The Wharton School
University of Pennsylvania
Prof. Stephan Dieckmann, Fall 2018

FNCE 235/725 Fixed Income Securities Project

Anheuser Busch recently decided to cut its dividend in half, and equity and bond prices reacted strongly. We looked at the market reaction in class on Nov 6. At the same time, Anheuser Busch is also trying to reposition some of its products and is expanding some parts of their business, for example recycling capabilities.

It is quite possible that Anheuser Busch will hit the bond market again in the near future, bond yields are still reasonably low, and many investors don't seem to shy away from riskier investments.

Information about Anheuser Busch, including market information about its debt and equity, will be posted on Canvas. I will also provide information about the riskless term structure. This project consists of two parts, equally weighted. The first part is about bond pricing and interest rate risk, the second part is about the credit risk of Anheuser Busch. This project is due December 6, the last day of class.

Students may prepare a write-up in groups (up to 4 students), and the submission should be joint as well, and in electronic form. Please limit the write-up to 4 pages of text; you can add tables or graphs.

Part I: Bond Pricing / Interest Rate Risk

Anheuser Busch would like to undertake additional financing in the amount of USD 500 million (value today). Please provide the management with a set of three different financing alternatives. Specifically, please deliver the pricing of three fixed income securities based on recent market data, and point out why they could be of interest to the company. The firm is interested in medium term financing; all bonds should have a time to maturity of 8 years. Otherwise, be creative. Financing could be in the form of coupon bonds, callable and non-callable, floating rate notes, with or without caps, you name it. At least one of the three alternatives should be a bond containing an embedded option.

Constraint: Investors are cautious about the price risk due to rising U.S. interest rates, and you would like to cater to that group of investors. Hence, they would like to see at least one financing alternative that has a delta less than the delta of a 4 year zero coupon bond. Please show the delta of all three fixed income securities. Please assume that credit risk is not an issue, and you can base all pricing on U.S. Treasury data or the USD Swap curve. Also, the pricing of these

securities does not need to include additional transaction costs that might arise (management, sales, underwriting).

The goal here is not to get as close as possible to actual bonds that Anheuser Busch has issued. Instead, the goal is to show that you can consistently price all three financing alternatives. Just pick a term structure model, Vasicek, Black Derman Toy, or any other model of your choice; calibrate the model to the current term structure, or estimate it with historical data, again your choice, and try to create some fixed income securities. Please show your work, and also comment on any complications that might arise during the modeling.

Part II: Credit Risk

Anheuser Busch is not free of credit risk, it is currently a single-A rated company. We had abstracted from this feature above, and now look at a more complete picture. The question is: How much additional yield could investors ask for when investing in a 8-year non-callable bond simply due to the inherent credit risk? There are many ways to answer such a question. You could base the answer on the rating of a firm and historical default probabilities, or employ a structural model of credit risk, for example the Merton model or the Black and Cox model.

In your write up, you should explain the nature of credit risk of Anheuser Busch and then try to quantify it. For example, it would be interesting to see whether the Merton model delivers reasonable results: You could make a prediction about the credit spread based on company specific information, or calibrate the model to the currently observed spread and decide if the parameters are appropriate.

Please show your work, and also comment on any complications that might arise.

Enjoy!