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Interest Rate Insurance Prices Implicit in Option Prices

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Despite significant tensions and geopolitical risks in Syria and North Korea, Brexit notification and major French election uncertainty, stock markets have held onto their gains pretty well in the past two months. Relatively strong economic growth and lower unemployment in Europe, the UK and the USA, and warmer relationships than expected of President Trump with foreign leaders appears to have offset some uncertainties. With the geopolitical uncertainties and worries that the USA stimulus might not occur as fast and as much as hoped, interest rates have declined after the post-November rise.

I. Overview of Recent Events.

Table 1 shows global stock prices and earnings forecasts as of Friday, April 7th, compared to our prior letter's February 3rd prices. Despite the ups and downs and global handwringing, the sharp recovery in global stock markets in the past year has held, and indeed stock prices increased about 3% in the past two months. As far as fundamentals are concerned, the story appears to be double digit increases in forecasted earnings all over the globe, but especially in Europe and the advanced economies in AustralAsia. As noted previously, despite stock price gains, forward Price/Earnings ratios have actually declined in the past year, due to the higher earnings expectations.

In bond markets, interest rates declined in major economies, with 10-year yields dropping 8 bp from 2.46% to 2.38% in the USA, 15 bp in Germany from 0.41% to 0.26%, and 27 bp in the UK from 1.35% to 1.08%. Recently, yields have risen in France relative to Germany, as rightwing candidate Le Pen and leftwing candidate Melenchon both have strong support, apparently exceeding that of centrist candidates, making the election outcome highly uncertain. The USA fired cruise missiles on Syria after Syria's apparent use of chemical weapons, and the USA has positioned a major ship near Korea, given the nuclear threats posed by North Korea. So there surely is a lot of geopolitical risk and uncertainty. Perhaps it should not be surprising that there has been some modest flight to quality and declines in interest rates globally. But also interestingly, stock markets have surged in both Brazil and South Korea in the past 6 months, despite their removals of their Presidents. So, markets are dealing well with large changes.

Interestingly, Federal Reserve minutes showed discussion of reducing the size of the Fed's massive $4.5 trillion balance sheet. I am delighted to see this, as I think massive Fed intervention in the strong USA economy is simply inappropriate, given an unemployment rate now down to 4.5%. I strongly support the Fed withdrawing its massive intervention in markets on a measured pace that begins right away. With interest rates so low, markets certainly don't seem worried about possible Fed asset sales. Just do it! The likely first step will be not

[1] I thank Song Xiao and Gloria Zeng of Duke for excellent research assistance.

reinvesting principal from paydowns on mortgage backed securities. That seems a no-brainer. The Fed is indicating 2-3 more rate hikes in 2017, which sounds good to me. Hopefully global tensions do not dissuade them from this normalization, which would give the Fed much more dry powder for future possible crises. I think that would be highly prudent.

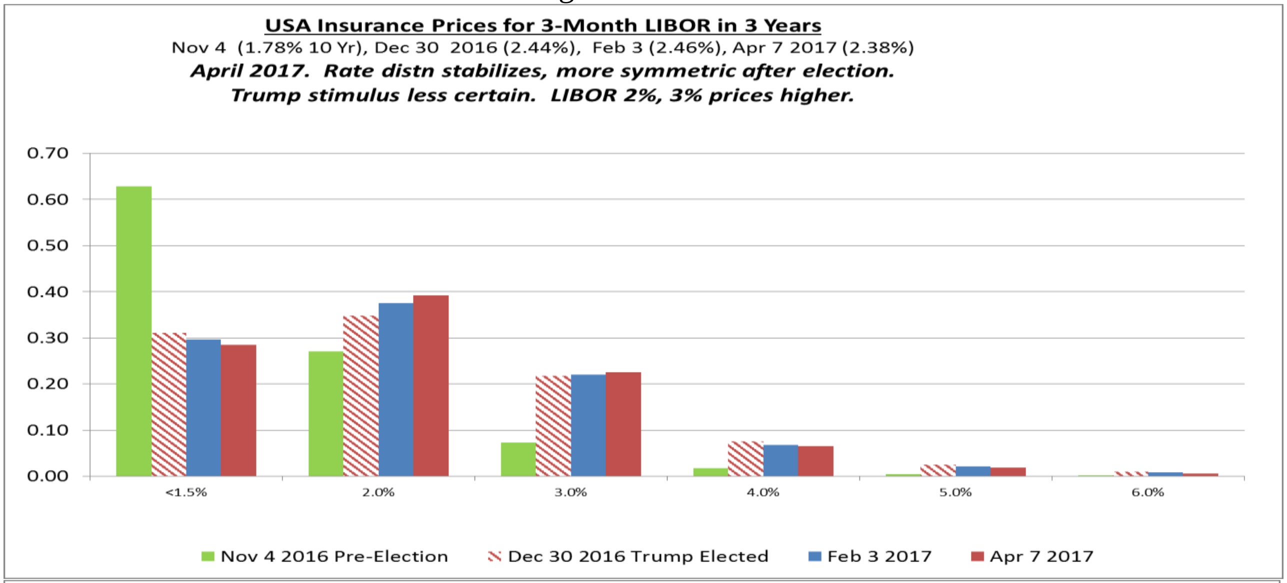
Table 1

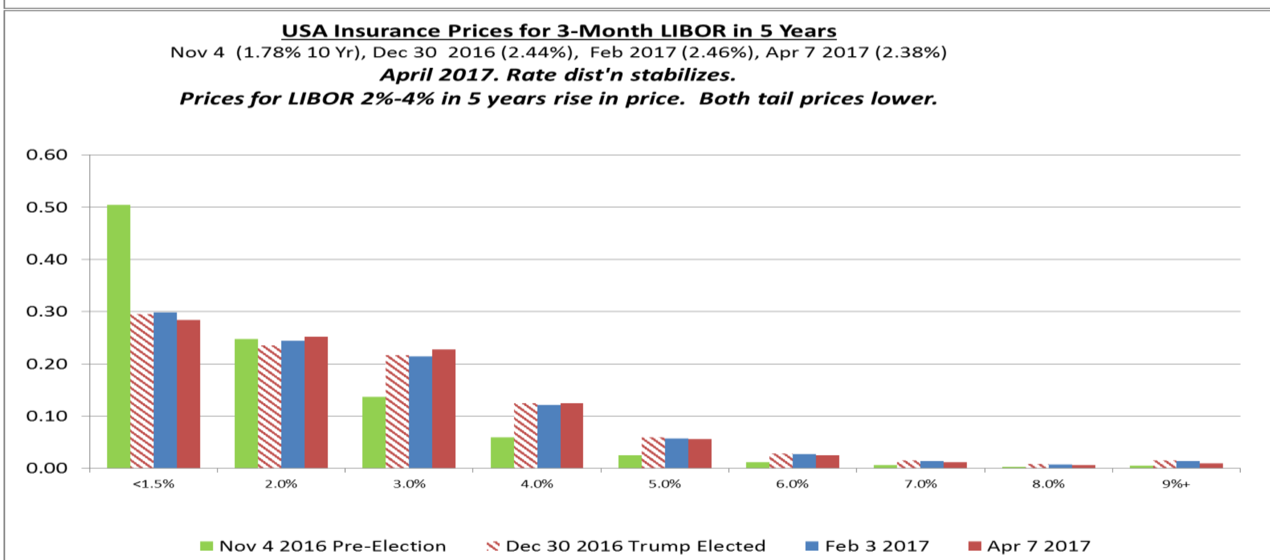
					Global Stock Market Valuation: 17 Trillion Dollar GDP Economies										
4/12/2017 11:14					Bloomberg Data with Prices as of close April 7, 2017										
	4/7/2017	2/3/2017	%Price Chg	%Price Chg	4/7/2017	11/4/2016	%Chg Fw12	Last 12mo	Last 12mo	Fwd 12 P/E	Fwd 12 P/E	CPI LTM	Fwd E/P	2-Year	StkPrice
	Price	Price	2/3/2017	12/31/2015	EPS Fwd 12	EPS Fwd 12	EPS Fcst	EPS LTM	P/E LTM	2016	2017	Inflation	Real (-Infl)	Hi Price	Off High
Americas			4/7/2017	4/7/2017				2/3/2017	4/7/2017	6/8/2016	4/7/2017		Eq. Risk Prem		
United States	2,356	2,297	3%	15%	134.1	127.0	6%	123.7	19.0	17.4	17.6	1.9%	3.8	2,401	-2%
Canada	15,667	15,476	1%	20%	938.4	878.9	7%	695.3	22.5	18.2	16.7	1.3%	4.7	15,943	-2%
Brazil	64,593	64,954	-1%	49%	5254.1	4436.6	18%	3337.6	19.4	13.3	12.3	5.0%	3.2	69,488	-7%
Mexico	49,344	47,225	4%	15%	2708.6	2616.2	4%	2014.6	24.5	20.1	18.2	3.0%	2.5	49,753	-1%
Europe															
Germany	12,225	11,651	5%	14%	875.7	811.3	8%	618.6	19.8	12.6	14.0	2.5%	4.6	12,391	-1%
France	5,135	4,825	6%	11%	350.2	318.2	10%	258.8	19.8	14.2	14.7	1.6%	5.2	5,284	-3%
United Kingdom	7,349	7,188	2%	18%	501.5	454.0	10%	189.5	38.8	16.3	14.7	2.4%	4.4	7,447	-1%
Italy	20,300	19,116	6%	-5%	1489.6	1261.8	18%	#VALUE!	#N/A N/A	13.7	13.6	0.7%	6.6	24,157	-16%
Spain	10,529	9,463	11%	10%	712.9	631.0	13%	535.3	19.7	13.5	14.8	3.5%	3.2	11,885	-11%
Russia	1,113	1,190	-6%	47%	181.1	146.6	24%	130.4	8.5	7.5	6.1	4.4%	11.9	1,280	-13%
Turkey	88,497	88,390	0%	23%	10477.8	8965.3	17%	8409.3	10.5	8.9	8.4	6.6%	5.2	91,806	-4%
Asia/Pacific															
Japan	18,665	18,918	-1%	-2%	1255.0	1023.6	23%	855.3	21.8	16.5	14.9	0.7%	6.0	20,953	-11%
Australia	5,862	5,622	4%	11%	365.5	327.9	11%	290.7	20.2	17.0	16.0	1.2%	5.0	5,997	-2%
South Korea	2,152	2,073	4%	10%	239.1	185.3	29%	64.6	33.3	10.9	9.0	1.1%	10.0	2,190	-2%
China	3,287	3,140	5%	-7%	235.6	233.2	1%	171.4	19.2	12.7	13.9	1.8%	5.4	5,178	-37%
India	29,707	28,241	5%	14%	1651.3	1651.7	0%	1347.4	22.0	18.5	18.0	2.2%	3.3	30,025	-1%
Indonesia	5,653	5,361	5%	23%	341.7	325.9	5%	268.8	21.0	15.1	16.5	2.5%	3.5	5,653	0%
Averages			3%	16%			12%		21.3	14.5	14.1		5.2		-7%
10-Year TreasYld	2.38	2.46													
VIX	12.9	11.0													

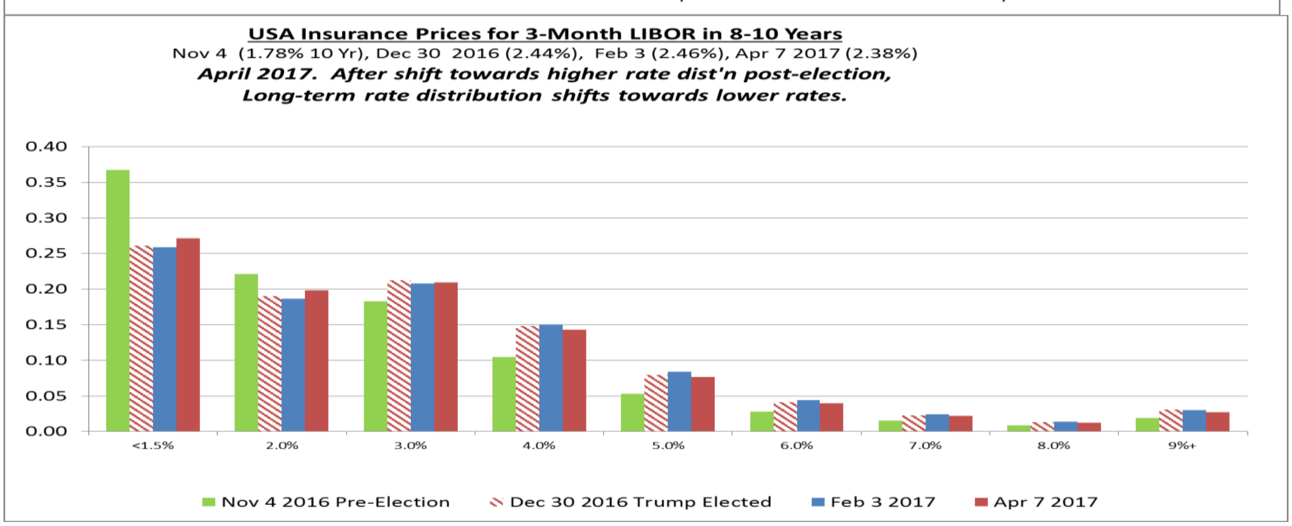
II. <u>USA: Interest Rate Insurance Prices for USA LIBOR 3, 5, and 10 Years Out</u>

Let’s turn to our usual graphic analysis of the interest rate insurance prices that are implicit in the prices of caps and floors, using the technique of Breeden and Litzenberger (1978, 2014). Using prices from Bloomberg Financial Markets and their volatility cube calculations, we see in Figures 1A-1C the prices for interest rate insurance for 3-month LIBOR rates in 3, 5 and 8-10 years. All graphs show slight movements towards concentration in the mid-range of rates, 2%-3% in 3 years, 2%-4% LIBOR in 5 years. Tail risk has dropped a bit. Of course, the insurance price distributions are more spread out for the longer maturities, as usual.

Figures 1A-1C



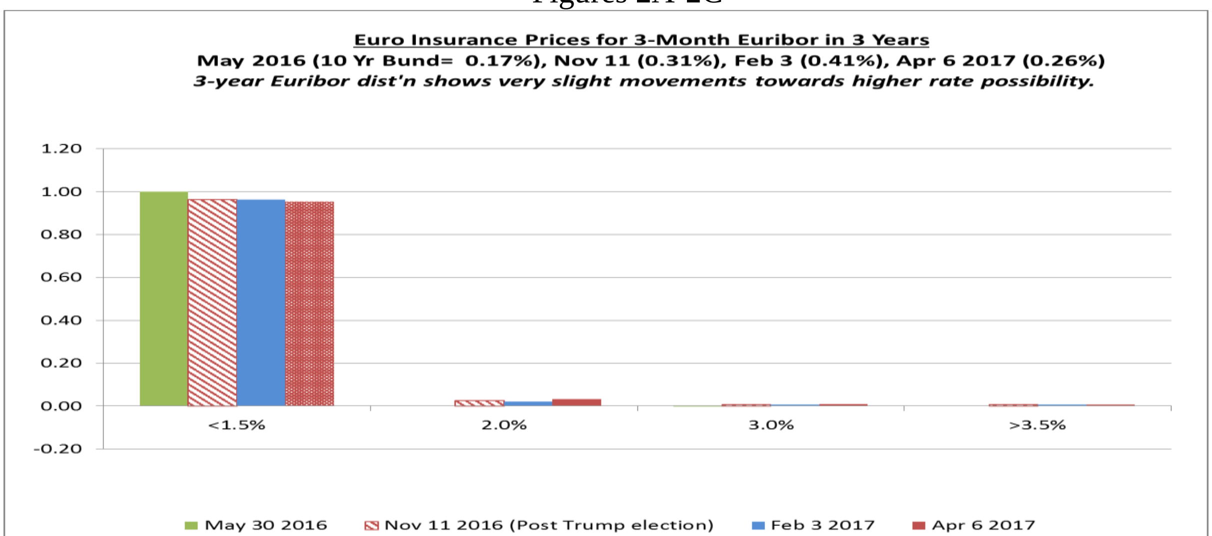


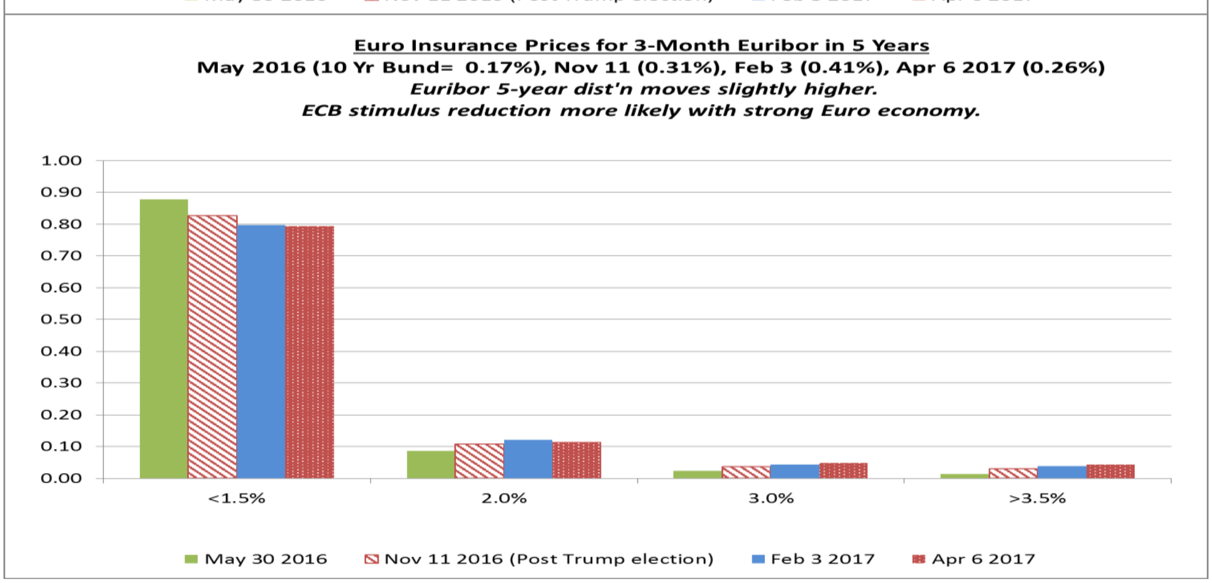


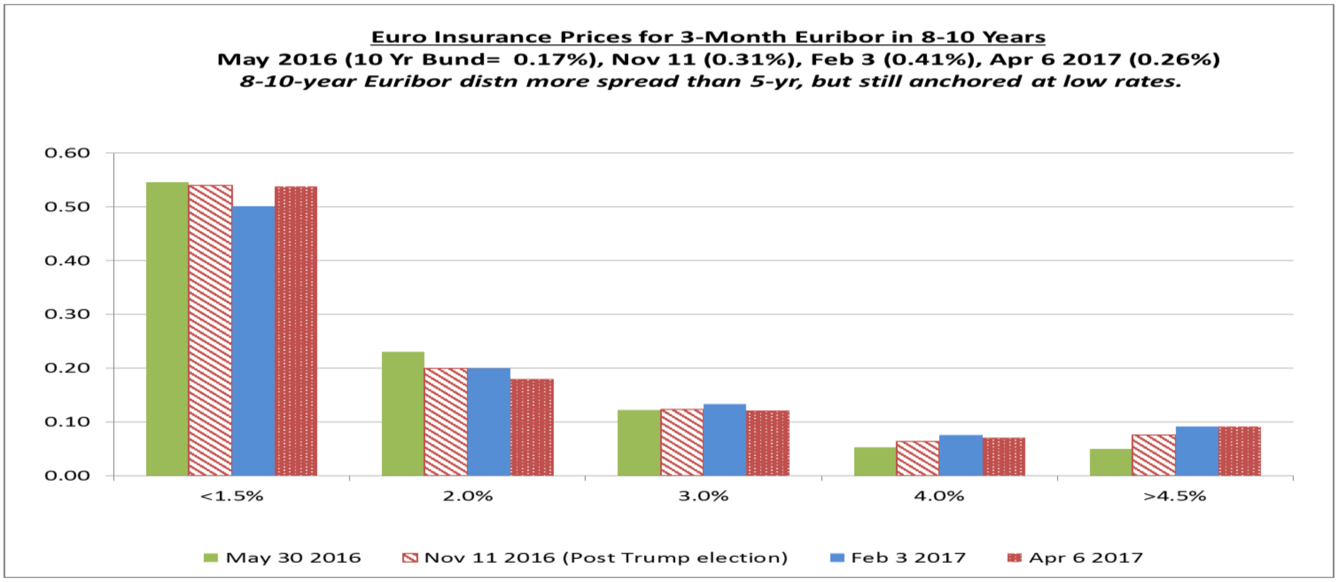
III. Euro Area: Interest Rate Insurance Prices for Euribor 3, 5, nd 8-10 Years Out

Figures 2A-2C give the options markets' pricing of insurance payoffs on Euribor in 3, 5, and 8-10 years, respectively. Of course, Draghi's ECB continues to conduct quite massive stimulus, but recent statements were slightly more hawkish, indicating a possible lessening of stimulus a bit sooner than before, given the stronger than expected European economy. Results for Euribor are much as they were 2 months ago. Over the next 3 years, almost all of the betting is on Euribor less than 1.5%. With the 5-year distribution, the value bets on Euribor above 1.5% are visibly increased, though 80% is still bet on Euribor less than 1.5%, which likely reflects risk aversion as well as probability. Looking at Figure 2C, one sees that the Euribor insurance price distribution gets considerably more spread out over the long term of 8-10 years. The price paid for insurance against rates being less than 1.5% is down to just above 50%, with almost 50% now being paid for higher rates.

Figures 2A-2C







IV. U.K: Interest Rate Insurance Prices for Interbank Rates in 3, 5, and 8-10 Years

Figures 3A-3C give the insurance price distributions for the UK interbank interest rate 3, 5 and 8-10 years out. In an historic move, on March 29th, Prime Minister Theresa May gave Article 50 Notification of planned withdrawal from the European Union, which is to take place within 2 years. As noted, while UK stocks have held up very well, interest rates have fallen rather sharply, down from 1.35% to 1.08%, or 27 bp, on the 10-year Gilt. Interest rate insurance price distributions for the UK interbank rate have shifted noticeably towards paying higher prices for the low-rate scenario (<1.5%) in 3 years, 5 years and in 8-10 years. The UK Brexit uncertainty does appear to be showing up in these insurance prices. Longer term insurance price distributions show quite a considerable amount of positive skewness, with prices being paid for rates of 4%, 5% and more than 5.5%, while at the same time having the highest price paid for low rates. Again, this likely reflects risk aversion against a possible bad economy scenario, if rates end up that low. If rates end up high, the UK has probably done well, and marginal utilities are likely low, so smaller prices are paid to hedge against higher rate possibilities.

Figures 3A-3C