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Abstract

This article investigates the pricing of subprime mortgage risk using data for the ABX.HE indices, which have become a key barometer of market conditions during the recent financial crisis. After a discussion of ABX index mechanics and observed pricing patterns, we use regression analysis to establish the relationship between observed index returns and macroeconomic news as well as market-based proxies of various pricing factors. The results imply that declining risk appetite and heightened concerns about market illiquidity—likely due in part to significant short positioning—have provided a sizeable contribution to the observed collapse in ABX prices. In particular, while fundamental factors, such as housing market activity, have continued to exert an important influence on the subordinated indices, those backed by senior exposures have tended to react more to the general deterioration of the financial market environment. This provides further support for the inappropriateness of pricing models that do not account sufficiently for factors such as risk appetite and liquidity risk, particularly in periods of stress. In addition, as related risk premia can be captured by unconstrained investors, these findings lend support to government measures aimed at taking troubled assets off banks' balance sheets (e.g. the Troubled Asset Relief Program).

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Notes

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⁵ Overall, the structure of the ABX indices of subprime mortgage-based CDS shows a number of similarities with the iTraxx and CDX credit index families, which are based on baskets of corporate CDS. Some of the more important differences include the securitized nature of the ABX underlyings and the fact that there can be multiple credit events whereas corporate CDS contracts tend to terminate after one single event.

⁶ Supplementary indices, called ABX.HE.PENAAA, were introduced in May 2008 to provide additional pricing information for all four existing index vintages.

⁷ FICO scores measure the credit risk of individual borrowers based on a statistical analysis of their credit files. FICO scores range between 300 and 850, and subprime loans are often defined as those to borrowers with limited income and/or a score of 620 or below. See Frankel ([Citation2006](#)) for details.

⁸ A requirement like that should provide a degree of protection against possible 'ratings shopping'. See Fender and Kiff ([Citation2005](#)).

⁹ See, for example, Lehman Brothers ([Citation2006](#)). The ABX indices have typically referenced collateral from more than 15 originators and serviced by a similar number of master servicers.

¹⁰ See, for example, The Economist Magazine (2008) and Wall Street Journal (2007).

¹¹ Note, however, that simple metrics such as FICO scores and LTVs can be 'gamed' and that there is evidence that underwriting quality erosion occurred primarily in the 'soft' data that was less readily available to investors in securitized pools (and the ABX). See Anderson *et al.* ([Citation2008](#)) and Keys *et al.* ([Citation2008](#)); Gorton ([Citation2008](#)) offers an opposing view.

¹² See Box 1 in Fender and Hoerdahl ([Citation2008](#)) for details.

¹³ A second fixed leg may be paid to reimburse the protection seller for reversed writedowns and interest rate shortfalls, but is irrelevant for our purposes here and thus ignored through the remainder

¹⁴ The 2008 BBB- index spread over the corresponding BBB-2 vintage are 11 basis points.

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¹⁷ See UBS ([Citation2007](#)) for more about the frequent deals, which will increase the spread.

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¹⁹ See UBS

²⁰ It took its first principal writedowns on the lower months.

²¹ Sensitivity in that interest payments that may be in place, or earned on the assets related to additional protection for investors. See UBS ([Citation2007](#)).

²² See Demyanyk and van Hemert ([Citation2008](#)) who use logit regressions to find that the quality of subprime loans deteriorated for six consecutive years before the crisis, with the decline masked by high house price appreciation between 2003 and 2005. Similarly, Anderson *et al.* ([Citation2008](#)), employing a hazard rate model to decompose foreclosure rates for subprime mortgages, attribute foreclosures about equally to underwriting quality and economic conditions.

²³ See chapter VI in BIS (2008) for a description of market developments during the onset of the financial crisis.

²⁴ Asset pricing theory suggests that current prices fully reflect the publicly available information about the state of the economy. Therefore, it is not the published level of a macroeconomic variable that affects the prices of securities or derivatives, but the unexpected component of the new information.

²⁵ Nonfarm payrolls are known to be the single most important macroeconomic news release in the US, with well documented effects for a variety of financial assets; see Fleming and Remolona ([Citation1997](#)). The other variables are suggested by authors such as Calomiris *et al.* (2008), who employ a panel VAR model to investigate the interaction of foreclosure rates, house prices and other economic variables. They find that employment shocks explain some 7-9% of the forecast variance of foreclosure rates at horizons of 8 and 20 quarters. Similar effects are found for (existing) home sales and building permits, whereas shocks to house price growth explain some 25% of the 20-quarter forecast variance of foreclosure rates.

²⁶ The resulting downgrade counts, aggregated into vintage-specific indices covering all five rating categories (RAT061 and RAT062) and an overall index (RAT06X), identify 48 days with downgrades on at least one underlying instrument over the period through end-June 2008. The maximum count for the 06-1 and 06-2 vintages is 14 and 51 downgrades/day, respectively, on 8 April 2008 and 30 January 2008. With 100 MBS bonds referenced by each individual ABX vintage, individual readings of our ratings indices can be interpreted as the percentage number of underlying bonds downgraded.

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generally found to give rise to statistically significant contemporaneous price or spread



movements. However, the changes are often economically insignificant and much smaller than would be suggested by the magnitude of the rating change itself; see Cantor ([Citation2004](#)).

³⁴ Across CDS index tranches, Scheicher ([Citation2008](#)) finds R^2 values ranging from 0.11 (most senior tranche) to 0.55 (mezzanine tranche).

³⁵ Alternatively, the regression setup may be inappropriately specified.

³⁶ This is in line with Danis and Pennington-Cross ([Citation2005](#)), who examine the performance of subprime mortgage loans on the basis of a set of logit models to find, among other things, that changes in interest rates affect prepayments, defaults and delinquencies. Changes in interest rates, therefore, are going to convey information about subprime mortgage risk that goes beyond the technical factors mentioned earlier.

³⁷ Under IO pricing, high upfront payments result in contractual patterns akin to loans extended by the protection buyer to the protection seller with uncertain amortization profiles.

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