MF728 Project Proposal

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We are going to build our project on hedging swaptions and swap portfolios (as if we were a dealer and needed to hedge our book) on the available yield curves. Dynamic hedging of the portfolio looks a lot more feasible, and why we are not going in the direction of a trading strategy. From our research surveys, it appears that we only need the underlying assets which we can pull from Bloomberg. The pricing tools in Bloomberg will help us validate up to the higher order greeks. The basic greeks we can match to the Bloomberg values. This gets us to the intersection of hedging or trading. We have more to work with in terms of hedging, and given what we all want to do in our careers after BU, building a hedging strategy will apply much more.

Specifically, hedging out option greeks on the available yield curves is not a simple process, because we will have to decide what exposures we want in a systematic way. We realize this is very similar to a trading strategy, but the hedging has more research on it for us to lean on. The most topical swaptions and swaps are inflation linked derivatives. This requires us to build an inflation model on top of the derivatives models, and this in tandem with the hedging gives us a formidable project to complete. Some of the inflation models that look interesting are the Jarrow and Yildirim model, the Mercurio Market models and the Beldgrade-Benhamou-Koehlar Market model. I would be very surprised if we had time to add on to this project, but if we do we will add on with another basket of options.

A short outline of classes that we will likely need to create are in the bullets. There is enough data in Bloomberg that we should be able to validate the results to market observed data (we are planning on rolling the individual maturities where applicable). The CPI data is vast, and we can get it from more places then just Bloomberg. The derivatives that we will be dealing with can all be priced in Bloomberg in some form or fashion, but we can't necessarily get the actual traded option data, which is why we don't want to go in the trading strategy direction.

* Market_Data
* Day_Count
* Curve_Constructor
* Options
* Volatility_Calibration
* Portfolio_Construction
* Hedging_Strategy

References are numerous, but helpful ones are harder to find. A few that look helpful are the all encompassing text by Paul Wilmott, he has a section on inflation modeling that we will lean on heavily for the inflation swaps/swaptions. The rest of the text books we might use as references are less important to list here then the papers:

- Bianchetti, Marco. *Two curves, one price: Pricing hedging interest rate derivatives decoupling forwarding and discounting yield curves. One Price: Pricing & Hedging Interest Rate Derivatives Decoupling Forwarding and Discounting Yield Curves* (November 14, 2008) (2008).

- Flavell, Richard R. *Swaps and other derivatives.* Vol. 480. John Wiley & Sons, 2010.

- Kambhu, John. *"Dealers' hedging of interest rate options in the US dollar fixed-income market."* Economic Policy Review 4, no. 2 (1998).

- Ryan, Ronald J. *Yield Curve Dynamics: State-of-the-art Techniques for Modeling, Trading and Hedging.* Global Professional Publishing, 1997.

- Joslin, Scott. *"Pricing and hedging volatility risk in fixed income markets."* Unpublished working paper. MIT Sloan School of Management (2007).

- Rebonato, Riccardo, Kenneth McKay, and Richard White. *The SABR/LIBOR Market Model: Pricing, calibration and hedging for complex interest-rate derivatives.* John Wiley & Sons, 2009.