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Is there a trade-off between low bond risk premiums and financial stability?

by Ben Chabot, financial economist

It has been suggested that financial instability may be more likely following periods of low bond market risk premiums. The timing of past episodes of instability casts doubt upon the hypothesis that low levels of risk premiums sow the seeds of future instability.

Sixty years of data suggest that large increases in bond risk premiums are independent of the recent level or change in risk premiums or federal funds rate.

There is considerable evidence that nontraditional policies adopted in the wake of the 2008 financial crisis by the Federal Open Market Committee (FOMC) have lowered long-term bond yields, term premiums, and credit spreads.[1] With inflation still below target and unemployment unacceptably high, the FOMC has stated that continued accommodation is still appropriate.[2]

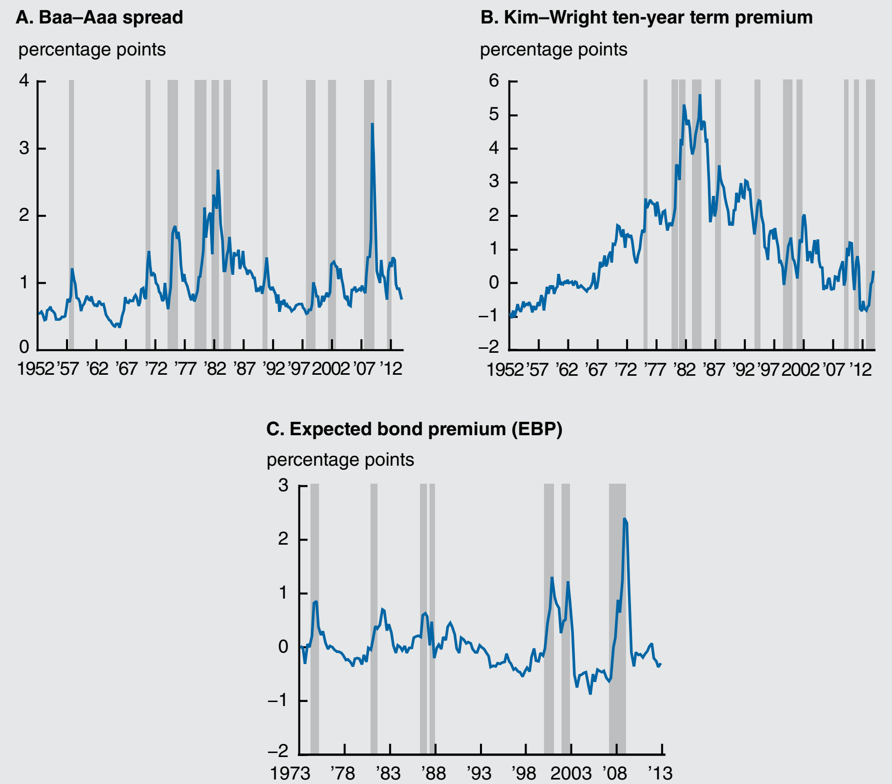
There is a concern, however, that a continuation of highly accommodative monetary policy may increase the risk of financial instability. Forward guidance and large-scale asset purchases (LSAPs) reduce long-term interest rates by lowering the path of expected future short-term rates and by removing duration risk from private portfolios, thereby reducing the term premium required by private investors. The concern is that yield-seeking investors will respond to depressed bond yields by increasing leverage or crowding into riskier investments. This shift into riskier bonds could further depress credit risk premiums (the increased return investors demand to hold higher-risk bonds) and encourage even more reach for yield. If enough investors crowd into bonds with high credit or duration risk, a sudden change in risk appetite could result in a sharp spike in bond risk premiums if investors sell bonds en masse. A sharp increase in bond risk premiums may make it more difficult for the FOMC to achieve its dual-mandate objectives of maximum employment and price stability. If monetary policy does in fact affect the probability of a sharp increase in bond risk premiums, then there may be a role for financial stability considerations in the setting of optimal monetary policy. But degrading monetary accommodation when the economy is still recovering is costly. An FOMC that gives weight to financial stability, said former Fed Governor Jeremy C. Stein, will determine that *"all else being equal, monetary policy should be less accommodative—by which I mean that it should be willing to tolerate a larger forecast shortfall of the path of the unemployment rate from its full-employment level—when estimates of risk premiums in the bond market are abnormally low."*[3]

Before we conclude that this might be an appropriate monetary policy response, we should be certain that low levels risk premiums do in fact increase the likelihood of future spikes in risk premiums. In this *Chicago Fed Letter,* I evaluate the usefulness of policy rates and bond risk premiums as predictors of large increases in risk premiums.

Measures of bond risk premiums

I consider three measures of bond risk premiums: Moody's Baa–Aaa spread, the Kim–Wright ten-year term premium, and

1. Large increases in risk premium series



Notes: The three measures are the Moody's Baa–Aaa spread, the Kim–Wright ten-year term premium, and the Gilchrist and Zakrajšek corporate expected bond premium (EBP). Periods of large increase are denoted by shaded regions.

Sources: Baa data from http://research.stlouisfed.org/fred2/series/BAA; Aaa data from http://research.stlouisfed.org/fred2/series/AAA; Kim–Wright ten-year term premium data based on calculations by staff economists at the Board of Governors of the Federal Reserve System; and EBP data from http://people.bu.edu/sgilchri/Data/data.htm.

the Gilchrist and Zakrajšek corporate expected bond premium (EBP). The first two are traditional measures of the credit and term premiums investors demand for holding credit default risk and duration risk, respectively. The third measure is an estimate of the expected premium on corporate bonds subject to default risk, introduced in recent work by Gilchrist and Zakrajšek (2012).[4] The Baa–Aaa spread and Kim–Wright ten-year term premium are available for the 1954–2013 period of our study, and the EBP is available for 1973–2012.

Are large increases in bond risk premiums more likely to occur following a period of low risk premiums? To answer this question, I need to identify "large" increases in a time series of risk premiums. I use a dating algorithm to select the largest trough-to-peak increases in the quarterly time series of EBP, the Baa–Aaa spread, and the Kim–Wright ten-year term premium.[5]

I consider thresholds that generate 12 "large" increases in the 60-year Baa–Aaa and Kim–Wright term premium samples and eight "large" increases in the 40-year EBP sample. These thresholds correspond to an unconditional hazard of one large increase every five years. Figure 1 plots the risk premium series and periods of large increase.[6]

The timing of large increases in risk premiums suggests that policymakers should be suspicious of the hypothesis that low levels of risk premiums sow the seeds of future instability. While nine of the 12 largest trough-to-peak increases in the Baa–Aaa spread were preceded by troughs below the median level of this spread, five of these nine were within 10 basis points of the median. The link between the level of risk premiums and subsequent large increase is even more tenuous in the other series. Only three of the eight largest up cycles in EBP were preceded by troughs below the median level of EBP, and one of these three was only 1 basis point below the median. Finally, only five of the 12 largest increases in the Kim–Wright term premium were preceded by a trough below the median level of that series.

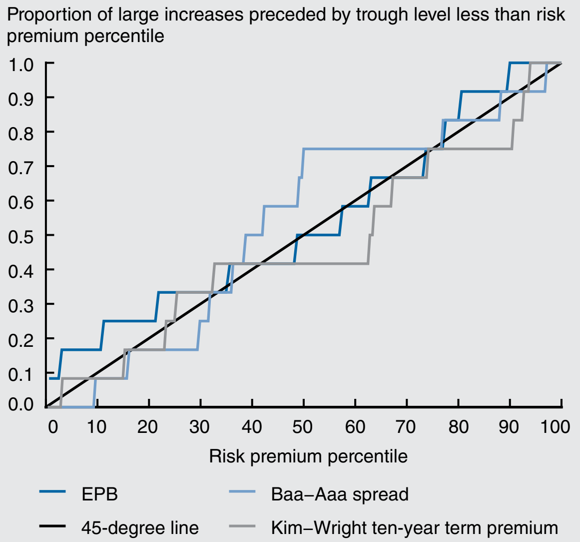
Figure 2 plots the proportion of large increases in each risk premium series that began with a trough level below a certain percentile. If low levels of risk premiums do in fact increase the likelihood of future sharp increases in risk premiums, we would expect the plots in figure 2 to lie well above the 45-degree line. In fact, the plots are close to or below the 45-degree line.

Figures 1 and 2 suggest that a policymaker who hopes to enhance financial stability by removing monetary accommodation when risk premiums fall below a pre-set level would be plagued by false positives, as the risk premium series often decline to low levels without subsequent spikes. This policy would lead to monetary policy that was more contractionary than necessary.

Determining the probability of a rare but costly outcome

Policymakers often have to make difficult decisions based upon a noisy signal about the probability of a rare but, if realized, costly outcome. The decision to evacuate a city in the path of a hurricane, ground a class of airliners after a malfunction, or scramble fighters in response to blips on a radar screen all require policymakers to weigh the cost of a false positive (ordering costly precautionary action to avoid an event that will not actually occur) against the cost of a false negative (taking no precautionary action when the dangerous event does in fact transpire). In the monetary policy context, a policymaker who is concerned that low risk premiums signals a future episode of financial instability could set a certain level of risk premiums as a discrimination threshold and adopt a policy of removing monetary stimulus whenever one of the risk premium series declines below this threshold. If the risk premium series does in fact transition to

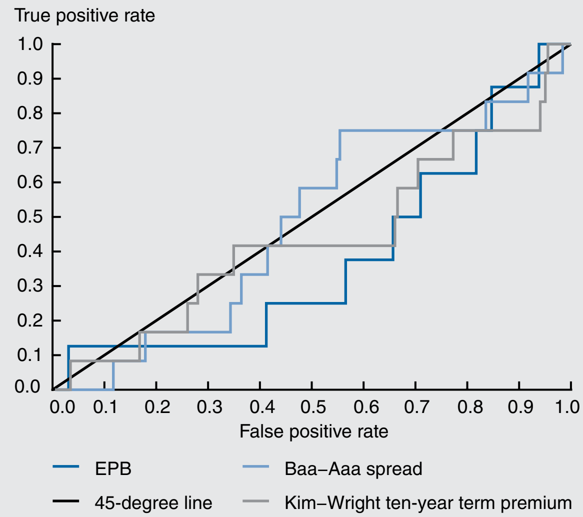
2. Distribution of troughs preceding large increases



Note: The three measures are the Moody's Baa–Aaa spread, the Kim–Wright ten-year term premium, and the Gilchrist and Zakrajšek corporate expected bond premium (EBP).

Source: Author's calculations based on the data series in figure 1.

3. ROC curves



Note: The three measures are the Moody's Baa–Aaa spread, the Kim–Wright ten-year term premium, and the Gilchrist and Zakrajšek corporate expected bond premium (EBP).

Source: Author's calculations based on the data series in figure 1.

a large increase when the level is below the selected threshold, the discrimination threshold accurately predicts the transition and we observe a true positive. On the other hand, the risk premium series may continue with no spike in levels. In this case, the discrimination threshold has generated a false positive.

Can risk premium levels accurately predict future financial instability? One way to measure the accuracy of a model of rare events is the receiver-operating-characteristic (ROC) curve, a tool commonly used in signal theory, engineering, and medicine to help policymakers visualize the information content of a model based on noisy signals.[7] The ROC curve plots the trade-off between the true positive and the false positive rate as the policymaker varies the discrimination threshold below which he will deviate from otherwise optimal monetary policy. The area under the ROC curve (AUC) is a summary statistic of the model's goodness of fit. A model based on a perfectly informative signal can successfully predict every large increase with no false positives and will have an AUC of 1, while a model based on uninformative random guesses will have an AUC of 0.5. Figure 3 plots the AUC curves for the three risk premium series.

Figure 3 illustrates the difficulty a policymaker would face trying to use the current level of risk premiums to predict large future increases in risk premiums. A policymaker who wished to choose a threshold in the Baa–Aaa spread that successfully predicts 90% of the large increases in this spread would have to set a threshold that generates a false positive rate of 91%! If the policymaker lowered the discrimination threshold to generate a more palatable false positive rate of 20%, the true positive rate would fall to a mere 16.66% and the threshold would fail to predict five out of every six spikes in the Baa–Aaa spread. The policymaker would fare even worse using the EBP or Kim–Wright term premium.

The ROC curves suggest that simple rules such as "reduce accommodation whenever risk premiums decline below a certain threshold" will be ineffective. Perhaps more complex models based on multiple inputs could generate a more accurate predictor of financial instability? To investigate this further, I use multiple predictors to model the hazard of a large increase in bond risk premiums.[8] I model the hazard of a large increase in the risk-premium series as a time-varying function of the risk spreads and monetary policy. The first six model specifications allow the hazard of a large increase in our series of interest to vary with the level of EBP or the Baa–Aaa spread, and

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a proxy for monetary policy—the real fed funds rate measured as the nominal rate minus the change in the Consumer Price Index (CPI) over the previous year. It is often suggested that the detrimental effects of low risk premiums take a while to build up in the financial system and the current level of risk premiums may not matter as much as the average level over time. The next six specifications replace current levels of the predictors with their average level over the previous year. Finally, I consider the possibility that the level of risk premiums does not matter but changes in risk premiums encourage destabilizing investor behavior. The final six specifications replace the level measures with change over the previous year.

The hazard model results suggest that the current levels and past changes in risk premiums are poor predictors of the risk of future large increases in risk premiums. The level and change in the real fed funds rate and risk premiums are insignificant in most specifications. In the few cases where the variables do significantly shift the hazard, the sign is always the opposite of what one would expect if low risk premiums or accommodative monetary policy did indeed sow the seeds of future instability. The hazard model suggests large increases in risk premiums are less likely when risk premiums have been depressed or have declined over the past year.

Conclusion

Financial instability is costly. It has been suggested that low bond risk premiums may predict future financial instability and that policymakers should take this into account and respond to low risk premiums by adopting less accommodative monetary policy than would otherwise be justified by economic conditions. But before we conclude that the economic cost of a potentially sharp increase in bond risk premiums justifies less accommodative monetary policy, we should be certain that financial instability is in fact more likely to arise when bond risk premiums are low. This study casts doubt upon the hypothesis that low levels of bond risk premiums increase the likelihood of destabilizing sharp increases. To the contrary, the past 60 years of data suggest that large increases in bond risk premiums are independent of the recent level or change in risk premiums or the real federal funds rate.

[1] Details of these and other programs are available at www.federalreserve.gov/faqs/money-rates-policy.htm. For evidence of the effectiveness of these policies, see www.federalreserve.gov/newsevents/speech/bernanke20120831a.htm; www.federalreserve.gov/newsevents/speech/stein20121011a.htm#fn3; and www.newyorkfed.org/research/epr/11v17n1/1105gagn.pdf.

[2] http://www.federalreserve.gov/newsevents/press/monetary/20140618a.htm.

[3] See www.federalreserve.gov/newsevents/speech/stein20140321a.htm.

[4] See www.aeaweb.org/articles.php?doi=10.1257/aer.102.4.1692.

[5] The data sources and algorithm are available in the online appendix at www.chicagofed.org/digital_assets/others/people/research_resources/chabot_ben/chabot_cfl_325_appendix.pdf.

[6] Table A1, in the online appendix available at www.chicagofed.org/digital_assets/others/people/research_resources/chabot_ben/chabot_cfl_325_appendix.pdf, describes the large increases in each series.

[7] See J. A. Swets, 1988, "Measuring the accuracy of diagnostic systems," *Science*, Vol. 240, No. 4857, June 3, pp. 1285–1293.

[8] A technical description of the hazard model and table of coefficient estimates are available in the online appendix at www.chicagofed.org/digital_assets/others/people/research_resources/chabot_ben/chabot_cfl_325_appendix.pdf.