**FIASI HALL OF FAME INDUCTION DINNER**

**Presentation**

* Thank you, Marek, for your very kind introduction.
* Marek and I met 25 years ago when he first asked me to teach a class at Fordham Business School. That meeting has led to an enduring 25-year friendship and professional collaboration.
* I am delighted to be joined this evening by
* My wife Louise, who really likes the presentation I’m about to share with all of you,
* My son Will,
* My brother David,
* David Gautschi, Dean of Fordham GBA,
* Donna Rapaccioli, Dean of Faculty of the Fordham Schools of Business and Dean of the Gabelli School of Business,
* Several colleagues from the Fordham faculty,
* Some of my Fordham students
* My consulting colleagues, and
* Several of my good friends from Merrill Lynch.
* I know that many of you are thinking, give a professor a captive audience, and we’ll never get out of here.
* But I promise to keep my remarks brief.

**SLIDE 1**

* I am going to talk about the integration of the global fixed income market.
* First, I would like to thank two people who helped enormously with this research:
* My Fordham graduate assistant, Mike Mrkaic, who has spent two years helping me build the data base, and
* My consulting colleague, Sherry Chen, who performed the statistical analyses.
* I will make these slides available on the FIASI web site and also on the Fordham Business School web site.

**SLIDE 2**

* The integration of the global equity markets has been studied extensively.
* The integration of the global fixed income markets, especially the emerging debt markets, has received less attention.
* We are studying the integration of the fixed income markets at Fordham Business School, and I want to share some interesting preliminary results with you.

**SLIDE 3**

* The first part of the study concerns what drives the term structure movements in the 10 developed countries listed on this slide.

**SLIDE 4**

* I used daily bond price and yield data for a range of sovereign debt issues than span the term structure in each market for 13 years, 1997-2009.
* An average of 26 debt issues per developed country, and 14 per emerging country, which I will talk about in a moment.
* I used principal components analysis to study the factors that drive term structure movements and then investigated the correlations between the changes in the values of these factors across the 10 sovereign debt markets between 1997 and 2009.

**SLIDE 5**

* The four components of the term structure movements can be identified as:
* Level (parallel shifts)
* Slope (steepening/flattening)
* Curvature (butterfly)
* Oscillation (chiefly monetary policy effects)

**SLIDE6**

* This slide shows the percentage of the term structure movements in the major developed country sovereign debt markets explained by the four term structure factors.
* Level or parallel shifts account for more than three quarters of the movements.
* Steepening and flattening account for about 11%.
* Curvature changes account for only about 5%.
* Oscillation in the short end of the term structure explains only about 2%.
* The four factors combined explain about 96 % of the movements in the term structure.

**SLIDE 7**

* Across the 10 countries, the average percentage of the term structure movements explained by the parallel shift comonnent is remarkably consistent.
* Note the relatively low percentage for the U.S.

**SLIDE 8**

* Also across the 10 countries, the average percentage of the term structure movements explained by slope changes is also fairly consistent, though not as consistent as the parallel shift percentage.
* Note the relatively high value for the U.S., which is more than double the percentage for some other countries.

**SLIDE 9**

* The percentage of the term structure movements explained by parallel shifts is relatively low for the U.S. throughout the 13-year period.
* It is especially low between 2000 and 2003, which includes the U.S. recession of 2001-2002, and it dipped again during the recent financial crisis.

**SLIDE 10**

* The percentage of the term structure movements explained by steepening and flattening is relatively high for the U.S. throughout the 13-year period.
* It is especially high during the recessionary-affected period 2000-2003 and again during the financial crisis years of 2007 and 2008.
* Real economic factors certainly play an important role in the relative importance of these term structure shift factors.

**SLIDE 11**

* The four key term structure components can be linked to the economic factors shown in the slide:
* Changes in level or parallel shifts are related to changes in the inflation rate because, as the economist Irving Fisher pointed out many years ago, the nominal interest rate is approximately the real interest rate plus the inflation rate.
* Slope changes are linked to changes in economic growth; faster growth or economic improvement is usually associated with curve steepening.
* Curvature shifts are tied to changes in the degree of economic uncertainty.
* Oscillation at the short end of the curve-- or lack of it -- is driven mainly by changes in monetary policy.

**SLIDE 12**

* This slide shows the positive association between the percentage of the term structure movements explained by parallel shifts and the average annual GDP deflator country by country.
* I arranged the countries from lowest to highest in terms of percentage explained by this first term structure component.

**SLIDE 13**

* This slide shows the positive association between the percentage of the term structure movements explained by slope changes and the variability of the annual GDP growth rate.

**SLIDE 14**

* This slide shows the association between the percentage of the term structure movements explained by curvature shifts and the average value of the consumer confidence indicator for the country.
* Consumer confidence and the degree of economic uncertainty should be inversely related.
* When economic uncertainty increases, the term structure’s curvature intensifies.

**SLIDE 15**

* This slide shows the positive association between the percentage of the term structure movements explained by fourth component and the variability of the short term interest rate.
* The fourth term structure factor is directly related to the variability of the short rate, which is why it can be interpreted as reflecting the variability of national monetary policy.

**SLIDE 16**

* Next, I investigated the correlations between movements in the key term structure components between 1997 and 2009.
* The top panel is parallel shift correlations, and the lower panel is slope correlations.
* I indicate significant contemporaneous correlations in the lower half of each panel.
* Green indicates highly significant correlations.
* Blue or orange indicate less significant correlations.
* The correlations between parallel shifts are highly significant across all 10 countries.
* The correlations between slope changes are also generally highly significant across all 10 countries.

**SLIDE 17**

* Correlations between curvature movements and between the oscillation movements are not as strong.

**SLIDE 18**

* During 2006-2009, the parallel shift correlations and the slope correlations are nearly as strong as for the entire 13-year period.

**SLIDE 19**

* What is striking is the strength of the correlations in the oscillation factor across the 10 countries during 2006-2009.
* This pattern reflects the tight coordination of monetary policy in the developed countries during the recent financial crisis.

**SLIDE 20**

* In view of the importance of economic factors in explaining term structure movements, I would expect that the correlations among term structure movements would be strongest between trading partners.
* I measured the correlations among term structure movements for the 5 leading trading partners for each of the 10 countries during three subperiods.
* I counted the number of significant factor relationships during each subperiod.
* In the middle of the slide you can see that the term structure correlations are particularly strong among European Union members that have adopted the Euro.
* The UK term structure has stronger correlations with the term structures of trading partners outside the EU.
* Additional evidence of significant term structure correlations between major trading partners that are not part of a currency block.
* Growing international trade promotes greater economic integration and at the same time global fixed income integration.

**SLIDE 21**

* The second part of the study concerns what drives the term structure movements in 7 emerging sovereign debt markets, which are listed on the slide.
* I repeated the study I have just described on this small sample but only for 2006 to 2009 due to data limitations.

**SLIDE 22**

* The relative importance of the four key term structure components for the emerging markets is similar to what we saw earlier in the developed markets.
* The sovereign debt markets worldwide all have a similar fundamental structure.

**SLIDE 23**

* The average percentages of the term structure movements explained by the four factors are not significantly different between the developed and emerging markets.

**SLIDE 24**

* The level, slope, and oscillation term structure movements in the emerging markets are generally highly correlated with term structure movements in the developed markets.
* They are also highly correlated with term structure movements in the Chinese sovereign debt market.

**SLIDE 25**

* Trade also plays an important role in explaining the strength of the term structure correlations in the developing markets.
* Note the significance of China for each of the other emerging countries.
* Not only is China an important trading partner of these developing countries, it has also become an important financial partner.
* China’s role is likely to become increasingly important both in international trade and in the global fixed income markets.

**SLIDE 26**

* Thank you for this wonderful award.
* Thank you for your attention.
* I look forward to seeing you at future FIASI events if I am invited to present additional results from this interesting research.