The Index Investor

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This Month's Issue: Key Points

This month's feature article extends our valuation model to emerging market equities. As usual, we start with the assumption that financial markets are a complex adaptive system that, while attracted to equilibrium and accurate fundamental valuation, are rarely in this state due to differences in the information investors possess, their varying capacity to make sense of it, and the emotional and social forces that influence their decisions. We review the writings of John Maynard Keynes, who has a similar view of markets that seems as timely today as it did when it first appeared in 1936. We then analyze the expected supply and demand for emerging market equity returns, focusing in particular on the controversial issues of how fast dividends might grow in the future, and the appropriate risk premium for this asset class. We conclude that, at the end of October 2008, emerging market equities were likely overvalued.

This month's product and strategy notes contain an assessment of the deflation risks we now face. We start with U.S. Treasury nominal and real yield curves, and find they imply a prolonged period of deflation. We then review the historical price record (from 1775 to 2007) in Sweden, the UK, and the US, and find that, while they have low correlations with each other, they contain very similar patterns of deflation, inflation and normal periods. We then examine

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Japanese data since 1980, and again find the same pattern of continuation and transition between deflationary, inflationary and normal states. This leads us to conclude that we indeed probably face significant deflation risks today. We then assess our current situation in light of historical lessons from other periods of deflation. We reach four key conclusions:

1. Historical data suggest that the risks of deflation may have been systematically underestimated by policymakers and investors.
2. That said, the deflation expectations implied by the current U.S. government yield curve appear to be excessive, given historic experience, unless one makes the further assumption that there is a high probability of serious policy errors being made by the United States and other countries.
3. While the immediate threat of a banking collapse and severe monetary contraction has been avoided, this is far from a full solution to the problem we confront.
4. The critical indicator of what lies ahead is likely to be what, if any, steps are taken to reduce household debt burdens. If a politically and economically acceptable way to accomplish this cannot be found, the probability of an extended deflationary depression significantly increases.

Other product and strategy notes review new research on the underlying causes of the U.S. housing crisis, the underwhelming performance of commodity trading advisors (CTAs), and the equally disappointing performance so far of carbon emissions credits as an asset class.

This Month's Letter to the Editor

Frankly, I'm a bit shell shocked by the events of the last two months. Where do we as investors go now?

First, you're not alone in your feelings. Even people who saw some type of crisis coming have been shocked by the ferocity with which it arrived – including us. That said, there are some basic rules for making good decisions in the face of high uncertainty and time pressure that have served us well over the years in different contexts. First, investors need to get their emotions back under control. One key to doing this is to stay focused on the goal or mission, so to speak. In the case of our readers, that mission is achieving one's retirement income and

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bequest goals (which our publications subdivide into accumulation and decumulation phases). Clarity about the mission enables you to turn away from undifferentiated and sometimes overwhelming feelings of panic and powerlessness, and focus on the next step: regaining your situational awareness, defining and assessing your options, and deciding which one to pursue and when to next assess your situation in light of your mission. For quite some time, we have stressed that this situation assessment has three main aspects: ensuring adequate liquidity for what may well be an extended downturn (given one's job risks and spending patterns), minimizing exposure to overvalued asset classes, and gradually implementing shifts to overweight positions in asset classes that appear undervalued. In addition to this, a broader situational assessment at this point might include a reexamination of assumptions about annual savings rates, when to retire, desired retirement income and bequest goals, and maximum acceptable risk (including the tradeoff between bequest and/or precautionary medical savings goals and the advantages of reducing longevity risk through the use of annuities). Our model portfolio calculators can be used to test different combinations of these variables (except for the annuitization decision, which we hope to add next year). While our tools will not provide a definitive answer, they will enable an investor to develop a clearer assessment of his or her situation and the potential impact of different decision options. From an emotional point of view, the very act of conducting this assessment – even if it simply clarifies the need to make decisions one would like to avoid – almost always causes feelings of panic to subside and be replaced with renewed, if sometimes grim, determination. As always, we are the first to stress that there are no magic bullet solutions to the problems facing many investors today. On the other hand, we also know from experience that a good plan, implemented with vigor and a willingness to adapt as circumstances require, will often produce much better results than a person or team initially expects.

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Global Asset Class Returns

YTD 31Oct08	In USD	In AUD	In CAD	In EURO	In JPY	In GBP	In CHF	In INR
Asset Held								
US Bonds	-1.91%	22.94%	16.92%	11.36%	-15.51%	16.92%	1.16%	18.38%
US Prop	-30.00%	-5.15%	-11.17%	-16.73%	-43.60%	-11.17%	-26.93%	-9.71%
US Equity	-32.88%	-8.03%	-14.05%	-19.61%	-46.48%	-14.05%	-29.81%	-12.59%
AUS Bonds	-13.36%	11.49%	5.47%	-0.10%	-26.96%	5.46%	-10.30%	6.93%
AUS Prop	-72.43%	-47.58%	-53.60%	-59.16%	-86.02%	-53.60%	-69.36%	-52.13%
AUS Equity	-47.99%	-23.14%	-29.16%	-34.72%	-61.58%	-29.16%	-44.92%	-27.69%
CAN Bonds	-17.42%	7.43%	1.41%	-4.16%	-31.02%	1.40%	-14.36%	2.87%
CAN Prop	-49.53%	-24.68%	-30.70%	-36.26%	-63.12%	-30.70%	-46.46%	-29.23%
CAN Equity	-42.09%	-17.24%	-23.26%	-28.82%	-55.69%	-23.26%	-39.02%	-21.79%
Euro Bonds	-9.25%	15.60%	9.58%	4.02%	-22.85%	9.58%	-6.18%	11.04%
Euro Prop.	-50.69%	-25.83%	-31.86%	-37.42%	-64.28%	-31.86%	-47.62%	-30.39%
Euro Equity	-49.78%	-24.93%	-30.95%	-36.51%	-63.38%	-30.95%	-46.71%	-29.49%
Japan Bnds	13.79%	38.65%	32.62%	27.06%	0.20%	32.62%	16.86%	34.09%
Japan Prop	-36.47%	-11.62%	-17.64%	-23.20%	-50.07%	-17.64%	-33.40%	-16.18%
Japan Eqty	-32.28%	-7.43%	-13.45%	-19.01%	-45.88%	-13.45%	-29.21%	-11.99%
UK Bonds	-16.75%	8.10%	2.08%	-3.49%	-30.35%	2.07%	-13.69%	3.54%
UK Prop.	-55.43%	-30.58%	-36.60%	-42.16%	-69.02%	-36.60%	-52.36%	-35.13%
UK Equity	-44.52%	-19.67%	-25.69%	-31.25%	-58.11%	-25.69%	-41.45%	-24.22%
World Bnds	-5.22%	19.64%	13.62%	8.05%	-18.81%	13.61%	-2.15%	15.08%
World Prop.	-44.71%	-19.86%	-25.88%	-31.44%	-58.31%	-25.88%	-41.64%	-24.42%
World Eqty	-38.87%	-14.01%	-20.03%	-25.60%	-52.46%	-20.04%	-35.80%	-18.57%
Commod	-28.06%	-3.21%	-9.23%	-14.79%	-41.66%	-9.23%	-24.99%	-7.77%
Timber	-19.44%	5.41%	-0.61%	-6.17%	-33.04%	-0.61%	-16.37%	0.85%
EqMktNtrl	-11.92%	12.93%	6.91%	1.35%	-25.52%	6.91%	-8.85%	8.37%
Volatility	166.18%	191.03%	185.01%	179.45%	152.58%	185.01%	169.25%	186.47%
Currency								
AUD	-24.85%	0.00%	-6.02%	-11.58%	-38.45%	-6.02%	-21.78%	-4.56%
CAD	-18.83%	6.02%	0.00%	-5.56%	-32.43%	0.00%	-15.76%	1.46%
EUR	-13.27%	11.58%	5.56%	0.00%	-26.86%	5.56%	-10.20%	7.03%
JPY	13.60%	38.45%	32.43%	26.86%	0.00%	32.42%	16.66%	33.89%
GBP	-18.83%	6.02%	0.00%	-5.56%	-32.42%	0.00%	-15.76%	1.47%
USD	0.00%	24.85%	18.83%	13.27%	-13.60%	18.83%	3.07%	20.29%
CHF	-3.07%	21.78%	15.76%	10.20%	-16.66%	15.76%	0.00%	17.23%
INR	-20.29%	4.56%	-1.46%	-7.03%	-33.89%	-1.47%	-17.23%	0.00%

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Asset Class Valuation Update

Our market valuation analyses are based on the belief that financial markets are complex adaptive systems, in which prices and returns emerge from the interaction of multiple rational, emotional and social processes. We further believe that while this system is attracted to equilibrium, it is generally not in this state. To put it differently, we believe it is possible for the supply of future returns a market is expected to provide to be higher or lower than the returns investors logically demand, resulting in over or undervaluation. The attraction of the system to equilibrium means that, at some point, these situations are likely to reverse. However, the complex adaptive nature of the system means that it is difficult if not impossible to accurately forecast how and when such reversals will occur. Yet that does not mean that valuation analyses are a fruitless enterprise. Far from it. For an investor trying to achieve a multiyear goal (e.g., accumulating a certain amount of capital in advance of retirement, and later trying to preserve the real value of that capital as one generates income from it), avoiding large downside losses is mathematically more important than reaching for the last few basis points of return. Investors who use valuation analyses to help them limit downside risk when an asset class appears to be substantially overvalued can materially increase the probability that they will achieve their long term goals.

We also believe that the use of a consistent quantitative approach to assessing asset class valuation helps to overcome normal human tendencies towards over-optimism, overconfidence, wishful thinking, and other biases that can cause investors to make decisions they later regret. Finally, we stress that our monthly market valuation update is only a snapshot in time, and says nothing about whether apparent over and undervaluations will become more extreme or reverse.

In the case of an equity market, we define the future supply of returns to be equal to the current dividend yield plus the rate at which dividends are expected to grow in the future. We define the return investors demand as the current yield on real return government bonds plus an equity market risk premium. As described in this month's feature article, people can and do disagree about the "right" values for these variables. Recognizing this, we present four valuation scenarios for an equity market, based on different values for three key variables. First, we use both the current dividend yield and the dividend yield adjusted upward by .50% to

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reflect share repurchases. Second, we define future dividend growth to be equal to the long-term rate of total (multifactor) productivity growth. For this variable, we use two different values, 1% or 2%. Third, we also use two different values for the equity risk premium required by investors: 2.5% and 4.0%. Different combinations of all these variables yield high and low scenarios for both the future returns the market is expected to supply (dividend yield plus growth rate), and the future returns investors will demand (real bond yield plus equity risk premium). We then use the dividend discount model to combine these scenarios, to produce four different views of whether an equity market is over, under, or fairly valued today. The specific formula is (Current Dividend Yield x 100) x (1+ Forecast Productivity Growth) divided by (Current Yield on Real Return Bonds + Equity Risk Premium - Forecast Productivity Growth). Our valuation estimates are shown in the following tables, where a value greater than 100% implies overvaluation, and less than 100% implies undervaluation. In our view, the greater the number of scenarios that point to overvaluation or undervaluation, the greater the probability that is likely to be the case.

Equity Market Valuation Analysis at 31 Oct 2008

Australia	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	48%	70%
Low Supplied Return	68%	92%

Canada	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	84%	126%
Low Supplied Return	132%	181%

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Eurozone	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	57%	81%
Low Supplied Return	80%	106%

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Japan	Low Demanded Return	High Demanded Return
High Supplied Return	113%	159%
Low Supplied Return	172%	227%

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United Kingdom	Low Demanded Return	High Demanded Return
High Supplied Return	36%	61%
Low Supplied Return	59%	87%

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United States	Low Demanded Return	High Demanded Return
High Supplied Return	125%	171%
Low Supplied Return	186%	241%

Switzerland	Low Demanded Return	High Demanded Return
High Supplied Return	37%	69%
Low Supplied Return	66%	153%

India	Low Demanded Return	High Demanded Return
High Supplied Return	54%	118%
Low Supplied Return	125%	206%

In our view, the key point to keep in mind with respect to equity market valuations is the level of the current dividend yield, which history has shown to be the key driver of long-term real equity returns in most markets. The recent increase in uncertainty has undoubtedly increased many investors' required risk and uncertainty premium above the long-term average, while simultaneously decreasing their long-term real growth forecasts. The net result has been a sharp fall in equity prices that has caused dividend yields to increase. From the perspective of an investor with long-term risk and growth assumptions in the range we use in our model, this increase in dividend yields has more than offset the simultaneous rise in real bond yields, and caused at least some equity markets to appear undervalued.

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Our government bond market valuation update is based on the same supply and demand methodology we use for our equity market valuation update. In this case, the supply of future fixed income returns is equal to the current nominal yield on ten-year government bonds. The demand for future returns is equal to the current real bond yield plus historical average inflation between 1989 and 2003. To estimate of the degree of over or undervaluation for a bond market, we use the rate of return supplied and the rate of return demanded to calculate the present values of a ten year zero coupon government bond, and then compare them. If the rate supplied is higher than the rate demanded, the market will appear to be undervalued. This information is contained in the following table:

Bond Market Analysis as of 31Oct08

	Current Real Rate	Average Inflation Premium (89-03)	Required Nominal Return	Nominal Return Supplied (10 year Govt)	Return Gap	Asset Class Over or (Under) Valuation, based on 10 year zero
Australia	2.70%	2.96%	5.66%	5.18%	-0.48%	4.64%
Canada	2.49%	2.40%	4.89%	3.77%	-1.12%	11.38%
Eurozone	3.12%	2.37%	5.49%	3.91%	-1.58%	16.25%
Japan	3.19%	0.77%	3.96%	1.49%	-2.47%	27.20%
UK	1.64%	3.17%	4.81%	4.53%	-0.28%	2.69%
USA	3.57%	2.93%	6.50%	3.96%	-2.54%	27.25%
Switz.	1.18%	2.03%	3.21%	2.78%	-0.43%	4.26%
India	1.79%	7.57%	9.36%	7.69%	-1.67%	16.64%

*Derived from ten year yield and forecast inflation

It is important to note some important limitations of this analysis. Our bond market analysis uses historical inflation as an estimate of expected future inflation. This may not produce an accurate valuation estimate, if the historical average level of inflation is not a good predictor of average future inflation levels. The following table, which shows historical average inflation rates (and their standard deviations) for the U.K. and U.S. over longer periods of time than the ones we have used, helps to put the possible size of any estimation and valuation errors into context:

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	U.K.	***U.S.***
Avg. Inflation, 1775-2007	2.19%	1.62%
Standard Deviation	6.60%	6.51%
Avg. Inflation, 1908-2007	4.61%	3.29%
Standard Deviation	6.24%	5.03%
Avg. Inflation, 1958-2007	5.98%	4.11%
Standard Deviation	5.01%	2.84%

If future inflation is expected to be lower than the inflation assumption we have used in our valuation analysis, then required returns should be lower. All else being equal, this would reduce any estimated overvaluation. In this regard, the difference between yields on ten year U.S. government nominal and inflation linked bonds is about one percent, is a rough proxy for the expected future rate of inflation (we say rough because it technically includes not only the expected inflation rate, but also a further premium for inflation risk). This value is currently well below the average historical rate of inflation we have used in our analysis.

Let us now move on to a closer look at the current level of real interest rates. Over the past forty years or so, this has averaged around 3.00% in the United States. Theoretically, the "natural" or equilibrium real rate of interest is a function of three variables: (1) the expected rate of multifactor productivity growth (as it increases, so to should the demand for investment, which, given a fixed amount of saving, will tend to raise the real rate); (2) risk aversion (as investors become more risk averse they save more, which should reduce the real rate of interest, all else being equal); and (3) the time discount rate, or the rate at which investors are willing to trade off consumption today against consumption in the future. A higher discount rate generally reflects a greater desire to consume today rather than waiting (as consumption today becomes relatively more important, savings decline, which should cause the real rate to increase). However, in the case of a so-called "uncertainty shock" (see "The Impact of Uncertainty Shocks" by Nicholas Bloom), a sharp rise in the time discount rate might also reflect a desire to hold greater than normal amounts of cash. The stability of risk aversion and the time discount rate, and the relationship between them, remain subjects of great controversy in economics. Clearly, investor behavior varies across individuals within in a single period and over time for both individuals and groups. The controversial issue is what exactly it is that

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motivates the observed changes in behavior – is it a change in risk preferences, in the time discount rate, or both (in which case, it is generally thought the two preferences are negatively correlated, with rising risk aversion associated with a longer time horizon and thus a lower time discount rate).

All three of these variables can only be estimated with uncertainty. For example, a time discount rate of 2.0% and risk aversion factor of 4 are considered to be average, but studies show that there is wide variation within the population and across the studies themselves. The analysis in the following table starts with current real return bond yields and the OECD's estimates of total factor productivity growth between 1995 and 2006 (with France and Germany proxying for the Eurozone). We assume that risk aversion is constant across time, and that changes in observed real bond yields reflect changes in the time discount rate. Given risk aversion and expected total factor productivity growth, as well as the observed yield on real return bonds, we can then back out the time discount rate (hence the change in the real interest rate from month to month is equal to the change in the underlying time discount rate).

Real Interest Rate Analysis at 31Oct08

Currency Zone	AUD	CAD	EUR	JPY	GBP	USD
Risk Aversion	4.0	4.0	4.0	4.0	4.0	4.0
TFP Growth	1.20%	1.00%	1.20%	1.20%	1.20%	1.20%
Actual Real Rate	2.70%	2.49%	3.12%	3.19%	1.64%	3.57%
Estimated Time Discount Rate This Month	2.40%	2.24%	2.82%	2.89%	1.34%	3.27%
Time Discount Rate Last Month	1.60%	1.97%	2.04%	1.62%	0.66%	2.08%
Change	***0.80%***	***0.27%***	***0.78%***	***1.27%***	***0.68%***	***1.19%***

As you can see, the past month has seen a sharp increase in real rates in all regions. Our interpretation is that this reflects the impact of an uncertainty shock and a consequent increase in the demand for liquidity. A possible alternative explanation is an anticipated fall in the global supply of savings, which logically would be driven by an increase in Chinese consumption. However, the latter seems a much more tenuous explanation than the serious shocks that hit the world's financial system over the past six weeks. Our expectation is that in the near term real rates should fall, for two reasons. First, the uncertainty shock should dissipate relatively quickly, assuming the success of government interventions to support the banking

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system. Second, this should focus investor's attention on declining consumer spending in the United States, and a consequent fall in investment spending around the world. Absent a clear indication that global savings will decline by a greater amount (e.g., due to a rise in Chinese consumption spending and/or a sharp fall in oil prices), this expected fall in investment spending should cause real rates to decline, not rise, in the absence of an increased demand for liquidity. Finally, we also expect yields on real return bonds to decline as investors bid up their price, after realizing that the long term implication of the current government interventions is likely to be higher inflation.

Let us now turn to the subject of the valuation of non-government bonds. Some have suggested that it is useful to decompose the bond yield spread into two parts. The first is the difference between the yield on AAA rated bonds and the yield on the ten year Treasury bond. Because default risk on AAA rated companies is very low, this spread may primarily reflect prevailing liquidity and jump (regime shift) risk conditions (e.g., between a low volatility, relatively high return regime, and a high volatility, lower return regime). The second is the difference between BBB and AAA rated bonds, which may tell us more about the level of compensation required by investors for bearing relatively high quality credit risk. For example, between August and October, 1998 (around the time of the Russian debt default and Long Term Capital Management crises), the AAA-Treasury spread jumped from 1.18% to 1.84%, while the BBB-AAA spread increased by much less, from .62% to .81%. This could be read as an indication of investor's higher concern with respect to the systematic risk implications of these crises (i.e., their potential to shift the financial markets into the low return, high volatility regime), and lesser concern with respect to their impact on the overall pricing of credit risk.

The following table shows the average level of these spreads between January, 1970 and December, 2005 (based on monthly Federal Reserve data), along with their standard deviations and 67% (average plus or minus one standard deviation) and 95% (average plus or minus two standard deviations) confidence range (i.e., based on historical data, 95% of the time you would expect the current spreads to be within two standard deviations of the long term average).

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	AAA – 10 Year Treasury	BBB-AAA
Average	.97%	1.08%
Standard Deviation	.47%	.42%
Avg. +/- 1 SD	1.44% - .50%	1.51% - .66%
Avg. +/- 2 SD	1.91% - .03%	1.93% - .23%

At **31 October 2008**, the AAA minus 10 year Treasury spread was 2.58%. This is an extraordinary 3.4 standard deviations above the long-term average compensation for bearing liquidity and jump risk (assuming our model is correct), and reflects continuing and severe investor concerns about the problems that have roiled the fixed income markets since August 2007 and have yet to fully abate. However, if one expects that they will eventually abate, then the current AAA spread could represent a historic opportunity for investors.

At the end of the month, the BBB minus AAA spread was 3.00%. This is also an unprecedented 4.6 standard deviations above the long-term average compensation for bearing credit risk. However, as conditions in the real economy continue to deteriorate, it may well be the case that this represents reasonable compensation for bearing relatively high quality credit risk under the current circumstances.

For an investor contemplating the purchase of foreign bonds or equities, the expected future annual percentage change in the exchange rate is also important. Study after study has shown that there is no reliable way to forecast this, particularly in the short term. At best, you can make an estimate that is justified in theory, knowing that in practice it will not turn out to be accurate. That is what we have chosen to do here. Specifically, we have taken the difference between the yields on ten-year government bonds as our estimate of the likely future annual change in exchange rates between two regions. According to theory, the currency with the relatively higher interest rates should depreciate versus the currency with the lower interest rates. Of course, in the short term this often doesn't happen, which is the premise of the popular hedge fund "carry trade" strategy of borrowing in low interest rate currencies, investing in high interest rate currencies, and, essentially, betting that the change in exchange rates over the holding period for the trade won't eliminate the potential profit. Because (as noted in our

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June 2007 issue) there are some important players in the foreign exchange markets who are not profit maximizers, carry trades are often profitable, at least over short time horizons. Our expected medium to long-term changes in exchange rates are summarized in the following table:

Annual Exchange Rate Changes Implied by Bond Market Yields on 31Oct08

	To AUD	**To CAD**	**To EUR**	**To JPY**	**To GBP**	**To USD**	**To CHF**	**To INR**
From								
AUD	0.00%	-1.41%	-1.27%	-3.69%	-0.65%	-1.22%	-2.40%	2.51%
CAD	1.41%	0.00%	0.14%	-2.28%	0.76%	0.19%	-0.99%	3.92%
EUR	1.27%	-0.14%	0.00%	-2.42%	0.62%	0.05%	-1.13%	3.78%
JPY	3.69%	2.28%	2.42%	0.00%	3.04%	2.47%	1.29%	6.20%
GBP	0.65%	-0.76%	-0.62%	-3.04%	0.00%	-0.57%	-1.75%	3.16%
USD	1.22%	-0.19%	-0.05%	-2.47%	0.57%	0.00%	-1.18%	3.73%
CHF	2.40%	0.99%	1.13%	-1.29%	1.75%	1.18%	0.00%	4.91%
INR	-2.51%	-3.92%	-3.78%	-6.20%	-3.16%	-3.73%	-4.91%	0.00%

Our approach to valuing commercial property securities as an asset class is also based on the expected supply of and demand for returns. As with equities, the supply of returns equals the current dividend yield plus the expected real growth rate of net operating income (NOI). A number of studies have found that real NOI growth has been basically flat over long periods of time (with apartments showing the strongest rates of real growth). This is in line with what economic theory predicts, with rapid increases in rent attracting new property investors, finance the construction of new space which, when it comes onto the market, causes rents to fall. Our analysis also assumes that investors require a 2.5% risk premium above the yield on real return bonds as compensation for bearing the risk of securitized commercial property as an asset class. Last but not least, there is significant research evidence that commercial property markets are frequently out of equilibrium, due to the interaction between fundamental factors and investors' emotions (see, for example, "Investor Rationality: An Analysis of NCREIF Commercial Property Data" by Hendershott and MacGregor; "Real Estate Market Fundamentals and Asset Pricing" by Sivitanides, Torto, and Wheaton; "Expected Returns and Expected Growth in Rents of Commercial Real Estate" by Plazzi, Torous, and Valkanov; and "Commercial Real Estate

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Valuation: Fundamentals versus Investor Sentiment" by Clayton, Ling, and Naranjo). Hence, it is extremely hard to forecast how long it will take for any over or undervaluations we identify to be reversed. The following table shows the results of this month's valuation analysis:

Country	Dividend Yield	Plus LT Real Growth Rate	Equals Supply of Returns	Real Bond Yield	Plus LT Comm Prop Risk Premium	Equals Returns Demanded	Over or Undervaluation (100% = Fair Value)
Australia	12.1%	0.2%	12.3%	2.7%	2.5%	5.2%	41.1%
Canada	8.0%	0.2%	8.2%	2.5%	2.5%	5.0%	60.2%
Eurozone	9.2%	0.2%	9.4%	3.1%	2.5%	5.6%	58.8%
Japan	3.7%	0.2%	3.9%	3.2%	2.5%	5.7%	146.3%
Switzerland	1.2%	0.2%	1.4%	1.2%	2.5%	3.7%	278.0%
United Kingdom	7.1%	0.2%	7.3%	1.6%	2.5%	4.1%	55.7%
United States	7.4%	0.2%	7.6%	3.6%	2.5%	6.1%	78.6%

Let us now turn to the Dow Jones AIG Commodity Index, our preferred benchmark for this asset class because of the roughly equal weights it gives to energy, metals and agricultural products. One of our core assumptions is that financial markets function as a complex adaptive system which, while attracted to equilibrium (which generates mean reversion) are seldom in it. To put it differently, we believe that investors' expectations for the returns an asset class is expected to supply in the future are rarely equal to the returns a rational long-term investor should logically demand. Hence, rather than being exceptions, over and undervaluations of different degrees are simply a financial fact of life. We express the demand for returns from an asset class as the current yield on real return government bonds (ideally of intermediate duration) plus an appropriate risk premium. While the former can be observed, the latter is usually the subject of disagreement. In determining the risk premium to use, we try to balance a variety of inputs, including historical realized premiums (which may differ considerably from those that were expected, due to unforeseen events), survey data and academic theory (e.g., assets that payoff in inflationary and deflationary states should command a lower risk premium than those whose payoffs are highest in "normal" periods of steady growth and modest changes in the price level). In the case of commodities, Gorton and Rouwenhorst (in their papers "Facts and Fantasies About Commodity Futures" and "A Note on Erb and Harvey") have shown that

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(1) commodity index futures provide a good hedge against unexpected inflation; (2) they also tend to hedge business cycle risk, as the peaks and troughs of their returns tend to lag behind those on equities (i.e., equity returns are leading indicators, while commodity returns are coincident indicators of the state of the real business cycle); and (3) the realized premium over real bond yields has historically been on the order of four percent. We are inclined to use a lower ex-ante risk premium in our analysis (though reasonable people can still differ about what it should be), because of the hedging benefits commodities provide relative to equities. This is consistent with the history of equities, where realized ex-post premiums have been shown to be larger than the ex-ante premiums investors should logically have expected.

The general form of the supply of returns an asset class is expected to generate in the future is its current yield (e.g., the dividend yield on equities), plus the rate at which this stream of income is expected to grow in the future. The key challenge with applying this framework to commodities is that the supply of commodity returns doesn't obviously fit into this framework. Broadly speaking, the supply of returns from an investment in commodity index futures comes from four sources. Since commodity index funds are fully collateralized investments, the first source of return is the yield on the cash that is received by the fund by not used to purchase commodity futures (which can be bought for a fraction of their face value). We conservatively assume that about 20% of funds are used to purchase futures, and 80% is invested in real return bonds.

The second source of return is the so-called "roll yield." Operationally, a commodity index fund buys futures contracts in the most liquid part of the market, which is usually limited to the near term. As these contracts near their expiration date, they are sold and replaced with new futures contracts. For example, a fund might buy contracts maturing in two or three months, and sell them when they approached maturity. The "roll yield" refers to the gains and losses realized by the fund on these sales. If spot prices (i.e., the price to buy the physical commodity today, towards which futures prices will move as they draw closer to expiration) are higher than two or three month futures, the fund will be selling high and buying low, and thus earning a positive roll yield. When a futures market is in this condition, it is said to be in "backwardation." On the other hand, if the spot price is lower than the two or three month's futures price, the market is said to be in "contango" and the roll yield will be negative (i.e., the fund will sell low and buy high). The interesting issue is what causes a commodity to be either

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backwardated or contangoed. A number of theories have been offered to explain this phenomenon. The one that seems to have accumulated the most supporting evidence to date is the so-called "Theory of Storage": begins with the observation that, all else being equal, contango should be the normal state of affairs, since a person buying a commodity at spot today and wishing to lock in a profit by selling a futures contract will have to incur storage and financing costs. In addition to his or her profit margin, storage and financing costs should cause the futures price to be higher than the spot price, and normal roll yields to be negative.

However, in the real world, all things are not equal. For example, some commodities are very difficult or expensive to store; others have very high costs if you run out of them (e.g., because of rapidly rising demand relative to supply, or a potential disruption of supply). For these commodities, there may be a significant option value to holding the physical product (the Theory of Storage refers to this option value as the "convenience yield"). If this option value is sufficiently high, spot prices may be bid up above futures prices, causing "backwardation" and positive roll-yields for commodity index funds. Hence, a key question is the extent to which different commodities within a given commodity index tend to be in backwardation or contango over time. Historically, most commodities have spent time n in both states. However, contango has generally been more common, but not equally so for all commodities. For example, oil has spent relatively more time in backwardation, as have copper, sugar, soybean meal and lean hogs. This highlights a key point about commodity futures index funds – because of the critical impact of the commodities they include, the weights they give them, and their rebalancing and rolling strategies, they are, in effect, uncorrelated alpha strategies. Moreover, because of changing supply and demand conditions in many commodities (e.g., global demand has been growing, while marginal supplies are more expensive to develop and generally have long lead times), it is not clear that historical tendencies toward backwardation or contango are a good guide to future conditions. To the extent that any generalizations can be made, higher real option values, and hence backwardation and positive roll returns are more likely to be found when demand is strong and supplies are tight, and/or when there is a rising probability of a supply disruption in a commodity where storage is difficult. For example, ten commodities make up roughly 75% of the value of the Dow Jones AIG Commodities Index. The current term structures of their futures curves are as follows:

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Commodity	2009 DJAIG Weight	Current Status
Crude Oil	13.8%	Contango
Natural Gas	11.9%	Contango
Gold	7.9%	Backwardated
Soybeans	7.6%	Contango
Copper	7.3%	Contango
Aluminum	7.0%	Contango
Corn	5.7%	Contango
Wheat	4.8%	Contango
Live Cattle	4.3%	Contango
Unleaded Gasoline	3.7%	Contango
	74.0%	

Given the prevalence of contangoed futures curves, in the near term (i.e., the next three months), roll returns on the DJAIG should be negative, absent major supply side shocks.

The third source of commodity futures return is unexpected changes in the price of the commodity during the term of the futures contract. It is important to stress that the market's consensus about the expected change in the spot price is already included in the futures price. The source of return we are referring to here is the unexpected portion of the actual change. Again, large surprises seem more likely when supply and demand and finely balanced – the same conditions which can also give rise to changes in real option values and positive roll returns. At the present time, with economic growth weakening, demand is falling across a wide range of commodities. Hence, the source of any surprising price increases must be a changes in expected supply that either occur suddenly and are extremely hard to forecast (e.g., a weather or terrorist related incident) or changes that investors may have not yet fully incorporated into their valuation models (e.g., the faster than expected decline in oil production from current reservoirs). This return driver probably offers investors the best chance of making profitable forecasts, since most human beings find it extremely difficult to accurately understand situations where cause and effect are significantly separated in time (e.g., failure to recognize how fast rising house prices would – albeit with a time delay – trigger an enormous increase in new supply).

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The fourth source of returns for a diversified commodity index fund is generated by rebalancing a fund's portfolio of futures contracts back to their target commodity weightings as prices change over time. This is analogous to an equity index having a more attractive risk/return profile than many individual stocks. This rebalancing return will be higher to the extent that price volatilities are high, and the correlations of price changes across commodities are low. Historically, this rebalancing return has been estimated to be around 2% per year, for an equally weighted portfolio of different commodities. However, as correlations have risen in recent years, the size of this return driver has probably declined – say to 1% per year.

So, to sum up, the expected supply of returns from a commodity index fund over a given period of time equals (1) the current yield on real return bonds, reduced by the percentage of funds used to purchase the futures contracts; (2) expected roll yields, adjusted for commodities' respective weights in the index; (3) unexpected spot price changes; and (4) the expected rebalancing return. Of these, the yield on real return bonds can be observed, and we can conservatively assume a long-term rebalancing return of, for example, 1.0%. These two sources of return are clearly less than the demand for returns that are equal to the real rate plus a risk premium of, say, 3.0%. The difference must be made up by a combination of roll returns (which, given the current shape of futures curves, are likely to be negative in the near term) and unexpected price changes, due to sudden changes in demand (where downside surprises currently seem more likely than upside surprises) and/or supply (where the best chance of a positive return driver seems to be incomplete investor recognition of slowing oil production from large reservoirs).

Another approach to assessing the valuation of commodities as an asset class is to compare the current value of the DJAIG Index to its long-term average. Between 1991 and 2005 period, the DJAIG had an average value of 107.6, with a standard deviation of 21.9. The **31 October 2008** closing value of 131.97 was about one standard deviation above the long term average (assuming the value of the index is normally distributed around its historical average, a value within one standard deviation of the average should occur about 67% of the time). So on this basis, and in light of the continuing deterioration of global economic demand, the best that one can say is that commodities might possibly still be overvalued. That said, it may also be the case that, because of structural changes in the world economy, the past behavior of this index may not be a good guide to the future. We still appear to be in

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unchartered territory today, whether due to speculation, a collective fear of high future inflation and/or a substantial decline in the value of the U.S. dollar versus many other currencies, and/or fundamental structural changes in supply and demand conditions in many commodity markets (e.g., the peak oil thesis, changing diets, and the increasing use of agricultural commodities for fuel as well as food, and/or a slow response of supply to increases in demand).

Our approach to assessing the current valuation of timber is based on two publicly traded timber REITS: Plum Creek (PCL) and Rayonier (RYN). As in the case of equities, we compare the return these are expected to supply (defined as their current dividend yield plus the expected growth rate of those dividends) to the equilibrium return investors should rationally demand for holding timber assets (defined as the current yield on real return bonds plus an appropriate risk premium for this asset class). Two of these variables are published: the dividend yields on the timber REITS and the yield on real return bonds. The other two variables have to be estimated, which presents a particularly difficult challenge with respect to the rate at which dividends will grow in the future.

In broad terms, the rate of dividend growth results from the interaction of physical, and economic processes. In the first part of the physical process, trees grow, adding a certain amount of mass each year. The exact rate depends on the mix of trees (e.g., southern pine grows much faster than northern hardwoods), on silviculture techniques employed (e.g., fertilization, thinning, etc.), and weather and other natural factors (e.g., fires, drought, and beetle invasions). In the second part of the physical process, a certain amount of trees are harvested each year, and sold to provide revenue to the timber REIT. In the economic area, three processes are important, As trees grow, they can be harvested to make increasingly valuable products, starting with pulpwood when they are young, and sawtimber when they reach full maturity. This value increasing process is known as "in-growth." The speed and extent to which in-growth increased value depends on the type of tree; in general, this process produces greater value growth for hardwoods (whose physical growth is slower) than it does for pines and other fast-growing softwoods. The second economic process (or, more accurately, processes) is the interaction of supply and demand that determines changes in real prices for pulpwood, sawtimber and other forest products. As is true in the case of commodities, there is likely to be an asymmetry at work with respect to the impact of these processes, with prices reacting more quickly to more visible changes in demand, while changes in supply side factors (which only happen with a significant time delay) are more likely to generate surprises. In North America., a good example of this may be the eventual supply side and price impact of the mountain pine beetle epidemic that has been spreading through the northwestern forests of the United States and Canada.

The IMF produces a global timber price index that captures the net impact of demand and supply fluctuations, which is further broken down into hardwood and softwood. The average annual

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change in real prices (derived by adjusting the IMF series for changes in U.S. inflation) between 1981 and 2007 are shown in the following table:

	Average	**Standard Deviation**
Hardwood	0.4%	11.8%
Softwood	1.7%	21.6%
All Timber	0.1%	9.2%

As you can see, over the long term, prices have been quite stable in real terms, though with a high level of volatility from year to year (and additional volatility across different regional markets). The final economic process that affects the growth rate of dividends is changes in the REIT's cost structure, and non-timber related revenue streams (e.g., from selling timber land for real estate development). With respect to the latter, the potential imposition of carbon taxes or cap and trade systems for carbon emissions could provide a new source of revenue for timber REITs in the future.

The following table summarizes the assumptions we make about these physical and economic variables in our valuation model:

Growth Driver	**Assumption**
Biological growth of trees	We assume 6% as the long term average for a diversified timberland portfolio.
Harvesting rate	As a long term average, we assume that 5% of tree volume is harvested each year.
In-growth of trees	We assume this adds 3% per year to the value of timber assets, assuming no change in the real price of pulpwood, sawtimber and other final products.
Change in prices of timber products	We assume that over the long term prices will just keep pace with inflation.
Carbon credits	We assume no additional return from this potential source of value.

This leaves the question of the appropriate return premium to assume for the overall risk of investing in timber as an asset class. Historically, the difference between returns on the NCRIEF timberland index and those on real return bonds has averaged around six percent. However, since the timber REITS are much more liquid than the properties included in the

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NCRIEF index, we have used four percent as the required return premium for investing in liquid timberland assets. Arguably, this may still be too high, as timber is an asset class whose return generating process (being partially biologically driven) has a low correlation with returns on other asset class. Hence, it should provide strong diversification benefits to a portfolio when they are most needed, and investors should therefore require a relatively low risk premium to hold this asset class.

Given these assumptions, our assessment of the valuation of the timber asset class at **31 October 2008** is as follows:

Average Dividend Yield	5.50%
Plus Long Term Annual Biological Growth	6.00%
Less Percent of Physical Timber Stock Harvested Each Year	(5.00%)
Plus Average Annual Increase in Stock Value due to In-growth	3.00%
Plus Long Term Real Annual Price Change	0.00%
Plus Other Sources of Annual Value Increase (e.g., Carbon Credits)	0.00%
Equals Average Annual Real Return Supplied	**9.50%**
Real Bond Yield	3.57%
Plus Risk Premium for Timber	4.00%
Equals Average Annual Real Return Demanded	**7.57%**
Ratio of Returns Demanded/Returns Supplied Equals Valuation Ratio (less than 100% implies undervaluation)	**81%**

Our approach to assessing the current value of equity market volatility (as measured by the VIX index, which tracks the level of S&P 500 Index volatility implied by the current pricing of put and call options on this index) is similar to our approach to commodities. Between January 2, 1990 and December 30, 2005, the average value of the VIX Index was 19.45, with a standard deviation of 6.40. The one standard deviation (67% confidence interval) range was 13.05 to 28.85, and the two standard deviations (95% confidence) range was from 6.65 to 32.25. On **31 October 2008**, the VIX closed at 59.89, more than six standard

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deviations above its historical average. This seems in line with the high degree of uncertainty that currently exists in financial markets and the world economy, and as a result, it is hard to say whether Volatility is under or overvalued today. In this case, an investor's valuation view fundamentally depends on his or her view of the likelihood that the current economic shock will be reversed before the downturn becomes self-sustaining, and much harder to turn around.

Sector and Style Rotation Watch

The following table shows a number of classic style and sector rotation strategies that attempt to generate above index returns by correctly forecasting turning points in the economy. This table assumes that active investors are trying to earn high returns by investing today in the styles and sectors that will perform best in the next stage of the economic cycle. The logic behind this is as follows: Theoretically, the fair price of an asset (also known as its fundamental value) is equal to the present value of the future cash flows it is expected to produce, discounted at a rate that reflects their relative riskiness.

Current economic conditions affect the current cash flow an asset produces. Future economic conditions affect future cash flows and discount rates. Because they are more numerous, expected future cash flows have a much bigger impact on the fundamental value of an asset than do current cash flows. Hence, if an investor is attempting to earn a positive return by purchasing today an asset whose value (and price) will increase in the future, he or she needs to accurately forecast the future value of that asset. To do this, he or she needs to forecast future economic conditions, and their impact on future cash flows and the future discount rate. Moreover, an investor also needs to do this before the majority of other investors reach the same conclusion about the asset's fair value, and through their buying and selling cause its price to adjust to that level (and eliminate the potential excess return).

We publish this table to make an important point: there is nothing unique about the various rotation strategies we describe, which are widely known by many investors. Rather, whatever active management returns (also known as "alpha") they are able to generate is directly related to how accurately (and consistently) one can forecast the turning points in the economic cycle. Regularly getting this right is beyond the skills of most investors. In other words, most of us are better off just getting our asset allocations right, and implementing them

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via index funds rather than trying to earn extra returns by accurately forecasting the ups and downs of different sub-segments of the U.S. equity and debt markets (for more on this, see "Sector Rotation Over Business Cycles" by Stangl, Jacobsen, and Visaltanachoti and "Can Exchange Traded Funds Be Used to Exploit Industry Momentum?" by Swinkels and Tjong-A-Tjoe).

That being said, the highest rolling three month returns in the table do provide us with a rough indication of how investors expect the economy and interest rates to perform in the near future. *The highest returns in a given row indicate that a plurality of investors (as measured by the value of the assets they manage) are anticipating the economic and interest rate conditions noted at the top of the next column* (e.g., if long maturity bonds have the highest year to date returns, a plurality of bond investor opinion expects rates to fall in the near future). Comparing returns across strategies provides a rough indication of the extent of agreement (or disagreement) investors about the most likely upcoming changes in the state of the economy. When the rolling returns on different strategies indicate different conclusions about the most likely direction in which the economy is headed, we place the greatest weight on bond market indicators. Why? We start from a basic difference in the psychology of equity and bond investors. The different risk/return profiles for these two investments produce a different balance of optimism and pessimism. For equities, the downside is limited (in the case of bankruptcy) to the original value of the investment, while the upside is unlimited. This tends to produce an optimistic view of the world. For bonds, the upside is limited to the contracted rate of interest and getting your original investment back (assuming the bonds are held to maturity). In contrast, the downside is significantly greater – complete loss of principal. This tends to produce a more pessimistic (some might say realistic) view of the world. As we have written many times, investors seeking to achieve a funding goal over a multi-year time horizon, avoiding big downside losses is arguably more important than reaching for the last few basis points of return. Bond market investors' perspective tends to be more consistent with this view than equity investors' natural optimism. Hence, when our rolling rotation returns table provides conflicting information, we tend to put the most weight on bond investors' implied expectations for what lies ahead.

Three Month Rolling Nominal Returns on Classic Rotation Strategies in the U.S. Markets

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Rolling 3 Month Returns Through	***31Oct08***			
Economy	Bottoming	Strengthening	Peaking	Weakening
Interest Rates	Falling	Bottom	Rising	Peak
Style and Size Rotation	Small Growth (DSG) **-32.51%**	Small Value (DSV) **-22.57%**	Large Value (ELV) **-21.84%**	Large Growth (ELG) **-25.91%**
Sector Rotation	Cyclicals (IYC) **-19.52%**	Industrials (IYJ) **-29.64%**	Staples (IYK) **-14.69%**	Utilities (IDU) **-22.81%**
Bond Market Rotation	Higher Risk (HYG) **-20.65%**	Short Maturity (SHY) **2.68%**	Low Risk (TIP) **-10.85%**	Long Maturity (TLT) **2.70%**

The following table sums up our conclusions (based on the analysis summarized in this article) as to potential asset class under and overvaluations at the end of **October 2008**. The distinction between possible, likely and probable reflects a rising degree of confidence in our estimate. Finally, we stress that this is an assessment of valuations at a given point in time, which implies no forecast as to whether and when the market's "animal spirits" will cause any over and undervaluations to worsen or reverse in the future.

Probably Overvalued	Canadian, Japan, and U.S. Equity; U.S. and Japan Bonds
Likely Overvalued	Volatility, India Equity and Bonds, Eurozone and Canadian Bonds, Swiss Commercial Property
Possibly Overvalued	Commodities; Japan Commercial Property
Possibly Undervalued	Timber; Canada, Eurozone and U.K. Commercial Property
Likely Undervalued	Eurozone and Swiss Equity; U.S. Real Return Bonds; Australia Commercial Property
Probably Undervalued	Australia and U.K. Equity

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Are Emerging Market Equities Undervalued?

Through the end of October, 2008, emerging markets equity indexes had fallen by more than fifty percent, year-to-date, in U.S. dollar terms. But at the same time, the latest World Economic Outlook from the IMF shows that emerging market economies GDP grew by eight percent in real terms in 2007, and are projected to grow by a further six to seven percent per year between 2008 and 2013. This raises an inevitable question: is this a good time to invest in this asset class? The answer depends on whether an investor believes emerging market equities to be over, under or fairly valued today. This article will present our answer to this question.

The starting point of this discussion must be the processes that determine asset prices. In light of the recent turmoil in financial markets, it is worth going back to John Maynard Keyne's discussion of asset valuation in Chapter 12 of his General Theory of Employment, Interest Rates and Money, which was first published in 1936. As you will see, time has not diminished the quality of Keynes' insights.

"The outstanding fact is the extreme precariousness of the basis of knowledge on which our estimates of [future returns] have to be made. Our knowledge of the factors which will govern the [return on] an investment some years hence is usually very slight and often negligible. If we speak frankly, we have to admit that our basis of knowledge for estimating the [return] ten years hence of a railway, a copper mine, a textile factory, the goodwill of a patent medicine, an Atlantic liner, a building in the City of London amounts to little and sometimes to nothing; or even five years hence. In fact, those who seriously attempt to make any such estimate are often so much in the minority that their behaviour does not govern the market..."

"In former times, when enterprises were mainly owned by those who undertook them or by their friends and associates, investment depended on a sufficient supply of individuals of sanguine temperament and constructive impulses who embarked on business as a way of life, not really relying on a precise calculation of prospective profit. The affair was partly a lottery, though with the ultimate result largely governed by whether the abilities and character of the managers were above or below the average. Some would fail and some would succeed...Business men play a mixed game of skill and chance, the average results of which to the players are not known by those who take a hand. If human nature felt no temptation to take

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a chance, no satisfaction (profit apart) in constructing a factory, a railway, a mine or a farm, there might not be much investment merely as a result of cold calculation."

"With the separation between ownership and management which prevails to-day and with the development of organised investment markets, a new factor of great importance has entered in, which sometimes facilitates investment but sometimes adds greatly to the instability of the system. In the absence of security markets, there is no object in frequently attempting to revalue an investment to which we are committed. But the Stock Exchange revalues many investments every day and the revaluations give a frequent opportunity to the individual (though not to the community as a whole) to revise his commitments. ... How then are these highly significant daily, even hourly, revaluations of existing investments carried out in practice?"

"In practice we have tacitly agreed, as a rule, to fall back on what is, in truth, a *convention.* The essence of this convention — though it does not, of course, work out quite so simply — lies in assuming that the existing state of affairs will continue indefinitely, except in so far as we have specific reasons to expect a change. This does not mean that we really believe that the existing state of affairs will continue indefinitely. We know from extensive experience that this is most unlikely. The actual results of an investment over a long term of years very seldom agree with the initial expectation...We [assume], in effect, that the existing market valuation, however arrived at, is uniquely *correct* in relation to our existing knowledge of the facts which will influence the yield of the investment, and that it will only change in proportion to changes in this knowledge; though, philosophically speaking it cannot be uniquely correct, since our existing knowledge does not provide a sufficient basis for a calculated mathematical expectation. In point of fact, all sorts of considerations enter into the market valuation which are in no way relevant to the prospective [return]."

"Nevertheless the above conventional method of calculation will be compatible with a considerable measure of continuity and stability in our affairs, *so long as we can rely on the maintenance of the convention...*But it is not surprising that a convention, in an absolute view of things so arbitrary, should have its weak points. It is its precariousness which creates no small part of our contemporary problem of securing sufficient investment."

"Some of the factors which accentuate this precariousness may be briefly mentioned.

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"(1) As a result of the gradual increase in the proportion of the equity in the community's aggregate capital investment which is owned by persons who do not manage and have no special knowledge of the circumstances, either actual or prospective, of the business in question, the element of real knowledge in the valuation of investments by those who own them or contemplate purchasing them has seriously declined.

"(2) Day-to-day fluctuations in the profits of existing investments, which are obviously of an ephemeral and non-significant character, tend to have an altogether excessive, and even an absurd, influence on the market. It is said, for example, that the shares of American companies which manufacture ice tend to sell at a higher price in summer when their profits are seasonally high than in winter when no one wants ice. The recurrence of a bank-holiday may raise the market valuation of the British railway system by several million pounds.

"(3) A conventional valuation which is established as the outcome of the mass psychology of a large number of ignorant individuals is liable to change violently as the result of a sudden fluctuation of opinion due to factors which do not really make much difference to the prospective yield; since there will be no strong roots of conviction to hold it steady. In abnormal times in particular, when the hypothesis of an indefinite continuance of the existing state of affairs is less plausible than usual even though there are no express grounds to anticipate a definite change, the market will be subject to waves of optimistic and pessimistic sentiment, which are unreasoning and yet in a sense legitimate where no solid basis exists for a reasonable calculation.

"(4) But there is one feature in particular which deserves our attention. It might have been supposed that competition between expert professionals, possessing judgment and knowledge beyond that of the average private investor, would correct the vagaries of the ignorant individual left to himself. It happens, however, that the energies and skill of the professional investor and speculator are mainly occupied otherwise. For most of these persons are, in fact, largely concerned, not with making superior long-term forecasts of the probable yield of an investment over its whole life, but with foreseeing changes in the conventional basis of valuation a short time ahead of the general public. They are concerned, not with what an investment is really worth to a man who buys it "for keeps", but with what the market will value it at, under the influence of mass psychology, three months or a year hence. Moreover, this behaviour is not the outcome of a wrong-headed propensity. It is an inevitable result of an

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investment market organised along the lines described. For it is not sensible to pay 25 for an investment of which you believe the prospective yield to justify a value of 30, if you also believe that the market will value it at 20 three months hence."

"Thus the professional investor is forced to concern himself with the anticipation of impending changes, in the news or in the atmosphere, of the kind by which experience shows that the mass psychology of the market is most influenced. This is the inevitable result of investment markets organised with a view to so-called "liquidity". Of the maxims of orthodox finance none, surely, is more anti-social than the fetish of liquidity, the doctrine that it is a positive virtue on the part of investment institutions to concentrate their resources upon the holding of "liquid" securities. It forgets that there is no such thing as liquidity of investment for the community as a whole. The social object of skilled investment should be to defeat the dark forces of time and ignorance which envelop our future. The actual, private object of the most skilled investment to-day is "to beat the gun", as the Americans so well express it, to outwit the crowd, and to pass the bad, or depreciating, half-crown to the other fellow."

"This battle of wits to anticipate the basis of conventional valuation a few months hence, rather than the prospective yield of an investment over a long term of years, does not even require gulls amongst the public to feed the maws of the professional; — it can be played by professionals amongst themselves. Nor is it necessary that anyone should keep his simple faith in the conventional basis of valuation having any genuine long-term validity. For it is, so to speak, a game of Snap, of Old Maid, of Musical Chairs — a pastime in which he is victor who says *Snap* neither too soon nor too late, who passes the Old Maid to his neighbour before the game is over, who secures a chair for himself when the music stops. These games can be played with zest and enjoyment, though all the players know that it is the Old Maid which is circulating, or that when the music stops some of the players will find themselves unseated."

"Or, to change the metaphor slightly, professional investment may be likened to those newspaper competitions in which the competitors have to pick out the six prettiest faces from a hundred photographs, the prize being awarded to the competitor whose choice most nearly corresponds to the average preferences of the competitors as a whole; so that each competitor has to pick, not those faces which he himself finds prettiest, but those which he thinks likeliest to catch the fancy of the other competitors, all of whom are looking at the problem from the same point of view. It is not a case of choosing those which, to the best of one's judgment, are

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really the prettiest, nor even those which average opinion genuinely thinks the prettiest. We have reached the third degree where we devote our intelligences to anticipating what average opinion expects the average opinion to be. And there are some, I believe, who practise the fourth, fifth and higher degrees."

"If the reader interjects that there must surely be large profits to be gained from the other players in the long run by a skilled individual who, unperturbed by the prevailing pastime, continues to purchase investments on the best genuine long-term expectations he can frame, he must be answered, first of all, that there are, indeed, such serious-minded individuals and that it makes a vast difference to an investment market whether or not they predominate in their influence over the game-players. But we must also add that there are several factors which jeopardise the predominance of such individuals in modern investment markets. Investment based on genuine long-term expectation is so difficult to-day as to be scarcely practicable. He who attempts it must surely lead much more laborious days and run greater risks than he who tries to guess better than the crowd how the crowd will behave; and, given equal intelligence, he may make more disastrous mistakes. There is no clear evidence from experience that the investment policy which is socially advantageous coincides with that which is most profitable. It needs more intelligence to defeat the forces of time and our ignorance of the future than to beat the gun. Moreover, life is not long enough; — human nature desires quick results, there is a peculiar zest in making money quickly, and remoter gains are discounted by the average man at a very high rate. The game of professional investment is intolerably boring and over-exacting to anyone who is entirely exempt from the gambling instinct; whilst he who has it must pay to this propensity the appropriate toll. Furthermore, an investor who proposes to ignore near-term market fluctuations needs greater resources for safety and must not operate on so large a scale, if at all, with borrowed money — a further reason for the higher return from the pastime to a given stock of intelligence and resources. Finally it is the long-term investor, he who most promotes the public interest, who will in practice come in for most criticism, wherever investment funds are managed by committees or boards or banks. For it is in the essence of his behaviour that he should be eccentric, unconventional and rash in the eyes of average opinion. If he is successful, that will only confirm the general belief in his rashness; and if in the short run he is unsuccessful, which is very likely, he will not receive much mercy. Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally..."

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"If I may be allowed to appropriate the term *speculation* for the activity of forecasting the psychology of the market, and the term *enterprise* for the activity of forecasting the prospective yield of assets over their whole life, it is by no means always the case that speculation predominates over enterprise. As the organisation of investment markets improves, the risk of the predominance of speculation does, however, increase. In one of the greatest investment markets in the world, namely, New York, the influence of speculation (in the above sense) is enormous. Even outside the field of finance, Americans are apt to be unduly interested in discovering what average opinion believes average opinion to be; and this national weakness finds its nemesis in the stock market. It is rare, one is told, for an American to invest, as many Englishmen still do, "for income"; and he will not readily purchase an investment except in the hope of capital appreciation. This is only another way of saying that, when he purchases an investment, the American is attaching his hopes, not so much to its prospective [return], as to a favourable change in the conventional basis of valuation, *i.e.* that he is, in the above sense, a speculator. Speculators may do no harm as bubbles on a steady stream of enterprise. But the position is serious when enterprise becomes the bubble on a whirlpool of speculation. When the capital development of a country becomes a by-product of the activities of a casino, the job is likely to be ill-done. The measure of success attained by Wall Street, regarded as an institution of which the proper social purpose is to direct new investment into the most profitable channels in terms of future [return], cannot be claimed as one of the outstanding triumphs of *laissez-faire* capitalism — which is not surprising, if I am right in thinking that the best brains of Wall Street have been in fact directed towards a different object. These tendencies are a scarcely avoidable outcome of our having successfully organised 'liquid' investment markets."

As Keynes makes clear, two fundamental valuation processes are at work in financial markets, which over time have gone by many names, including fundamental and trend-following; value and momentum; and mean-reversion and mean-continuation. One is more cognitive, and one more social and emotional. In reality, the decisions of all investors are inescapably driven by both processes (see, for example, "The Influence of Affect on Beliefs, Preferences and Financial Decisions" by Kuhnen and Knutson). It is also the case that asset pricing is affected not only by the relative (and continuously evolving) weights of these two processes, but also – as the Behavioral Finance school has shown -- by the relative rationality of the investors who carry them out, day after day. As active managers have repeatedly

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demonstrated, accurate prediction of asset prices in the complex adaptive system that is our financial markets is extremely difficult, particularly over long-periods of time (which also make the difference between skill and luck painfully clear). Yet if they are to survive over the long-term, financial markets must also be attracted to accurate, fundamentally grounded valuations, even if they are rarely achieved in practice. This assumption is of central importance to investors who are trying to achieve long-term goals (e.g., achieving the compound rate of return needed to fund a long-term liability, or deliver a multi-year stream of income, rather than outperform their peers or a market benchmark over a given year). For long-term investors, it is critical to avoid large losses when bubbles implode; to a lesser extent, they can also raise the probability of achieving their goals by investing when asset classes appear to be undervalued. In sum, despite the inescapable uncertainties involved, we believe it worthwhile to fundamentally analyze whether asset classes are over, under or fairly valued at any point in time.

To approach this issue, we use the well-known Gordon Growth Model, in which the current value of an asset equals the discounted present value of the sequence of cash flows it will produce in the future. In its simplest form, this calculation requires four inputs: (1) the current dividend; (2) the rate at which dividends are expected to grow in the future; (3) the current risk free interest rate; and (4) a risk premium that reflects the relative riskiness of the asset being valued. The specific equation is Value equals (Current Dividend times 1 + Expected Growth Rate) divided by (Risk Free Rate plus Risk Premium minus Expected Growth Rate). In our valuation process, we compare the supply of returns the asset is expected to produce (which equals the dividend yield plus the expected growth rate) to the returns a rational investor should demand in exchange for his or her investment (which equals the risk free rate plus the risk premium). If the expected supply is less than the returns demanded, the asset class will be overvalued, which raises the probability of price declines (which would raise the dividend yield, or, from another perspective, reduce the market Price/Earnings ratio). If the expected supply exceeds the return demanded undervaluation will result, which should eventually trigger a rise in market prices.

Two of the variables in our model are easily observed: the current dividend yield (with some adjustment for stock buybacks, in the case of developed markets) and the current real risk free rate (e.g., the current yield on inflation protected government bonds). For the other two –

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the rate at which dividends will grow in the future, and the appropriate risk premium – we have to make assumptions.

Let's look first at the future rate of dividend growth. Over short periods of time, rising dividends can be paid from a number of sources, including reduced retained earnings, increased borrowing, or rising profits driven by increased prices or a relative reduction in labor or other input costs. Over the long-term, however, none of these are sustainable sources of dividend growth. Continual reduction in retained earnings results in liquidation, and there are finite limits on leverage. Increasing prices and profits trigger competitive responses, which force returns down again, toward the company's cost of capital. Growing competition, structural growth, and/or cyclical economic recovery all tend to put upward pressure on input prices. Finally, at the country level, history has shown that falls in labor's share of national income also tend to reverse, due to political changes (e.g., making unionization easier) or demographic change (e.g., declining birth rates in a labor force with already high participation rates and cultural barriers to unlimited immigration). Over the long-run, there is only one durable source of dividend growth: increased output.

What then, drives output? Economists use a simple equation, called a Cobb Douglas production function, to answer this question. In this model, changes in the level of output are a function of (a) changes in the amount of labor used; (b) changes in the amount of capital used; and (c) changes in total factor productivity, or TFP. This latter term is estimated as a residual, after the effects of changes in labor and capital inputs have been identified. Since these are not easy to measure, different analyses tend to produce different estimates of TFP. On the other hand, this isn't surprising, since TFP captures a wide range of improvements, including higher labor quality (note that some models try to measure this separately), better capital quality (i.e., new technology), scale economies, competition in the market for corporate control (which forces companies to become more efficient), reallocation of labor from low to high productivity industries (e.g., from farming to manufacturing), and growth in managerial skill. Once again, there are differences in sustainability between these output drivers. As companies operating in China have recently discovered, the supply of trained workers is not infinite, and when demand for them exceeds a tipping point, labor costs increase, even as the rate of output growth slows due to declining average quality as more marginal workers enter the job market. To cite another example, the deterioration of public education quality in the United States has made it

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much harder for companies operating there to find workers with some types of skills. Finally, European companies face the challenge of declining birth rates and labor force size, and/or the challenges of integrating immigrant workers into their operations.

Increasing output by increasing capital also suffers from the same process of declining marginal improvements. An example near and dear to many workers' hearts is the integration of computers and software into their jobs. In the early stages of this process (e.g., think VisiCalc), the productivity improvements were undoubtedly very substantial. But the incremental productivity improvements from subsequent computer investments (e.g., Windows operating system upgrades) were undoubtedly much smaller. At the national level, evidence also supports this point – great increases in output can be achieved by providing workers with more capital equipment, where little was available before. However, as the stock of capital per worker increases, this "capital deepening" approach produces smaller and smaller improvements to output growth.

Over the long-term, the only sustainable source of output growth is increases in Total Factor Productivity – that is, changes that enable a company to produce more output with the same inputs, or, viewed another way, the same output with fewer inputs (see, for example, "Total Factor Productivity" by Diego Comin, and "World Technology Usage Lags" by Comin, Hobijn, and Rovito). However, the rate of TFP growth will logically not be constant over time. In particular, it will be faster the further away a company or country is from the so-called "TFP frontier" – the rate of TFP growth at the most productive company or country in an industry. As a recent paper by the Federal Reserve Bank of New York noted, "the interaction between an economy's place in the catch-up process, its use of new technologies, and the flexibility of its markets determines how fast its productivity will grow relative to the frontier. At low levels of productivity, the positive catch-up effects will dominate, and countries may grow fast relative to the frontier. Closer to the frontier, however, market rigidities become more of a constraint, reducing the economy's ability to innovate, make technological advances, and reallocate resources efficiently. In sum, market rigidities and institutional factors are more of a detriment to productivity growth for those countries that have achieved relatively high levels of productivity and are near the technological frontier." As evidence of this phenomenon, the study ("Is the United States Losing Its Productivity Advantage?" by Amiti and Stiroh) compares the relatively slower rates of productivity growth in Europe to the much faster recent

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growth in emerging markets that are much further from the frontier. On the other hand, this is not the case in all emerging markets, particularly those marked by challenging legal and institutional environments. For example, some studies have found that TFP growth was negative in the Middle East in the 1990s, and was stagnant in much of Latin America during the 1980s and 1990s (see, for example, "Factor Returns, Institutions, and Geography: A View From Trade" by Baier, Dwyer and Tamura). The following table shows average rates of TFP growth in recent years across key developed and emerging economies:

Country	**Period**	**GDP per Capita, in 2007 U.S. Dollars (IMF)***	**Average Annual TFP Growth**
Australia	1993 - 2004	$43,163	1.5%
Canada	1993 – 2004	$43,674	0.9%
France	1993 – 2004	$42,034	1.2%
Germany	1993 – 2004	$40,400	1.1%
Japan	1993 – 2004	$34,296	1.0%
Sweden	1993 – 2004	$49,603	1.5%
Switzerland	1993 – 2004	$58,513	0.5%
United Kingdom	1993 – 2004	$46,099	1.5%
United States	1993 – 2004	$45,725	1.3%
Brazil	1993 – 2004	$ 6,938	0.0%
China	1993 – 2004	$ 2,483	3.9%
India	1993 – 2004	$ 942	2.3%
South Korea	1990 – 2004	$20,015	1.9%

* Using Purchasing Power Parity Exchange Rates

With respect to the long-term growth of dividends, a key question is how the benefits of TFP growth are divided. Broadly speaking, they are divided among four parties: (1) consumers, in the form of lower prices; (2) workers, in the form of higher compensation (wages plus benefits); (3) capital providers, in the form of higher profits and dividends; and (4) government, via higher taxes. Over time, competition ensures that most of the benefits of TFP growth are captured by consumers. However, the shares captured by the other three parties vary over time and place. For example, between 1929 and 2007 total labor compensation (wages plus benefits) in the United States averaged 62.7% of National Income, with a standard deviation of 3.2%; over the same period, corporate profits (including proprietor profits and rents) averaged 23.3%, with a standard deviation of 5.0%. The correlation between the shares was (.81). In

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recent years, perhaps because of higher competition in labor markets due to globalization, labor's share has been declining, while capital's has been increasing, as shown in the following table:

Period	**Labor Share of National Income in the USA**	**Capital Share of National Income in the USA**
1980 - 1989	66.0%	16.6%
1990 - 1999	65.1%	19.4%
2000 - 2007	64.9%	21.0%

As noted above, these shares have mean-reverted over time, driven by both political and demographic factors (see, for example, "Capital vs. Talent: The Battle Rages On" by Roger Martin, Dean of the Rotman School of Management). Looking to the future, this table helps to clarify the "demographic problem" faced by suppliers of capital. With populations declining in developed countries, labor's share of the benefits of TFP growth should logically increase, and capital providers' share decline, unless either birth or immigration rates sharply increase. Seeking to maintain their returns, capital providers have logically looked to emerging markets, where labor is much more abundant relative to capital. All else being equal, this should theoretically generate high returns on capital investments in these countries, as well as a significant share of TFP growth. However, as is usually the case, all else isn't equal. As we have noted in the past, the political and institutional systems in many emerging markets are quite different from those in developed country markets, which could reduce the returns to foreign capital providers (e.g., due to higher costs of corruption, taxes, cartels, etc.).

Even in the absence of such barriers, there is not a one-for-one correspondence between TFP and dividend growth on public market equity indexes. We have already mentioned one reason for this – the shifting over time of the share of benefits going to consumers, labor, taxes and capital providers. But there is a second factor that affects investors in equity indexes composed of publicly traded companies. Not all productivity innovations happen in publicly traded companies. Moreover, even among public companies, there is evidence that more TFP growth happens in smaller companies that have smaller weights in the overall equity market index. For example, consider China, where many of the largest firms in the public market index are recently privatized state owned enterprises who were more likely to be the source of political patronage jobs than hotbeds of TFP innovation. Taken together, these issues (plus

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TFP measurement uncertainties) mean that real dividend growth and TFP growth are not likely to match each other perfectly over time. This is confirmed in the following table:

Country	**Average Annual Growth in TFP, 1950 – 1999**	**Average Annual Real Dividend Growth, 1950 - 1999**
Australia	1.6%	1.1%
Canada	1.5%	0.2%
United Kingdom	1.2%	1.7%
United States	1.4%	1.7%*

**For the 1871 to 2007 period, real dividends in the U.S. grew by 1.38% per year*

The table also makes another point that investors often overlook: over long periods of time, the dividend yield has been a much more important source of returns on equity as an asset class than the rate at which dividends grow.

Finally, there is accumulating evidence that stock prices – at both the individual company level and the national level – incorporate anticipated changes in TFP (on the former, see "Corporate Innovation and its Effects on Equity Returns" by Vassalou and Apedjinou; on the latter, see "Stock Prices, Total Factor Productivity and Economic Fluctuations" by Beaudry and Portier). So, on balance, we have concluded that TFP is the right metric to use to estimate the future real growth rate of dividends on country level public equity indexes.

That still leaves us with the question of the right TFP growth rate to use in our analysis of emerging equity market valuation levels. Let's start with index weights. Emerging Markets Equities currently make up about 10% (by market capitalization) of the world equity market. Within the emerging markets group of countries, Aggregate China accounts for about 40% (Honk Kong 17%, Taiwan 13% and China 9%), followed by Brazil (16%), Korea (15%) and India (10%). Together, these represent about eighty percent of the emerging markets equity index. Applying these weights to the historical country TFP growth rates noted above yields a weighted TFP of just over 2.0% -- which does not include TFP growth for the countries comprising the remaining 20% of the index. Nor does this rough estimate capture possible future dynamics – for example, a decline in Chinese TFP growth as services grow as a percentage of its total output, or, in Brazil, a shift to output growth based on TFP increases, and not just capital deepening and a shift of workers from agriculture to industry. Because of these uncertainties, we have decided to use two different average rates of TFP growth in our

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emerging markets valuation analysis – a low rate of 2% per year, and a high rate of 3% per year.

Now let's move on to the second unobserved variable in our valuation model – the appropriate risk premium to use. Over the years, we have spent a lot of time on valuation analyses, in many different capacities and countries. Above all this has taught us one lasting lesson: discussions about the best or right was to incorporate risk into valuation analyses make medieval scholastic theology, evolutionary biology, theoretical physics and other allegedly difficult subjects seem like child's play! With that in mind, we will do our best to be simple and clear, while recognizing that reasonable people can and do disagree on this issue.

At first glance, the risk assessment issue is relatively clear: an analyst must take into account both company-specific and equity market-wide risk, and decide whether to do this by adjusting the numerator (i.e., the future dividend or, more broadly, cash flow available to equity investors) or the denominator (i.e., the discount rate) of the valuation equation. Broadly speaking, there are three ways to do this. First, an analyst can discount the most likely future cash flows at a discount rate equal to (a) the risk free rate, plus (b) the equity market risk premium, plus (c) an additional premium to capture company specific risks. There are many ways to make this last adjustment, which we won't review here. Suffice to say, there is no general agreement on the right approach to use. Second, instead of using the most likely future cash flows, an analyst could conduct more analysis to determine the expected future cash flows. For example, the analyst could construct three future scenarios, calculate the cash flow under each of them, and then weight the cash flows by the scenarios' respective probabilities. Since company-specific risk is captured in the scenarios, the expected cash flows could be discounted at a rate equal to the risk free interest rate plus the overall equity market risk premium. While conceptually straightforward (and more useful for managers trying to hedge downside exposures), this approach is often accused of "double counting" risk – it is almost impossible for the cash flow scenarios to not include some systematic risk that is also included in the equity market risk premium. To address this issue, the third approach attempts to capture all risk in the numerator, by converting either most likely or expected future cash flows to their so-called "certainty equivalents" or CEQs. The easiest way to do this is to ask what cash flow you would accept from the U.S. Treasury (or a similar government organization with zero default risk) in exchange for the risky cash flow. Once this is done, the series of CEQ cash flows can

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be discounted at the risk free rate to their present value (one additional point – in all these models, we are speaking in "real" terms, and have deliberately left inflation – a key source of valuation problems – out of this discussion).

This is a powerful technique that, in our experience, inevitably produces two insights when it is used in a capital budgeting context. First, the CEQ cash flows are usually significantly smaller than the expected cash flows (that, in theory, already capture many risks). The initial reaction of managers to the size of this adjustment is to say that it reflects their lack of confidence that the cash flow scenarios truly capture the full range of risks. However, when pressed to identify the missing risks, most managers fail to come up with convincing answers given the size of the CEQ adjustment they have made. Instead, the insight that typically emerges is that the adjustment is not due to company-specific and equity market risk (i.e., sources of future cash flow variation that can be identified and analyzed), but rather to a desire to be compensated for bearing uncertainty (i.e., sources of variation in future cash flows that can't be identified or analyzed).

The second insight that usually emerges is that CEQ adjustments differ significantly between individuals (we have also noted that they tend to vary over time when the CEQ technique is consistently used). Again, discussion among the participating managers usually shows that their differences are driven far more by differing perceptions of, and willingness to bear, *uncertainty* than they are by perceptions of, and willingness to bear *risk*. While risk lends itself to analysis and rational discussion, uncertainty is much more subjective, and is much more affected by emotional and social factors (e.g., recent studies have shown that feelings of fear are highly contagious). To bring this back to Keynes, in our valuation model, "animal spirits" should manifest themselves in the factors that cannot be directly observed. Euphoric spirits (i.e., the greed phase of the cycle) should lead to excessive estimates of future growth and a depressed risk/uncertainty premium. In contrast, high anxiety (the fear phase) should lead to depressed growth estimates and significantly higher risk/uncertainty premiums. Given that relatively more objective data is available with respect to dividend growth rates, changes in "animal spirits" should have their greatest impact on the uncertainty part of the risk/uncertainty premium. Once again, however, while we cannot forecast these changes, they will affect our model – e.g., in the case of rising fear, via a fall in stock prices and an increase in the market dividend yield.

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That still leaves us with the challenge of deciding on the long-term risk premium to use for an investment in an emerging markets equity index. The traditional approach to this question was to subtract the realized real interest rate (the return on nominal return Treasury bonds less realized inflation) from the realized return on the equity market over time, and take the average of this result. However, critics have pointed out that this realized, or "ex-post" equity risk premium may have differed considerably from what investors actually expected – that is, from their "ex-ante" risk premium. This criticism led to a large number of studies that attempted to identify the ex-ante risk premium that investors had used, and a reasonable ex-ante premium to use in the future. The results of a number of these studies are summarized in the following table:

Study and Authors	Equity Risk Premium Estimate
Merrill Lynch Survey of Fund Managers, May, 2002	**3.8% for world ERP**
"Estimating the Equity Risk Premium", by O'Hanlon and Steele	**4% to 5% in U.K.**
"The Shrinking Equity Premium" by Jeremy Siegel	**1.5% to 2.5% in U.S.**
"An Ex-Ante Examination of the Equity Premium" by Glen Donaldson et al	**3.5% in U.S.**
"New Estimates of the Equity Risk Premium" by Douglas Lamdin	**3.1% in U.S.**
"The Declining U.S. Equity Premium" by Ravi Jagannathan et al	**0.7% after 1970 in U.S.**
"The Equity Premium" by Eugene Fama and Kenneth French	**2.55% for 1951 to 2000 in U.S.**
"What Risk Premium is Normal?" by Robert Arnott and Peter Bernstein	**2.4% in U.S. from 1810 to 2001**
"Estimating the Market Risk Premium" by Scott Mayfield (a very impressive study that relates the equity risk premium to market volatility, using a regime switching model)	**4.1% in U.S.**

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Study and Authors	Equity Risk Premium Estimate
2005 Global Investment Returns Yearbook, by Dimson, Marsh and Staunton	**5% over Short Term Government Debt (roughly 3.5% over bonds)**
"The Market Equity Risk Premium" a very comprehensive review of multiple studies published in May, 2005 by the New Zealand Treasury	**3% to 5% range; 4% estimate**
"The Long-Run Equity Risk Premium" by Graham and Harvey	**3.66%**
"The Equity Risk Premium is Lower Than You Think It Is" by Claus and Thomas	**About 3%**
"Equity Market Volatility and Expected Risk Premium" by Chen, Guo and Zhang	**3.84%**

Reflecting the range of conclusions reached in these studies, in our valuation models for developed market equity indexes we use two estimated Equity Risk Premiums – a low estimate of 2.5% over the real risk free rate, and a high estimate of 4.0%. However, compared to developed markets, emerging equity markets are characterized by much higher levels of volatility, greater maximum drawdowns, and, for many investors, higher perceived levels of uncertainty. Hence, we should require a higher risk premium for investing in them. The question is how to establish that premium in a logically consistent manner.

Once again, this is a subject on which reasonable people can and do (sometimes vehemently) disagree. One school of thought proposes to capture the additional risk of investing in emerging equity markets by adding to the developed markets risk premium the current spread between the yield on an emerging markets bond index and the yield on U.S. Treasury (or other government) bonds. As of early November, 2008, this spread is 5.72% (based on the CDX.EM.Diversified Credit Default Swap index). One argument against this approach is that the emerging markets bond spread could, at least in part, reflect credit market factors that aren't relevant to equity investors. A second argument is that this approach makes equity market valuation heavily dependent on the composition of a bond market index.

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A second school of thought proposes to adjust the developed market risk premium to reflect the additional risk of investing in emerging equity markets. This adjustment is based on two factors: (a) the volatility of the emerging market index relative to the volatility of the developed market index, and (b) the correlation of returns between the two (since the impact of higher volatility should be offset, in part, by less-than perfect correlation). The actual calculation multiplies the developed market risk premium times the volatility ratio times the correlation coefficient. The problem with this approach is that all three of these variables change over time. For example, historically, emerging market equity volatility has been about 1.7 times developed market volatility, with a correlation of roughly .67 (strictly speaking, we are referring here to U.S. dollar based returns; for other currencies, it has historically been in the 1.5 to 2.0x range). However, between January 2007 and October 2008, relative volatility (again, in USD terms) increased to 2.39x and correlation increased to .9 as equity markets around the world suffered the consequences of the global credit and liquidity crisis (which, in addition to measurable risk, also increased uncertainty and fear). Rather than attempting to forecast these regime changes and adjust our valuation model accordingly, we have decided to use a mid-point between them in our emerging market valuation model. Specifically, we will use a relative volatility of 2.0x and a correlation of .75. As our objective is to identify over and undervaluations from the perspective of a long-term investor (who will likely experience multiple regime changes), we believe this is a logical approach. Hence, our emerging markets valuation model will contain not only two possible dividend growth rates, but also two possible equity market risk premiums, of 3.75% and 6.00%. Along with the observable dividend yield (currently 4.11%) and current yield on inflation protected U.S. bonds (3.57% at 31 October 2008), this yields the same 2 x 2 matrix of equity market valuation estimates we use in our developed market assessments. At the end of October, 2008, the result of our emerging markets equity valuation analysis is as follows:

Emerging Mkts Valuation Ratios*	**Low Demanded Return**	**High Demanded Return**
High Supplied Return	102%	155%
Low Supplied Return	127%	180%

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* Formula = 100/((DivYld * (1+Growth))/(Rf+Rp-Growth))

In sum, our analysis leads us to conclude that as of 31 October 2008, emerging market equities are likely overvalued.

Product and Strategy Notes

Interesting New Papers and Products

We read with great interest this past month that Harvard Management Company is trying to sell a substantial portion of its private equity portfolio, while other institutional investors are balking at calls to pony up more cash under the terms of their existing commitments to private equity funds. It would seem that, with the credit market crash, the bloom has finally come off the private equity rose. Not that this should come as a surprise to readers of our publications. We have long noted that in recent years, the returns on private equity seem to have been driven by public equity market returns and by reductions in the return for bearing credit risk. As we and others have pointed out, a leveraged portfolio of public equities (e.g., ETFs) can replicate many of the benefits of private equity. In the 1980s, a significant number of public companies were inefficiently run, and people like Lord Hanson could create substantial value for investors by improving their operations. Over the past twenty years, company managers have absorbed these lessons, and most operations today are run much more efficiently. While there are undoubtedly private equity managers who can still produce operational improvements (e.g., via consolidation or revenue growth strategies), their task has become more challenging, and there are relatively fewer of them around today. With too many private equity funds charging "2 and 20" for basically adding leverage to a previously public company, it isn't hard to understand why investors like Harvard are pulling the plug.

We were also impressed by a new paper by Bhardwaj, Gorton and Rouwenhorst. In "Fooling Some of the People All of the Time", they examine the performance of commodity trading advisers (CTAs), who pursue active management strategies in this asset class (often based on trend following). The authors find that between 1994 and 2007, CTA excess returns to investors (net of fees) was statistically not different from zero. They further estimate that "CTAs on average earned gross excess returns (before fees) of 5.4%, which implies that funds captured most of the [benefits of their performance] through the fees they charge." Finally,

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they note that even on a before-fees basis, "CTAs display no alpha relative to simple futures strategies that are in the public domain." This raises the question of "why CTAs have continued to grow, apparently despite a long history of poor performance." They conclude that CTAs are able to remain in business despite this performance because investors lack sufficient information to evaluate CTA performance – "[the] evidence suggests that investors' experience of poor performance is not common knowledge."

Recent months have also seen the publication of a number of new papers that have further delved into the root causes of the housing crisis in the United States. In "The Failure of Models that Predict Failure", Rajan, Seru, and Vig find that relationships that were estimated using historical data from the pre-securitization era did not accurately predict defaults in an era of high securitization. As we have noted in the past, models being invalidated by changes in the underlying economic relationships and/or human behavior are an old lesson that is repeatedly relearned. However, contrary to conventional wisdom, a severe decline in lending standards may not have been one of the main causes of the crisis. In "Where's the Smoking Gun? A Study of Underwriting Standards for U.S. Subprime Mortgages", Bhardwai and Sengupta use loan level data to examine changes in underwriting standards between 1998 and 2007. They find that "while underwriting may have weakened along some dimensions, it strengthened along others...Average observable risk characteristics on mortgages underwritten post-2004 would have resulted in a significantly lower ex-post default rate if they had been originated in 2001 or 2002." Hence, it is more likely that a critical change in borrower behavior occurred in 2005 and 2006, rather than changes in observed risk characteristics or underwriting standards. In another study, aptly called "Anatomy of a Train Wreck", Professor Stanley Liebowitz of the University of Texas takes a look at just this issue. Liebowitz concludes that the so-called "sub-prime" crisis is misnamed; what really happened was a sharp rise in defaults on adjustable rate (but not fixed rate) mortgages, regardless of the economic characteristics of the borrower. Liebowitz finds that a substantial portion of these ARMs were taken out by buyers who had no intention of living in the mortgaged property. When market prices began to turn down, a rising number of these buyers defaulted on their loans. As Steve Malanga points out in another article ("Foreclosure Myths: Can the Media Handle the Truth?") this may be why government programs to restructure mortgages have found so few borrowers who qualify, or have even applied for this relief. Finally, in his paper on "Historic Turning

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Points in Real Estate", Robert Shiller concludes (correctly, in our view) that the underlying problem was borrowers' inability to take into account the eventual impact on house prices of a sharp, but significantly time lagged, increase in the construction of new properties. And at the same time, they were under significant social pressure to "get into the real estate game" and not get left behind. This is consistent with other research findings (e.g., into production process control) that human beings frequently misjudge processes characterized by significant time lags between cause and effect, and/or non-linear relationships between them.

Taken together, these and other papers (with the benefit of 20/20 hindsight) paint a picture of how the housing bubble grew and burst. Between May 2000 and June 2005, Federal Reserve data showed that the average conventional mortgage rate fell from 8.52% to 5.58%. On a $250,000 mortgage, this fall in interest rates represented a 32% fall in annual cash interest cost. Unsurprisingly, house prices rose as a result of interest rate falls. In some markets, housing supply expanded quite quickly, which limited the upwards pressure on prices. In other markets, however, the supply response only occurred with a considerable time lag. As a result, prices in these markets rose quickly, creating social pressure on people to "get in on the real estate game" (funny how you don't hear advertisements any more for seminars on "how to get rich in real estate with no money down"). The belated arrival of new supply in these markets coincided with a rise in cash interest costs. Between June 2005 and July 2006, the average conventional mortgage rate rose from 5.58% to 6.76%, which raised cash interest costs on a $250,000 mortgage by almost 17%. Taken together, it is easy to see how increased supply and rising financing costs could have so slowed the rise in house prices that some highly leveraged speculative buyers chose to default on their loans and thereby set off the downward spiral that continues to this day.

Another topic we have written about in the past is whether carbon credits represent a new asset class that could provide diversification benefits to investors. Recent results are not encouraging. On July 8, 2008, the iPath Global Carbon Index exchange traded note (ticker GRN) began trading in the United States. Through the end of October, it was down (29.3%) year to date, which is about equal to the (30.0%) drop suffered by the MSCI All Country World Index ETF (ticker ACWI) over the same period. The underlying reason for this seems clear: with a fixed amount of carbon emissions credits outstanding, their value declines with GDP and the overall volume of emissions produced. Moreover, unlike commodities (whose value tends

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rise and fall coincident with changes in GDP), the price of carbon credits seems to change in advance of expected changes in GDP, just like equity prices.

Elsewhere on the product front, we note Northern Trust's recent launch of a new U.S. traded ETF that tracks the performance of the Tokyo Stock Exchange REIT Index. This will make it easier for international investors to track the performance of, and perhaps fine tune their allocations to the international commercial property asset class.

Last but not least, recent events have provided us with a second example (in addition to the 9/11 attack) of how different asset classes react to a sudden spike in uncertainty. The following table shows nominal U.S. dollar denominated returns from different asset classes during the third quarter of 2001 and 2008.

Asset Class	**3Q 2001 Return**	**3Q 2008 Return**
Real Return Bonds	2.4%	4.6%
U.S. Gov't Bonds	6.3% (VFITX)	5.5% (SHY)
Foreign Gov't Bonds	7.0%	2.3%
Domestic Comm. Property	(2.7%)	11.6%
Foreign Comm. Property	(8.9%)	(35.7%)
Commodities	(5.6%)	(20.0%)
Timber	0.8%	27.9%
U.S. Equity	(15.9%)	(24.1%)
EAFE Equity	(15.4%)	(41.4%)
Emerging Equity	(22.1%)	(48.0%)
Volatility (VIX)	67.5%	61.6%
Emerging Markets Neutral (CS Tremont Index)	3.4%	(2.0%)
HSGFX (fund)	3.4%	6.4%
JAMNX (fund)	0.0%	(8.9%)

As you can see, all three fixed income asset classes, along with timber and volatility, delivered positive returns during both shock quarters. Equity market neutral as a broad strategy also performed well, and HSGFX was positive in both quarters. As we have noted, a common sense approach to asset allocation involves a mix of investments that have their highest expected payoffs in different economic states, which we term deflation/uncertainty shock, inflation and normal growth. For better or worse, we now have two pieces of empirical evidence to help us with this task. We should all keep them in mind as we look to the future.

Debt, Deflation – and Depression?

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The ongoing credit crisis has now quite clearly spread to the real economy, and concerns about inflation have given way to fears of deflation. A look at history suggests that the latter are not unfounded; Japan's prolonged struggle to emerge from debt deflation and depression suggest that this is a harder trend to reverse that a spike in inflation. With that in mind, we collected some market and historical data to help us better understand the deflation risk.

Our first step was to use identify the future annual inflation/deflation rates that are implicit in the yield curves for nominal and real return U.S. Government bonds. To obtain our estimates, we took published yields (shown in bold), along with an assumption for the one year real rate under current unsettled market conditions (obtained from Ang and Bekaert's regime switching study, "The Term Structure of Real Rates and Expected Inflation"), and assumed that the yield curve changed linearly in between these values. Our results are shown below:

Implied Inflation/Deflation on 31 October 2008

Years	Nominal Return Bond Yields by Maturity	Real Return Bond Yields by Maturity	Implied Annual Price Level Change
1	**1.34%**	***2.39%***	-1.05%
2	**1.56%**	2.73%	-1.17%
3	**1.80%**	3.08%	-1.28%
4	2.30%	3.42%	-1.12%
5	**2.80%**	**3.76%**	-0.96%
6	3.05%	3.83%	-0.79%
7	**3.29%**	**3.90%**	-0.61%
8	3.53%	3.65%	-0.12%
9	3.77%	3.39%	0.38%
10	**4.01%**	**3.14%**	0.87%

As you can see, at the end of last month, bond yields had priced in a substantial period of inflation in the years ahead.

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Our next step was to place this into a better historical context. To do this, we collected very long term price change data for three countries – the United Kingdom, the United States, and Sweden – from 1775 to 2007. The correlation between the UK and US series was .41; between the U.K. and Sweden, .63; and between the U.S. and Sweden, .34. These relatively low correlations are important, because of the common patterns we found in the data. In particular, we were interested in three data points: the probability of being in a state of deflation, inflation or normality, and the probability, contingent on being in a given state, or remaining in it the next year (the continuation probability) or switching to one of the other two states (the transition probabilities). To obtain this data, we divided each data series into three categories: years when prices declined (Deflation); years when the rate of price increase was more than one standard deviation above the long-term average (Inflation); and the remaining years (Normal). The following tables show the results of this analysis for Sweden, the UK and the USA. The first shows the state probabilities for each country, over the 1775 – 2007 period:

	Sweden	**United Kingdom**	**United States**
Probability of Deflation	29%	32%	33%
Probability of Inflation	12%	13%	12%
Probability of Normal	59%	55%	55%

As you can see, from an historical perspective, periods of deflation have been a more common occurrence than many people probably realize. The next three tables show the continuation and transition probabilities for each country. Rather than taking a complicated econometric approach to estimating these (e.g., fitting a Markov Switching Vector Autoregressive, or similar model), we have constructed a simple transition matrix, that has two virtues. First, it clearly conveys the essential information. Second, when it comes to describing the behavior of complex adaptive systems, relatively simple, "coarse grained" approaches have been shown to be quite effective. In the table that follows, the initial state (i.e., the condition in the first year) is listed in the column on the left; the next year's condition is shown along the top row (so that each row sums to 100%):

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Sweden

	End in Deflation	*End in Inflation*	*End in Normal*
Start in Deflation	54.4%	1.5%	44.1%
Start in Inflation	18.5%	37.0%	44.5%
Start in Normal	19.0%	10.9%	70.1%

United Kingdom

	End in Deflation	*End in Inflation*	*End in Normal*
Start in Deflation	60.8%	2.7%	36.5%
Start in Inflation	10.0%	40.0%	50.0%
Start in Normal	19.5%	12.5%	68.0%

United States

	End in Deflation	*End in Inflation*	*End in Normal*
Start in Deflation	55.3%	5.2%	39.5%
Start in Inflation	22.2%	51.9%	25.9%
Start in Normal	20.9%	7.0%	72.1%

We hope you find these tables as interesting as we did. As you can see, the most persistent state is Normal – assuming you are in the Normal state to start with, the chances are better than 2 in 3 you will be in it the next year too, if history is a valid guide. On the other hand, inflation is much less persistent – the highest continuation probability is in the United States, and it is only 50/50. On the other hand, deflation appears to be tougher to escape, once you have slipped into that state – while the continuation probability is less than that for the Normal state, it is, on average, significantly higher than for the Inflation state. Finally, history suggests that the chances of transitioning from Normal to Deflation are significantly higher than they are for a transition from Normal to Inflation.

We acknowledge that arguments will be raised against drawing conclusions from this raw historical data (which, in its early years, is clearly subject to measurement error). Some will say that economies have become much more complex in recent years, or governments' ability to manage them has improved (we'll leave aside, for now, the possible contradiction between those two objections!). Others will argue that the adoption of fiat currencies and the elimination of the gold standard have raised the chances of inflation occurring in our "modern"

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world. We acknowledge that all these arguments have some degree of merit. But we also acknowledge that when it comes to understanding – even at a coarse grained level – the operation of complex adaptive systems like an economy, we ignore patterns that repeat at our peril. In sum, our analysis of quite long, and relatively uncorrelated historical data series for three countries indicates that economies seem to have a 20% chance of slipping from normal times into deflation, and once there, a better than 50% of staying in that state for one more year, and a better than 25% chance of staying there for two. So, based on the historical record, the deflation expectations built into the October 31st U.S. dollar yield curve seem a bit extreme.

Might these expectations have something to do with Japan's more recent experience of prolonged deflation? Between 1980 and 2007, inflation in Japan averaged 1.24% per year, with a standard deviation of 1.92%. Applying the same approach as we did for Sweden, the U.K. and the U.S., over the 1980 – 2007 period, Japan was in a Normal state 63% of the time, in an Inflation state 11%, and in a Deflation state 26%. However, take a look at the continuation and transition probabilities over this period:

Japan

	End in Deflation	***End in Inflation***	***End in Normal***
Start in Deflation	57.1%	0.0%	42.9%
Start in Inflation	0.0%	33.3%	66.7%
Start in Normal	17.6%	5.9%	76.5%

Once again, it appears that Japan's economy, over a much shorter period of time, displayed a similar pattern of behavior to the one found in Sweden, the U.K., and U.S., with roughly a 1 in 5 chance of slipping from the Normal state into Deflation, and a 1 in 2 chance of staying in it the following year. Like we said, you ignore repeated patterns in complex adaptive systems – attractors, as they are known -- at your peril.

With this historical background in mind, let us look more closely at the situation we face today. Our starting point is a great deal of humility when it comes to the economists', policymakers' and investors' understanding of the complex interactions between different variables that caused, and then prolonged, the 1930's depression. This is a critical point that was also made by Amity Shlaes in her excellent book on this period (The Forgotten Man), as well as Greg Mankiw (former Chairman of the U.S. Council of Economic Advisers) in a recent

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New York Times OpEd ("But Have We Learned Enough?" NYT 26Oct08). Let's start with what we know today:

- In recent years, the two great engines of global demand growth were U.S. private consumption and Chinese capital investment.
- Consumers in the United States and many other countries have taken on unprecedented amounts of debt, some of which is secured by houses that have substantially declined in value since 2007.
- Both U.S. consumers and Chinese producers were put under considerable strain by the sharp spike in commodity prices earlier this year.
- As a result, even before the events of September, both of these critical sectors were cutting back on spending, although the full effects of this change were temporarily offset by the effects of the U.S. tax cut earlier in the year.
- The financial market shocks of September 2008 have generated a spike in psychological uncertainty for both consumers and businesses, causing a sharp cutback in spending by both, as well as a significant tightening of credit standards.
- Various positive feedback loops have been triggered by these shocks (e.g., reduced borrowing limits triggering asset sales, falls in prices and rising volatility, causing VaR model-based risk limits to be exceeded, causing further asset sales and mark-to-market reductions of balance sheet asset values, which in turn cause breaches of capital adequacy limits, and trigger further asset sales; hedge fund investors seeking to withdraw their funds; individual investors liquidating investments in riskier asset classes, etc.). Collectively, these have further restricted credit availability, worsened the economic situation, reinforced negative expectations, and further raised uncertainty.
- Said feelings of uncertainty and fear have undoubtedly spread more quickly than in the past, due to 24/7 global media and the internet.
- This has caused the cutback in consumption spending to accelerate in the United States, and to spread around the world.

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- Businesses have begun to react by cutting spending plans and laying off workers, which has further accentuated consumers' and businesses' uncertainty and fear.
- On the positive side, the rapid fall in aggregate global demand has caused an equally sharp fall in commodity prices.
- Also on the positive side, residential construction spending has collapsed. While this is not good for employment, it has reduced the rate of increase in the supply of housing that may have triggered the collapse in prices.
- Governments initially focused on a supposed market liquidity crisis, then, led by the British, changed their focus to shoring up the fundamental solvency of the world's financial system, by effectively nationalizing great parts of it.
- U.S. Federal Reserve Chairman Ben Bernanke, one of the economics profession's leading students of the Great Depression, has moved quickly to implement a large number of non-traditional monetary policies to avoid a banking collapse.
- However, banks have thus far, and quite reasonably, shown no willingness to make additional loans to overleveraged borrowers who face a rising probability of falls in their income and/or declines in the value of their collateral. In addition, further lending may be inhibited by continuing capital adequacy concerns, linked to uncertainty about the fair market value of some assets already on banks' books.
- Thus far, we have yet to see deflationary dumping of products on the world market (i.e., "beggar thy neighbor" actions) by Chinese and other developing country exporters who are desperately trying to maintain employment, social peace and political stability. Should this occur, it would further reduce the competitiveness and creditworthiness of Western companies, and likely lead to further employment declines, loan losses, and demand contraction.
- Finally, the United States has conducted a Presidential election, and will be in its interregnum period until Barack Obama is inaugurated on January 20, 2009.

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To this evidence, let us add the apparent lessons of the Great Depression of the 1930s, the history of debt deflations, and the more recent depression in Japan:

- Avoiding a collapse of the banking system and a contraction of the money supply is necessary to stave off a depression. Policymakers recognize this, and have been taking aggressive steps in this area.
- In Japan, as in the U.S. Savings and Loan crisis, re-establishing transparent values for questionable assets, and moving them off (nationalized) banks' balance sheets and onto the balance sheet of the government (e.g., into the Resolution Trust Company), seemed to speed the return of the financial system to health.
- However, while necessary, preventing a banking and money supply collapse may not be sufficient to prevent a debt deflation and depression.
- Uncertainty and confidence are critical to consumers' willingness to spend, and businesses' willingness to maintain employment and invest.
- Both too few and too many policy initiatives can further raise uncertainty.
- Beyond reduced uncertainty, however, lies the more fundamental problem of the high levels of debt on consumer balance sheets that was slowing down spending even before the financial markets crisis blew up. The following table shows OECD estimates of household debt as a percentage of household income as of 2005. Keep in mind that in 1985 the OECD average for this measure was only 40%!

Country	Household Debt/Income
Australia	173%
Canada	126%
France	89%
Germany	107%
Japan	132%
Sweden	134%
United Kingdom	159%
United States	135%

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- Throughout history, the essential process underway in debt deflations has been the destruction of creditors' wealth, the removal of debt from borrowers' balance sheets, and an increase in the value of and cash and real assets generating positive cash flow. With capital scarce, investors could earn very high returns, and thus were, perhaps, more willing to once again lend and invest, rather than hoard their funds in cash. Similarly, the removal of onerous debt service requirements from borrowers' backs made them more willing and able to resume spending.
- For better or worse, we live in a different world today, where creditors are either large institutions whose failure would pose systemic risk, or collective investment vehicles like pension funds and insurance companies, whose failure might well escalate uncertainty and further reduce consumer and business spending. Hence, there are political and economic obstacles to the traditional approach of allowing debt deflations to "wipe the slate clean" after periods of excessive borrowing and spending.
- The scale of the problem also seems too big for established bankruptcy courts to resolve in an acceptable period of time.
- In the absence of a politically and economically acceptable means of quickly and substantially reducing consumers' debt burden, it is hard to see how deflation and further falls in aggregate demand can be avoided. In the face of uncertainty about whether and when they can get out from under the debt they have taken on, which will inevitably be compounded by fears of losing their job, health insurance, and house, people will not spend on anything but necessities – and this will inevitably trigger further employment losses, collateral value declines, and further write downs of the value of loans and other debt securities.
- As the Japanese government learned through very expensive experience, neither tax cuts nor large increases in government spending can do more than temporarily alleviate this problem. In fact, by repeatedly raising and then dashing hopes, these efforts at fiscally stimulating their way out of the problem may have worsened it, by shifting consumers' and businesses' expectations

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about the likely impact, or lack thereof. This is not dissimilar to the life-long consumption habits that characterized people who came of age during the Great Depression. Moreover, this habit formation process has also found support in recent research (see, for example, "The Influence of Affect on Beliefs, Preferences, and Financial Decisions" by Kuhnen and Knutson, as well as "Managerial Overconfidence and Corporate Policies" by Ben-David, Graham, and Harvey).

In light of the evidence we have reviewed, we have reached four conclusions:

1. Historical data suggest that the risks of deflation may have been systematically underestimated by policymakers and investors.
2. That said, the deflation expectations implied by the current U.S. government yield curve appear to be excessive, given historic experience, unless one makes the further assumption that there is a high probability of serious policy errors being made by the United States and other countries.
3. While the immediate threat of a banking collapse and severe monetary contraction has been avoided, this is far from a full solution to the problem we confront.
4. The critical indicator of what lies ahead is likely to be what, if any, steps are taken to reduce household debt burdens. If a politically and economically acceptable way to accomplish this cannot be found, the probability of an extended deflationary depression significantly increases.

Model Portfolios Year-to-Date Performance

Our model portfolios are constructed using a simulation optimization methodology. They assume that an investor understands the long-term compound real rate of return he or she needs to earn on his or her portfolio to achieve his or her long-term financial goals. We use SO to develop multi-period asset allocation solutions that are "robust". They are intended to maximize the probability of achieving an investor's compound annual return target under a wide range of possible future asset class return scenarios. More information about the SO methodology is available on our website. Using this approach, we produce model portfolios for

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six different compound annual real return targets: 7%, 6%, 5%, 4%, 3%, and 2% We produce two sets of these portfolios: one assumes only investments in broad asset class index funds. These are our "all beta" portfolios. The second set of model portfolios includes equity market neutral (uncorrelated alpha) funds as a possible investment. These assume that an investor is primarily investing in index funds, but is willing to allocate up to ten percent of his or her portfolio to equity market neutral investments.

We use two benchmarks to measure the performance of our model portfolios. The first is cash, which we define as the yield on a one year government security purchased on the last trading day of the previous year. For 2008, our Swiss Franc cash benchmark is 2.73% (in nominal terms). The second benchmark we use is a portfolio equally allocated between the ten asset classes we use (it does not include equity market neutral). This portfolio assumes that an investor believes it is not possible to forecast the risk or return of any asset class. While we disagree with that assumption, it is an intellectually honest benchmark for our model portfolios' results.

The year-to-date nominal returns for all these model portfolios can be found here:
http://www.indexinvestor.com/Members/YTDReturns/Swiss.php

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