The Changing Risk Environment

October showcased the responsiveness of the new and enhanced Barra Global Equity Model (GEM2) to changes in the risk environment. As the events of October unfolded, the risk forecast of the long-term model (GEM2L) for the global portfolio increased 74% from 15% to 26%.[1] The short-term model's (GEM2S) response was even more dramatic from 16% to 36%, an increase of 125%. As we show in this Research Bulletin, GEM2's responsiveness allows us to see that these changes are unprecedented in the past approximately 15 years. We examine the magnitude of these increases relative to other periods and discuss some of the relationships between risk forecast jumps and the GEM2 factors.

An Unprecedented Increase in Risk

Crises have hit the markets during the past 15 years, but none has resulted in the increases in risk experienced during the current crisis. The GEM2 raw data history begins in June 1992, and we examine weekly risk forecasts from 1997, when the factor covariance history begins. Since 1997, five major crises have occurred prior to the current one, including the 1997-98 Asian crisis, 1998 LTCM crisis, 2000-2001 bursting of the technology bubble, and 9/11. As Table 1 shows, the risk increases in October 2008 were unprecedented; they were between 153% and 184% higher than the previously highest increase, which occurred during 9/11.

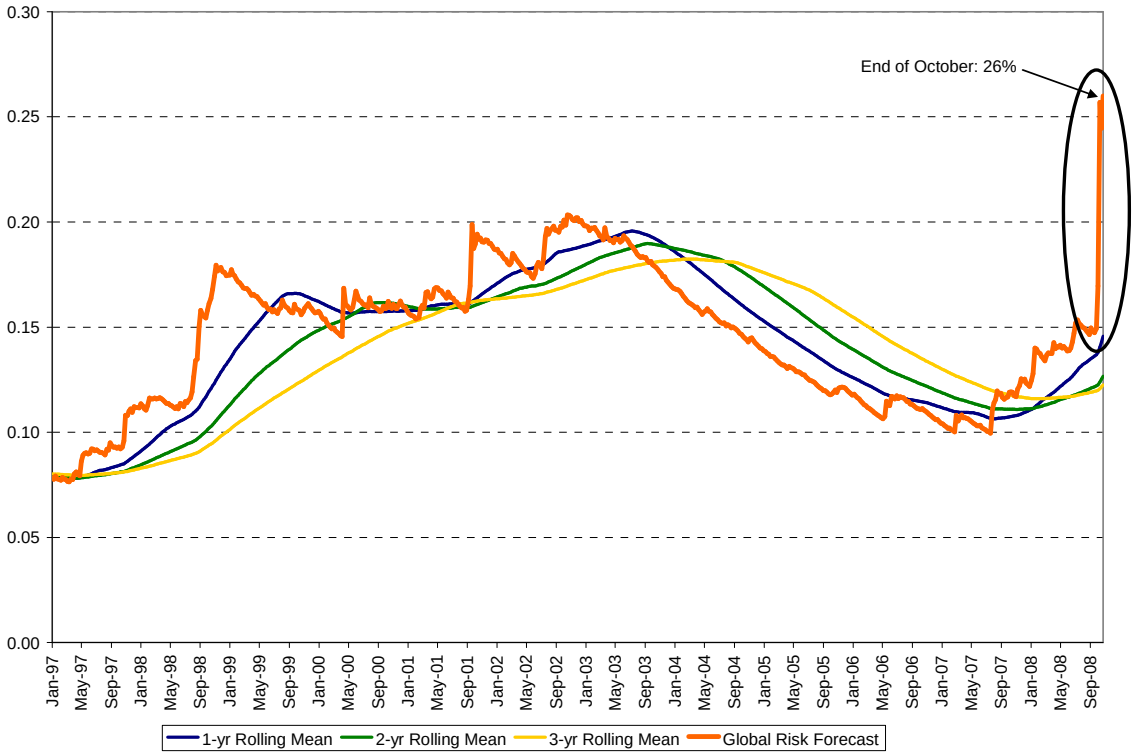
Table 1: Highest 4-week Increases in Risk Forecasts (Global Portfolio; GEM2L)

Week Ending	Percent Change
11/14/1997	18.52%
8/28/1998	25.93%
4/14/2000	14.23%
9/21/2001	26.09%
8/17/2007	20.30%
10/10/2008	73.40%
10/17/2008	65.91%
10/24/2008	74.10%

Figure 1 graphically bolsters these findings by showing GEM2L's responsiveness during prior crises and the unprecedented nature of October 2008. The orange line represents the risk forecast for the global portfolio, while the blue, green, and yellow lines show, respectively, the 1-year, 2-year, and 3-year averages of the risk forecasts. In 1998, 2000, and 2001, and 2007, there are immediate spikes in the risk forecasts in response to the various crises as represented by the deviations from the long-term averages. The graph also shows the long period during which risk decreased between 2003 and 2006 as given by risk forecasts below the long-term averages. However, the increase in October 2008 is in a league of its own with an out-sized deviation from the long-term averages. As the graph demonstrates, no crisis since 1997 has resulted in the current magnitude of the deviation in risk from long-term averages.

[1] The Global Portfolio is the GEM2 estimation universe, which consists of the constituents of the MSCI All Country World Index (ACWI), part of the MSCI Global Investable Market Indices (GIMI) series, MSCI GCC Countries Index, and the MSCI China A Index, although the latter two are given less weight relative to the MSCI ACWI IMI. For more details, see Jose Menchero, Andrei Morozov, and Peter Shepard, "The Barra Global Equity Model (GEM2)," MSCI Barra Model Insights, September 2008, pp. 7-9.

Figure 1: Risk Forecasts Relative to Long-term Means (Global Portfolio; GEM2L)



Relating Risk to Factors

What relates to the deviations of risk from the long-term means? GEM2 allows us to investigate this question by breaking down the relationships by intuitive fundamental factors. Using the outputs of the GEM2L model, we examined which factor volatilities – industries, countries, currencies, and styles – have been most related to the global risk forecast since 1997. With weekly volatility data, we calculated percent changes from four weeks prior to each crisis for the global risk forecast, each of the style factors, the capitalization-weighted average industry factors, cap-weighted country factors, cap-weighted currency factors, and cap-weighted specific factors.[2] Table 2 provides these calculations for each of the five prior crises since 1997 as well as for the current crisis.

[2] The eight style factors are Volatility, Momentum, Size, Value, Growth, Non-linear Size, Liquidity and Leverage. See Menchero, Morozov and Shepard, pp. 13-15, for more details.

Table 2: Percent Change in Risk Forecast and Factor Volatilities from Four Weeks Prior to Each Crisis (GEM2L)

	11/14/1997	8/28/1998	4/14/2000	9/21/2001	8/17/2007	10/24/2008
Global Portfolio	18.5%	25.9%	14.2%	26.1%	20.3%	74.1%
Growth	-0.6%	3.0%	17.5%	-0.6%	9.0%	3.7%
Liquidity	17.1%	9.6%	0.8%	20.7%	21.6%	10.6%
Non-linear Size	-0.6%	1.4%	1.5%	-1.9%	6.5%	-2.2%
Size	1.1%	8.9%	12.2%	-2.4%	-1.0%	-1.3%
Value	-0.6%	-0.9%	26.1%	-1.6%	37.5%	5.1%
Leverage	3.8%	4.9%	9.2%	23.0%	3.9%	71.1%
Volatility	4.1%	25.3%	30.0%	3.3%	2.8%	48.1%
Momentum	7.6%	-2.0%	17.6%	-2.1%	19.7%	-0.8%
Average Industry	3.1%	4.3%	7.3%	4.1%	2.5%	9.4%
Average Country	0.0%	0.2%	2.0%	8.2%	15.6%	6.1%
Average Currency	1.7%	2.9%	-3.4%	1.4%	4.0%	28.2%
Average Specific	2.6%	0.9%	1.7%	-0.8%	4.2%	10.3%

As Table 2 shows, the prominence of factors changes over time; no one factor has dominated since 1997. For example, during the 1997 Asian crisis, the percent change in liquidity volatility was by far the largest of any factor in Table 2 (17%), although some of the individual currency factors were even larger at 66% for the Taiwanese Dollar and 55% for the Korean Won. A year later, during the LTCM crisis, volatility was largest (25%) and 2.5 times the percent change in liquidity; the Russian Ruble exhibited an astounding 485% change in August 1998. In the bursting of the internet bubble in April 2000, the most prominent factor was, again, volatility (30%) along with value (26%); no individual country, currency, or industry factor, including the internet factor, trumps these two style factors. In the 9/11 crisis, liquidity and leverage changed the most at 21% and 23%, respectively, although some of the individual industry factors, such as Airlines and Automobiles & Components, changed even more at 41% and 34%, respectively. In August 2007, value comes to the fore once more (37%) and is the second highest relative to all factors; the highest is 86% for the Kuwaiti Dinar, a pegged currency, which experienced a revaluation in August 2007.

In the current crisis, leverage and volatility figure most prominently with changes of 71% and 48%, respectively. These are the two largest changes considered in Table 2 and emphasize, once more, the special nature of the current risk environment. As with some of the prior crises, there are two individual currency factors that changed even more, namely the Mexican Peso at 134% and the Turkish Lira at 73%. But leverage remains third highest among all GEM2 factors and is itself 90% higher than prior changes during crises covered in Table 2.

Conclusions

The GEM2 model is designed to be more responsive to changes in the underlying risk environment. The events of recent months allow us to evaluate whether GEM2 performs as expected. We find that both the GEM2L and GEM2S are highly responsive to the extreme changes in risk we have experienced. Due to their responsiveness, the GEM2 results aid in assessing and quantifying the magnitude of those changes. October was highly unusual with a 74% increase in the global risk forecast, which was accompanied by a large 71% increase in the leverage volatility.

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