from a premium pool, volatility increases chances for WAL, hence value, to extend (partial Vega is positive). In contrast, an IO stripped from a discounted pool will likely show a negative partial Vega. If the GWAC is located at the center of the S-like refinancing curve (from the forward-market stand point), the extensions and contractions offset each other leading to a close-to-zero partial Vega.

The full-Vega picture will look different. The MBS static rate will widen to swaps when volatility is up. This change alone contributes positively to the value of IOs because it slows down the prepayment speeds. The positive Vega territory is therefore much larger than the partial Vega analysis suggests. Only deeply discounted collateral will produce negative Vega for its IO strip. The following exhibit compares the partial and full Vega for 64 Trust IOs.

Exhibit. The Full and Partial Vega for Trust IOs (as of Oct 2007, FNCL = 6.0%)



Note that within each coupon group IOs are listed from oldest to youngest. The approximation (punctured line) for full Vega shown in the exhibit is as follows:

$$V_{MBS}^{full} = V_{MBS}^{part} - D_{MBS}^{s} \frac{V_{CC}^{part}}{D_{CC}^{s} + IOM_{CC}} \qquad (*)$$

where D^s is duration to the current-coupon market (par TBA) rate, IOM stands for the IO multiple, "MBS" refers to the MBS in question (Trust IOs in our example) and "CC" refers to the par TBA.

The derivation of (*) is rather straight-forward. The first term in the right-hand side is the partial Vega we measure explicitly, whereas the second term quantifies the current-coupon effect. Note that $D_{CC}^{s} + IOM_{CC}$ measures the total sensitivity of the par TBA to its own coupon as the paid rate (IOM_{CC}) and as the market rate (D_{CC}^{s}). The par TBA doesn't change its value by definition, therefore the ratio of V_{CC}^{part} to $D_{CC}^{s} + IOM_{CC}$ measures the current-coupon rate sensitivity to volatility. Multiplying it by D_{MBS}^{s} we get the sensitivity of the MBS value to volatility due to the change in the current-coupon rate.

As shown in the exhibit, our approximation is rather accurate. It expresses the full Vega through measures easily obtainable via AD&Co's OAS model. It relieves financial engineers from the necessity to link current-coupon to volatility endogenously (inside the OAS model) that typically impairs performance.

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