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# Investment Management Journal

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January 2014

With the close of 2013, we are excited about the opportunities that 2014 will offer. Interest rates continue to be a main topic of focus as market participants ponder when they might rise and what impact the Federal Reserve's "tapering" could have on that transition. In this latest issue of the *Morgan Stanley Investment Management Journal*, some of our firm's best thinkers offer their opinions across a variety of topics including an examination of excessive private credit growth, a consideration of mezzanine debt in the current environment, and the improving landscape for European equities.

Our other authors consider equity efficient portfolios, look ahead at the 2014 midterm elections in the U.S., evaluate real estate debt investment managers and present a theoretical model of equity-bond correlation in a rising rate world. I hope these articles provide some insights into our firm's world-class intellectual firepower.

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Sincerely,



Gregory J. Fleming  
President, Morgan Stanley Investment Management  
President, Morgan Stanley Wealth Management



**GREGORY J. FLEMING**  
*President, Morgan Stanley  
Investment Management*

*President, Morgan Stanley  
Wealth Management*



# The Overlooked Risk of Credit Booms

## Executive Summary

The publishing industry loves a good crisis: the deluge of prescriptive books and academic papers released since 2008 is similar in scale to the spate of books published during the Great Depression.<sup>1</sup> Such publications often tout warning signs clear only with the benefit of hindsight, since the intricacies of each new crisis often vary. Yet the ability of private credit growth in signaling future distress is as relevant today as it was in the 1600s, offering policymakers and investors alike a simple yet very important heuristic.

While much of the new research regarding the importance of credit focuses on financial crises, the often-overlooked threat is lower future GDP growth, irrespective of a crisis.<sup>2</sup> We find that GDP growth is significantly lower following large increases in the private credit to GDP ratio, or “credit gap.” A one-standard deviation increase in the credit gap (14 percentage points) is associated with a slowdown in growth of one-half percent. In China’s case, given the drastic increase in credit, the hit to growth could be over 2 percent, suggesting that the five-year-average GDP growth will fall from 8.8 percent down to 6.5 percent. Brazil and Turkey could see a hit to growth of roughly 1 percent. Yet the converse is also true: countries which have not seen a sharp rise in their credit gap—such as the Philippines and Mexico—are not subject to such headwinds.

To better frame the rather phenomenal increase in China’s credit gap (65pp)<sup>3</sup> we isolate the instances in emerging markets (EM) throughout history that experienced an increase of similar scale. While there are only seventeen such cases in the last half century, few saw an increase of a larger scale than China, and in nearly every case the country experienced a slowdown in growth. In fact, the median growth rate of these countries fell from 7.4 percent to 2.5 percent.

## AUTHOR



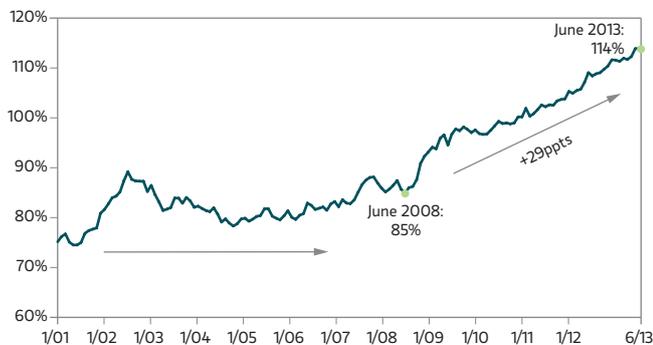
**STEVEN QUATTRY**

*Senior Associate  
Morgan Stanley  
Investment Management*

These results suggest a lower near-term growth outlook for emerging markets, which as a whole have seen a steady rise in the private-credit-to-GDP ratio (*Display 1*). It also suggests a further headwind for China. Despite the sharp increase in the credit gap over the past five years, many observers believe China can maintain its growth rate above 7.5 percent over the coming years. Our findings would caution against such a view, and constitute a timely warning for Chinese policymakers. We believe that the very policy China has undertaken to combat low growth—excessive expansion of credit—will only serve to further exacerbate their growth challenges. We now turn to a review of the recent literature on excessive credit growth.

**Display 1: Emerging Markets: Private-Credit-to-GDP Ratio**

Weighted by market cap of MSCI EM constituent countries



Source: FactSet, Haver, BIS, Goldman Sachs, Emerging Advisors. Data as of June 30, 2013.

**Brief Literature Overview**

**Credit growth is often a welcome phenomenon:** Seminal papers by Goldsmith (1969)<sup>4</sup> and McKinnon (1973)<sup>5</sup> point to the importance of financial development in future GDP growth, and Rodrik (2008) suggests that the absence of a well-functioning domestic financial system can act as a “binding constraint” on growth, preventing a country from reaching its economic growth potential.<sup>6</sup> Bernanke and Gertler (1989) discuss the positive association between output and credit via the wealth effect, and Biggs et al. (2010)<sup>7</sup> note the link between economic output and the second derivative of credit (“credit impulse”). In fact, a

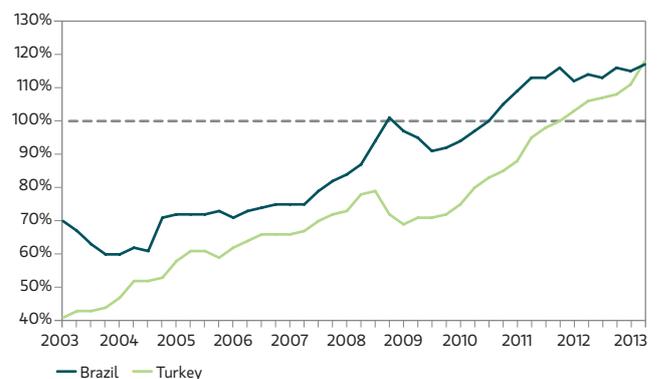
large increase in credit growth often reflects “a healthy response of markets to expected future productivity gains including new technologies, new resources, and institutional improvements.”<sup>8</sup> Further, credit booms often “result in permanent financial deepening,” which may support higher trend growth (Dell’Ariccia et al., 2012).<sup>9</sup>

**Yet be wary when private credit begins growing faster than the rest of the economy:** While credit growth in and of itself tends to be associated with higher GDP growth, there is evidence that when credit is growing faster than GDP, troubles may soon arise. In fact, a number of recent studies<sup>10</sup> concluded that the best predictor of future financial troubles lay in the *change in the private-credit-to-GDP ratio*, or “*credit gap*.” In other words, we should take notice when a country’s private credit growth exceeds GDP growth, especially if it continues for a number of years.

The Bank of International Settlements (BIS)<sup>11</sup> has suggested that when the credit gap deviates from its trend there is a higher likelihood of a future financial crisis, especially when accompanied by large asset price increases. Similarly, the European Central Bank (ECB)<sup>12</sup> examined “early warning indicators for costly asset price boom/bust cycles” and found that among a large sample of metrics, private credit growth above trend was found to be “the best indicator for a policy maker” as it “predicted on average 95 percent of high-cost booms.”

**Display 2: Banking Lending to the Private Sector Has Increased Sharply in Brazil and Turkey**

Bank sector credit to the private sectors, % of total deposits



Source: Haver, IMF, IFS. Data as of March 31, 2013.

Recent work from the IMF<sup>13</sup> came to a similar conclusion. Although they used a different measure of the credit gap, the change in the credit to GDP ratio as opposed to the deviation from trend,<sup>14</sup> they suggested that “changes in the credit-to-GDP ratio...accelerate sharply before a crisis event occurs.”<sup>15</sup> Finally, Schularick and Taylor<sup>16</sup> examined data over the past 140 years and found that “credit growth is a powerful predictor of financial crises, suggesting that such crises are ‘credit booms gone wrong.’”

**Keep your eye on asset prices, banking sector leverage and overvalued currencies:** Credit is often a

necessary, but not always sufficient, condition of future financial distress; other variables such as asset prices, real exchange rates, bank leverage and cross-border funding should be studied as they have tended to increase leading up to a number of crises (IMF, 2011).<sup>17</sup> *Up Close* examines these warning signs for a few key countries.

**Public debt and current accounts may not matter once we control for private credit:** Although fiscal profligacy is at the root of some recent crises—such as Greece—most crises can be traced back to the private financial sector—as was the case in Ireland and Spain. Schularick and Taylor

#### UP CLOSE: CHINA, BRAZIL, AND TURKEY

**Although examining private credit excesses is a good starting point in determining where future financial distress may occur, a more complete analysis should include many of the indicators outlined in the Brief Literature Overview. While a thorough examination of these metrics is outside the scope of this paper and likely merits a paper of its own, we would simply point out that three of the countries which appear to have extended credit cycles—China, Brazil, and Turkey—also exhibit some of the other worrisome characteristics listed earlier.**

**Asset price increases:** Although the run-up in Chinese real estate prices continues to captivate many observers, relatively less attention has been paid to the property market in Brazil. Yet Brazil remains “one of the world’s strongest housing markets,”<sup>18</sup> with real estate prices up by 223 percent since 2008 in Rio de Janeiro and by a similar magnitude in Sao Paulo.<sup>19</sup> Turkey has seen a much more tame property sector, but even there, home prices in Istanbul have risen by 50 percent since 2010. Many investors are cautiously watching for a turn in these markets, since the reversal of asset prices is often the trigger for “the unwinding of leverage-driven asset bubbles that puts financial stability most at risk.”<sup>20</sup>

**Banking sector leverage, foreign currency borrowing:** As *Display 2* illustrates, both Brazil and Turkey have seen a steady increase in banking sector leverage, a large majority of which has arrived over the past few years. Credit to the private sector relative to deposits in both countries now sits above 100 percent.

While China’s loan-to-deposit ratios do not appear as extended, a recent paper from the BIS highlights the trend of increased cross-border foreign currency borrowing in China. Loans denominated in foreign currency “grew by 35 percent in the twelve months through end-March 2013.”<sup>21</sup> The paper goes on to note that “foreign currency loans booked in China and loans extended cross-border to non-banks in China...have more than tripled in four years, rising from \$270 billion to a conservatively estimated \$880 billion in March 2013,” which would equate to roughly 10 percent of GDP.<sup>22</sup>

Somewhat similarly, the financial sector in Turkey has seen a steady deterioration in its external position. The financial sector is now

running a net foreign liability position equal to over 10 percent of GDP (\$87 billion), which is in stark contrast to a decade ago when the financial sector had a net foreign asset position equal to roughly 1 percent of GDP. The non-financial corporate sector in Turkey has also accumulated substantial net external liabilities equal to roughly 20 percent of GDP (\$163 billion), and is increasingly reliant on shorter-term debt financing.<sup>23</sup>

**Overvalued currencies:**<sup>24</sup> Although it has declined a bit over the past few years, Brazil’s real effective exchange rate is still up by over 90 percent since 2003. This is in part due to a large terms of trade shock, as the rising price of commodities has benefitted the commodity-exporting nation, but also in part due to rising inflation relative to its trading partners, which has slowly eroded the country’s competitiveness. Furthermore, Brazil’s current account deficit appears to be greater than its estimated medium-term sustainable level,<sup>25</sup> suggesting that the currency is overvalued and needs to adjust to reduce the deficit. On this measure, the Turkish lira also appears overvalued by 15 to 20 percent, as the country is running a fairly sizable current account deficit.

In summary, in addition to strong credit growth, China, Brazil, and Turkey currently exhibit some of the characteristics that are often present prior to periods of financial distress. While some might suggest that Brazil and Turkey still have fairly low levels of private credit penetration (Credit/GDP) we would simply point out that there are a number of cases—such as the Ukraine and Nigeria of late—that have suffered a banking crisis despite low levels of credit penetration. While it is difficult to differentiate between “worrisome” credit booms that are associated with financial distress, and “healthy” credit booms, which can be the result of “anticipated improvement in the economy’s fundamentals,” we would simply make the point that one is hard pressed to find evidence of improving fundamentals in many of the EMs that have extended credit cycles at the moment.

This is not to suggest we believe a financial crisis is imminent in these countries. After all, history has shown that academic literature is better at analyzing the reasons behind crises past than predicting those in the future. We continue to remain cautious on the near-term prospects of these countries, however especially within the financial sector.

recently suggested that there is little evidence that public debt increases are more closely associated with financial crises once one controls for private credit growth.

Additionally, the current account historically has not been a good predictor of future financial crises in the developed world, since “credit booms and busts can be driven just as easily by *domestic* savings as *foreign savings*” (Schularick and Taylor). This mirrors Kaminsky et al.’s (1998) findings that “the current account balance did not receive much support as a useful indicator of crises.” Similarly, Dell’Ariccia et al. (2012) note that “indicators that have been identified as predictors of financial crises,” such as a worsening trade balance, “lose significance once we condition for the presence of a credit boom.” Taylor and Schularick conclude, “Over 140 years there has been no systematic correlation of financial crises with either prior current account deficits or prior growth in public debt levels. Private credit has always been the only useful and reliable predictive factor.”

In summary, credit growth is often a welcome phenomenon, as it can reflect a necessary financial deepening or expected future income gains due to productivity increases. One should be wary if private credit begins to grow faster than the rest of the economy, however, especially if it does not correspond with any improvement in underlying fundamentals and continues for a number of years. Excessive credit growth becomes even more worrisome if a country is exhibiting large asset price increases, increased banking sector leverage and reliance on cross-border funding, or a strong rise in real effective exchange rates. Finally, current account surpluses and low public debt levels are no guarantee that a country can avoid a financial crisis which may have particular relevance for China. We now turn to the next section, where we seek to better understand the relationship between credit gaps and future GDP growth.

## Is Excessive Credit Growth Associated with Slower Future GDP Growth?

This question is timely considering that many emerging markets have experienced rapid credit growth well in excess of GDP over the past few years. While much of the recent literature on excessive credit has focused on predicting future financial crises, relatively less has been written regarding the association between excessive credit growth and future GDP growth. Perhaps most relevant, Dell’Ariccia et al (2012) noted that 60 percent of “credit booms” were “characterized by

below-trend growth during the six-year period following their end,” during which GDP growth was “2.2 percentage points lower than ‘normal’ times.” In this section, we address the link between GDP growth and credit gaps.

The recent growing pains of EM have been well documented. EM GDP growth<sup>26</sup> fell from a high of 10.6 percent in 3Q2009 to merely 4 percent in 1Q2013, as EM export growth slowed, current account balances deteriorated, and the financing of current account deficits shifted towards lower-quality flows—less foreign direct investment, more short-term portfolio flows (*Displays 3-6*). On the other hand, credit

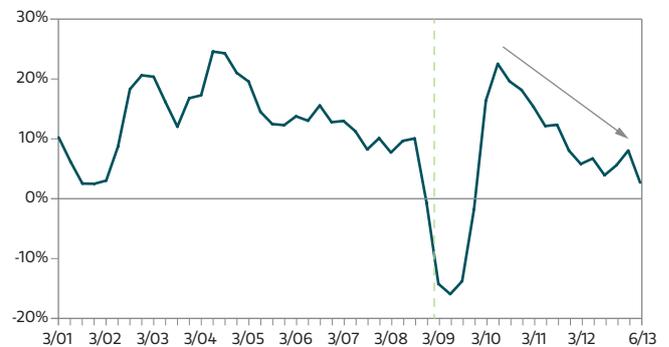
### Is Credit the New Growth Driver in EM?

Display 3: EM Real GDP



Source: FactSet, Haver. Data as of June 30, 2013.

Display 4: EM Export Growth



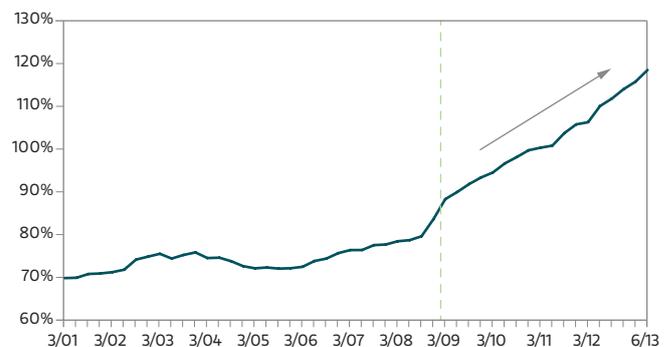
Source: FactSet, Haver. Data as of June 30, 2013.

Display 5: EM Current Account to GDP



Source: FactSet, Haver. Data as of June 30, 2013.

Display 6: EM Credit to GDP

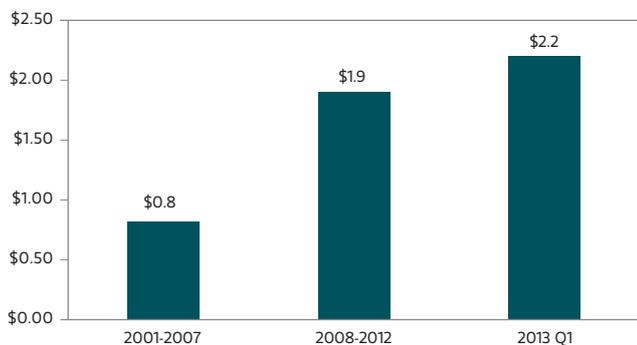


Source: FactSet, Haver, BIS, Goldman Sachs, Emerging Advisors. Data as of June 30, 2013.

growth in EM has risen considerably, especially relative to GDP, prompting some analysts to suggest that domestic credit has replaced exports as the “mainstay of growth” in EM.<sup>27</sup>

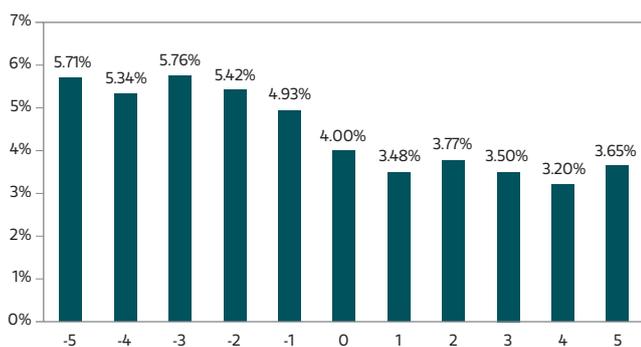
That credit is rising while growth is slowing suggests that the efficiency of new credit is also declining. As *Display 7* illustrates, to generate one dollar of growth, EM in aggregate now requires \$2.20 of new credit. This compares to the roughly \$0.80 of new credit that was needed to generate one dollar of growth on average between 2001 and 2007. In other words, the amount of new debt needed to generate GDP growth has more than doubled since the early 2000s.

**Display 7: A Doubling of Debt for the Same Amount of Growth**



Source: Haver, BIS, Goldman Sachs, Emerging Advisors. Data as of March 31, 2013.

**Display 8: Growth Slows After a Peak in the Credit Gap**  
( $t=0$  is peak in credit/GDP 5 yr change)



Source: Haver, IMF, BIS, Goldman Sachs, Emerging Advisors, MSIM. Data as of June 30, 2013.

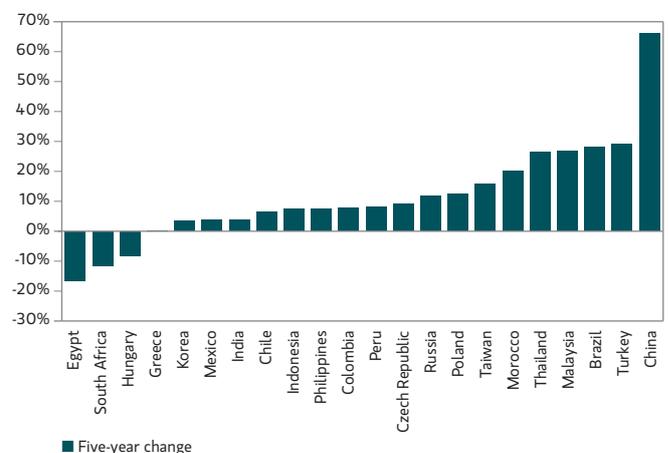
The obvious question becomes, has the credit growth in EM been rapid enough to warrant a GDP slowdown and, if so, which countries appear most at risk? To answer this question, we examine the recent credit growth from the perspective of three credit “thresholds.”

**1. What happens to GDP growth after a peak in the credit gap?**

First, it should be clear that credit simply cannot grow faster than GDP forever. As Kindleberger notes, “Debt can increase much more rapidly than income for two or three or a few more years, but debt cannot grow more rapidly than income for an extended period.” Since we know the rate of credit growth must eventually slow relative to GDP, we can study GDP growth around this turning point. As *Display 8* illustrates, GDP growth is very clearly higher in the years during which the five-year credit gap is increasing towards its historical peak, only to fall once the credit gap begins to decline. The increases in the credit gap over the last five years in both China and Turkey are at historical highs. While no one knows for sure exactly when these credit cycles will turn, it seems increasingly clear at least in China that credit cannot continue growing at such a rate in excess of GDP for much longer. Thus, when the cycle does turn, the above suggests GDP will enter a phase of lower growth.

**Display 9: China Has Gone on the Biggest EM Credit Binge**

Five-year change in credit/GDP ratio, in percentage points



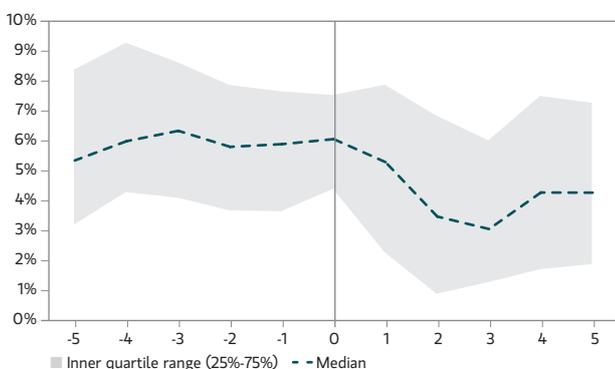
Source: BIS, Goldman Sachs, Emerging Advisors. Data as of June 30, 2013.

**2. Is there a credit gap threshold, beyond which GDP growth tends to slow?** One problem with the first threshold is that the peak only becomes clear after it has passed. Therefore we now ask whether we can establish a real-time threshold of credit growth, beyond which GDP growth tends to slow. We chose a fairly straightforward approach using a difference of means test for various percentiles of the credit gap.<sup>28</sup> This suggests that the decline in GDP growth is statistically significant following an increase in the credit gap equal to the 90th percentile of observations, or 25.6pp.

With this finding in mind, we examine the path of GDP growth in over 40 cases identified where credit to GDP increased by 25pp or more over a five-year period. As *Display 10* clearly shows, the median path of GDP growth slows sharply after breaching the 25pp threshold, denoted by point 0 on the horizontal axis. Specifically, the median growth rate falls from 6 percent to 4 percent during the five years following a breach of the threshold.

*Display 9* charts the current credit gap for countries in the MSCI EM index. As the reader can see, Brazil, Turkey, and China are exhibiting fairly extended credit cycles as the credit to GDP ratio has increased by 25pp or more over the past five years. Malaysia and Thailand are not far behind. But one thing is clear: China is in a class of its own.

**Display 10: Growth Slows After 25pp Credit Gap**

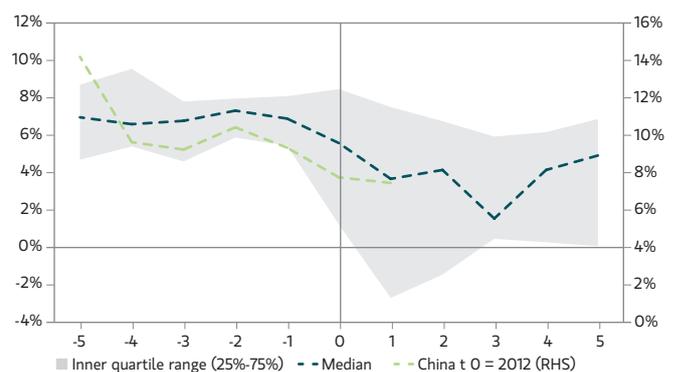


Source: Haver, IMF, BIS, Goldman Sachs, Emerging Advisors, MSIM. Data as of June 30, 2013.

**3. What happens to GDP growth after a credit boom on the scale of the one in China today?** China has seen a much more drastic increase in the credit gap than other recent cases. The 65pp increase over the last five years pushed the private-credit-to-GDP ratio up from 109 percent to 174 percent. The obvious question is, what has happened to GDP growth in countries that saw a credit boom of this magnitude? To answer this question, we examine the cases of emerging markets that have experienced an increase in the credit gap of three standard deviations or greater, which corresponds to 42pp or more.

Seventeen countries have experienced a credit boom of this magnitude, and GDP growth slowed in nearly every case. China, which breached this threshold in 2012, has thus far exhibited a rather typical growth path relative to these previous cases, as *Display 11* illustrates, albeit from a higher starting point. Interestingly, in most cases GDP growth did not trough until three years after surpassing the threshold, which would correspond to 2015 in the case of China.

**Display 11: Real GDP Growth**



Source: Haver, IMF, BIS, Goldman Sachs, Emerging Advisors, MSIM. Data as of June 30, 2013.

*Display 12* lists these countries, and highlights a few key points. First, the estimated 65pp increase in China over a five-year period is one of the highest on record in the emerging world. Second, these cases saw a fairly sizable growth slowdown, with median GDP growth dropping from 7.4 percent to 2.5 percent a difference of nearly 5 percent (see bottom rows of *Display 12*). Third, we used the Reinhart and Rogoff database on various crises and find that 8 out of 10 countries, for which we have data suffered a banking crisis during the five years after breaching the three standard deviation threshold. To be fair, the credit cycles in most of these countries were underpinned by foreign borrowing, and many of these countries faced balance of payments issues, which seems less relevant to China today. However, Taiwan offers a relevant case study: the country was running a fairly large current account surplus during its credit

boom, yet still faced a growth slowdown from 8.9 percent to 6.8 percent as well as a banking crisis, with an ultimate loss in output equal to over 20 percent of GDP.<sup>29</sup> In short, China's pace of credit growth places it in a rare class of emerging markets—a class which has rarely escaped a growth slowdown, and very often suffers a banking crisis.

Although the discussion above does appear to suggest that GDP growth slows after periods of credit growth in excess of GDP, it remains unclear as to whether such a finding holds up after controlling for differences among countries. For instance, perhaps credit growth is not worrisome so long as a country has a high investment-to-GDP ratio, which may suggest credit is funding “productive investment.” Therefore, in the next section we study the association between credit and GDP growth while incorporating other variables to isolate the impact of credit.

**Display 12: Not So Strange Bedfellows—Countries with a 3 Standard Deviation (SD) Increase in the Credit Gap**

COUNTRY	YEAR BREACHED 3SD	PEAK IN CREDIT GAP	PRIOR 3SD: REAL GDP (5Y AVG)	POST 3SD: REAL GDP (5Y AVG)	GDP DIFF	BANKING CRISIS FOLLOWING 5YR? Y/N/--
Malaysia	1995	68%	9.3%	5.0%	-4.3%	Yes
Thailand	1993	67%	10.7%	2.5%	-8.2%	Yes
China	2012	65%	10.6%	??	??	??
Zimbabwe	2002	65%	0.7%	-7.1%	-7.8%	Yes
Chile	1982	64%	7.8%	3.5%	-4.4%	Yes
Latvia	2005	61%	7.4%	0.0%	-7.4%	--
Vietnam	2007	59%	7.8%	5.8%	-1.9%	--
Taiwan	1991	58%	8.9%	6.8%	-2.1%	Yes
Ukraine	2008	49%	7.9%	-1.3%	-9.2%	--
South Africa	2007	47%	4.4%	2.2%	-2.2%	No
Uruguay	1982	47%	4.2%	2.8%	-1.4%	Yes
Estonia	2006	47%	7.7%	0.2%	-7.5%	--
Bulgaria	2007	45%	6.0%	0.7%	-5.2%	--
Slovenia	2008	45%	4.8%	-2.1%	-6.9%	--
Uruguay	2002	45%	0.2%	4.8%	4.6%	Yes
Lithuania	2007	44%	8.0%	-0.2%	-8.2%	--
Malaysia	1986	43%	5.2%	8.6%	3.4%	Yes
Panama	1974	42%	6.9%	3.7%	-3.2%	No
<b>Average ex-China</b>		<b>53%</b>	<b>6.3%</b>	<b>2.1%</b>	<b>4.2%</b>	
<b>Median ex China</b>		<b>47%</b>	<b>7.4%</b>	<b>2.5%</b>	<b>5.0%</b>	

Source: Haver, IMF, BIS, Goldman Sachs, Emerging Advisors, MSIM. Data as of June 30, 2013.

## Measuring the Hit to Growth from Excessive Credit

Our results from a series of panel regressions (see *Appendix 1*) suggest that there is a negative relationship between the credit gap and future GDP growth. The credit gap is statistically significant at the 1 percent level, even after we control for variables, often cited in the growth literature. Whether we add variables commonly identified as positive for growth—such as investment to GDP or a measure of human capital—or variables often cited as harmful to growth—such as public debt—we find that the credit gap remains a statistically significant indicator of future growth.

Our study confirms the critical importance of private credit growth in excess of GDP. A one-standard-deviation increase in the credit gap (an increase of 14pp) is associated with a marginal decline in GDP growth of roughly one-half percent (50pp) on average for each of the following five years. This half percentage point impact on growth is not insignificant when considering that the average GDP growth in our sample is only 3.8 percent. Note that the converse is also true: future growth tends to be higher after a country has seen its private credit stock decrease relative to GDP.

Although some have suggested that large changes in public debt are associated with growth slowdowns, our regressions suggest that, once we control for private credit, public debt adds very little to the outlook for future growth. The same, strikingly, goes for the current account to GDP ratio, and the external debt to GDP ratio. Neither enter the regression equation with any significance, nor do they alter the strong significance or coefficient of private credit.

These results have clear implications for China. Despite the fact that the country's private credit to GDP ratio has increased by 65pp over the past five years, many observers believe China can maintain its growth rate above 7.5 percent over the coming years. Our findings would caution against such a view, and constitute a timely warning for Chinese policymakers. We believe that the hit to growth from credit could be over 2 percent in China, suggesting that the five-year average GDP growth rate will fall from 8.8 percent (2009 to 2013) to 6.5 percent (2014 to 2018). Similarly, we think the hit to growth from credit alone could be as high as 1 percent in both Brazil and Turkey.

Though many economists are now lowering forecasts for GDP growth in China, they often cite the unprecedented ratio of investment to GDP, or the fact that per capita GDP has reached a point where growth will be lower from a higher base. Our research suggests that, even controlling these factors—investment ratio and income level—GDP is likely to slow further due to the rapid pace of private credit growth relative to the economy.

## Conclusion

Using a broad sample of emerging economies, we found that GDP growth slows significantly after a five-year period of excessive credit growth, and that this holds no matter which of three different thresholds we used to define “excessive”: the peak in the credit gap, increases in the credit gap of 25pp or more, and increases in the credit gap corresponding to three standard deviations in our sample. Comparing GDP growth in the five-year periods before and after the credit threshold, the growth slowdown is significant. Moreover, the association between credit excesses and growth slowdowns holds true even if we run a series of regressions to control for other variables known to impact growth, such as income level, educational attainment, investment ratios, and various crises.

We believe our findings add meaningfully to the current debate surrounding the future of growth in the emerging world, where many countries have seen fairly strong credit growth in excess of GDP. We examined emerging market countries in the past which have seen an increase of 25pp or more in their credit gap and found that the median GDP growth rate fell from 6 percent in the five years prior to this threshold, to 4 percent during the following five years. At present, China, Brazil, and Turkey appear at risk of a growth slowdown based on this threshold, although Thailand and Malaysia are not far behind. In the rare case that a country has seen their credit gap increase by three standard deviations (42pp), we find that GDP growth slows rather meaningfully. The median GDP growth rate fell from 7.4 percent to 2.5 percent, a difference of nearly 5 percent. With an increase in its credit gap estimated to be 65pp, China presently finds itself among this undesirable group. In other words, our works suggests that the policy China has deployed to combat low growth—excessive expansion of credit—will only serve to further exacerbate their growth challenges.

Lest we paint all emerging nations in a negative light, it is important to point out that some countries—such as Hungary—have begun to deleverage from past excesses, while others including Mexico and the Philippines have only experienced mild increases in credit.

We see many rich opportunities for further research. We have set about identifying a useful warning signal—a credit threshold beyond which GDP growth falls—and find strong reason to believe that a 25pp threshold may provide that warning signal. Further work to refine and build upon credit gap thresholds and their implications for future GDP growth has the potential to be a useful tool for policy makers. Future studies which can more specifically distinguish between healthy and worrisome credit growth will help to further advance our understanding of credit. Furthermore, developing a framework that takes into account changes in the structure of credit—for example, new credit offerings with increased maturities or changes to policy such as pension reform—will help policy makers to strike a balance between necessary financial deepening and prudential credit controls.

The publication of books on financial crises is counter cyclical,<sup>30</sup> and the wave of books released on the subject since 2008 suggests that this time is not different. Investors anxiously await the outcome of the Federal Reserve's slow reversal of accommodative monetary policy, as well as China's attempt to slow the rise of property prices and the shadow banking sector. One cannot help but wonder whether publishers will be trotting out yet another series of accounts in two years time regarding what went wrong. Irrespective of a future crisis, however, we believe GDP growth in a number of large emerging economies is likely to slow due to fairly mature credit cycles.

## Appendix I: Regression Results

In this section, we run a number of regressions to determine more rigorously whether the change in private credit to GDP has any significant association with future GDP growth. Our results suggest that GDP growth slows after periods when credit growth exceeds GDP growth, even controlling for other variables. Whether we add variables commonly identified as positive for growth—such as a measure of human capital—or variables often cited as harmful to growth—such as public debt or external debt—we find that credit remains a statistically significant indicator of future growth at the 1 percent level. Further, the inclusion of other variables after we have controlled for credit does not substantially increase the fit (R-squared) of the regression, nor do they substantially alter the coefficient of the private credit variable, which suggests that these added controls do not diminish the impact credit has on future growth.

We compiled annual data on emerging and developing countries going back to 1960. We excluded countries that rely on petroleum products as is common in the literature, as their experience is not replicable for other countries, and we have also focused our study on countries that have surpassed a minimum threshold of income (\$1,000 GDP per capita). After these exclusions and because data is unavailable for certain variables, we are left with a sample of 58 countries for our regression analysis.

To test the hypothesis that credit growth contains meaningful information about future GDP growth, we examined five-year-non-overlapping observations of average real GDP growth again as is common in the growth literature. Our measure of the credit gap is the change in the private-credit-to-GDP ratio over the past five years. Therefore, at any point in time, we are comparing the association between the change in the credit-to-GDP ratio over the previous five years to average real GDP growth over the following five years.

With the above in mind, we run a series of panel regressions utilizing country fixed effects.<sup>31</sup> First, we regress average future GDP growth against the change in private credit to GDP. Second, we add a number of variables to control for other underlying drivers of economic growth in order to isolate the impact of prior credit growth. These variables, which include GDP per capita, tertiary education attainment, life expectancy and fertility rates, were chosen in accordance with existing economic literature, and we use them by taking the natural log of each. Finally, we use the Reinhart and Rogoff (2009) database to control for various “crises” such as a currency crisis, debt crisis or stock market crash in order to explore whether credit has any significant link to future growth over and above such events.<sup>32</sup>

*Table 1* shows the results of these three regressions. Specification (1) suggests that the credit gap does have a strong negative association with future average GDP growth, as it is significant at the 1 percent level. Private credit enters the equation with a negative coefficient suggesting that when private credit is growing in excess of GDP, future growth tends to be lower. Specifically a 10pp increase in the credit gap over the past five years lowers GDP growth by 0.48pp per year over the following five years. Similarly, future growth tends to be higher after a country has seen its private credit stock decrease relative to GDP.

**Table 1: Regression Results**

DEPENDENT VARIABLE	(1) AVG FUTURE GDP GROWTH (5Y)	(2) AVG FUTURE GDP GROWTH (5Y)	(3) AVG FUTURE GDP GROWTH (5Y)
Private Credit Gap (5 year)	-0.0479*** (0.0121)	-0.0366*** (0.0108)	-0.0230** (0.00972)
GDP per Capita		-0.0251*** (0.00374)	-0.0251*** (0.00338)
Fertility		-0.0480*** (0.0129)	-0.0133 (0.0131)
Education		-0.000391 (0.00572)	0.0121** (0.00544)
Life Expectancy		0.0598* (0.0350)	0.0131 (0.0494)
Crises			-0.0116*** (0.00230)
Constant	0.0401*** (0.00149)	0.0372 (0.151)	0.191 (0.213)
Observations	232	232	169
Number of Countries	58	58	37
R-squared	0.45	0.58	0.65
Adj. R-squared	0.27	0.42	0.54

Robust standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
 Source: MSIM. Data as of June 30, 2013.

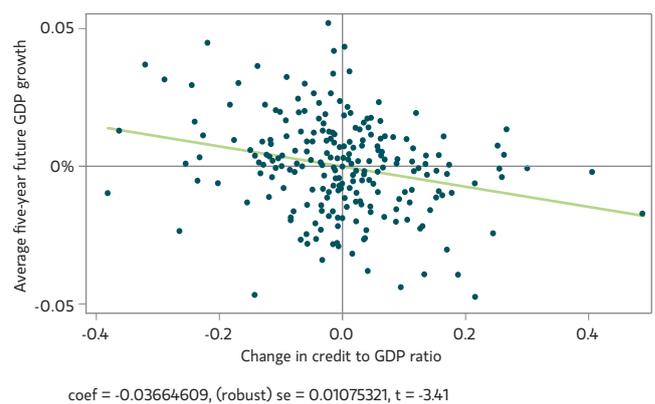
Specification (2) adds a number of variables commonly associated with GDP growth in the literature, and not surprisingly the R-squared rises quite significantly. GDP per capita and fertility enter the regression with the correct sign—lower levels of income and lower fertility rates are both associated with higher GDP growth—and both are significant at the 1 percent level. Although life expectancy enters with the correct sign, it is only significant at the 10 percent level. Interestingly, our measure of credit retains its significance at the 1 percent level even after adding these variables.

The coefficient on the credit gap in specification (2) is -0.037, and, therefore, a one standard deviation increase in the credit gap (an increase of 14pp) is associated with a marginal decline in GDP growth of roughly one-half percent (50pp) on average for each of the following five years. This half percentage point impact on growth is not insignificant when considering that the average GDP growth in our sample is only 3.8 percent.

Furthermore, a number of countries have recently exhibited increases in their credit gap much larger than one standard deviation. For instance China’s private-credit-to-GDP ratio has grown by 65pp over the past five years, implying a marginal effect on growth of 2.3 percent. Similarly Brazil’s private-credit-to-GDP ratio has increased by 25pp, implying a marginal slowdown in average GDP growth of roughly 1 percent over the next five years.

Display 13 illustrates the relationship between past credit gap (x-axis) and average future GDP growth (y-axis) while holding constant the other variables in Specification (2)—education, fertility, GDP per capita, and life expectancy.

**Display 13: Future GDP Growth versus Past Credit Growth**



Source: Haver, BIS, Goldman Sachs, Emerging Advisors. Data as of June 30, 2013  
 Illustrates the relationship between past credit growth and future GDP growth after controlling for GDP per capita, fertility, education, life expectancy.

Finally, Specification (3) adds our crisis variable. Note that due to data limitations surrounding the countries for which we have data on various crises, the sample falls from n=232 to n=169. Not surprisingly, the crisis variable is significant at the 1 percent

level and enters with a negative coefficient, suggesting that the presence of future crises is associated with lower future GDP growth. Note that credit retains its significance with future GDP growth, albeit now at the 5 percent level.<sup>33</sup>

Having established that the credit gap does appear to have a significant relationship to future growth, we now add

a number of other explanatory variables to our baseline regression in Specification (2) to test the robustness of these results and to guard against omitted variable bias.

*Table 2* summarizes these findings. In Specification (4) we consider the five-year change in public debt to GDP, since many prior findings suggest large changes in public debt are

**Table 2: Regression Results Continued**

DEP VARIABLE	(2) AVG FUTURE GDP GROWTH (5Y)	(4) AVG FUTURE GDP GROWTH (5Y)	(5) AVG FUTURE GDP GROWTH (5Y)	(6) AVG FUTURE GDP GROWTH (5Y)	(7) AVG FUTURE GDP GROWTH (5Y)	(8) AVG FUTURE GDP GROWTH (5Y)
Private Credit Gap (5 year)	-0.0366*** (0.0108)	-0.0337*** (0.0112)	-0.0367*** (0.0106)	-0.0368*** (0.0111)	-0.0394*** (0.0115)	-0.0423*** (0.0119)
GDP per Capita	-0.0251*** (0.00374)	-0.0261*** (0.00385)	-0.0263*** (0.00420)	-0.0251*** (0.00397)	-0.0248*** (0.00378)	-0.0259*** (0.00490)
Fertility	-0.0480*** (0.0129)	-0.0468*** (0.0129)	-0.0451*** (0.0136)	-0.0481*** (0.0130)	-0.0484*** (0.0130)	-0.0325** (0.0141)
Education	-0.000391 (0.00572)	-3.15e-05 (0.00570)	0.000703 (0.00581)	-0.000361 (0.00585)	0.000496 (0.00567)	0.00168 (0.00618)
Life Expectancy	0.0598* (0.0350)	0.0653* (0.0350)	0.0594* (0.0349)	0.0597* (0.0350)	0.0571* (0.0328)	0.111*** (0.0392)
Public Credit Gap (5 year)		-0.00377 (0.00531)				
Inflation			-0.00127 (0.00180)			
Investment to GDP				0.000325 (0.00931)		
Current Account (LN)					-0.0232 (0.0365)	
External Debt (LN)						-0.00377 (0.00470)
Constant	0.0170 (0.150)	0.0204 (0.150)	0.0408 (0.151)	0.0382 (0.153)	0.0454 (0.143)	0.191 (0.213)
Observations	232	232	232	232	232	199
R-squared	0.58	0.570	0.580	0.578	0.579	0.579

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

LN = Natural Log

Source: MSIM. Data as of June 30, 2013.

associated with lower growth. While public debt does enter the regression with the correct negative sign—suggesting increases in public debt are associated with lower future growth—it does not enter the regression with any statistical significance. Private credit, however, retains its strong significance at the 1 percent level, suggesting that once we control for private credit, public debt adds very little to the outlook for future growth. Comparing Specification (4) to (2) illustrates that public debt does not substantially increase the fit (R-squared), nor does it substantially alter the credit coefficient.

Specification (6) adds the rate of inflation to the baseline as some studies suggest it is associated with lower growth. Inflation does enter with the correct negative sign, suggesting higher inflation is associated with lower future growth. However, inflation does not enter the regression with statistical significance at any level, nor does the fit (R-squared) rise. Meanwhile, private credit retains its significance at the 1 percent level, and the coefficient of credit remains relatively unchanged, suggesting that the impact of private credit on future growth remains the same even if we account for inflation.

Specifications (6), (7), and (8), respectively, add the investment-to-GDP ratio, the current-account-to-GDP ratio, and the external-debt-to-GDP ratio to our baseline regression with similar results: none enter the regression equation with any significance, nor do they increase the fit or alter the credit coefficient, while the private credit variable retains its significance at the 1 percent level. In other words, despite claims that so long as credit is funding “productive investment,” credit growth is less of a concern, our results suggest that investment, along with the current account and external debt, is unable to add any meaningful information about future GDP growth once we control for the increase in private credit.

In summary, utilizing a large data set which encompasses the modern era of developing markets suggests that when private credit is growing faster than the rest of the economy, future growth tends to be lower. The same cannot be said for other variables, such as public debt, external debt, or the current account; in other words, they do not have as strong of an impact on future growth. In this vein, private credit appears to be unique and policymakers would do well to keep that in mind.

## Appendix II:

### Finding a Credit Gap Threshold

#### Difference of means test for various percentiles of increases in the credit-to-GDP ratio

Two-sample t test with equal variances

Testing:  $\text{diff} = \text{mean}(0) - \text{mean}(1)$   
 where  $\text{mean}(1)$  corresponds to the percentile in question and  $\text{mean}(0)$  corresponds to all other percentiles

Null hypothesis:  $H_0: \text{diff} = 0$

Alternative hypotheses:  $H_a: \text{diff} < 0$ ,  $H_a: \text{diff} \neq 0$ ,  $H_a: \text{diff} > 0$

	OBS	HA: DIFF < 0	HA: DIFF != 0	HA: DIFF > 0
<b>QUARTILES</b>				
1	188	23.0%	46.0%	77.0%
2	188	74.9%	50.3%	25.1%
3	188	14.0%	27.9%	86.0%
4	188	87.5%	25.0%	12.5%
<b>QUINTILES</b>				
1	151	23.5%	47.1%	76.5%
2	150	47.6%	95.2%	52.4%
3	151	47.8%	95.6%	52.2%
4	150	40.0%	80.0%	60.0%
5	150	86.3%	27.5%	13.7%
<b>DECILES</b>				
1	76	19.8%	39.5%	80.2%
2	75	45.6%	91.3%	54.4%
3	75	82.4%	35.2%	17.6%
4	75	15.6%	31.2%	84.4%
5	75	82.8%	34.5%	17.2%
6	76	15.5%	31.1%	84.5%
7	76	17.6%	35.1%	82.4%
8	74	72.7%	54.7%	27.3%
9	75	31.3%	62.5%	68.7%
10	75	97.4%	5.15%*	2.57%**

- <sup>1</sup> Charles Kindleberger and Robert Z. Aliber. *Manias, Panics and Crashes: A History of Financial Crises*, 6th ed. (New York: Palgrave Macmillan, 2011).
- <sup>2</sup> While Reinhart and Rogoff's 2010 "Growth in a Time of Debt" discussed the relationship between public debt and real GDP growth; we are instead interested in *private* debt.
- <sup>3</sup> Chinese private credit data includes credit from the shadow banking sector and is sourced from Goldman Sachs. Note that credit data for other countries uses credit from banks to the private sector. This raises the question as to whether it is fair to compare the two, but a comparison of banking credit versus all sector credit to the private sector using BIS data confirms that there is very little difference between the two data series for most EM countries, except for China. We think this lends support to the view that China's recent increase in non-banking credit is unique relative to other countries and justifies its inclusion in our analysis.
- <sup>4</sup> Source: Goldsmith, Raymond W. *Financial Structure and Development*. (New Haven, CT: Yale University Press, 1969).
- <sup>5</sup> Source: McKinnon, Ronald I. *Money and Capital in Economic Development*. (Washington, DC: Brookings Institution, 1973).
- <sup>6</sup> Source: Rodrik, Dani. *One Economics, Many Recipes*. (Princeton, NJ: Princeton University Press, 2008).
- <sup>7</sup> Biggs, Michael, Thomas Mayer, and Andreas Pick. *Credit and Economic Recovery: Demystifying Phoenix Miracles*. 2010.
- <sup>8</sup> IMF. *Global Financial Stability Report*. Washington, DC.: September, 2011.
- <sup>9</sup> Dell'Ariccia, Giovanni, Deniz Igan, Luc Laeven, Hui Tong, Bas Bakker, and Jerome Vandenbussche. *Policies for Macroeconomic Stability: How to Deal with Credit Booms*. IMF Staff Discussion Note. Washington, DC: 2012.
- <sup>10</sup> Refers to studies cited within document.
- <sup>11</sup> Borio, Claudio and Mathias Drehmann. Assessing the risk of banking crises—revisited. *BIS Quarterly Review* (March 2009).
- <sup>12</sup> Alessi, Lucia and Detken, Carsten. 'Real Time' Early Warning Indicators for Costly Asset Price Boom/Bust Cycles. ECB Working Paper Series No. 1039. Frankfurt, Germany.: 2009.
- <sup>13</sup> IMF. *Global Financial Stability Report*. Washington, DC.: September, 2011.
- <sup>14</sup> There is no single standard used to measure excess credit growth in the literature, although many studies focus on the credit-to-GDP ratio relative to its nonlinear trend. We have chosen to use the change in the credit-to-GDP ratio as the IMF recently found this to be slightly better than the "credit gap" as a leading indicator of future financial distress. That said, both measures tend to overlap in their "signal" or identification of credit excesses.
- <sup>15</sup> The IMF used two approaches to identify the warning signals of a crisis: their event study suggested that a reasonably clear warning flashes when the ratio of credit-to-GDP is rising by 3 percentage points a year; the second approach using noise-to-signal ratio and regression put this threshold higher, at 5 percentage points a year.
- <sup>16</sup> Schularick, Moritz and Alan Taylor. Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008. *American Economic Review*, American Economic Association, vol. 102(2), pages 1029-61, April 2012.
- <sup>17</sup> IMF. *Global Financial Stability Report*. Washington, DC.: September, 2011.
- <sup>18</sup> Global Property Guide. "Brazilian house prices continue to rise, albeit at a slower pace," June 26, 2013 (from the web: www.global-propertyguide.com).
- <sup>19</sup> Source: Haver Analytics. Data as of June 30, 2013.
- <sup>20</sup> Schularick, Moritz and Alan Taylor. Credit Booms Gone Bust: Monetary Policy, Leverage Cycles and Financial Crises, 1870-2008. *American Economic Review*, American Economic Association, vol. 102(2), pages 1029-61, April 2012.
- <sup>21</sup> He, Dong and Robert N. McCauley. Transmitting global liquidity to East Asia: policy rates, bond yields, currencies and dollar credit. BIS Working Paper, October 2013.
- <sup>22</sup> Nominal GDP in USD in 2012 was estimated to be \$8.20tn.
- <sup>23</sup> Akarli, Ahmet and Michael Hinds. *Turkey's dormant 'fault line.'* Goldman Sachs, May 10, 2013.
- <sup>24</sup> We fully accept that measures of currency valuation are notoriously inconclusive as currencies can remain over or undervalued for quite some time (mean reversion is often slow) and a currency's fair value is often starting-point dependent.
- <sup>25</sup> Baweja, Bhanu and team. *EM Cross Asset Outlook 2014*. UBS, November 11th, 2013.
- <sup>26</sup> Quarter over quarter, annualized growth of aggregate GDP for MSCI Emerging Market index constituents, GDP weighted.
- <sup>27</sup> UBS. *The weakest link in EM*. UBS, May 29th 2013.
- <sup>28</sup> We distribute the various magnitudes of increases in the credit-to-GDP ratio into four equal sections (quartiles). We then run a difference-of-means test for each quartile to determine if any particular quartile has statistically significantly different future growth than the others, either higher or lower. We then repeat the exercise by distributing the increases in the credit-to-GDP ratio into quintiles (5) and then deciles (10). The results of the difference-of-means tests for the various quartiles and quintiles revealed that neither exhibited future growth that was statistically significantly different at even the 10 percent level. However, the tenth decile, which corresponds to increases in the credit to GDP ratio of 25.6ppts or greater, was associated with lower average future GDP growth than the other nine deciles, a finding which is significant at the 5 percent level.
- <sup>29</sup> Caprio, Gerard, Daniela Klingebiel, Luc Laeven, and Guillermo Noguera. *Banking Crisis Database*. The World Bank, October 2003.
- <sup>30</sup> Charles Kindleberger and Robert Z. Aliber. *Manias, Panics and Crashes: A History of Financial Crises*, 6th ed. (New York: Palgrave Macmillan, 2011).
- <sup>31</sup> We list cluster robust standard errors throughout the paper since we are using panel data.

<sup>32</sup> We exclude banking crises from this variable since large increases in private credit tend to be correlated with future banking crises and thus we do not want to fully control for them.

<sup>33</sup> While the coefficient of credit falls from specification (2) to (3), it is predominantly due to the sample falling from  $n=232$  to  $n=169$ . We re-ran specification (2) using only the countries for which we have crisis data, and now the credit coefficient decline was much less from  $-0.0278$  to  $-0.0230$ . This suggests that controlling for crises does not significantly alter the impact of past credit growth on future GDP growth as the coefficient is not significantly altered. What it does suggest is that countries for which we have data on various crises, tend on average to see growth fall by less for a given increase in credit.

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# Private Debt: Seeking Higher Returns in a Low Yield World

## Executive Summary

Investors have faced a low yield environment for the past several years. Historically, the liquid leveraged finance markets—the high yield market and the broadly syndicated loan market (together, the “traditional leveraged credit markets”)—have provided attractive absolute yields to investors.

The traditional leveraged credit markets today provide relatively modest yields, despite an increasing risk profile (e.g. proliferation of covenant-lite bank loans). The private debt market<sup>1</sup> provides a significant premium compared to the traditional leveraged credit market, with lower volatility and less correlation to public equities, and therefore is particularly worth exploring in the current environment.

In this piece, we seek to:

- Review the macro environment of the traditional leveraged credit markets from 2010 to the present
- Evaluate the current private debt market premia
- Discuss benefits and considerations for investors in the mezzanine market

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<sup>1</sup> Private debt markets are defined as middle market loans (companies with less than \$50 million of EBITDA) and mezzanine debt.

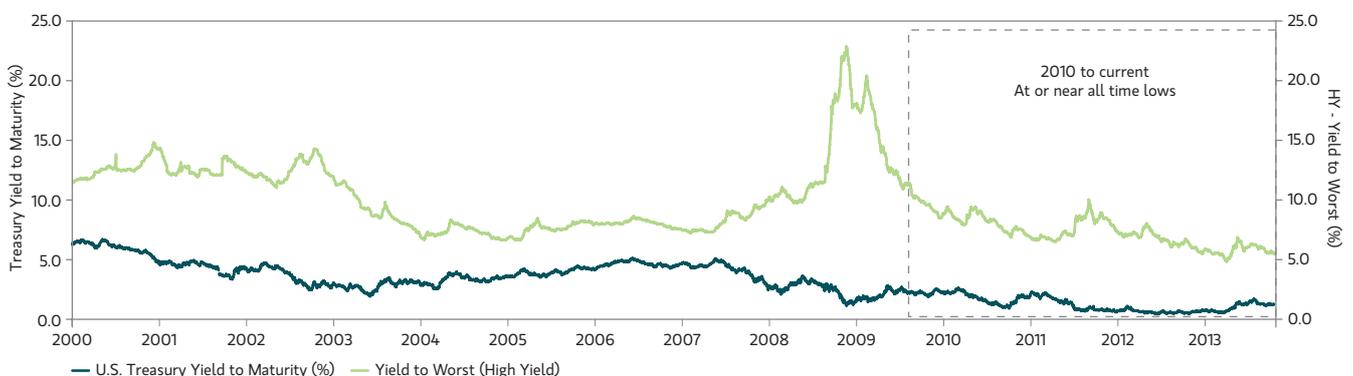
## Traditional Leveraged Credit Markets: Review of the Macro Environment

After a period of high returns in the traditional leveraged credit market, investors have encountered a challenging investing environment recently, with potentially lower returns in these markets. Unprecedented market liquidity since 2010 has contributed to record lows in interest rates and provided a technical underpinning favoring borrowers, leaving traditional leveraged credit investors searching for yield.

### Traditional leveraged credit markets have enjoyed an ideal environment for 4 years...

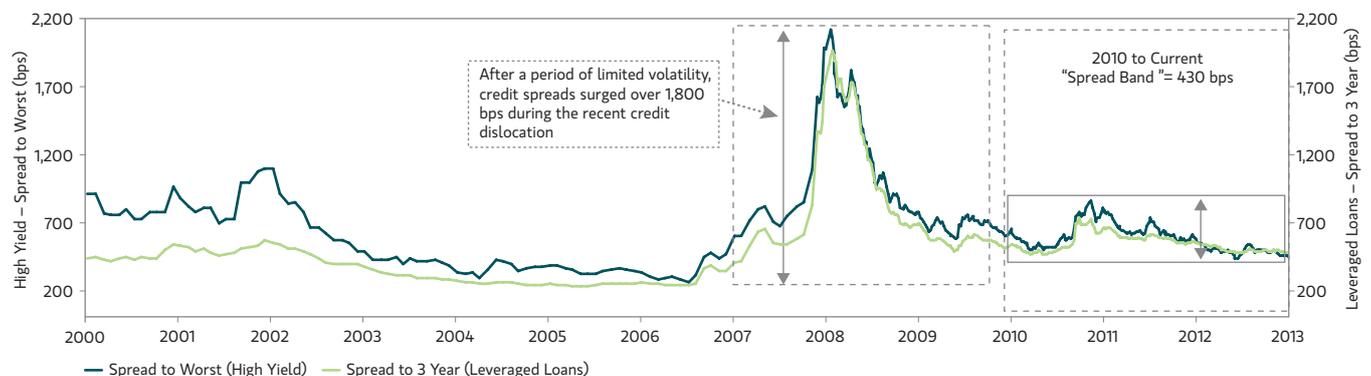
- Absolute level of rates and yields:** The traditional leveraged credit markets have been at or near all-time lows in terms of yield since 2010. As shown in *Display 1*, yields for high yield bonds are currently 5.60 percent<sup>2</sup>; for context, yields have been this low less than 1.1 percent of the time since 2000.
- Relative level of rates and yield (i.e., credit spreads):** Aside from late 2011, credit spreads have experienced minimal volatility since the credit dislocation of 2008 to

Display 1: **Absolute Level of Rates and Yields**



Source: Bloomberg, Barclays High Yield Index, LCD/LSTA Leveraged Loan. Data as of December 1, 2013.

Display 2: **Relative Level of Rates and Yields (i.e., Credit Spreads)**



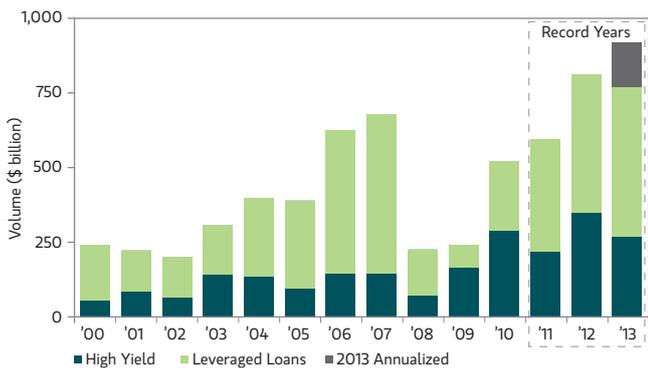
Source: Bloomberg, Barclays High Yield Index. Data as of December 1, 2013.

<sup>2</sup> As measured by the Barclays High Yield Index LCD/LSTA Leveraged Loan. Data as of December 1, 2013.

2009. While high yield spreads are still wide relative to pre-financial-crisis levels, (as illustrated in *Display 2*) absolute yields are at or near record lows.

- **New issue environment:** Strong demand has supported new issue markets, resulting in volumes rebounding and surpassing pre-financial-crisis levels (see *Display 3*). Much of this demand has been driven by refinancing to take advantage of lower rates.

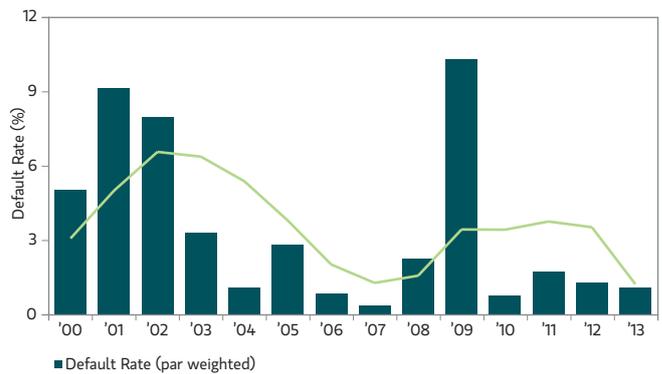
Display 3: Leveraged Finance Market Issuance Volume



Source: S&P Capital IQ Leveraged Commentary. Data as of September 2013.

- **Default:** Default rates have fallen from the spike in 2009 (as shown in *Display 4*), and the rolling four-year average is at an all-time low. This can be partially attributed to improved credit underwriting standards stemming from the credit crisis. In extended periods of low default rates, investors tend to become less risk adverse and credit underwriting standards may become looser.

Display 4: Default Rates

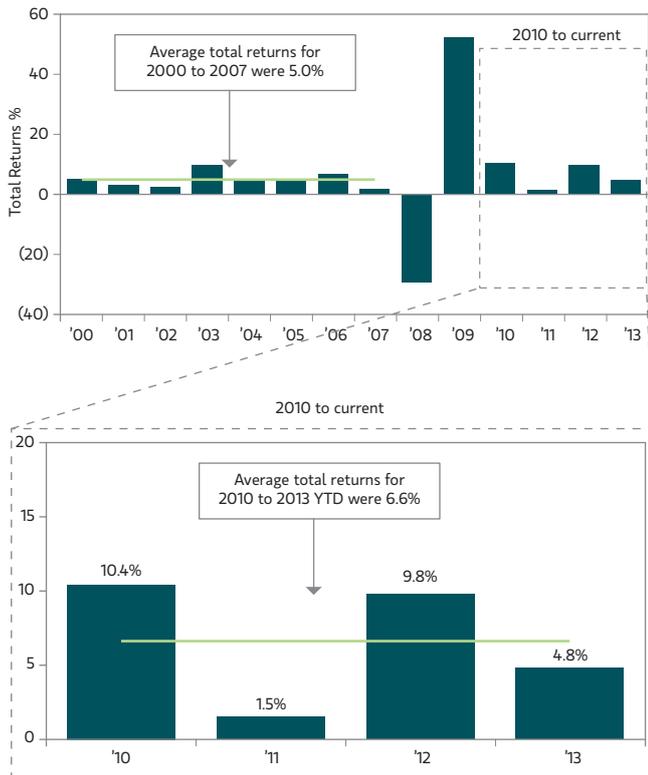


Source: Moody's Investors Service; J.P. Morgan. Data as of September 2013. Rolling four-year averages are backward looking. For example, the 2000 rolling average is the simple average of 1997, 1998, 1999, and 2000. Line = rolling four-year-average default rate

**...Leading to very attractive returns**

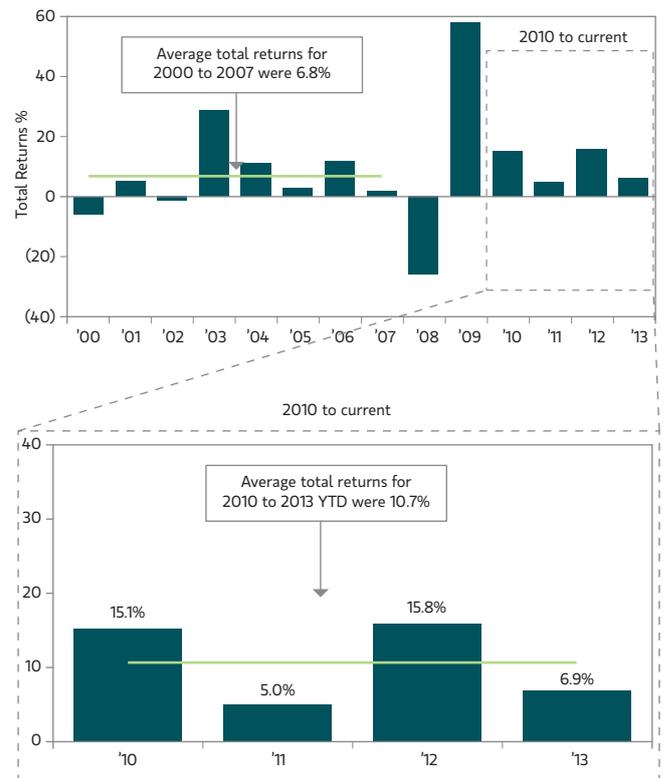
Since 2010, the traditional leveraged credit markets have experienced attractive total returns as evidenced by 6.6 percent average annual returns in the leveraged loan market and 10.7 percent average annual returns in the high yield market (see *Display 5* and *6*). These are higher than the comparable total returns of 5.0 percent and 6.8 percent, respectively, for the high yield and leveraged loan markets in the seven years leading up to the financial crisis of 2008 to 2009.

**Display 5: Leveraged Loan Total Returns**



Source: S&P/LSTA Performing Leveraged Loan Index, 2013 year to date through December 1, 2013.

**Display 6: High Yield Total Returns**



Source: Barclays High Yield Index. 2013 Year to date through December 1, 2013.

**Current yields are quite low, potentially compressing future investor returns**

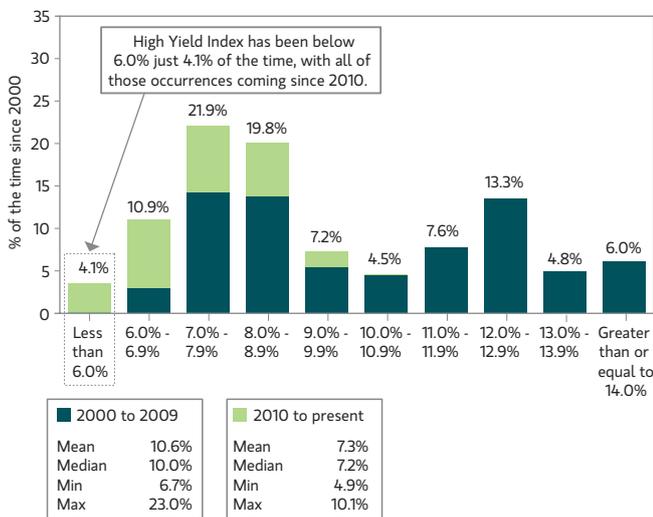
Near-term returns, however, may be compressed given low current yields and little room for capital appreciation (e.g., many outstanding high yield issues and leveraged loans trade at or above par. See *Display 8*: the high yield index currently trades at 103.6). Prior to 2010, the long-term average yield for the high yield index was over 10.5 percent and the index never traded below 6.0 percent. Since 2010, the average is less than 7.5 percent and has not gone above 10.2 percent—these low rates and the modest potential for capital appreciation may make it challenging to realize strong total returns in the near term.

**Display 8: High Yield Index Bid Price**



Source: Bloomberg, Barclays High Yield Index. Data as of December 1, 2013.

**Display 7: High Yield Index Yield to Worst Histogram**



Source: Bloomberg, Barclays High Yield Index. Data as of December 1, 2013.

## Private Debt Market Premium

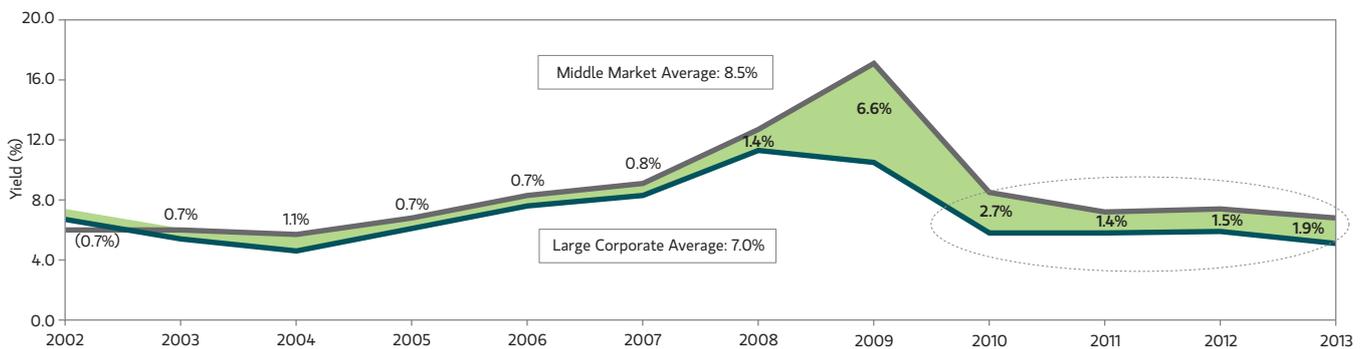
The private debt market serves the needs of borrowers and issuers who are unable to access the traditional credit markets, primarily due to size. This is a niche market that includes approximately \$80 billion of middle market<sup>3</sup> loans and approximately \$40 billion of mezzanine<sup>4</sup> (best thought of as private market high yield), which is typically characterized by: higher expected net returns versus the traditional credit markets, lower volatility and limited correlation to equities.

## Middle market loans

The spread between middle market loan yields and large corporate loan yields has tightened to 1.9 percent in 2013; nevertheless, the spread is still considerably wider than the levels seen prior to the credit dislocation of 2008 to 2009.

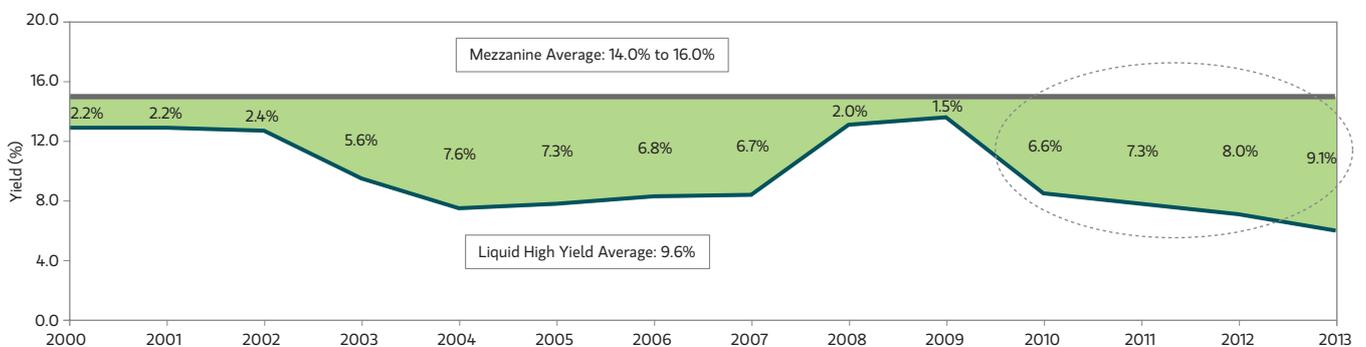
We believe that this wider (relative to history) premium is caused by the supply-demand dynamics currently present in the middle market. We believe this premium may continue to erode to near pre-2008 levels as investors continue to search for yield and while a large amount of capital continues to flow into the asset class.

Display 9: Middle Market vs. Large Corporate<sup>5</sup> Senior Loan Yields



Source: S&P Capital IQ Leveraged Commentary. Data as of December 1, 2013.

Display 10: High Yield to Yield to Worst vs. Mezzanine Average Yields



Source: MSIM estimates, Barclays High Yield Index. Data as of December 1, 2013. Note: HY Yield to Worst (YTW) is average of daily close, per annum.

<sup>3</sup> Companies with less than \$50 million of EBITDA are considered middle market.

<sup>4</sup> MSIM estimates that approximately \$24 billion of the \$40 billion mezzanine market is earmarked for middle market companies.

<sup>5</sup> Companies with more than \$50 million of EBITDA are considered large corporate.

## Mezzanine

In contrast with middle market senior loans, the premium (spread) of mezzanine yields over the liquid high yield yields widened to 9.1 percent in 2013, above the historical average of 5.4 percent.

We believe that the higher returns and the wider premium of mezzanine has persisted due to the supply-demand dynamics for capital in the middle market and the fact that mezzanine tends to be an absolute return asset class. In periods where the yields for the liquid high yield market widen, the mezzanine premium compresses. Conversely, in a low yield environment, mezzanine premiums tend to be amplified.

We believe that mezzanine is a relatively more attractive asset class than middle market senior loans due to several key factors:

- Higher historical average private debt illiquidity premium;
- The mezzanine private debt illiquidity premium has grown in a low return environment and has represented a very large component of the total return; and
- Barriers to entry are higher in the mezzanine asset class vis-à-vis middle market loans and thus we believe the relatively larger illiquidity premium should persist.

## Private Debt Market Outlook

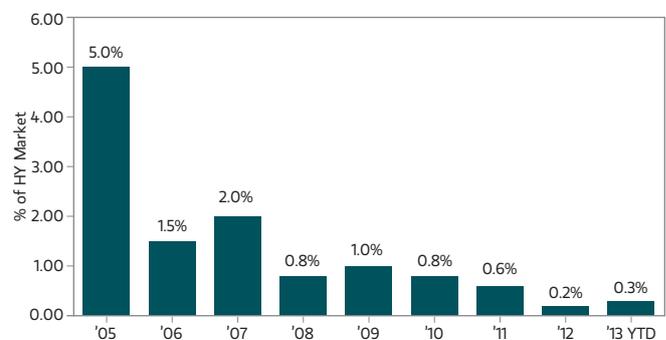
We believe the outlook for investing in the private debt market is positive due to persistent structural factors preventing middle market companies<sup>6</sup> from accessing the broader traditional leveraged credit markets. The continued demand for capital creates a dynamic in the middle market leveraged credit markets that is less amenable to issuers, and more favorable to investors, especially versus the traditional credit markets

## Supply factors

Public high yield remains largely inaccessible to smaller companies, and traditional suppliers of middle market credit capital are constrained, as banks, second-lien loans and securitized markets have all experienced decreases in their abilities to serve in this capacity

- **Public high yield inaccessible to smaller companies:** The traditional leveraged credit markets have normalized since the credit crisis, but middle market companies are rarely able to access these markets. For context, the average issuer in the liquid high yield market has more than \$1 billion of debt outstanding.<sup>7</sup> On average, small high yield issuers have represented less than 1 percent of new issuance since 2007 (see *Display 11*).

Display 11: Small High Yield Issuers % of Market



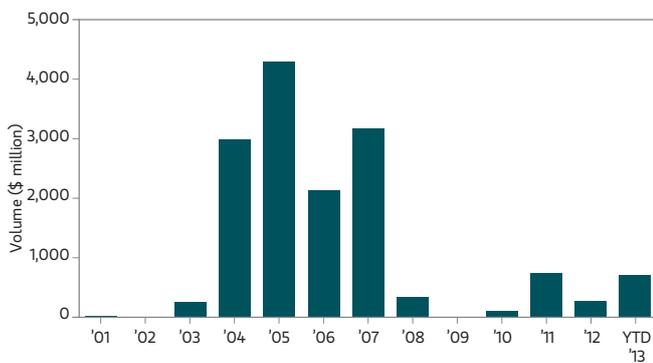
Source: S&P Capital IQ Leveraged Commentary. Data as of December 2013. Small high yield issues are less than \$150MM and exclude add-ons.

<sup>6</sup> Companies with less than \$50 million of EBITDA are considered middle market.

<sup>7</sup> As of December 1, 2013, the average amount outstanding per issuer in the BAML HY Index is \$1.2 billion.

- **Second-lien loans:** As shown in *Display 12*, second-lien loan markets, which once served as a major source of supply of junior debt, have fallen significantly since 2007. Despite the recent uptick, volume is still less than 20 percent of the 2005 peak (as illustrated in *Display 12*).

Display 12: Middle Market Second Lien Loan Volume



Source: S&P Capital IQ Leveraged Commentary. Data as of September 2013.

- **No new mezzanine fund managers:** We do not believe that there have been any new corporate mezzanine fund managers formed since 2010.

### Demand factors

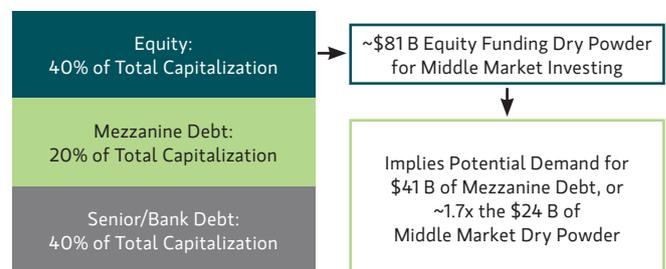
While the supply of credit capital for middle market companies remains constrained, demand for middle market credit remains strong due to the expected deployment of committed, uninvested private equity capital and the refinancing overhang of middle market companies.

- **Uninvested private equity:** After raising a record amount of capital from 2005 to 2007, private equity funds have a significant amount of committed, uninvested capital, which is expected to be deployed over the next several years. We estimate that approximately \$81 billion, of the \$367 billion total, represents the uninvested capital of funds that target middle market investments.

*Display 13* illustrates the potential Leveraged Buy Out (LBO) funding demand utilizing a typical middle market LBO capital structure, with 20 percent of the total capitalization as mezzanine debt, implying approximately \$41 billion of

demand, or approximately 1.7 times the uninvested capital for middle market mezzanine funds.

Display 13: Potential LBO Funding Demand<sup>8</sup>



Source: Preqin, ACG / Pitchbook Private Equity and MSIM estimates. Data as of September 2013.

- **Middle market LBO volume:** Both the dollar volume and number of deals are well below historical averages, and a return to a more normalized level could be a significant tailwind for demand. We estimate that average middle market LBO activity since 2010 has been approximately 40 percent below historic levels.<sup>9</sup>
- **Refinancing overhang:** The ongoing refinancing wave experienced in the liquid high yield and broadly syndicated loan markets beginning in late 2010 reshaped the “maturity wall” to a more manageable level. Nevertheless, middle market companies still have a significant amount of credit maturing between 2014 and 2018, which will drive demand, albeit at a much lower level than LBO related activity.

## Mezzanine Debt Overview

Mezzanine debt, which can best be thought of as private high yield for middle market companies, is a niche, illiquid market, accounting for a small fraction of the broader leveraged finance markets.

Mezzanine debt is typically utilized in LBOs, recapitalizations, refinancings, acquisitions and other transactions for middle

<sup>8</sup> MSIM estimates that approximately \$24 billion of the \$40 billion mezzanine market is earmarked for middle market companies.

<sup>9</sup> Source: S&P Capital IQ Leveraged Commentary. Data as of September 2013. Historical levels measured by U.S. middle market leveraged buyout volume since 1998.

market companies. As shown in *Display 13*, mezzanine debt occupies the layer of a company's capital structure that is subordinated to bank debt and senior to equity.

Mezzanine debt investments are typically structured as a senior or subordinated unsecured note, which is often paired with an equity component or the equity co-investment, to afford additional upside potential.

#### Display 14: Illustrative Capital Structure with Mezzanine

<b>Senior Secured / Bank Debt</b> 30% to 50% of Total Capitalization 2.5x to 3.5x EBITDA
<b>Mezzanine Debt</b> 15% to 25% of Total Capitalization 1.0x to 1.5x EBITDA
<b>Equity</b> 25% to 50% of Total Capitalization 1.5x to 3.0x EBITDA

Source: MSIM. Note: This capital structure is presented for illustrative purposes only. There can be no assurances that future capital structures will be consistent with this example.

#### Return profile<sup>10</sup>

Our experience has shown that expected gross returns for mezzanine are generally in the mid-to-high teens range and tend to be on the higher end of the range when credit is in short supply.

The mid-to-high teens range is driven by four main components:

**1. Interest:** Total coupons are typically in the 13 to 15 percent range and can be a combination of cash and paid in kind (PIK).<sup>11</sup>

- Cash coupons are generally 11 to 13 percent; PIK components are typically 1 to 4 percent

<sup>10</sup> Past performance is not indicative of future results. Expected gross returns are based on research regarding historical results and are subject to change, and may not necessarily come to pass. They are provided for informational purposes only and do not represent the performance of any Morgan Stanley investment.

<sup>11</sup> "Paid-in-kind" is added to the face value of the note.

**2. Upfront fees:** Fees can be paid upfront at the time of origination in the form of cash or as an original issue discount (OID), which is effectively a purchase of the note at a discount to par.

- Typically 1.5 to 3.0 percent

**3. Call premiums/prepayment penalties:** If the debt is repaid before its maturity date, the borrower is often required to pay prepayment premiums in the first three or four years after the issuance date.

**4. Equity co-investment:** Offers upside potential to the debt investment.

*Display 15* illustrates the return profile at various interest rate and upfront fee levels for a hypothetical mezzanine note with a no equity co-investment.

#### Display 15: Mezzanine Note 4–Year Gross IRR Sensitivity

		UPFRONT FEE/OID			
		3.0%	2.5%	2.0%	1.5%
TOTAL INTEREST RATES <sup>(1)</sup>	13.0%	14.7%	14.6%	14.4%	14.2%
	13.5%	15.3%	15.1%	14.9%	14.8%
	14.0%	15.9%	15.7%	15.5%	15.3%
	14.5%	16.4%	16.3%	16.1%	15.9%
	15.0%	17.0%	16.8%	16.6%	16.5%

1) Assumes 12.0 percent cash interest with the PIK component variable. IRR = internal rate of return

Note: Terms are presented for illustrative purposes only. Calculation reflects quarterly compounding.

The illustrative example is not intended to predict or project investment performance of any investment or investment strategy. There can be no assurance that any investment return can be realized or that actual returns or performance results will not be materially lower than those estimated herein. The returns do not reflect the performance of any Morgan Stanley investment.

## Mezzanine: Benefits and Considerations for Investors

### Benefits

- **Premium to traditional leveraged credit market returns:** Mezzanine debt typically pays a cash coupon in the range of approximately 11 to 13 percent. Mezzanine debt is typically priced to yield in the mid-to-high teens, which has been superior to long-term average high yield levels.<sup>12</sup>
- **Senior to private equity:** Mezzanine debt has greater seniority in a company's capital structure relative to equity. Typically, there is a 25 to 50 percent equity cushion to mezzanine debt, which can afford higher downside risk management to investors.
- **Low historical volatility and low correlation to the liquid high yield market and equities:** Historically, mezzanine has provided higher returns per unit of volatility than high yield and private equity funds over the long run. Mezzanine debt has had low mark-to-market volatility as the market is illiquid and tends to be absolute return driven. In contrast, the liquid high yield market is much more volatile and is highly correlated with equity volatility.
- **Equity component:** Mezzanine debt is typically structured as a subordinated or unsecured note paired with an equity component (generally in the form of common stock, preferred stock, or warrants), which can add potential upside to returns.
- **Prudent deal structures and lower leverage than traditional leveraged credit markets:** Middle market LBOs typically have less leverage than large-capitalization LBOs. Historically, middle market LBO structures have had on average 0.6 times last twelve months EBITDA less total debt than large corporate LBO structures.<sup>13</sup>
- **Private, nonsyndicated deals:** Middle market debt transactions are often directly originated, privately negotiated and involve a small, stable lending group. This affords investors flexibility in structuring terms, covenants, and other measures (such as access to management and board observation rights) that help mitigate risk. We believe that a small, aligned lender group is more readily able to respond to borrower needs while

also protecting the overall performance of the investment as compared to transactions in the traditional leveraged credit markets. In those markets, transactions are typically syndicated to a wide range of institutions and the presence of an active secondary market can lead to significant changes in the investor base, resulting in disparate agendas.

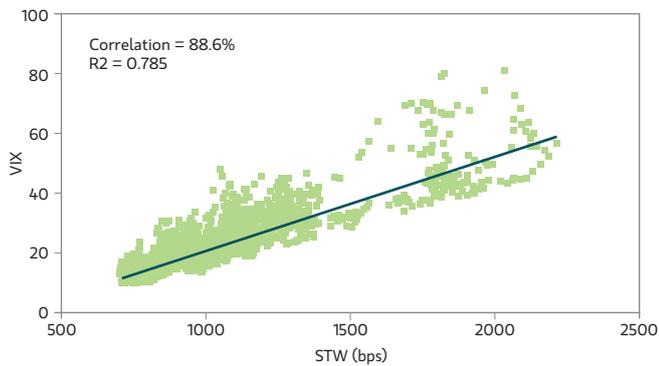
### Considerations

- **Illiquidity:** Investors in mezzanine debt need to have capacity for some level of illiquidity in their portfolios. Since there is typically no liquid secondary market for mezzanine debt, it is inherently a long-term buy-and-hold investment. The average expected life of a mezzanine investment is 2½ to 3 years, although the contracted maturity is five to seven years.
- **Limited access to investment opportunities:** The universe of available mezzanine investments is significantly smaller than opportunities in the traditional leveraged credit markets due to the market size and private nature of the transactions. A successful fund manager needs abundant sources of transaction deal flow, including strong relationships with private equity funds, middle market corporations, investment banks, and other sources. As such, it is imperative for investors to consider any potential manager's ability to source attractive investment opportunities.

<sup>12</sup> There can be no assurance that any mezzanine debt investment will be profitable.

<sup>13</sup> Source: S&P Capital IQ Leveraged Commentary. Data as of September 2013.

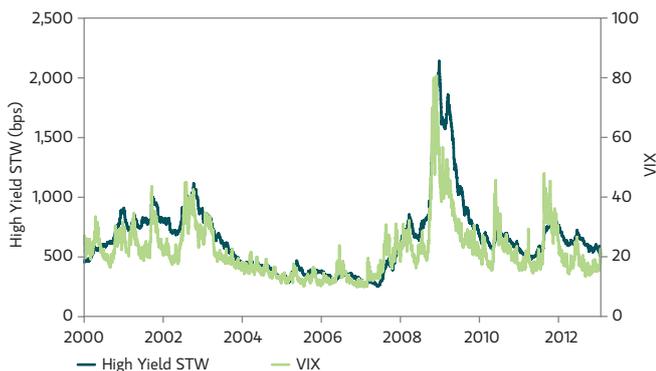
### Display 16: Correlation: High Yield Returns vs. Equity Volatility (VIX)



Source: Capital IQ and Barclays High Yield Index. Data as of December 1, 2013.

VIX is the Chicago Board Options Exchange Volatility Index® and measures market expectation of near-term volatility conveyed by stock index option prices. STW is the spread-to-worst, which is calculated as the yield-to-worst (YTW) minus the YTW on a similar duration Treasury.

### Display 17: High Yield Spread (STW) vs. Equity Volatility (VIX)



Source: Capital IQ and Barclays High Yield Index. Data as of December 1, 2013.

VIX is the Chicago Board Options Exchange Volatility Index® and measures market expectation of near-term volatility conveyed by stock index option prices. STW is the spread-to-worst, which is calculated as the yield-to-worst (YTW) minus the YTW on a similar duration Treasury.

## Conclusion

In our analysis of private debt markets and mezzanine vis-à-vis the traditional leveraged credit markets, we have found that

- Traditional leveraged credit markets are currently trading at historically low yields and high dollar prices and, in our view, do not present a compelling risk-return profile for investors.
- The private debt market has generated a significant premium to the traditional leveraged credit markets, with lower volatility and less correlation to public equities. It is supported by persistent structural factors in the middle market, providing an attractive yield to investors. The mezzanine private market premium has typically been much larger than the middle market loan private market premium.
- Since mezzanine returns tend to be relatively more attractive in a low-rate environment, we believe the mezzanine asset class may represent an attractive investment opportunity for investors to consider, provided that they can bear a certain level of illiquidity in their portfolio.

Against the backdrop of rate compression in the traditional leveraged credit markets, resulting in potentially lower returns for investors, we believe that the private debt market, particularly mezzanine, presents a compelling opportunity for achieving higher returns with lower volatility and less correlation to public equities.

The document has been prepared as information for investors and it is not a recommendation to buy or sell any particular security or to adopt any investment strategy. This material has been prepared using sources of information generally believed to be reliable but no representation can be made as to its accuracy. Information in this presentation does not contend to address the financial objectives, situation or specific needs of any individual investor. The views expressed in the presentation are those of the authors as of April 2012, are subject to change based on market and economic conditions, and are not necessarily representative of the opinions and views of the firm as a whole. Forecasts and estimates are based on current market conditions, subject to change, and may not necessarily come to pass.

All investments involve risks, including a loss of principal. These investments are designed for investors who understand and are willing to accept these risks. Performance may be volatile, and an investor could lose all or a substantial portion of his or her investment. Leveraged finance investments have significant risks as a result of business, financial, market or legal uncertainties. The current turmoil in the global financial system has heightened the risks associated with such investments, and it is possible that an investment in leveraged finance could result in significant losses during this economic cycle.



# European Equities, Improving Fortunes

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## Summary

Despite newspaper headlines of interminable government bailouts, complaints of regional dysfunction, and the occasional political hiatus, the companies and markets of Europe have been improving, almost by stealth. Given these perceived headwinds, global investors who choose to underweight Europe in their portfolios face a continuing challenge in trying to decide how to next adjust their exposure.

What is often overlooked is that the likely improvement in economic growth in the euro area in 2014 should actually be rather impressive. A probable turnaround from contraction in real GDP this year of 0.4 percent to growth of 1.0 percent in 2014 implies an improvement of 1.4 percent, for what is a very large economy.<sup>1</sup> No other region of the world is likely to experience an acceleration in growth of this magnitude.

It is true that there remain clearly identifiable risks that may affect Europe's return to robust economic health. But, with European equities looking attractive in terms of longer-term valuations, it may be possible for patient and disciplined stock selection to boost performance.

## Equities versus Bonds

Europe's equity markets have been rising over the last couple of years. Although punctuated with periods of volatility, worries about fiscal positions, Greek bailouts and elections, Europe's image is improving, slowly.

## AUTHOR

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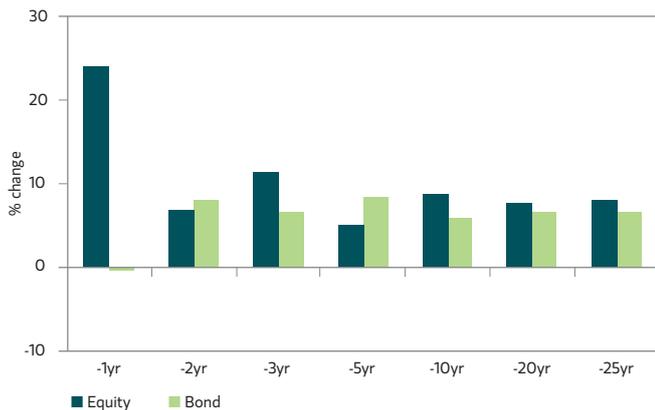
<sup>1</sup> Source: Datastream, Credit Suisse Research, JP Morgan Research. Data as of July 2013.

For years prior to 2013, a major trend was the fall in yields and the rise in prices of government bonds. More recently, bonds have sold off. Some commentators have suggested that this development may mark the start of a new episode in which equity returns exceed bond returns—particularly as it is possible to see scenarios wherein yields could rise.

Rolling returns from equities are now starting to look competitive relative to those of bonds. In the U.S., over 1, 2, 3, 5, 10, 20, and 25 years (S&P 500 Index to the end of June 2013), equity returns are ahead of bond returns. In Europe at the moment the score is 5 to 2 in favor of equities if one uses Germany's DAX as a suitable proxy of their performance.

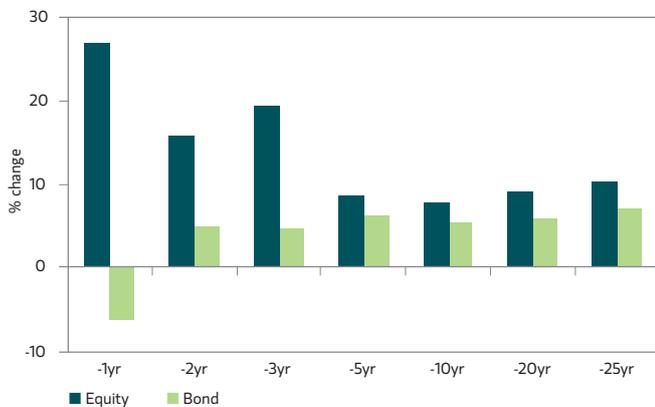
**Display 1: Equities Are Building an Attractive Track Record**

German Annualized Returns



Source: Citi, Datastream. Data as of June 30, 2013.

U.S. Annualized Returns



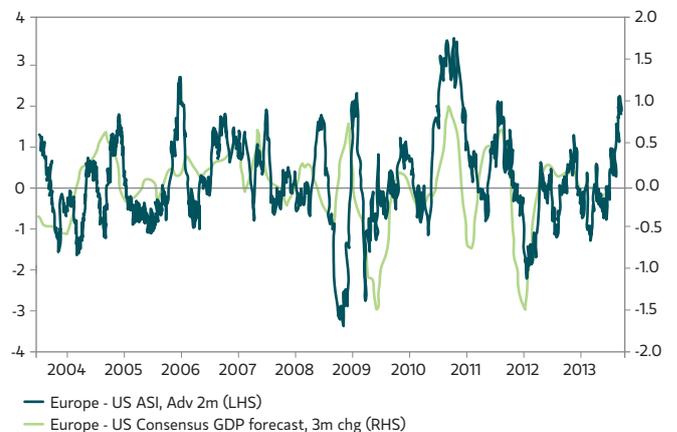
Source: Citi, Datastream. Data as of June 30, 2013.

**Why Europe looks more positive over the longer term**

The improvement in the relative (and absolute) performance of equities is based on sound fundamentals. Most analysts are looking for GDP growth in Europe of 1 percent in 2014. That may not sound like much, but it needs to be considered in relation to the 0.4 percent contraction in GDP that is widely anticipated in 2013. The turnaround in GDP growth, or the acceleration, is therefore 1.4 percent. This positive change in GDP growth is larger than the positive changes that are envisaged for other parts of the world.

Actually, activity in Europe over the recent past has surprised observers on the upside to a much greater extent than activity in the U.S.

**Display 2: European Economic Activity Has Surprised Positively**

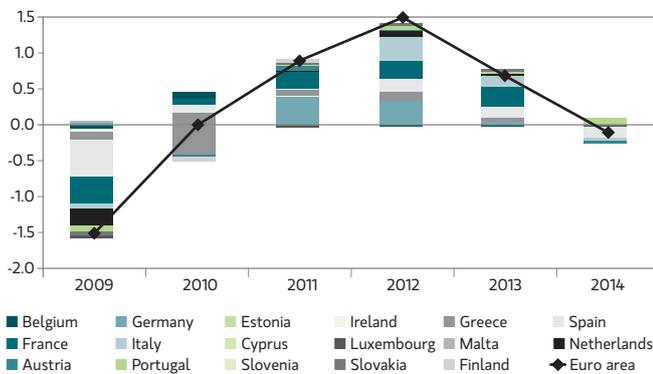


Source: ASR Ltd. / Thomson Reuters Datastream. Data as of July 2013.

### Fiscal headwinds abating

All this begs the question of what is underlying the general improvement in economic activity in the euro area. Fiscal policies across the region are a part of the answer. In 2012, fiscal policies resulted in overall GDP growth being close to 1.5 percent lower than it otherwise would have been, acting as a sizeable headwind to overall activity. That headwind was about 0.8 percent of GDP in 2013. In 2014, however, fiscal policies could actually act as a boost to overall activity—or as a tailwind. Detailed projections in relation to these matters need to be used with caution: the trend, though, is clearly in the right direction.

Display 3: The Impact of Austerity



Source: European Commission, UBS. Contributions from individual countries are GDP weighted. Data as of August 1, 2013.

Positive changes are also visible in labor markets. Thanks in part to improving productivity, unit labor costs in “peripheral” euro area countries have fallen. This has contributed to the rise in exports from the euro area (and other nearby countries). About 55 percent of trade from continental European countries is with countries that are outside continental Europe—such as the UK, the U.S. and most emerging markets.

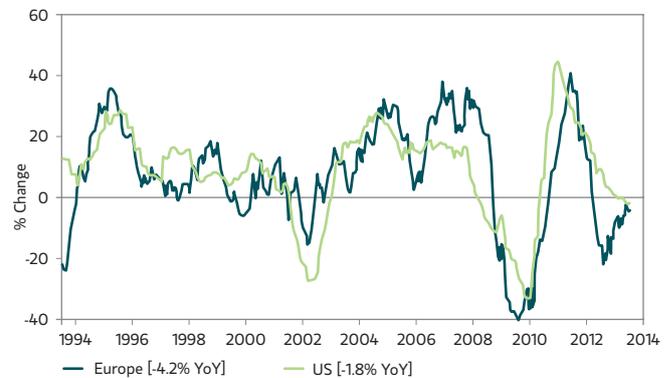
In many cases, the growth of the export markets is relatively high, or at least improving. Crucially, European companies that are global leaders in their respective fields produce goods and services that are seen as being desirable. What these otherwise quite diverse companies have in common is that

they produce unique, high value added products for which there is strong demand globally. Crucially, the products are difficult for rivals to produce, whether because of the strength of the brands, the quality of the product that is involved or protection offered by patents.

This good news is feeding through into earnings expectations. Consensus corporate earnings per share (EPS) growth forecasts for 2014 are around 12 percent to 13 percent. A global recovery in demand is contributing to the strengthening growth in the euro area and to corporate earnings. All this is already being reflected in the purchasing managers indices that are being published.

Display 4: Europe Is Well Linked Into Global Economic Expansion

12MM Trailing EPS Growth—Percentage Growth Year-on-Year (YoY)

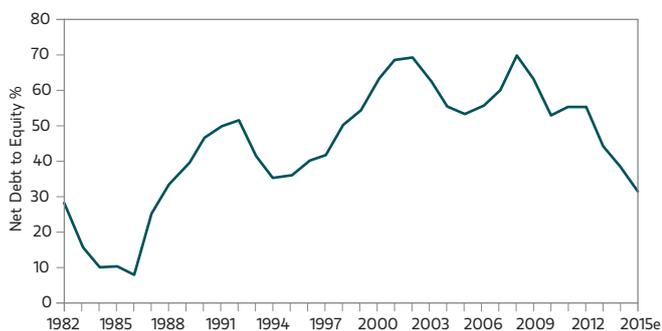


Source: ASR Ltd. / Thomson Reuters Datastream. Data as of July 2013.

Moreover, this improvement in economic growth and corporate earnings is taking place at a time that companies in non-financial sectors are in fairly good shape financially. Net debt-to-equity figures have reached low levels last seen in the late 1980s. One result of this is that merger and acquisition (M&A) activity has picked up; nevertheless, even the companies that are most active in terms of their dealmaking are generally careful to ensure that they retain good buffers of cash and liquidity.

**Display 5: Healthy Companies: Low Debt**

European Nonfinancials at Cycle-Low Debt Ratios

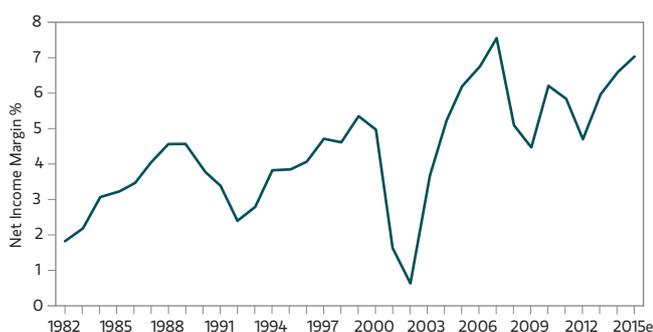


Source: MSCI, Worldscope, IBES, Morgan Stanley. Data as of August 2, 2013.

Note: Data excludes financials sector  
e = IBES estimates

**Display 6: Healthy Companies: Rising Margins**

European Nonfinancials Margin Progression



Source: MSCI, Worldscope, IBES, Morgan Stanley. Data as of August 2, 2013.

Note: Data excludes financials sector  
e = IBES estimates

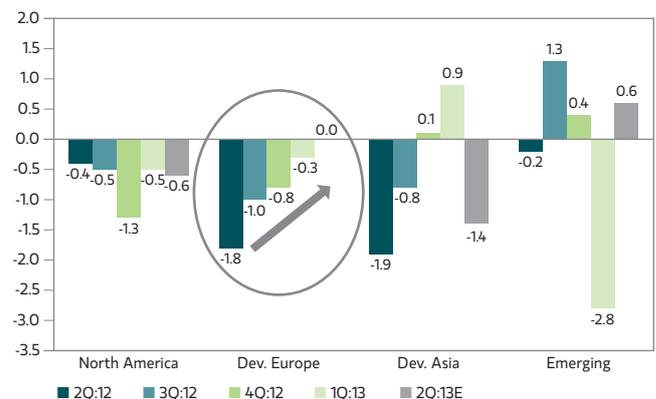
Net income margins are also improving. Rising margins signify that a lot of companies are actively working to improve their operational efficiency and working capital management. This is particularly evident in industries where companies do not naturally have pricing power. The pick-up in sales that can reasonably be expected in 2014 as overall GDP growth improves should boost margins even further.

Further, pricing power has been improving steadily in Europe, at a time that commodity prices have been soft or stable. The implication is that European companies with clear global leadership in terms of brand, technology or patent protection have been more able to exploit these advantages.

In the short term, adverse currency movements may cause some volatility in corporate earnings. The longer-term trends, though, are positive.

**Display 7: Pricing Power in Europe Has Been Improving**

Global Large Capitalization Stocks ex-Energy, Second Quarter 2012 to Second Quarter 2013e (as of August 6, 2013)



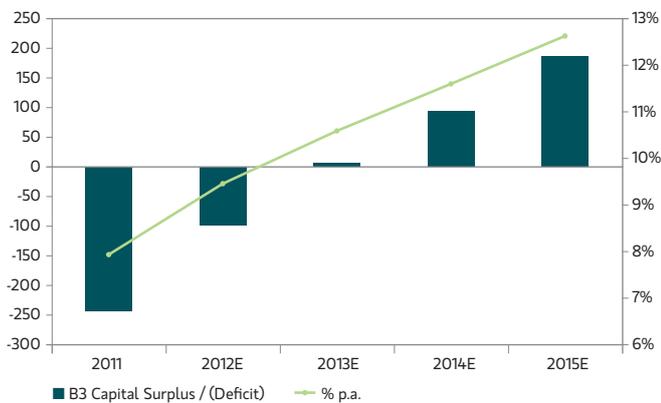
Source: Compustat Factset, Bernstein analysis. Data as of August 2013.  
e = estimate

**Financials**

Europe's financial sector was at the heart of the great crisis of 2008 to 2009. The sector has been subject to a lot of scrutiny from regulators and investors since then. Debates continue in relation to the Basel III rules that pertain to capital adequacy ratios. Nevertheless, over the last few years, there has been much change, which has generally been for the good. Non-core businesses have been divested. Operating costs have been pared. Risks have been reduced. Portfolios have been rationalized. At long last, investors are beginning to respond favorably to situations where large banks have clearly improved their leverage positions. Thanks in part to retained earnings and in part to the past issuance of securities, the European banks' capital positions are improving steadily.

### Display 8: European Bank Capital Is Rising

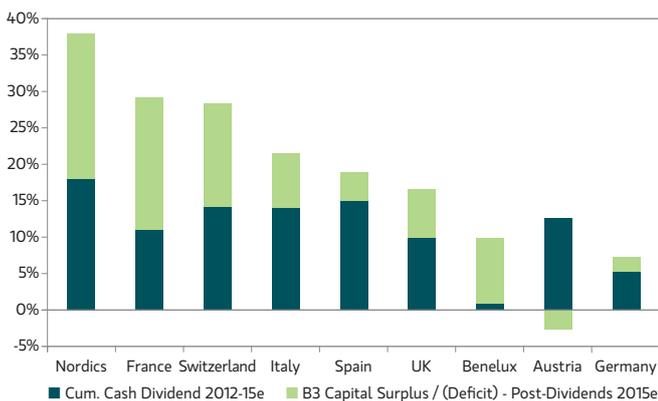
Sector Capital Deficit Turning to Surplus, 2011 to 2015e (€B)



Source: Citi Research. Data as of May 2013.

Note: surplus / (deficit) is before 2012e to 2015e dividends  
e = estimate

### Capital Surplus Positions: by Country, 2015e, Percentage of Market Capitalization



Source: Citi Research. Data as of May 2013.  
e = estimate

### Valuation

These factors provide a more attractive backdrop for European equities than we have seen over the past few years. However, long-term investors profit from markets by taking advantage of attractive valuations. And while European equities have rerated recently, we still see the potential for positive returns

for long-term investors who profit from markets by taking advantage of attractive valuations.

### Display 9: European Equities Are Still Cheap

European Market, Trend P/E, 1980 to 2013



Source: Mirabaud Securities. Data as of July 2013.

Over the last 30 years, other than during the technology media and telecommunications bubble around 2000, the average trend price/earnings (P/E) ratio has been around 13. For about one third of the time, the trend P/E ratio has been between that level and about 16. For another third of the time, the trend P/E ratio has been between 13 and 9.7, or thereabouts. Currently, the trend P/E ratio is 9.2 times.<sup>2</sup>

By these metrics, European equities look inexpensive. The same is true if one considers price/book value (P/B) ratios and the equity risk premiums. It should be emphasized, though, that these figures include the financials.

What really matters, though, is this: a rerating of European equities in terms of the trend P/E ratios could have a very substantial and positive impact on the returns that they deliver shareholders over the next five years. If one assumes that earnings per share grow at a fairly modest rate of 20 percent over 5 years (3.7 percent per annum), then even if the market is only rerated to the “lower tramline,” one standard deviation below the mean, total returns will nevertheless be about 4.2 percent per annum. If the trend P/E ratio actually reverts to the long-term mean, European equities could

<sup>2</sup> Source: Mirabaud Securities. Data as of July 2013.

provide annual returns of 9.5 percent. In the event that the trend P/E ratio rises to one standard deviation above the mean (i.e., the “upper tramline”) the corresponding figure could be as much as 14 percent.

## Conclusion

The economic picture in Europe is improving. This is evidenced by the 1.4 percent turnaround in the euro area’s likely GDP growth rate in 2014 relative to that of 2013. In comparison with other parts of the world, this is a very large improvement and one that is already visible in the various purchasing managers indices that are being published.

Hopefully this will have a positive impact on markets and on stocks. Corporate profits are improving, as are balance sheets in the euro area’s financial sector. The political environment is more stable than it has been in the past.

On a longer-term basis, valuations are attractive. There are some risk factors that may generate volatility in markets generally. Nevertheless, it should be possible for patient and disciplined managers to generate consistent performance by careful stock selection. As ever, Europe is home to a number of companies that have strong balance sheets, pricing power and superior management.

## DISCLOSURES

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The indices do not include any expenses, fees or charges and are unmanaged and should not be considered investments. An investor can not invest directly in any index.

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## RISK CONSIDERATIONS

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# Evaluating Alternative Betas: When Is a Portfolio Efficient Enough?

## Introduction

According to Fama and French, the capital asset pricing model (CAPM) developed by William Sharpe and John Lintner in the 1960's marks the birth of asset pricing theory. Unfortunately, this theory has had a difficult life over the last five decades. Extensive empirical tests have generally rejected the validity of its predictions.<sup>1</sup> Moreover, there is even a view, first expressed by Richard Roll that the theory is inherently untestable because key elements of the theory, in particular the so-called "market portfolio" are un-observable.<sup>2</sup>

Fama and French conclude their excellent review of the CAPM by saying that the CAPM is a "theoretical tour de force," but "that despite its seductive simplicity, the CAPM's empirical problems probably invalidate its use in applications."<sup>3</sup>

In the light of these considerations, an investor might be tempted to reject asset pricing theory altogether as a portfolio construction technique and look to other methods of building an investment portfolio. Abandoning CAPM also implies abandoning a view that a capitalization-weighted portfolio of assets has any special claim of being better than other possible portfolios in the absence of specific views on asset-expected returns.

This creates a dilemma for a large segment of investors who are passive. For a long time, most passive portfolios were constructed using capitalization weights for each asset in the portfolio. As long as an investor believes in CAPM then

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<sup>1</sup> Fama, E.F. and French, K.R. "The Capital Asset Pricing Model: Theory and Evidence", *Journal of Economic Perspectives*, 8: 3 (Summer 2004), pp 25-46

<sup>2</sup> Roll, Richard "A Critique of the Asset Pricing Theory's Tests' Part I: On Past and Potential Testability of the theory.", *Journal of Financial Economics*, (1977) 4:2, pp. 129-176

<sup>3</sup> Fama and French, p.44

there is a reasonable hope that a capitalization-weighted portfolio that is broad enough in the sense of including a large number of asset classes will approximate the “true” market portfolio. Since the market portfolio is “mean variance efficient” (MVE), if CAPM is true then the actual investor’s broadly diversified market capitalization portfolio may be close enough to being MVE. This means that for the amount of risk the portfolio takes its expected return will match or exceed that of any other portfolio with the same risk.

Once CAPM (or a variant on this theory) is rejected, then there is no reason to believe that a capitalization-weighted portfolio will have an attractive expected return relative to its risk. As a result, investors are investigating whether other ways of constructing passive portfolios may lead to more attractive risk-to-reward trade-offs than a typical capitalization-weighted portfolio. One productive avenue of research has been to construct portfolios looking only at risk. These “Alternative Beta” approaches include risk parity (or equal risk contribution), minimum variance and maximum diversification portfolio construction techniques.

Ultimately, however, investors cannot escape dealing with expected returns. If a pure risk-based approach is used, then there needs to be some reason why expected returns for this approach will be satisfactory relative to the risk taken. For example, a minimum variance portfolio approach is justified if an investor believes that expected returns for all assets are the same—or alternatively that they are so uncertain that assuming they are the same is as good an estimate as any.

Risk parity and maximum diversification can be justified intuitively if each asset’s expected return is roughly proportional to its own volatility. For example, a risk parity portfolio allocation to each asset is such that the contribution to risk (on the margin) of each asset is equal. This is intuitive if the expected returns of all assets are proportional to their risks. This allocation would not be intuitive, however, if some assets had a much higher expected returns relative to risk than others. In this case, one could argue that a disproportionate amount of risk could be justified for the asset with a very high expected return relative to its risk.

Moreover, risk parity portfolios and maximum diversification portfolios can be MVE, although the assumptions needed for this to happen may appear restrictive. For example, it is possible to show that if each asset’s expected return is exactly proportional to that asset’s volatility, and if the correlations of

all the assets are the same, then a risk parity portfolio is MVE. However, this does have some relatively counter-intuitive implications. If a risk parity portfolio is MVE then the allocation to each asset would be inversely proportional to its expected return (please see *Appendix III*).

## Can an Investor Use CAPM Insights Even If CAPM Is Invalid?

In practice, a portfolio manager may wish to take advantage of some of the insights from capital markets theory realizing, however, that in its pure form the CAPM model is now generally thought to be invalid. One of the key assumptions underlying CAPM, first discussed by Harry Markowitz in a seminal 1952 paper, is that all else being equal, an investor’s preference for one portfolio relative to another depends on the expected return of the portfolio and on its variance (or standard deviation). That is to say, that for all feasible portfolios with a given expected return an investor will prefer the portfolio with the smallest standard deviation of return.<sup>4</sup>

Regardless of whether CAPM is true, this preference ordering is appealing and an investor may wish to apply it in selecting a portfolio. It is clear that a particular investor’s preferences can have this characteristic even if other investors do not and if CAPM is invalid. In effect, a particular investor looking at only a particular well-defined set of assets can in principle decide to select only portfolios of this defined set of assets that have the highest expected return given their level of volatility. The portfolios that have this characteristic can be called efficient enough (EE) and the set of all portfolios that have this characteristic can be called the efficient enough frontier (EEF).

The reason for this non standard terminology is to distinguish the EEF from the generally accepted definition of the efficient frontier that would include every possible asset (including things like “human capital”). It is important to note that an EE portfolio will most likely not be on a true efficient frontier

<sup>4</sup> See for example Fama and French, p. 26 that discusses the “Logic of CAPM”. The discussion there describes how Harry Markowitz (in 1952, “Portfolio Selection”, *Journal of Finance* 7:1 pp 77-99 and in 1959 *Portfolio Selection: Efficient Diversification of Investments*, Cowles Foundation Monograph No 16. New York: John Wiley & Sons, Inc.) developed the model of investor preference such that the investor prefers a portfolio that has the highest expected return for a given variance or alternatively the minimum variance for a given expected return. Sharpe and Linter then elaborated this into the full CAPM.

if one exists. Moreover, for the definition of an EE portfolio to be useful it is necessary to assume that expected returns and volatilities exist.<sup>5</sup>

The main impact of discarding CAPM is that it means there is no particular reason to infer a portfolio on the efficient frontier will be a capitalization-weighted portfolio. By extension, there is also no particular reason to believe that an EE portfolio will be capitalization-weighted. The key issue for an investor who wishes to select a portfolio that is EE becomes how to construct one. Simply opting for a capitalization weighted portfolio and stopping there is no longer a viable option.

If an investor knew what the true expected returns and risks were for assets in the investible universe, then it would be quite straightforward to calculate the set of portfolios that are EEF within that universe. A portfolio optimization program can do this. It takes as inputs the expected returns and risks and then calculates the required EEF assuming these inputs are exactly accurate. Once an EEF is calculated in this way from assumed expected returns and risks, the investor can simply select a particular portfolio from the EEF that has the desired risk level or risk-reward trade-off.

There is vast literature on this most direct way to create an EEF. While this paper will not attempt to review the literature, the biggest difficulty in using this approach is that there can be large errors, especially in estimates of expected returns. It is fair to say that unless they are heavily constrained or managed in some way (such as using Bayesian priors for expected returns) the resulting portfolios frequently “optimize” on the errors. That is to say, the optimizer left to itself, will generally create an EEF with portfolios that put a high weight on assets with the most optimistic return-to-risk estimates (and the converse). Needless to say, the most optimistic return-to-risk estimates are often the estimates with the greatest potential error, and the result of the optimization can be a portfolio that looks odd or is very unbalanced.

Here a different approach is taken. The starting point is a well-diversified portfolio (the anchor portfolio) that the investor feels has a good chance of being close to “efficient;” that is, providing the best return for the amount of risk taken.

<sup>5</sup> This is not a trivial assumption. An influential paper by Mandelbrot (in 1963 “The Variation of Certain Speculative Prices”, *Journal of Business* 36, pp. 394-419) suggested stock return distributions might have infinite variance. Many prominent researchers have investigated this possibility.

Importantly, this portfolio can be one constructed using an Alternative Beta technique. Next, implied returns are estimated for this portfolio assuming that it is exactly efficient for the given investment universe. These implied returns are reverse engineered to be returns that, when used as an input into an optimizer along with the assumed risk parameters, yield the given portfolio as the output.<sup>6</sup>

The final step in this process is to verify the “believability” of the implied returns. If in fact the given portfolio is efficient, then by definition the implied returns should equal the “true” expected returns for the assets up to a scale factor.<sup>7</sup> This means that if the implied returns are in some sense “close enough” to what the investor believes to be good estimates of the true expected returns, then for practical purposes the portfolio is “efficient enough.” If on the other hand, the implied returns are hugely different from what the investor believes are reasonable expected returns, then this would suggest the selected portfolio is not close to being efficient. In this case, the investor would need to re-evaluate whether the selected portfolio really provides a good risk-reward trade-off, given the manager’s a priori beliefs about returns.

The crucial difference between this approach and the direct optimization approach is that the investor proposes an anchor portfolio and then checks whether its implied returns are generally close enough to the investor’s a priori views. Unlike the optimization approach that can lead to a portfolio that appears unbalanced, because for example the optimizer loads up on an asset that has a particularly optimistic return assumption, here the investor is already generally satisfied with the anchor portfolio. The investor will only reject the anchor portfolio if it produces counter-intuitive implied returns.

Once the investor has verified that this anchor portfolio is EE by checking its implied returns, the investor can use it to construct the whole efficient enough frontier. By using the implied expected returns of the anchor portfolio and the estimated risk

<sup>6</sup> Sharpe, W.F., “Imputing Expected Security Returns from Portfolio Composition” (June 1974) *Journal of Financial and Quantitative Analysis* shows generally how to calculate ‘implied returns’ from a portfolio if it is assumed the portfolio is a mean variance optimal portfolio. Please see the Appendix for the formula used here.

<sup>7</sup> More generally, the implied returns of a genuinely mean variance efficient portfolio could be any arbitrary linear transformation of the true expected returns. Please see the appendix for more details on this.

parameters as inputs into a standard portfolio optimization tool, the investor can then choose a portfolio from this constructed EEF that has the desired risk level and risk-reward trade-off. Note that the final portfolio the investor chooses may have a very different level of risk than the anchor portfolio.

## Empirical Results for a Global Balanced Portfolio

The first step in the selection process is to identify portfolios that are reasonably well-diversified and might be efficient enough to be EE. Here we look at a number of alternative weighting

methods used to construct portfolios. These are capitalization weighting, equal weighting, GDP weighting, risk parity and minimum variance. The asset classes used are commonly used indices on both the equity and fixed income side. *Table 1* shows the indices that have been selected and the weights assigned to each one by the different weighting methods.

The capitalization weights and the GDP weights are calculated in two steps. First, capitalization and GDP weighting is done separately within the equity assets universe and within the fixed income asset universe. The total portfolio weights are a blend of the weights within equity and fixed income. Weights in the former are multiplied by 60 percent to get their final total portfolio weight and in the latter by 40 percent. Therefore, for

**Table 1: Proposed alternative anchor portfolios for a global balanced portfolio**

	<b>GDP WEIGHTED*</b>	<b>CAP WEIGHTED*</b>	<b>EQUAL WEIGHT</b>	<b>MIN VAR**</b>	<b>RISK PARITY**</b>
S&P 500 Index	20.4%	32.3%	6.7%	0.3%	2.2%
MSCI Europe	17.8%	10.0%	6.7%	1.2%	2.1%
MSCI UK	3.1%	5.9%	6.7%	0.1%	2.6%
MSCI Japan	7.5%	6.9%	6.7%	3.2%	2.7%
MSCI EM	11.2%	4.9%	6.7%	0.0%	1.4%
Citigroup Japan GBI All Maturities	6.2%	9.1%	6.7%	45.0%	23.8%
Citigroup Germany GBI All Maturities	3.8%	2.3%	6.7%	6.4%	11.3%
Citigroup France GBI All Maturities	2.9%	2.6%	6.7%	0.0%	9.7%
Citigroup UK GBI All Maturities	2.6%	2.0%	6.7%	0.0%	7.1%
Citigroup US GBI All Maturities	10.1%	9.9%	6.7%	0.0%	8.1%
Barclays US Treasury Inflation	0.7%	1.4%	6.7%	0.0%	5.4%
Barclays GNMA Total Return Ind	1.1%	2.2%	6.7%	43.7%	12.8%
Barclays US Agg Corporate Total Return	3.2%	6.3%	6.7%	0.0%	4.1%
Barclays US High Yield 2% Issuer Cap	0.8%	2.1%	6.7%	0.2%	3.5%
JPMorgan Emerging Markets Bond	8.5%	2.2%	6.7%	0.0%	3.2%
<b>Equity</b>	<b>60%</b>	<b>60%</b>	<b>33%</b>	<b>5%</b>	<b>11%</b>
<b>Fixed Income</b>	<b>40%</b>	<b>40%</b>	<b>67%</b>	<b>95%</b>	<b>89%</b>
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

\* Source: Bloomberg for the market capitalization and GDP weight of each of the equity and fixed income indices. Next, we assume 60 percent equity weight and a 40 percent fixed income weight.

\*\* Source: Bloomberg. The historic time period for monthly local currency returns is from April 1997 to October 2013. This return dataset is to construct a variance-covariance matrix. In turn, this matrix is used to construct the minimum variance and the risk parity portfolios.

For illustrative purposes only.

both capitalization and GDP-weighted portfolios the broad asset allocation between equity and fixed income is 60/40.

For the minimum variance (Min Var) weighting and the risk parity weighting methods the starting point is a data set of monthly returns for the asset classes being included. The dataset uses local currency returns for each index in order to focus only on asset returns and avoid the impact of currency fluctuations. This dataset is used to construct a variance-covariance matrix. The Minimum Variance weights are those of the portfolio that have the minimum variance given this sample variance-covariance matrix. The risk parity weights for each asset are those where the weighted risk contribution of each asset is equal. Again, the risk is evaluated from the sample variance covariance matrix. (Please see *Appendix II* and *Appendix III* for the exact formula used).

*Table 2* shows the implied returns associated with each of the anchor portfolios. The implied returns associated with a given anchor portfolio are derived from the sample variance covariance matrix and the assumption that the anchor portfolio is mean-variance efficient (Please see *Appendix I* for the formula used to calculate the implied returns). Note that there is an arbitrary scaling factor for implied returns. For each anchor portfolio we chose a scale factor that minimized the least square deviation of the scaled implied returns from historical returns over the sample period.

The next step in the process is to check each anchor portfolio to see how believable it is that this portfolio is EE. One way to do this is to compute a Spearman rank correlation coefficient between the assets ranked by the anchor portfolio's implied returns and the assets ranked by what the investor believes

**Table 2: Implied returns for alternative anchor portfolios**

	<b>GDP WEIGHTED</b>	<b>MARKET CAP WEIGHTED†</b>	<b>EQUAL WEIGHTED</b>	<b>MINIMUM VARIANCE</b>	<b>EQUAL RISK</b>	<b>RISK PARITY</b>
S&P 500 Index	3.8	3.9	4.4	3.0	3.0	4.4
MSCI Europe	4.5	4.2	5.3	3.2	3.5	5.6
MSCI UK	4.1	3.9	5.0	1.7	3.4	5.0
MSCI Japan	5.3	5.1	6.9	-0.5	5.2	4.9
MSCI EM	4.4	3.7	5.7	8.3	3.2	8.0
Citigroup Japan GBI All Maturities	-0.2	-0.2	0.0	3.3	-0.2	1.8
Citigroup Germany GBI All Maturities	0.0	0.0	0.7	4.3	0.0	3.9
Citigroup France GBI All Maturities	0.2	0.1	0.9	4.2	0.1	4.0
Citigroup UK GBI All Maturities	-0.3	-0.4	0.6	7.1	-0.3	5.7
Citigroup US GBI All Maturities	0.1	0.0	0.7	4.7	0.0	3.6
Barclays US Treasury Inflation	0.8	0.7	2.2	9.7	0.5	7.9
Barclays GNMA Total Return Ind	0.5	0.5	1.3	6.7	0.3	4.6
Barclays US Agg Corporate Total Return	0.5	0.4	1.5	7.3	0.3	5.9
Barclays US High Yield 2% Issuer Cap	1.2	1.1	1.8	3.3	0.9	3.4
JPMorgan Emerging Markets Bond	1.6	1.3	3.0	9.2	1.1	8.2

Source: Bloomberg. The historic time period for monthly local currency returns is from April 1997 to October 2013. This return dataset is used to construct a variance-covariance matrix. In turn, this matrix is used to calculate the implied return. The arbitrary scaling factor for each anchor portfolio is set so as to minimize the square deviation of the implied returns for that anchor portfolio relative to the historical returns over the sample period.

For illustrative purposes only.

† The equity capitalization weights are based on S&P and MSCI equity index weights and the fixed income capitalization weights are based on Barclays, JPMorgan and Citibank Indices.

are reasonable a priori returns for the assets. The Spearman rank correlation coefficient is particularly well-suited for this reasonableness test. First, it is non parametric, that is it does not assume that stocks follow any particular probability distribution. Second, it is unaffected by scale, so the value of the arbitrary scale parameter used to calculate the implied returns has no impact on the results.

Here we do this analysis relative to two different potential a priori expected-return estimates for the assets. These a priori expected-return estimates are shown in *Table 3*.

The first set of a priori expected returns an investor may wish to use is the historical annualized return over the sample period. This is the first column in *Table 3*.

It is well known, however, that historical returns may not be good predictors of future returns. This could happen if, for example, one asset class has risen so much in value that it appears to be “over-valued.” Alternatively, the market environment may change and alter the outlook for returns of an asset class from its historical values. An examination of the historical returns in *Table 3* reveals some unusual features. First of all, most of the best performing asset classes over the historical sample period were fixed income assets. Moreover, the sample period returns on these fixed income assets all exceed the current yields on these assets substantially. In view of this, an investor may decide that the current yield to maturity of these Fixed Income assets is a more reliable indicator of their forward looking returns than the sample period historic return.

A second unusual feature of the historic returns in *Table 3* is that the return to Japanese equities is negative. If an investor truly believed that the forward-looking return to Japanese equities were negative then the investor would be unlikely to want to include this market in the investment universe. If Japan equities are retained in the universe it seems reasonable that the investor believes it to have a positive forward looking expected return that is similar to that of other global equity markets.

The second column in *Table 3*, called adjusted expected return, makes adjustments to eliminate the unusual features of the historic returns above. First, MSCI Japan is set equal to the average of the historical returns of the other equity assets. All the other equity market expected returns remain the same as their historic returns. Next, the expected returns to each of

the fixed income assets are set equal to the yield to maturity for that asset.

**Table 3: Two alternative a priori expected-return estimates for the assets**

	HISTORIC ANNUALIZED RETURN*	ADJUSTED EXPECTED RETURN**
S&P 500 Index	5.4	5.4
MSCI Europe	3.4	3.4
MSCI UK	2.9	2.9
MSCI Japan	-2.3	4.8
MSCI EM	7.7	7.7
Citigroup Japan GBI All Maturities	2.2	0.6
Citigroup Germany GBI All Maturities	5.5	1.1
Citigroup France GBI All Maturities	5.6	1.6
Citigroup UK GBI All Maturities	7.1	2.3
Citigroup US GBI All Maturities	6.1	1.2
Barclays US Treasury Inflation	7.2	2.6
Barclays GNMA Total Return Ind	6.1	2.9
Barclays US Agg Corporate Total Return	7.0	3.8
Barclays US High Yield 2% Issuer Cap	7.7	5.9
JPMorgan Emerging Markets Bond	8.7	6.8

\* Source: Bloomberg. Historic time period using monthly local currency data from April 1997 to October 2013.

\*\* The adjusted annualized returns equal the historic returns for equity assets except MSCI Japan. This is because it appears unlikely investors would expect a negative return for any asset if they invest in it. So the adjusted return for MSCI Japan is set to the average of the historical returns for all the other equity indices. In the case of fixed income assets the adjusted return is set to their recent yield levels.

For illustrative purposes only.

The final step in the process is to evaluate the Spearman rank correlation coefficients between each anchor portfolio's implied returns and the two possible a priori expected returns. The correlation coefficients are reported in *Table 4*.

One striking result from *Table 4* is that the investor return assumptions matter a great deal and point clearly towards

some, and away from other potential anchor portfolios. An investor that believes historic returns are the best estimates for forward-looking expected returns would select the Minimum Variance portfolio as the anchor. This portfolio's implied returns have a correlation with the historical annualized returns of 78 percent that is well above the 1 percent significance level of 60 percent. In contrast, the implied returns from GDP, market capitalization, and equal-weighted anchor portfolios are uncorrelated or even negatively correlated with historic returns. The risk parity-weighted portfolio's implied returns have a statistically significant correlation at the 5 percent level with historic returns, but the correlation is 45 percent, much less than that of the Minimum Variance implied returns.

On the other hand, an investor who believes the adjusted expected returns are the best estimate of forward looking returns will decide to use one of the GDP, market capitalization, or equal weighted portfolios as the anchor portfolio. At a rigorous significance level of 1 percent, only the GDP, market capitalization and Equal-Weighted portfolios' implied returns are statistically significantly correlated with Adjusted Expected Returns. The minimum variance implied returns are uncorrelated with the adjusted expected returns. The risk parity portfolio's implied returns turn out to be statistically significantly correlated at the 5 percent level but again the correlation is 52 percent, well below the 70 percent to 76 percent correlations achieved by the implied returns of the GDP, market capitalization, or equal weighted portfolios.

Table 4: Spearman rank correlations

ANCHOR PORTFOLIO CANDIDATES	CORRELATION TO HISTORIC ANNUALIZED RETURNS	ADJUSTED EXPECTED RETURN*
GDP Weighted	-12%	74%
Market Cap Weighted	-19%	70%
Equal Weighted	-7%	76%
Minimum Variance	78%	5%
Risk Parity	45%	52%

Source: MSIM, based on data in Table 2 and Table 3.

For illustrative purposes only.

## Review and Conclusion

Ever since Markowitz published his seminal papers on portfolio construction, which led to the elegant CAPM theory of Sharpe and Lintner, investors have been impressed by this “theoretical tour de force,” and intrigued by “its seductive simplicity.” Efforts to use insights from the theory in practical investment portfolios have, however, proven difficult.

One approach has been to estimate directly forward-looking expected returns and risks for a selected set of assets and then to use a portfolio optimization tool to construct estimated MVE portfolios. This approach has often foundered because of the high level of estimation error for expected returns in particular. Historical returns to asset classes often prove to be poor guides to their future returns. Consequently, there are many approaches to adjust expected returns based on subjective analysis or based on complex quantitative techniques to make them better estimators for future returns. Regardless of the adjustment technique, however, it is likely that estimation errors remain significant. Moreover, a direct optimization tool will by its nature tend to concentrate a portfolio on assets that have unusually optimistic return-to-risk characteristics, which in turn may be most likely to have the largest forecast error. The output of an optimization tool in these circumstances may be a portfolio that appears odd or unbalanced.

A second approach to applying insights from CAPM has been to consider its implication that there is a capitalization-weighted portfolio of all assets in existence, the so-called “market portfolio” that is MVE. A result of this is that market capitalization indices are often used as benchmarks for evaluating portfolio performance and there is a whole class of professional investors who simply invest “passively” in capitalization-weighted indices. If CAPM is not true, however, then there is no reason to believe that capitalization-weighted indices are MVE. Moreover, if capitalization-weighted indices are not MVE, then there is no reason to believe they should be used as benchmarks—or that they should be invested in passively.

This paper explores a third approach that builds on recent alternative beta investment approaches using risk parity and minimum variance concepts that aim to create a portfolio by looking only at a portfolio's estimated risk parameters, or other relevant factors. Unfortunately, an investor cannot ignore expected returns in the end, as investment performance

depends critically on good investment returns as well as portfolio risk levels.

The approach here is to assume a particular investor's preferences are consistent with CAPM, wherein the investor looks only at portfolio expected returns and portfolio standard deviation. Moreover, the investor is assumed to want a portfolio that is EE. That is, for the particular investment universe the investor is considering, the investor aims to choose portfolios that offer the highest expected return for the given risk level. Moreover we assume that expected returns and risks actually exist (that is, are finite).

Next, the investor is assumed to construct portfolios that appear well-diversified or otherwise attractive using techniques that are independent of any expected return estimate. Specifically, we investigate portfolios that are constructed using market-capitalization weights, GDP weights, equal weights to all assets, risk parity weights and minimum variance weights, given a historical sample period variance-covariance matrix.

Finally, the investor chooses from among the constructed portfolios an anchor portfolio, which is the one that, if it is assumed to be MVE for the specific universe of assets, has implied returns that are most highly correlated with the investor's a priori views on expected returns. In this paper we would call this anchor portfolio efficient enough or EE. That is to say its implied returns are close enough to the investor's views about expected returns that the investor is willing to act as if it were actually MVE. Here the investor uses the non-parametric Spearman rank correlation coefficient to evaluate the correlation level and also its statistical significance. Once the investor has selected the anchor portfolio and derived its expected returns, then the investor can create a whole set of portfolios with differing risk levels that have the same implied expected returns. An investor can then select a portfolio from this frontier with the right risk level and have the assurance that the chosen portfolio's implied returns are highly correlated with the investor's a priori views on expected returns.

This paper applies the approach on a portfolio consisting of 15 global equity and fixed income indices and data on their returns over the last 16 years ending in October 2013. It turns out that an investor using this approach—who believes that historical annualized returns over the sample period are the best estimate of future expected returns—would choose to use a minimum variance portfolio as the anchor portfolio. This is because its implied returns are correlated with the historical returns at the 1 percent statistical-significance level. Also the investor would reject GDP, market capitalization, or equal-weighted portfolios as anchor portfolios. These portfolios are uncorrelated or even negatively correlated with historic returns.

Since it is well-known that forward-looking expected returns can differ substantially from historical returns, this paper also investigates how the results might change if an investor's a priori expectations differed from historical returns. In particular, the investor is assumed to believe that all forward-looking equity investments the investor is considering have positive expected returns and that fixed income returns are likely to be centered around yield to maturity. The results show that an investor who is not purely backward looking, but makes these adjustments to the a priori expected returns, would choose one of the GDP, market capitalization, or equal-weighted portfolios as the anchor portfolio and reject the minimum variance portfolio.

In summary, the approach discussed here aims to take advantage of work done on constructing portfolios without explicit expected return assumptions, such as Alternative Beta portfolio construction techniques. The idea is to completely avoid the risk of the portfolio construction process being thrown off by forecast errors that are generally high for forward-looking expected returns, while at the same time to provide a way for an investor, who believes in the "spirit" of the CAPM theory, to evaluate whether a selected portfolio is efficient enough or EE, by evaluating the correlation of the portfolio's implied returns with the investor's a priori views on expected returns.

## Appendix I:

### Definition of Implied Returns

Building on the approach in William Sharpe's 1974 paper the definition of implied returns of a given portfolio are those returns that, if they represent expected returns, would result in the given portfolio being the solution of a "standard portfolio selection problem."<sup>8</sup>

In vector notation, let  $\mathbf{r}$  be a  $n \times 1$  vector of implied returns for  $n$  selected assets. Let  $\mathbf{V}$  be the  $n \times n$  variance-covariance matrix and let  $\mathbf{w}$  be the  $n \times 1$  vector of the weights for the given portfolio.

The standard portfolio selection problem can be set up in several ways. Each of these generally lead to the same solution in the sense that the function that defines the "optimal" portfolio is the same. This function relates the weights of the optimal portfolio,  $\mathbf{w}$ , to a formula that includes  $\mathbf{r}$ ,  $\mathbf{V}$  as well as some so-called Lagrange optimization parameters.

Next what Sharpe does is "invert" the function in the sense that instead of representing the portfolio weights,  $\mathbf{w}$ , as a function of  $\mathbf{r}$ ,  $\mathbf{V}$  and the Lagrange multipliers, now  $\mathbf{r}$  is represented as a function of  $\mathbf{w}$ ,  $\mathbf{V}$  and the multipliers. If  $\mathbf{w}$ ,  $\mathbf{V}$  and the multipliers are given, then the returns that are consistent with  $\mathbf{w}$  being "optimal" are found by this inverted formula. These returns are the implied returns.

In vector notation Sharpe's equation for the implied return vector,  $\mathbf{r}^*$ , is:

#### EQUATION 1<sup>9</sup>

$$\mathbf{r} = \frac{\partial (\mathbf{w}'\mathbf{V}\mathbf{w})}{\partial \mathbf{w}'} \lambda_0 + \sum_{k=1}^m \mathbf{a}_k \lambda_k$$

Here  $\lambda_0$  and the  $\lambda_k$ 's are Lagrange multipliers and  $\mathbf{w}'\mathbf{V}\mathbf{w}$  is the variance of the given portfolio (the anchor portfolio)  $\mathbf{w}^{10}$ . Each  $\mathbf{a}_k$  is a  $n \times 1$  constant vector representing a linear constraint.  $m$  is the number of linear constraints the portfolio must satisfy.

<sup>8</sup> Sharpe, W pp 463

<sup>9</sup> Sharpe p. 465

<sup>10</sup> Note:  $\mathbf{w}'$ ,  $\mathbf{r}'$  and so on represent the transposes of  $\mathbf{w}$  and  $\mathbf{r}$

It is worth pointing out that one important linear constraint that often applies is that the sum of the weights of the portfolio is one (or 100 percent). In this case, one of the  $\mathbf{a}_k$  vectors would be the unit vector,  $\mathbf{J}$ , which is a  $n \times 1$  vector where each element is the natural number 1. In vector notation this constraint that portfolio weights add up to 1 is

$$\mathbf{w}'\mathbf{J} = 1$$

This paper uses a simplified version of equation 1. The implied return vector,  $\mathbf{r}_i^*$  here is defined to be

#### EQUATION 2

$$\mathbf{r}_i^* = \frac{\partial (\mathbf{w}'\mathbf{V}\mathbf{w})}{\partial \mathbf{w}'} \lambda_i$$

This is justified by noting that the portfolio  $\mathbf{w}$  already meets all the required linear constraints. This is because the portfolio we use is either a market cap portfolio summing to 100 percent or it is an alternative beta portfolio that sums to 100 percent and otherwise meets all relevant constraints. By defining implied returns using equation (2) the Lagrange multipliers for all the other linear constraints become zero. This is a general property of Lagrange multipliers: if the constraints associated with the multipliers are satisfied "naturally" (that is before the multipliers are included in the formulation) then the multiplier has a value of zero.

Moreover, let  $G$  be  $G = \frac{\partial \mathbf{w}'\mathbf{V}\mathbf{w}}{\partial \mathbf{w}'}$

It is generally true from equation (1) that  $\mathbf{r}^* = G \lambda_0 + c$

Where  $c$  is a constant given  $\lambda_k$ 's

Next since  $\frac{\mathbf{r}_i^*}{\lambda_i} = G$

It must be that (substituting for  $G$ )

$$\mathbf{r}^* = \left( \frac{\mathbf{r}_i^*}{\lambda_i} \right) \lambda_0 + c$$

In other words, any  $\mathbf{r}^*$  will be a linear transformation of  $\mathbf{r}_i^*$ . That is to say a ranking of assets by  $\mathbf{r}^*$  will be the same as

a ranking by  $r_i^*$  as long as  $\lambda_0$  and  $\lambda_0^i$  both are positive. Since  $\lambda_0$  and  $\lambda_0^i$  both have interpretations as the ratio of the investor required return per unit of variance, these must be positive for risk-averse investors. The whole mean variance risk preference framework assumes the investor is risk averse and none of the results in this paper apply if an investor wants a bigger negative return per unit of risk taken.

Given that the approach proposed in this paper investigates only the correlation between the rankings of asset classes based on a priori investor return expectation and ranking based on implied returns, using equation (2) to define implied returns will give identical results to using equation (1).

Finally it is worth pointing out that

**EQUATION 3**

$$G = \frac{\partial w'Vw}{\partial w'} = 2Vw$$

This means the final formula for  $r_i^* = (Vw) (2 \lambda_0^i)$

Where, in effect,  $2 \lambda_0^i$  is an arbitrary (positive) scale factor. Its value does not affect the ranking of asset classes by implied return. Nonetheless, when implied returns themselves are reported, as in *Table 2*,  $\lambda_0^i$  is selected to minimise the least square error between historic returns to the assets and the  $r_i^*$  of each anchor portfolio.

**Appendix II:**

**Minimum Variance (Min Var) Portfolio Calculation**

In the calculation of the Min Var portfolio it is critical to note that all the assets are “risky.” Clearly if a riskless asset were included then it would be the Min Var portfolio by definition. Also when constructing this portfolio it is clearly essential to force the sum of the portfolio weights to be 1 (or 100%). If not, then of course the minimum variance portfolio would just be zero holdings of the risky assets.

The portfolio selection problem becomes

$$\begin{aligned} &\text{Min } w'Vw \\ &\text{s.t. } w'J = 1 \end{aligned}$$

When J is the unit vector.

The Lagrangian for this is

$$L = w'Vw - (w'J - 1)\lambda_1$$

The necessary conditions for a minimum are

$$2Vw = J \lambda_1$$

Therefore the Min Var portfolio weights  $w_{\min}$  are

**EQUATION 4**

$$w_{\min} = \frac{\lambda_1}{2} V^{-1} J$$

Where  $V^{-1}$  is the inverse of V.

Also since the Min Var weights sum to 1

$$J'w_{\min} = 1$$

But from Equation 4

$$J'w_{\min} = \frac{\lambda_1}{2} J'V^{-1}J = 1$$

Therefore

$$\frac{\lambda_1}{2} = \frac{1}{J'V^{-1}J}$$

This means the final formula for  $w_{\min}$  is

**EQUATION 5<sup>11</sup>**

$$w_{\min} = \frac{V^{-1}J}{J'V^{-1}J}$$

<sup>11</sup> Note: since  $w'Vw$  is a quadratic function and V is a positive definite, matrix the necessary conditions are in this case sufficient to define the minimum variance portfolio.

## Appendix III: Risk Parity Portfolio

The definition used for the risk parity portfolio is based on the one used by Maillard, Roncalli and Teiletche. See for example their paper “The Properties of Equally Weighted Risk Contribution Portfolios.”<sup>12</sup> The risk parity portfolio, as defined here using vector notation  $w_{rp}$  is the solution of the portfolio construction equations for a  $n \times 1$  weight vector  $w$ ,

### EQUATION 6

$$D(w_i) \frac{\partial \sqrt{w'Vw}}{\partial w'} = kJ$$

### EQUATION 7

$$w'J = 1$$

$w_i$  is the  $i^{\text{th}}$  element of  $w$ .  $k$  is a constant and  $J$  is the unit vector.

$D(w_i)$  is the  $n \times n$  diagonal matrix where the element  $ij$  is zero if  $i$  does not equal  $j$  and is  $w_i$  if  $i$  equals  $j$ .  $V$  is the  $n \times n$  variance-covariance matrix of asset classes.

Note that

$$\frac{\partial \sqrt{w'Vw}}{\partial w'} = \frac{Vw}{\sqrt{w'Vw}} = \frac{Vw}{\bar{\sigma}_{RP}}$$

Where  $\bar{\sigma}_{RP} = \sqrt{w'Vw}$ ,

which is the standard deviation of the risk parity portfolio. Since  $V$  is  $n \times n$  and  $w$  is  $n \times 1$ , the expression above is a  $n \times 1$  vector.

This allows equation (6) to be written as

### EQUATION 8

$$D(w_i) \frac{Vw}{\bar{\sigma}_{RP}} = kJ$$

Pre-multiplying equation (8) by the transpose of the unit vector yields

$$J'D(w_i) \frac{Vw}{\bar{\sigma}_{RP}} = kJ'J = nk$$

Note that  $J'D(w_i)$  is just the transpose of the weight vector,  $w'$ . So the equation can be rewritten as

$$\frac{w'Vw}{\bar{\sigma}_{RP}} = nk$$

But  $w'Vw$  is just the variance of the risk parity portfolio,  $\bar{\sigma}_{RP}^2$ . This means

$$\frac{\bar{\sigma}_{RP}^2}{\bar{\sigma}_{RP}} = \bar{\sigma}_{RP} = nk$$

Solving this for  $k$  shows that

$$k = \frac{\bar{\sigma}_{RP}}{n}$$

This means that equation (8) can be rewritten as

$$D(w_i) \frac{Vw}{\bar{\sigma}_{RP}} = \frac{\bar{\sigma}_{RP}}{n} J$$

### EQUATION 9

$$D(w_i) \frac{Vw}{\bar{\sigma}_{RP}^2} = \frac{1}{n} J$$

The equations can then be solved using an iterative procedure for  $w_{RP}$

### EQUATION 10

$$D(w_{RP,i}) \frac{Vw_{RP}}{\bar{\sigma}_{RP}^2} = \frac{1}{n} J$$

<sup>12</sup> Maillard, S., Roncalli, T. and Teiletche, J., “The Properties of Equally Weighted Risk Contribution Portfolios,” *Journal of Portfolio Management* 36:4.

**EQUATION 11**

$$J'w_{RP} = 1$$

Here  $w_{RP,i}$  is the  $i^{th}$  element of  $w_{RP}$ .

It is interesting to note that in equation (10)

$$\frac{V_{w_{RP}}}{\tilde{\sigma}_{RP}^2} = \beta$$

Where  $\beta$  is the  $n \times 1$  vector of the betas of each asset to the risk parity portfolio. This is because  $V_{w_{RP}}$  is the  $n \times 1$  vector where the  $i^{th}$  element is the covariance of asset  $i$  with the portfolio as a whole. The beta of asset  $i$  with respect to RP is by definition the covariance divided by  $\tilde{\sigma}_{RP}^2$ , the variance of RP.

This means equation (10) can be rewritten as

$$D(w_{RP,i})\beta = \frac{1}{n}J$$

$$= D(w_{RP,i} \times \beta_i)J = \frac{1}{n}J$$

The left term is the diagonal matrix where the  $i^{th}$  diagonal element is the multiple of  $w_{RP,i}$  and  $\beta_i$  where  $\beta_i$  is the  $i^{th}$  element of  $\beta$ . Looking at each row of the vector formula above it is clear that

$$w_{RP,i} \times \beta_i = \frac{1}{n}$$

or,

$$w_{RP,i} = \frac{1}{n\beta_i}$$

This is the well-known result that for a risk parity portfolio, the weight of the asset  $i$  will equal the reciprocal of  $n$  times the beta of the asset  $i$  with respect to the risk parity portfolio.<sup>13</sup>

If the RP portfolio is assumed to be mean variance efficient then it is possible to calculate implied returns for each asset using equation (2). Moreover, if the RP portfolio is truly efficient then these implied returns will equal “true” expected returns. Let  $r_{RP,i}^*$  be the true *and* implied returns to each asset. It is a well-known result that for a mean variance efficient portfolio

$$(r_{RP,i}^* - r_f) = \beta_i (r_{RP}^* - r_f)$$

Where  $r_f$  is a risk-free rate.

This implies that if RP is mean variance efficient then replacing  $\beta_i$ ,

$$w_{RP,i} = \frac{1}{n} \left( \frac{r_{RP}^* - r_f}{r_{RP,i}^* - r_f} \right)$$

This is the somewhat counter-intuitive result that the weight of an asset in a risk parity portfolio will be inversely proportional to the asset’s expected return above the risk-free rate,  $r_{RP,i}^* - r_f$ , if the RP parity portfolio is efficient.

<sup>13</sup> See Maillard et al.

All data sourced by Global Asset Allocation Group at Morgan Stanley Investment Management (MSIM).

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Diversification does not protect you against a loss in a particular market; however it allows you to spread that risk across various asset classes.

## INDEX DEFINITIONS

The Standard & Poor's 500® Index (S&P 500®) measures the performance of the large-cap segment of the U.S. equities market, covering approximately 75% of the U.S. equities market. The Index includes 500 leading companies in leading industries of the U.S.

The Morgan Stanley Capital International (MSCI) Europe Index is a free float-adjusted market-capitalization-weighted index that is designed to measure developed market equity performance in Europe. The term "free float" represents the portion of shares outstanding that are deemed to be available for purchase in the public equity markets by investors. The performance of the index is listed in U.S. dollars and assumes reinvestment of net dividends.

The Morgan Stanley Capital International (MSCI) UK Index is designed to measure the performance of the large and mid cap segments of the UK market. With 106 constituents, the index covers approximately 85% of the free float-adjusted market capitalization in the UK.

The Morgan Stanley Capital International (MSCI) Japan Index is designed to broadly and fairly represent the full diversity of business activities in Japan. As of the close of May 31, 2002, this index will aim to capture 85% of the free-float adjusted market-capitalization in each industry group.

The Morgan Stanley Capital International (MSCI) Emerging Markets Net Index is a free float-adjusted market-capitalization-weighted index that is designed to measure equity market performance of emerging markets. The term "free float" represents the portion of shares outstanding that are deemed to be available for purchase in the public equity markets by investors. The MSCI Emerging Markets Net Index currently consists of 21 emerging market country indices. The performance of the Index is listed in U.S. dollars and assumes reinvestment of net dividends.

The Citigroup World Government Bond Index includes the 23 government bond markets of Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Malaysia, Mexico, the Netherlands, Norway, Poland, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

The Barclays Capital US Treasury Inflation Index measures the performance of the US Treasury Inflation Protected Securities ("TIPS") market. The index includes TIPS with one or more years remaining maturity with total outstanding issue size of \$500 million or more.

The Barclays Capital U.S. GNMA Total Return Index tracks the performance of mortgage-backed pass-through securities of the Government National Mortgage Association (GNMA).

The Barclays Capital U.S. Aggregate Corporate Total Return Index tracks the performance of all U.S. government agency and Treasury securities, investment-grade corporate debt securities, agency mortgage-backed securities, asset-backed securities and commercial mortgage-backed securities.

The Barclays Capital U.S. High Yield 2% Issuer Cap Index is an issuer-constrained version of the U.S. Corporate High-Yield Index that measures the market of U.S. Dollar-denominated, non-investment grade, fixed-rate, taxable corporate bonds. The index follows the same rules as the uncapped index but limits the exposure of each issuer to 2% of the total market value and redistributes any excess market value index-wide on a prorated basis.

The JPMorgan Emerging Markets Bond Index tracks total returns for U.S. dollar-denominated debt instruments issued by emerging markets sovereign and quasi-sovereign entities: Brady Bonds, loans, eurobonds and local market instruments for over 30 emerging market countries.

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# The 2014 Midterm Elections: Setting the Stage for Senate and House Races

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## Executive Summary

To many a casual observer, it appears that political campaigns, especially those at the federal level, never cease to end. The barrage of ads and mail may subside during the off years between elections, but they never completely fall below the horizon. In fact, in today's world of incumbent communication, super committees, politically active non-profits, and a never-ending, 24-hour news cycle accessible via numerous mediums, political advocacy is omnipresent, requiring campaigns to always be at least involved in some form of campaign activity, if not simply fundraising.

Even with constant access to constituents/voters, however there comes a time during every election cycle when the political heat actually turns up, and suddenly we find ourselves looking at a constant barrage of advertisements and other outreach efforts that follow a constant and predictable drumbeat. At this point, the campaign season has "officially" begun, and ads suddenly become more constant and hard-hitting, the issues more focused, and the candidates more critical of their opponents.

President Obama, in the 2012 campaign, seemed to sum up nicely the feelings that campaigns invoke in voters at this point in the cycle, when he said:

*"I know that campaigns can seem small, and even silly. Trivial things become big distractions. Serious issues become sound bites. And the truth gets buried under an avalanche of money and advertising. If you're sick of hearing me approve this message, believe me — so am I."*

*President Barack Obama*

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As we enter 2014, the important midterm congressional campaigns are well-underway, with the primary season shortly upon us, followed immediately by the general election campaign leading up to Election Day on November 4, 2014. And in many states, primary elections are very late in what is otherwise a general election campaign season). Over the course of the next several months, ending with a bruising crescendo in October, the amount of money that will be spent in an attempt to influence voters will be staggering. What we attempt to do below is provide you with an indication of how candidates traditionally fare in midterm elections, what to possibly expect this cycle, and some things to look for and consider as you watch what undoubtedly, at some point, will be dubbed the most important mid-term election in a generation.

## The Power Structure in Washington

Each election cycle is invariably touted for its importance, and the 2014 midterm election is no exception. The power structure in Washington during the remaining two years of President Obama's second term will have implications for the policy direction of the country going forward.

We have had a divided government in Washington since 2011. The 2010 midterm elections saw the Republicans swing back into power in the House, but the Democrats remained in control of the Senate, while President Obama, who was not on the ballot, was in the middle of his first term. This divided government remained in place through the 2012 presidential campaign, which resulted in a status-quo election, with President Obama winning a second term, the Democrats retaining control of the Senate, and the Republicans retaining control of the House.

Now that we are approaching the 2014 midterm elections, it is time again to consider what the likely power structure will be in Washington in 2015. The implications for the president's policy agenda are invariably tied to the makeup of Congress. Should the Democrats retain control of the Senate, and do well enough to take control of the House, then the president's final two years in office could be productive in terms of policy

initiatives pursued by the White House.<sup>1</sup> If the Republicans are successful, however, in retaining the House, and do well enough to either take control of the Senate or reduce the current Democratic majority, the president's ability to move his policy priorities forward becomes much more limited. For both parties, the stakes are high, which is likely to be reflected in the intensity of the coming campaign season.

## Setting the Stage: The 113th Congress in More Detail

The 113th Congress is currently composed as follows: Democrats control the Senate with a 55 to 45 seat majority (including two independent members who caucus with the Democratic members), while Republicans control the House with a 231 to 200 majority (with four vacancies). The majority party's margin is an important indicator of possible outcomes in an election year, considering the historic re-election rates of incumbents. The larger the margin, the easier it is to survive an election that is more national in scope, otherwise known as a "wave" election, when close races seem to trend in favor of one party. This margin takes on enhanced significance in the Senate, where only a third of the senators are up for re-election each cycle.<sup>2</sup>

## The Senate

In a traditional cycle, there are either 33 to 34 contested seats in the Senate. In the 2014 election cycle, however, there are 35 Senate seats up for re-election, including special elections in both Hawaii and South Carolina.

Of the 35 Senate seats up in 2014, Democrats have 21 seats in play, with Republicans holding 14. Of those 21 Democratic seats, five will be open races, as the incumbents have already announced their retirement. Of the 14 Republican seats that are up in 2014, two seats will be open races as the incumbent senators have already announced their retirement. As of this writing, of the 35 seats in total that are to be contested in

<sup>1</sup> Please note that current Senate rules provide the minority party with the ability to influence legislative outcomes, and unless the majority party has a 60-vote margin, or can persuade a sufficient number of senators in the minority to vote in favor of a particular motion or measure, achieving policy objectives can be difficult.

<sup>2</sup> In any given election cycle, the number of senators up for re-election may be skewed towards one party and that fact, among others, could influence outcomes and, consequently, control, even though only one-third of the entire Senate is up each cycle.

2014, 28 will involve an incumbent senator running for re-election, and seven will be open races in which no incumbent will be on the ballot. This is an important differential that could play into election results and, ultimately, control come 2015.

## The House of Representatives

In each election cycle, all 435 House members must run for re-election if they want to return for the next Congress. Of this total, as of November 2013 there are four vacancies, due to the resignation or unfortunate death of a member; six members have announced their intention to retire at the end of the Congress; and 11 members have announced their intention to run for either the Senate or another office.

As with Senate races, retirements and other vacancies (if not filled in the interim) create open races in which no incumbent will hold any structural advantages. The number of such vacancies can be indicators of the relative perception of members regarding their re-election prospects, or in their view of the prospects for a change in control that could either propel them into the majority with possible enhanced committee responsibilities, or conversely into the minority with decreased power.<sup>3</sup> It is early in this cycle, and so the number of members deciding to retire is likely to grow during the spring months. Beginning in early 2014, the number of members announcing their retirements will begin leading up to the primary season, and depending upon how these announcements trend, could provide an early indication of possible election outcomes.

## The First Indicator of Likely Outcomes in 2014—Incumbency

Despite all the attention that is focused on the low approval rating of Congress, as a whole, those ratings do not necessarily correspond with the re-election success of incumbent members. This year, prior to the government fiscal and debt-ceiling impasse in October, including the shutdown of many federal operations, the approval rating for Congress hovered around 20 percent.<sup>4</sup> This already low number actually dropped further,

<sup>3</sup> In the 2012 election cycle, 25 members retired; in 2010, 19 members retired.

down to 11 percent, during and immediately following the fiscal impasse.<sup>5</sup> As detailed below, however, these low numbers may not necessarily translate into a “throw the bums out” mentality, considering how successful individual members are at winning re-election cycle after cycle. While Americans generally dislike Congress as an institution, they, nonetheless, like their particular House member, or senator, enough to return them to Washington with regularity.

## The Senate

When looking at the Senate this coming midterm election, the first consideration is the number of senators opting to run for re-election. History shows that incumbent senators face good odds of winning re-election in normal election cycles. In fact, since the 1980 election cycle, the re-election rate for incumbent senators averages approximately 85 percent.<sup>6</sup> Therefore, in 2014, with 28 of the contested Senate races involving an incumbent senator running for re-election, a prognosticator would likely concede that, absent extraneous intervening circumstances, the chances for many of these seats to change control are minimal.

While there may be a variety of reasons why incumbents fare better than their challengers each election cycle, one significant reason is the fundraising advantage incumbents enjoy. Just looking back at the 2012 campaign, incumbent senators (in both parties) raised over \$296 million, versus \$178 million for their challengers.<sup>7</sup> Obviously, the cost of running a successful campaign will vary from state to state, but the ability of incumbents to out-raise their challengers does work to their advantage, especially when considered along with the other powers of incumbency.

Even at this rate of success, however, and with certain advantages that incumbents have over challengers, the historic re-election rate implies that in the 2014 cycle roughly six Senate seats will change party control. This is an important conclusion, considering the

<sup>4</sup> Gallup, Congress and the Public, Congressional Job Approval Ratings Trend (1974-Present), Thursday, Oct. 31, 2013; [www.gallup.com/poll/1600/congress-public.aspx#4](http://www.gallup.com/poll/1600/congress-public.aspx#4).

<sup>5</sup> Ibid.

<sup>6</sup> The re-election rate for incumbent senators in 2012 was 91 percent.

<sup>7</sup> Center for Responsive Politics.

current five-seat margin in favor of Democrats and the seven races to be contested with no incumbent advantage.

### House of Representatives

House members mirror their Senate colleagues in terms of re-election success over the years. Over the course of the past 17 election cycles, again dating back to 1980, the rate of re-election for incumbent House members has averaged 94 percent. Thus, of the 435 seats in the House, each election cycle returns roughly 407 members to their congressional seat. Looked at conversely, roughly 27 seats change hands each cycle. Some years these numbers may favor one party over the other, but they basically tell us that, in each cycle, it is the incumbent member's race to lose.<sup>8</sup>

In this cycle, Democrats need to win a net 17 seats in order to retake control of the House in 2015. A simple math calculation would indicate that change is possible, with 27 seats traditionally changing control each cycle. When the historic percentage change in seats is proportioned among the parties based upon current ratios, however, it implies a diminished Republican majority in the House, but not a change in control. Obviously, election outcomes are much less predictable than averages, with many different variables all playing into the final count. But, should this election cycle follow previous patterns, Republicans would likely control the House in the 114th Congress.

Of course, the power of incumbency also provides House members with a stark fundraising advantage over their challengers. Just looking back one cycle to the most recent House races in 2012, incumbent House members outraised their challengers by a margin of 3 to 1.<sup>9</sup> In terms of dollar amounts, this translated into a total of \$671 million for incumbent representatives, versus \$222 million for challengers.<sup>10</sup> Clearly, fundraising advantages incumbents in House races, absent other outside financial influences.

<sup>8</sup> In the 2012 election, the House re-election rate was 90 percent.

<sup>9</sup> Center for Responsive Politics – based upon data released by the FEC on April 16, 2013. Includes all candidates that filed reports.

<sup>10</sup> These numbers do not include expenditures by outside groups, such as super committees, 501(c) groups, political parties, corporations, and individuals – all of which may spend considerable sums in particular races, as discussed in more detail later in this piece.

## A Key Variable to Watch – Open Seat Races

Campaigns are usually fairly predictable—as mentioned previously, the incumbent member has certain advantages in terms of name identification, the ability to raise sufficient funds necessary to reach potential voters and the ability to reach all constituents via official communications (up to a certain point in a campaign) from the congressional office. That said, the first place to look for possible changes in the party that holds a particular seat, is via retirements. When a member announces his/her retirement, the seat becomes open, putting candidates on somewhat more equal footing in terms of reaching voters. The power of incumbency is not present as it is when a member is seeking re-election.

Below we simply focus on the Senate. With only six House members having announced their retirement, it is premature to focus on those open seats, as they would have minimal effect on control. Should more retirement announcements be forthcoming, further analysis may be warranted at that time.

## The Senate

In the 2014 election cycle, the seven open Senate races are in the following states: Georgia (R), Iowa (D), Michigan (D), Montana (D), Nebraska (R), South Dakota (D) and West Virginia (D). According to professor Larry Sabato of the University of Virginia, at this very early stage, two states, Montana and West Virginia, “lean” towards switching from Democratic to Republican control, and South Dakota is “likely” to switch from Democratic to Republican control.<sup>11</sup> While strength of candidates could be a deciding factor in each of these open seat races, we looked at the results of the 2012 presidential campaign to gauge party strength in these contested states. In each instance, Governor Romney won with comfortable margins—winning Montana by 13 percent, West Virginia by 26 percent, and South Dakota by 18 percent. Does this alone mean that these seats are going to change control from Democratic to Republican? Absolutely not. The relative party affiliation of a state does become a more important indicator of possible outcomes when there is no incumbent member on the ballot.

<sup>11</sup> Sabato's Crystal Ball; University of Virginia, Center for Politics, 2014 Senate Races (Oct. 25, 2013).

Of the remaining four open seats, three states, Michigan, Iowa, and Georgia, currently lean toward retention of the seat by the current party.<sup>12</sup> In two states, Michigan and Iowa, current polling indicates a lean towards the Democrats retaining the seats within their party; President Obama won those states with comfortable margins (8 percent in Michigan and 6 percent in Iowa). In Georgia, where polling indicates voters today lean toward keeping the seat Republican, Governor Romney won with a comfortable 8 percent margin. Nebraska is the only seat considered “safe” for the party that currently holds it (Republican)—and Governor Romney won that state by over 21 percent.

Should the races in these open seats mirror the outcome from the 2012 presidential race, the Senate split would become 52 to 48, a two-seat margin in favor of the Democrats. This does not consider the other 28 races involving incumbent members running for re-election. So, again looking at outcomes over time, and the historic 85 percent return rate for incumbents, it becomes important to go back and review those races where, at this early point in the political season, an incumbent is in a difficult race.

Looking at professor Sabato’s analysis, of the 28 contested seats involving an incumbent senator, 24 are considered either safe or likely to favor the incumbent at this point in time. The breakdown is evenly split, with 12 seats held by Democratic senators and 12 held by Republican senators. If the election were held today, polling indicates these seats would likely not change party control. There are four seats that involve incumbent Democratic members, however, where current polling indicating the race to be either a “tossup” or one that “leans” towards or against retention of the seat. The seats in question are Alaska (Begich – D), Arkansas (Pryor – D), Louisiana (Landrieu – D), and North Carolina (Hagan – D). In comparing these states against the 2012 presidential election results, the breakdown is as follows: Alaska – Governor Romney won by a margin of 14 percent; Arkansas – Governor Romney won by a margin of 24 percent; Louisiana – Governor Romney won by a margin of 17 percent; and North Carolina – Governor Romney won by a margin of 3 percent. If the presidential results from 2012 were the only gauge for Senate race outcomes, then the outsized margins in Alaska, Arkansas, and Louisiana, combined with

the ranking of these campaigns today as tossups or leaning towards or against an incumbent (in Louisiana, the polls show the race leaning in favor of Senator Landrieu) would indicate that these three seats are in play. Should that hold true, and North Carolina remains in Democratic control, then the 114th Senate would come into Republican control with a 51 to 49 seat majority.

As with every campaign, however, looking solely at numbers at such an early stage in the campaign season does not take into consideration the relative strengths of the individual candidates or their opponents, or myriad other factors that affect election outcomes. Absent any real guiding data at this point in time, however, comparing to 2012 simply helps to set the stage and gives readers an idea of what races to watch as we approach the primary and general election seasons.

## Other Factors to Consider

Regardless of the differential in fundraising, and the historic advantage that incumbents have in returning to Washington election cycle after election cycle, other meaningful factors can influence election outcomes in conjunction with or even contrary to conventional wisdom or data. We next detail a handful of variables to consider in 2014, as each singularly or in combination with others may play an important role in determining control in 2015.

### 1. Is it a National (Wave) or Local Election?

In some years, the ability of an incumbent to retain his or her seat may depend upon whether the particular election is national in scope, or local in nature. In a national election, known also as a wave election, a single issue, or mood, may help propel the candidates of one party versus the other. When this happens, the incumbent may have structural advantages, but those are outweighed by voter sentiment that may ultimately drive election results. In wave elections, individual members may lose seats that are otherwise considered safe. While wave elections have occurred with some frequency over the past several cycles, the norm is for midterm elections to focus more on the candidates themselves, and on the particulars of the states in which they compete and/or represent. In these local-focus elections, an incumbent’s advantages are in many instances difficult to overcome.

<sup>12</sup> Ibid.

In the 2014 campaign, as of the time of this paper, two issues have the potential to turn the election into a national referendum or wave election. One issue favors Democratic candidates, and the other issue may favor Republican or Democratic candidates, depending upon how it plays out in the coming months.

The recent debate regarding the debt-ceiling limit increase and the shutdown of most operations of the federal government for 16 days in October 2013, are issues that could negatively affect Republican candidates and/or incumbents in the coming election. Polling during and immediately following this impasse indicated that Republican members fared worse in public perception regarding blame for the shutdown and the debt-ceiling brinksmanship.<sup>13</sup> An overriding question is whether voter sentiment will diminish over the course of 2014, or whether the shutdown remains a defining issue throughout the campaign season. Congress will have to revisit the debt ceiling in early 2014.<sup>14</sup> Should Congress force another shutdown, or come near to (or possibly) default on the obligations of the United States in the spring of 2014, it is likely to affect Republican members in a negative way (should these two issues be addressed in a manner similar to October 2013). It could lead to a wave election where a number of Republicans are swept out of office.

Alternatively, the Affordable Care Act (ACA), or Obamacare, and the problems surrounding its implementation, may influence voter sentiment. With millions of Americans affected by the health care system, any sentiment flowing from the rollout of the ACA, whether positive or negative, may help drive the November elections. To date, the rollout of the ACA has not gone well. With the ACA as the crowning achievement of the president and the Democratic-controlled Congress in 2010, should the problems with implementation of the ACA persist into and through the summer, Republican members and challengers could benefit come Election Day on November 4, 2014.<sup>15</sup> One thing is certain—at this point in time, the ACA

is likely to be a major campaign theme in the coming year. Whether it translates into a “wave” election remains to be seen.

If these issues fade from the public view during the coming year, which is doubtful but not impossible, this cycle would more likely turn into a “local” election, driven more by the personalities of the candidates themselves, and the issues particular to their states and/or districts. A local election requires a somewhat different analysis, and it becomes more important to focus on certain dynamics to gauge which party, if either, has the edge. At this point, the type of election we will experience in 2014, whether wave or local, is undetermined. It may become more clear as we move into the general election season.

## 2. The Unknown – Outside Spending’s Influence in 2014

One of the more newer phenomena of recent elections is the influence of “outside spending” in congressional races. These are political expenditures by groups or individuals that are not coordinated with any particular candidate.<sup>16</sup> These groups have the potential to be overly active in congressional campaigns. In fact, during the 2012 congressional election cycle, outside groups in 26 congressional races actually outspent the candidates themselves.<sup>17</sup> From issue ads, to voter education, to get-out-the vote efforts, these groups have spent significant amounts to influence both presidential and congressional races. In the 2011-to-2012 election cycle, these non-connected political action committees (PACs) raised over \$1 billion and spent over \$972 million on a variety of independent political activities.<sup>18</sup> The significant presence of these groups in the political process can influence election outcomes, whether at the primary level, or in the general election.

The question in an off-year midterm election is, what is the extent of these groups’ involvement in campaigns? Without a

<sup>13</sup> Gallup, Congress and the Public, *Congressional Job Approval Ratings Trend (1974-Present)*, Thursday, Oct. 31, 2013.

<sup>14</sup> On February 7, 2014, when the current suspension of the debt-ceiling limit expires, it is anticipated that the Treasury Department will be able to resort to extraordinary measures for a period of time to avoid a default.

<sup>15</sup> While it is too early at this point to know what will drive the midterm elections, other possible issues to watch include immigration reform and fundamental tax reform, both of which could affect voter sentiment if they begin to take the national policy stage. At this point, however, neither is considered a driving issue for 2014.

<sup>16</sup> These groups are characterized as super PACs; 527 organizations; and/or 501(c) (3) and (4) organizations; party organizations, etc.

<sup>17</sup> OpenSecretsblog; Investigating Money in Politics; “Outside Groups Outspend Candidates in 26 House Races”, by Viveca Novak, October 10, 2012.

<sup>18</sup> Source: Federal Election Commission. [http://www.fec.gov/press/press2013/20130419\\_2012\\_24m-Summary.shtm](http://www.fec.gov/press/press2013/20130419_2012_24m-Summary.shtm). Calculation based on PAC Activity from January 1, 2011, through December 31, 2012, for “nonconnected PACs” and the addition of the receipts (\$1.003 billion). This total is then compared to disbursements (\$972.2 million).

presidential election to help drive fundraising and spending, it remains to be seen exactly how much these groups will spend this cycle, and how effective they will be in the races in which they participate. With the return rates for members of Congress in the 80 and 90 percent ranges, however, their effectiveness each cycle may not necessarily correspond with success, unless they focus their attention on supporting incumbents.

### 3. The President—He Is Not on the Ballot, But Will He Affect Outcomes?

History shows that the midterm elections do not favor the party in power. This particular midterm election, coming during the president's second term, and historically referred to as the "six-year itch," may be problematic for Democratic members.

In the previous two midterm elections, one occurring in the second term of President Bush, and one occurring in President Obama's first term, voters swept House incumbents out of power in large numbers, and the party in control of the White House lost significant seats—larger than historic averages. For instance, in the 2010 midterm elections, Democratic members lost a net of 63 seats, turning control over to the Republicans. Likewise, just four years earlier, the 2006 midterm elections had the Republicans losing a net 30 seats, and ceding control of the House to a Democratic majority (but close enough to historic averages that some might consider it simply a normal outcome). Should the results of the previous two midterm elections repeat this cycle, then Republicans, could be the beneficiaries on Election Day (ignoring all other variables, of course).

On the other hand, recent Senate races have not mirrored House trends. For instance in the 2006 midterm elections (Bush), Democrats gained a net of six seats, while in the 2010 midterm elections (Obama), Republicans turned the tide and gained a net six seats. At this point, it is unknown whether the six-year itch will affect either the open-seat races or the close incumbent re-election races in a manner detrimental to Democrats in the Senate.

### 4. Follow the Generic Polling—Throughout the Year

One key metric to watch during the campaign season is the generic polling that many organizations undertake to gauge support for, or opposition to, members of a particular party. A good indicator of possible outcomes, especially in the races for the House of Representatives, is the generic congressional poll that asks which party, Democratic or Republican, voters would likely support if the election for Congress were held today.

According to Real Clear Politics, the latest generic poll, an average of eight different polls conducted on various dates in October, indicates that voters support Democrats over Republicans in Congress by a margin of 46.3 to 40.1 percent, a 6.2 percent spread on average.<sup>19</sup> While these can be indicators of voter sentiment, it is important to look to the various candidates fielded against incumbents, as a generic poll does not necessarily translate into voter sentiment in a particular race between two named candidates. It is much easier for voters to say "throw the bums out" than it is to cast the vote that accomplishes this, especially when it involves your particular representative or senator.

We would say watch the generic polls, as good indicators of trends for or against either party, but look at the other factors above as better gauges of particular races in which you may have an interest.

## Summary

The midterm elections are a good time for voters to reflect on the direction of the country, and the success of the president in pursuing particular policy initiatives. In some midterm election years, voter sentiment may lead to a wave election in which a larger than usual number of seats changes party control. In other midterm elections, in the absence of overriding issues that drive outcomes, a more local campaign results, focused on a variety of issues relative to the state and/or congressional district, and, more importantly, on the relative strengths or weaknesses of individual candidates. Will 2014 be a wave election year, or one more local in nature? At this point it is anybody's guess. Stay tuned—we are about to find out.

<sup>19</sup> Real Clear Politics, Generic Congressional Vote; <http://www.realclearpolitics.com>

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# Real Estate Debt Investment Manager Performance and Selection

The AIP Real Estate team believes that real estate debt markets can offer an attractive investment opportunity and value proposition. Numerous investment managers pursue a wide range of debt strategies, so choosing the right manager to invest with based on your return objectives is critical. Furthermore, there is a large discrepancy in historical performance amongst real estate debt investment managers. Many commercial real estate lenders, particularly those focused on mezzanine debt, went out of business during and after the global financial crisis as a result of making too many risky loans on inflated asset values and using imprudent means to finance those debt investments. Managers who were more selective in lending capital, used conservative underwriting metrics (i.e. in-place cash flow as opposed to pro-forma metrics), and used little or no leverage to finance those investments, were more likely to perform well. This white paper briefly provides an overview of the market opportunity and debt fund universe before discussing the discrepancies in performance and criteria for manager selection. We also focus on the U.S. debt markets, which are more mature markets and larger than other geographic markets, both in terms of the size of the debt capital markets and the number of fund managers.

With approximately \$1.5 trillion in commercial mortgages scheduled to mature over the next five years,<sup>1</sup> there is a large opportunity set of assets that will need to be refinanced through new senior and mezzanine loans. At the same time, commercial real estate (CRE) lending from commercial banks remains approximately 20 percent off of 2008 peak levels and has increased only marginally in the past 12 months.<sup>2</sup> The withdrawal of commercial banks from CRE lending has been exacerbated by funding and regulatory pressure, and has

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<sup>1</sup> Source: Trepp. Data as of 2013.

<sup>2</sup> Source: Federal Reserve Bank. Data as of August 2013.

created a funding gap in the capital stack for real estate loans. A real estate debt strategy focused on acquiring and originating commercial loans can take advantage of current market dislocations and the funding gap, and may deliver favorable risk-adjusted returns and current income.

Real estate debt investment managers typically originate and/or acquire performing senior and junior commercial mortgage loans, mezzanine loans, and preferred equity. Some managers also focus on acquiring distressed commercial loans, junior tranches of commercial mortgage backed securities (CMBS), and residential mortgage pools. Our research shows that return targets for debt funds range anywhere from 6 percent to 20 percent+ depending on the strategy and use of leverage on the portfolio.<sup>3</sup> AIP estimates that most funds that invest in mezzanine loans have had a gross return target in the 12 percent range and a willingness to invest up to 80 to 85 percent loan-to-value (LTV) in the capital stack.<sup>4</sup> Some funds may use a subscription line, term facility, or other means of financing to help enhance returns.

With such a wide range of debt strategies and a large discrepancy in performance amongst real estate debt fund managers, investment manager selection is critical. In 2007, at the peak of the commercial real estate market, commercial real estate lending reached a high of \$508 billion in new origination, of which \$230 billion came from the CMBS market (~45 percent).<sup>5</sup> In 2008, the most active year for

real estate debt fundraising, there were 29 real estate debt focused managers that held final closings.<sup>6</sup> Many of these fund managers are no longer in business and several public mortgage REITs have filed for bankruptcy.

Coming off the peak, full-year 2012 commercial real estate lending was approximately \$230 billion, of which \$50 billion came from the CMBS market.<sup>7</sup> This is approximately 55 percent off peak lending volume. AIP estimates that there are more than 30 real estate debt focused managers actively investing in the market today, with an additional 23 funds in the market looking to raise \$12.2 billion in capital.<sup>8</sup> We do not believe that all 23 will be able to raise capital as many funds began fundraising in 2010 and 2011 with little to no success thus far. *Display 1* shows the change in fundraising from 2006 to today.

Display 1: U.S. Focused Real Estate Debt Fundraising, 2006 to August 2013<sup>9</sup>



In the real estate debt space, there is a wide dispersion of returns between top and bottom quartile performers. As indicated in the table below, the 2000 to 2010 vintage real estate debt funds have generated a median return of 9.5

<sup>3</sup> Morgan Stanley AIP's review of Private Placement Memorandum for debt funds. There can be no assurance that any fund will achieve its return targets or that actual performance will not be materially lower. The return targets provided above are based on asset class characteristics and market conditions for relevant investments. The targets do not reflect the performance of any AIP investment. Some factors that could prevent a portfolio or strategy from achieving its return target include adverse macroeconomic and real estate market conditions, and a greater-than-anticipated number of loan defaults and loss severity. **Past performance is no indication of future results.**

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<sup>5</sup> Source: Clarion Partners research. Data as of May 2013.

<sup>6</sup> Source: Preqin Special Report: Real Estate Debt. Data as of September 2013.

<sup>7</sup> Source: Clarion Partners research. Data as of May 2013.

<sup>8</sup> Source: Preqin Special Report: Real Estate Debt. Data as of September 2013.

<sup>9</sup> Source: Preqin Special Report: Real Estate Debt. Data as of September 2013.

percent net to investors, but their performance has varied greatly. Bottom-quartile funds have generated a median -3.7 percent net return to investors, while top-quartile funds have generated a 15.8 percent net return to investors. This dispersion of returns is comparable to the dispersion of returns for all 2000 to 2010 vintage funds (i.e. both equity and debt funds) tracked by Preqin, which have a median performance of 6.7 percent, bottom quartile performance of -2 percent, and top quartile performance of 15 percent.<sup>10</sup>

Display 2: Fund Performance 2000 to 2010

PREQIN DATA	DEBT FUNDS		ALL FUNDS	
	NET MULTIPLE (X)	NET IRR (%)	NET MULTIPLE (X)	NET IRR (%)
Top Quartile	1.40	15.8	1.39	15.0
<b>Median</b>	<b>1.22</b>	<b>9.5</b>	<b>1.16</b>	<b>6.7</b>
Bottom Quartile	0.77	-3.7	0.89	-2.0

Past performance is not indicative of future results.

It is clear that manager selection does make a difference in the debt space given the range of strategies and large spread in performance. It is just as important to select strong managers in the real estate debt space as it is in the equity space. We believe it also makes sense to consider diversifying and allocating capital to several different investment managers. A best-in-class portfolio of managers who specialize in different debt strategies may outperform a “rifle shot” strategy of allocating capital to just one manager or strategy. Investors expose themselves to a sizable risk if they think all debt managers are the same and just invest with one or two managers. In our view, with a pure equity strategy, 10 to 15 different managers might provide an appropriate level of diversification<sup>11</sup> given the broad range of strategies and different geographic focuses, whereas in the debt space, six to eight managers may be sufficient to help mitigate dispersions of returns.

Furthermore, investing in a combination of large diversified debt managers, as well as small- to mid-sized managers who

specialize in a particular asset type or segment of the debt market can offer, we believe, the best risk-adjusted returns. The advantage of specialized managers is their deep level of expertise and the disadvantage is that they will likely continue to invest in their space even when the investing environment is less favorable. Diversified managers can be flexible in pursuing different investment strategies that offer the best risk-reward payoffs but they may lack deep domain expertise. The goal is to construct a portfolio of debt strategies that strikes the right balance between diversification and specialization based on market conditions.

Best-in-class real estate debt fund managers have several common traits that, we believe, can be used as selection criteria. They typically have specialized expertise and deep industry experience, with a focus on performing asset-by-asset loan-level diligence. Debt investors who make macro-level assumptions and do not perform fundamental real estate underwriting may underestimate the risks in a transaction. Prudent lenders focus on helping to protect the downside risk through a favorable basis on high quality properties in markets that can provide a higher degree of repayment certainty. Furthermore, borrower quality is important—strong sponsors that have invested significant equity into a property and have demonstrated an ability to execute the business plan are obviously preferable. The debt investment managers that have historically outperformed also tend to take a proactive approach to the surveillance of the underlying loan collateral and have the capacity to “work out” loans or take over the equity interest in assets if there is distress. Lastly, lenders took on too much leverage prior to the financial crisis, improperly financing their debt investments with non-match term, recourse financing. We believe that lenders should only use modest leverage, if any, to help enhance their returns, which can ensure that they have flexibility in the event of a downturn. Lenders should rely more on making fundamentally sound real estate loans and avoid the dangers of adding “leverage on leverage.”

In summary, we believe that an optimal debt fund portfolio will target a mix of strategies and return profiles, and provide exposure to the best relative risk-adjusted return opportunities in the market. Given the varied track record of real estate debt managers, it is advisable to diversify investments and conduct extensive diligence on a manager’s investment philosophy, underwriting methodology and use of leverage before allocating capital to a discretionary debt fund vehicle.

<sup>10</sup> AIP Real Estate analysis of Preqin data, September 2013; 764 funds included in the analysis.

<sup>11</sup> Diversification does not eliminate the risk of loss.

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Real estate development and repositioning is a highly competitive business which involves significant risks. In particular, because of the long lead-time between the inception of a project and its completion, a well-conceived project may, as a result of changes in real estate market, economic and other conditions prior to its completion (including as a result of the construction of competing projects), become an economically unattractive investment. It is possible that an Underlying Fund may make a commitment prior to obtaining all necessary entitlements, approvals or consents and may not obtain or may incur significant costs to obtain such items. In addition, real estate development involves the risk that construction may not be completed within budget or on schedule because of cost overruns, unforeseen construction difficulties, work stoppages, shortages of building materials, the inability of contractors to perform their obligations under construction contracts, defects in plans and specifications, failure to obtain necessary entitlements or other factors. Any delay in completing a project may result in increased interest and construction cost, the potential loss of purchasers or tenants, increased competition from other projects, and the possibility of defaults under project financings. In addition, the demand for quality commercial real estate projects is largely dependent upon the continued economic growth of the markets and submarkets in which these projects are located. There can be no assurance that such economic growth or demand for such projects will continue in the markets in which the Underlying Funds make their investments or that the actual occupancy and/or rental rates for the real property underlying the Underlying Funds' investments will not be less than the projected occupancy and/or rental rates used in determining whether to make such Investments. Furthermore, increased real estate development in such markets may lead to periods of oversupply and result in vacancies, lower rentals, and lower sale prices for real estate projects.

Investments in real estate related securities involve many of the risks associated with real estate investments as described above, as well as additional risks, including, but not limited to, interest rate and credit risk, lack of liquidity, risk of principal prepayment, risk of loss of principal, and risk of default.

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# Portfolio Strategy: A Theoretical Model of Equity/Bond Correlation under Rising Rates

In a rising rate environment, there is a natural concern higher rates could adversely affect equity returns. It is possible to shed some light on this issue by focusing on two theoretical models that characterize 1) rate-driven increases in expected equity return, and 2) realized “return drags” from adverse equity/rate correlations.

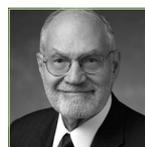
This study uses a two-variable simulation approach that represents an extension of our earlier duration targeting framework for bond portfolios. In the first simulation, nominal interest rates are assumed to experience 1 percent volatility around drift rates ranging from -0.1 percent to +0.6 percent per year. In the second simulation, each year’s ex-ante equity return is centered around a mean comprised of the prevailing interest rate and a 3.5 percent risk premium. The ex-post realized equity return is then subject to 16 percent volatility, together with a prescribed correlation with the year-end change in rates.

For a given pace of rising rates, the question then becomes what threshold correlation allows the expected equity return to be maintained over the investment horizon. For a +0.3 percent annual rate increase, the threshold correlations were found to be -0.3 and -0.15 for horizons of 10 and 5 years, respectively.

In recent years, correlations have been generally positive, well above the level that would represent any “return drag” within the context of this analysis. Prior to 2000, however, correlations were generally negative, averaging around -0.4. Moreover, an earlier historical study showed that there are tipping points at which these correlations can shift from positive to negative values and begin to erode equity valuations.

Thus, while far from providing a complete answer, we hope that this concept of a threshold correlation helps illuminate some facets of the complex interactions between equity returns and interest rate movements.

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## Summary

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In a rising rate environment, there is a natural concern about how higher interest rates could adversely affect equity returns. The present paper is an admittedly theoretical study that makes no pretense of comprehensively addressing this highly complex problem.

Nevertheless, some light can be shed on this issue by focusing on two models that are commonly used to characterize 1) rate-driven increases in expected equity return, and 2) realized "return drags" from adverse equity/rate correlations.

The first model treats ex-ante equity expectations as being the sum of a risk premium and some base level of interest rates. By itself, this "accrual" model would imply that—all else being equal—the mean long-term equity return should increase with rising rates.

It is arguable what should be the term and credit structure of this base rate, and whether it should be nominal or real. For illustrative purposes, our examples will simply take this base rate as the nominal Treasury yield for bonds with a five-year duration.

The second model focuses on the ex-post impact of the changes in rates by assuming that this effect can be treated as a stable correlation relationship. With this second model, in a rising rate environment, negative correlations should act as an ex-post return drag. (A negative correlation with interest rates corresponds to a positive correlation with bond returns).

This study uses a simulation approach with two interconnected random walks for interest rates and equity returns. In the first simulation, interest rates are assumed to experience 1 percent volatility around drift rates ranging from -0.1 percent to +0.6 percent per year. In the second simulation, each year's ex ante equity returns are centered around a mean comprised of a 3.5 percent risk premium layered on the interest rate at the beginning of each year. The ex-post realized equity return is then subject to 16 percent volatility together with a prescribed correlation with the year-end change in rates. Correlations ranging from -0.6 to +0.6 are explored.

To the extent that this correlation effect is stable over time, it would suggest an equity duration model that has many similarities to the duration targeting structure for bonds.<sup>1</sup>

In this duration targeting analogy, the expected equity return acts as the bond yield in centering the near-term return distribution.<sup>2,3,4</sup> The equity duration then relates the subsequent gains or losses to the movement in interest rates. One could theoretically extend the equity duration to a second dimension that relates the gains or losses derived from changes in the equity premium itself.<sup>5</sup> In our model, however, the risk premium is (probably incorrectly) treated as being constant over the investment horizon.

As with duration targeting, the ex-ante expectation effect for equities grows slowly as an accrual each period, while the ex-post correlation effect can easily dominate in the early years. Over time, however, the accrual accumulates faster with each increase in rates, ultimately reaching the point of offsetting the level of price loss.

The question then becomes what level of correlation is needed to offset the "positive ex-ante" effects from the rising rate trend. The answer to this question turns out to depend on the investment horizon.

This "offset horizon" depends on the correlation assumption. In other words, for a given horizon, there exists a specified threshold correlation value that maintains the initial return expectations. With correlations below this threshold value, price effects continue to dominate the accruals so that horizon returns fall below the initial expectations.

For a +0.3 percent annual rate increase, the threshold correlations were found to be -0.3 and -0.15 for horizons of 10 and 5 years, respectively.

<sup>1</sup> Leibowitz, Martin L. "Total Portfolio Duration." *Financial Analysts Journal*, September/October 1986.

<sup>2</sup> Langetieg, Terence C., Martin L. Leibowitz and Stanley Kogelman. "Duration Targeting and the Management of Multiperiod Returns." *Financial Analysts Journal*, September/October 1990.

<sup>3</sup> Leibowitz, Martin L. and Anthony Bova. "Duration Targeting: A New Look at Bond Portfolios." *Morgan Stanley Research*, December 18, 2012.

<sup>4</sup> Leibowitz, Martin L., Sidney Homer, Anthony Bova and Stanley Kogelman. "Inside the Yield Book", 3rd Edition, Wiley, 2013.

<sup>5</sup> Leibowitz, Martin L. and Anthony Bova. "Policy Portfolios and Rebalancing Behavior." *The Journal of Portfolio Management*, Winter 2011.

In recent years, correlations have been generally positive. However, prior to 2000, correlations were generally negative, averaging around -0.4.

It should be underscored that the preceding simulation results are derived from a number of clearly fragile modeling assumptions such as trendline rising rates, a fixed ex-ante risk premium, and stable correlation values. Moreover, as noted in earlier papers,<sup>6,7</sup> rising real rates can lead to first higher and then lower P/E ratios, implying equity/rate correlations that are subject to regime shifts. Also, our model does not address the impact of expected or unexpected inflation on growth prospects or equity valuations.

With these caveats in mind, we hope that this model of duration targeting for equities and the concept of a threshold correlation can provide some guidance in assessing the potential impact of rising rates on long-term equity returns.

## Duration-Targeted Bond Returns

A wide range of bond management practices have been shown to follow some form of “duration targeting,” in which the portfolio is periodically rebalanced to maintain a roughly constant duration.

To illustrate how yield changes affect returns within a duration targeting context, we begin with a simple nine-year yield trendline path that proceeds at +50 basis points (bps) per year from an initial yield of 2 percent to a final 6 percent. *Display 1* displays the corresponding returns for a zero-coupon Treasury bond with a five-year duration.

Display 1: **Trendline Bond Returns for a 5-Year Duration Target**

YEAR	STARTING YIELD	PRICE LOSS	ANNUAL RETURN	CUM RETURN	ANNUALIZED CUM RETURN
1	2.0%	-2.0%	0.0%	0.0%	0.00%
2	2.5%	-2.0%	0.5%	0.5%	0.25%
3	3.0%	-2.0%	1.0%	1.5%	0.50%
4	3.5%	-2.0%	1.5%	3.0%	0.75%
5	4.0%	-2.0%	2.0%	5.0%	1.00%
6	4.5%	-2.0%	2.5%	7.5%	1.25%
7	5.0%	-2.0%	3.0%	10.5%	1.50%
8	5.5%	-2.0%	3.5%	14.0%	1.75%
9	6.0%	-2.0%	4.0%	18.0%	2.00%
Total	36.0%	-18.0%	18.0%	18.0%	

Source: Morgan Stanley Research.

The first-year accrual corresponds to the 2 percent initial yield. Over the year, the bond ages and the initial five-year bond duration declines to a four year. Since the year-end yield is 0.5 percent higher than the initial yield, the rebalancing bond sale results in a price loss that is approximately  $-4 \times 0.5$  percent = -2 percent. The total return for this first year is therefore 0 percent (2 percent accrual - 2 percent price loss).

The sale proceeds are then re-invested in a new five-year bond at the higher 2.5 percent yield. This 2.5 percent yield then becomes the basis for the second-year accrual. The yield then increases by another 0.5 percent, and the second-year price loss is again -2 percent. This -2 percent loss combines with the second-year accrual of 2.5 percent, leading to an annual return of 0.5 percent. With each subsequent year, the accrual rate increases by another 50 bps, while the price loss remains the same at -2 percent, so that the annual return increases by 0.5 percent each year.

After four years of 0.5 percent yield increases, yields and accruals will have risen by 2 percent, from 2 percent to 4 percent. In the fifth year, the excess accrual of 2 percent (i.e., the difference between the accrual and the initial yield) precisely offsets the -2 percent price loss, so the annual return is the same as the initial yield. In later years, with ever higher accruals, annual returns continue to grow so that, after nine years, the accruals completely offset the cumulative price

<sup>6</sup> Leibowitz, Martin L. and Anthony Bova. “P/E’s and Pension Fund Ratios.” *Financial Analysts Journal*, January/February 2007.

<sup>7</sup> Leibowitz, Martin L. and Anthony Bova. “The Risk Premium Smile Behind the P/E Frown.” *Morgan Stanley Research*, April 24, 2012.

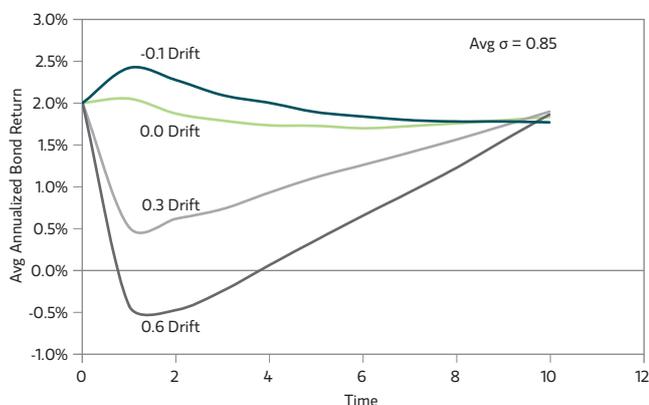
losses. This nine-year “offset horizon” at which the annualized return comes back to the starting yield can be viewed as an “effective maturity.”

## Simulation Model of Random Rate Paths

*Display 1* focused on one trendline path with rates rising at a fixed 50 bps per year. A more general approach is to generate the myriad rate paths that evolve from a Monte Carlo simulation with random annual yield movements subject to some given annual drift rate. In these simulations, we again begin with an initial yield of 2 percent, with the random rate changes drawn from a distribution with a mean equal to the specified drift rate and a 1 percent volatility.

*Display 2* displays these simulation results in terms of the average annualized bond returns over various horizons and for drift rates of -0.1 percent, 0 percent, 0.3 percent and 0.6 percent. With the higher drift rates of 0.3 percent and 0.6 percent, the average returns fall in the early years of the horizon period as the price loss from the increasing rates dominates the yield accruals. In the later years, the higher yield accruals will offset the price effects, leading to the higher annual returns.

**Display 2: Multi-Year Returns for 5-Year Duration Bonds**



Source: Morgan Stanley Research.

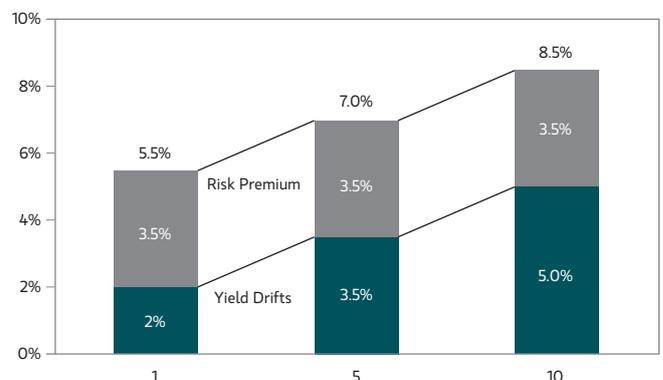
It can be seen that the returns for all four drift rates converge at the 10-year horizon (the dispersion is around 0.85 percent). These simulation results confirm the findings from our earlier reports that duration targeting bond returns tend to converge towards their initial yield (in this case 2 percent).<sup>4,5,6</sup> Moreover, this close convergence to the starting yield can be shown to occur throughout a wide range of interest rate fluctuations.

## Equity Returns under Rising Rates

Equity returns are obviously subject to a far more complex constellation of valuation factors. However, in this study, we want to focus primarily on 1) a relatively standard model of ex-ante expected equity returns, and 2) another relatively standard model of how equity returns relate to ex-post interest rate movements. In the first model, the expected return is derived from a standard risk premium layered on the current level of interest rates. As rates rise year by year, our model then assumes that the expected equity return for the coming year would rise accordingly.

*Display 3* depicts these equity return expectations with a 0.3 percent drift per year. These higher yields will be added to an assumed risk premium of 3.5 percent,<sup>8</sup> leading to an ex-ante expected return of 5.5 percent in the first year, a 7 percent expected return for year five, and an 8.5 percent expected return in year 10.

**Display 3: Rising Yields and Equity Return Expectations**



Source: Morgan Stanley Research

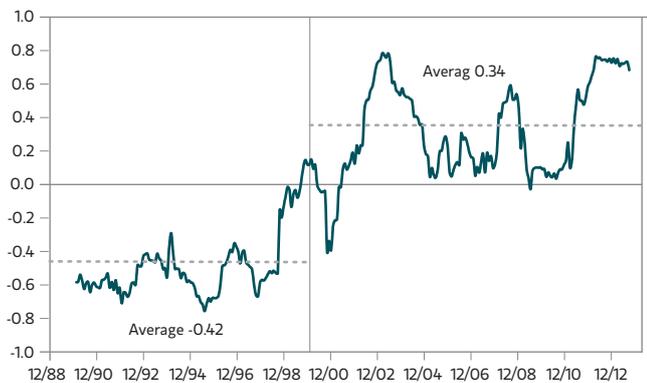
<sup>8</sup> “Rethinking the Equity Risk Premium.” edited by P. Brett Hammond, Martin L. Leibowitz and Laurence B. Siegel. *Research Foundation of CFA Institute*, December 23, 2011.

## Equity/Rate Correlations

In contrast with bonds, equities have a much wider dispersion between the expected equity returns and realized returns. These ex-post realizations are modeled as a random process of price changes centered around the expected return, but with a total annual standard deviation of 16 percent that incorporates the correlation with interest rate moves.

As shown in *Display 4*, the 24-month correlation between equity returns and interest rate moves has varied widely over the years in both direction and magnitude. From 1989 to 1999, the average equity/rate correlation was mostly negative, averaging around -0.4. In contrast, from 2000 to May 2013, the correlation was basically positive, averaging 0.34. It is also important to note that on several occasions, the correlation reached both below -0.6 and above 0.6.

**Display 4: 24-Month Equity/Rate Correlations**



Source: Morgan Stanley Research.

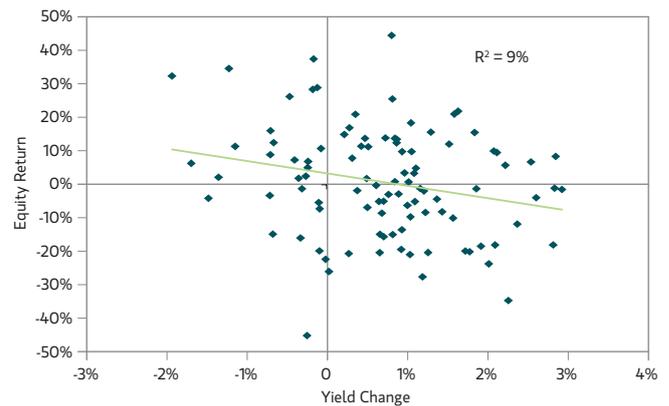
Positive equity/rate correlations (or equivalently negative equity/bond correlations) should enhance ex-post realized equity returns, while negative correlations should act as a drag on returns.

Our goal is to determine at what threshold correlation level are the benefits of higher interest rates eroded by the decline in ex-post-realized returns. Our primary focus will therefore be on negative equity/rate correlations.

*Display 5* is a scatter plot of one-year equity returns with a -0.3 correlation with rate moves (which also corresponds

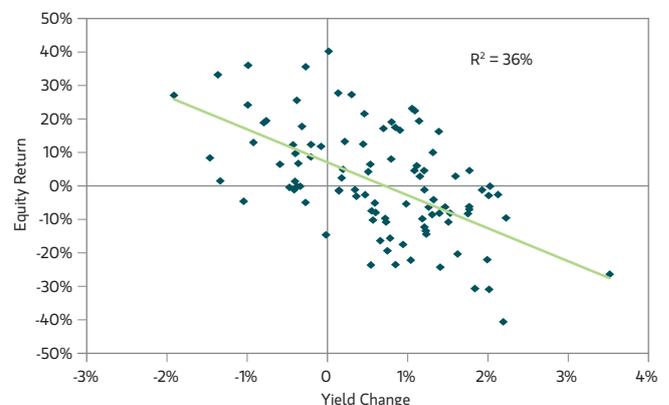
with a +0.3 correlation between one-year equity returns and bond returns). It is important to note that this -0.3 equity/rate correlation implies a weak relationship as evidenced by the low  $R^2$  of 9 percent. As shown in *Display 6*, even a -0.6 equity/rate correlation (in line with the more negative correlation experienced over the last 20 years) will still only imply an  $R^2$  of 36 percent.

**Display 5: 1-Year Equity Returns Given -0.3 Correlation with Rates**



Source: Morgan Stanley Research.

**Display 6: 1-Year Equity Returns Given -0.6 Correlation with Rates**



Source: Morgan Stanley Research.

## Equity Duration

In the earlier discussion on duration-targeted bond portfolios, it was shown that bond returns converge to the initial yield. The horizon at which this convergence takes place is approximately equal to twice the duration. Convergence depends solely on the bond duration and is independent of the size and direction of yield moves. For the five-year duration bond, convergence occurs at nine years.

It is of course impossible to find a mathematical duration for equities that is comparable to that which applies to high-grade bonds. Given an assumed equity/rate correlation, however, a statistical concept of duration can be developed for equity returns represented by the slope of the lines in *Displays 5* and *6*. This regression-based duration is a weaker construct than the mathematical duration for bonds. However, it turns out to be helpful in explaining the convergence results from our equity simulations.

This theoretical equity duration can be calculated using a simple equation of the negative of (the equity/rate correlation) x (the ratio of the equity volatility to rate volatility). The second column in *Display 7* displays these theoretical equity durations for a variety of correlations (the ratio of equity volatility to rate volatility is assumed to be 16:1 in all cases).

Display 7: Theoretical “Equity Duration”

EQUITY/RATE CORRELATION	THEORETICAL EQUITY DURATION	CONVERGENCE HORIZON (YEARS)
0	0	1
-0.3	4.8	10
-0.6	9.6	20

Source: Morgan Stanley Research.

## Trendline Equity Returns

*Display 8* makes use of a +30bps per year rate trendline to develop a deterministic progression of equity returns over time in a similar pattern to the bond returns shown in *Display 1*. The first year return corresponds to the 5.5 percent initial “equity yield” comprised of the initial 2 percent yield plus the 3.5 percent risk premium. In the second year as rates rise 30 basis points, the equity expectation increases from 5.5 percent

to 5.8 percent. With this model, the expected equity return acts as an accrual effect similar to that exhibited by bonds in *Display 1*. With an equity duration of five, the annual price loss will be  $-5 \times 0.3$  percent = -1.5 percent, bringing the second-year return down to 4.3 percent. With each subsequent year, the equity yield increases by another 30bps, while the price loss remains the same -1.5 percent.

Display 8: Bondlike Progression of Equity Returns

YEAR	“EQUITY YIELD”	EQUITY YIELD MOVE	EQUITY DURATION	PRICE LOSS	NET ANNUAL RETURN	ANNUALIZED CUMULATIVE RETURN
1	5.5	0 bp	5	0	5.5	5.5
2	5.8	+30	5	-1.5	4.3	4.9
3	6.1	+30	5	-1.5	4.6	4.8
4	6.4	+30	5	-1.5	4.9	4.8
5	6.7	+30	5	-1.5	5.2	4.9
6	7	+30	5	-1.5	5.5	5.0
7	7.3	+30	5	-1.5	5.8	5.1
8	7.6	+30	5	-1.5	6.1	5.2
9	7.9	+30	5	-1.5	6.4	5.4
10	8.2	+30	5	-1.5	6.7	5.5

Source: Morgan Stanley Research.

In the 10th year, the mean equity return is 8.2 percent, with the -1.5 percent price loss, leading to a 6.7 percent annual return. At this 10-year point, the higher equity yields have offset the cumulative price losses, and the annualized cumulative return equals the starting equity yield of 5.5 percent.

## The “Double Simulation”

*Display 8* is an example of one deterministic return path, which moves at +30bps per year along with a constant 3.5 percent risk premium. A deeper approach is to generate a double simulation that encompasses the statistical volatility of equities as well as multiple interest rate paths.

The interest rate simulation begins with an initial yield of 2 percent, with random rate moves drawn from a distribution with a mean equal to the specified drift rate and a 1 percent

volatility. The equity path is somewhat more complicated. The beginning interest rate for the coming year combines with the 3.5 percent risk premium to determine the mean value of the equity distribution. The incremental equity return is then found through a second random walk based on the 16 percent equity volatility and the assumed correlation with the rate move realized over the course of the year.

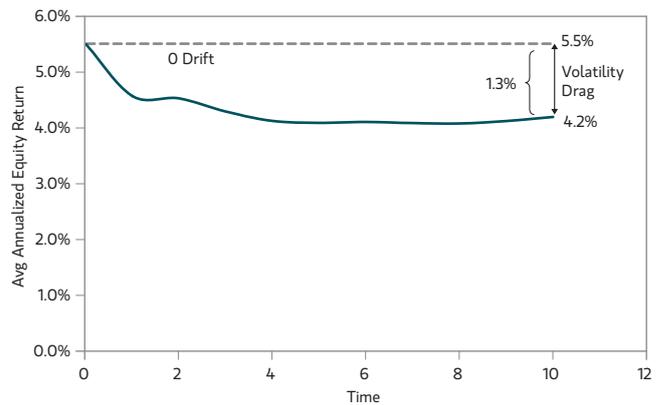
For each random path, the annual equity returns are then compounded to determine the growth in value over the horizon. The annualized rate of growth is then calculated for each path, and these geometric returns are averaged across all the simulated paths.

## The Volatility Drag

Before discussing the simulation results for the various interest rate drifts, it is worth pausing to consider the impact of the well-known “volatility drag” effect. Geometric returns are adversely affected by volatility ( $\sigma$ ) which, over time, erodes the arithmetic returns by around  $\sigma^2/2$ . Thus, for the assumed equity volatility of 16 percent, this drag would amount to  $(0.16)^2/2 = 1.3$  percent.

To illustrate this drag effect in the simplest possible framework, *Display 9* sets the rate drift at zero and shows the average geometric returns for various horizons. Over the 10-year horizon, the simulated returns of 4.2 percent are seen to fall 1.3 percent below the one-year arithmetic return of 5.5 percent, just as predicted by the volatility drag formula. Moreover, it is striking how quickly this drag effect takes hold—by the fourth year, the drag has essentially reached its long-term level of -1.3 percent.

Display 9: Volatility Drag Effect

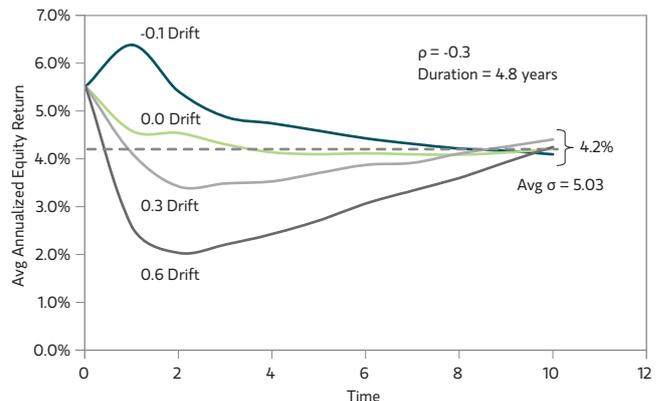


Source: Morgan Stanley Research.

## Equity Orbits for Various Drift Rates

For an equity/rate correlation of  $-0.3$ , *Display 10* displays the average horizon returns for interest rate drifts of  $-0.1$  percent,  $0$  percent,  $+0.3$  percent and  $0.6$  percent. For the positive drift rates of  $0.3$  percent and  $0.6$  percent, the average return declines dramatically in the first two years, and then gradually rises until reaching close to the  $4.2$  percent “post-drag” level. In contrast, with the modestly negative rate drift of  $-0.1$  percent per year, the average return moves higher at the outset and then persistently declines until falling to  $4.2$  percent.

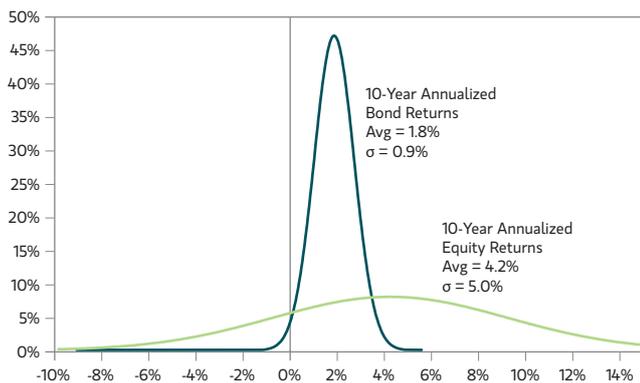
Display 10: Equity Returns under Various Drift Rates for  $\rho = -0.3$



Source: Morgan Stanley Research.

It should be emphasized that *Display 10's* return path represents average values from our simulation model. As depicted schematically in *Display 11*, although the average 100 percent equity 10-year return is 4.2 percent, there is a tremendous amount of volatility around this average value. This contrasts with the 100 percent bond case in which there is relatively modest variability around the average 10-year returns.

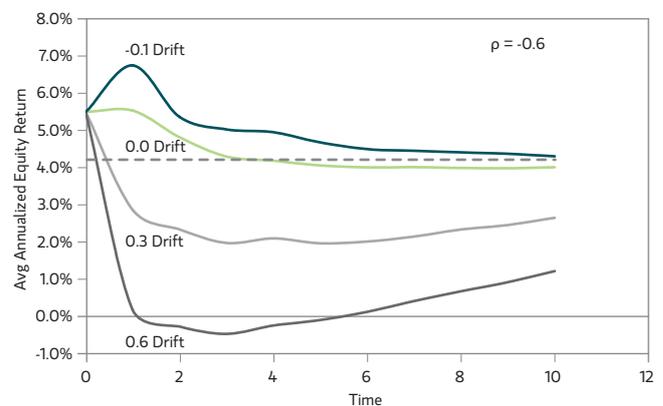
**Display 11: Equity and Bond 10-Year Return Distributions**



Source: Morgan Stanley Research.

With a more negative  $-0.6$  equity/rate correlation, the returns take the very different pattern displayed in *Display 12*. With this higher equity duration and the greater price sensitivity to upward yield moves, there is essentially no convergence over the 10-year horizon. Moreover, for the positive drift rates of 0.3 percent and 0.6 percent per year, the overall pattern of average returns is dramatically lower.

**Display 12: Equity Returns under Various Drift Rates for  $\rho = -0.6$**



Source: Morgan Stanley Research.

*Display 13* summarizes the results for the 10-year horizon with various assumptions. In this model, there are two interest rate effects that affect the equity returns: 1) the rate level that forms the base for the equity premium, and 2) the ex-post price effect from a given level of equity correlation with subsequent rate moves. Thus, the 4.2 percent 10-year return in the shaded row should represent the expected 10-year return with a 3.5 percent risk premium layered on a fixed (drift-free) 2 percent foundation.

**Display 13: 10-Year Equity Returns**

AVERAGE RATE DRIFT PER YEAR	10-YEAR AVERAGE ANNUALIZED RETURN				
	P = 0.3	P = 0	P = -0.15	P = -0.3	P = -0.6
-0.1%	3.5%	4.0%	4.1%	4.2%	4.9%
0.0	4.1%	4.2%	4.2%	4.2%	4.2%
0.3	7.6%	5.7%	5.1%	4.4%	2.7%
0.6	10.2%	7.0%	5.7%	4.2%	1.2%

Source: Morgan Stanley Research.

For the  $-0.3$  correlation, the shaded column shows that changing the upward pace of the rate drift does not materially alter the average returns. All the 10-year annualized returns for the  $-0.3$  correlation case come close to the 4.2 percent that

would be expected with the initial return of 5.5 percent less the 1.3 percent volatility drag.

With correlations other than -0.3, the convergence effect vanishes and the 10-year returns exhibit considerable sensitivity to the level of drift. For example, at the higher drift rates of 0.3 percent and 0.6 percent, the more positive correlations of -0.15, 0, and 0.3 lead to returns greater than 4.2 percent, while the more negative -0.6 correlation leads to returns falling below 4.2 percent.

## The Threshold Correlation

It can be shown that even for a much wider range of rate drifts, the average 10-year return converges to 4.2 percent when the correlation is -0.3. Thus, for the 10-year horizon, the -0.3 correlation can be viewed as a critical “threshold level” that leads to the same 4.2 percent 10-year return regardless of any upward or downward drift in rates.

The preceding analysis thus far has focused on the 10-year horizon. *Display 14* repeats the cases listed in *Display 13* but over a five-year horizon. Taking the -0.15 rate/equity correlation case, the five-year returns are all seen close to 4.5 percent, the initial 5.5 percent expected value less a somewhat lower volatility drag of around 1 percent. Thus, over the five-year horizon, the -0.15 correlation acts as a threshold level. With increasing rates, any correlation less than -0.15 will lead to equity returns coming in below the 4.5 percent “convergence level” and vice versa for higher correlations.

Display 14: 5-Year Equity Returns

AVERAGE RATE DRIFT PER YEAR	5-YEAR AVERAGE ANNUALIZED RETURN				
	P = 0.3	P = 0	P = -0.15	P = -0.3	P = -0.6
-0.1%	3.8%	4.4%	4.5%	4.5%	5.2%
0.0	4.4%	4.4%	4.5%	4.5%	4.3%
0.3	6.9%	5.2%	4.5%	3.8%	1.8%
0.6	8.9%	5.7%	4.4%	2.6%	-0.1%

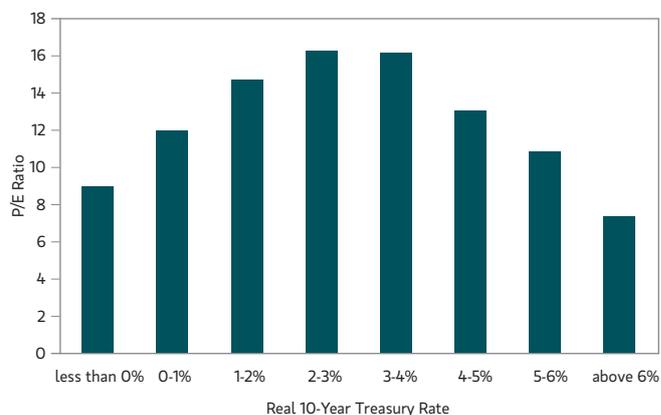
Source: Morgan Stanley Research.

## The Far More Complex Reality

It is important to note that our analysis addresses only two narrow facets of the effect of rising interest rates on equity returns. Our model is admittedly simplistic in that both the drift rate and the correlation level are assumed to be stable over the investment horizon. In reality, there are a myriad of other factors that affect the behavior of equity returns and their interactions with interest rates.

Indeed, there is good reason to believe that equity/rate correlations are regime dependent. For example, *Display 15* displays a histogram of P/E ratios versus real rates over the period from 1978 to 2011. The P/Es were formed from S&P prices and 12-month forward consensus earnings estimates. The real rates were derived from 10-year Treasury yields less concomitant CPI inflation.

Display 15: P/E Ratios vs. Real Rates: 1978-2011



Source: Morgan Stanley Research.

During this period, very low real rates tended to be associated with a dismal economic environment and depressed growth prospects, and hence low P/E ratios. As conditions improve, both real rates and P/Es rise, indicating a positive equity/rate correlation. Beyond some critical level, the regime shifts and rising rates act as a P/E depressant. This historical pattern exemplifies how equity/rate correlations can shift from positive in low rate environments to negative at higher rates.

## Conclusions

This report explores the interaction between the positive ex-ante effects of rising rates and the adverse effects from negative ex-post equity/rate correlations. In theory, it was found that for each investment horizon, there is a threshold correlation that maintains the initial expected equity return across a range of interest rate paths.

For 10-year horizons, this threshold correlation was found to be -0.3. Thus, correlation greater than -0.3 leads to improved 10-year returns for positive drift rates and to deteriorating 10-year returns for negative rate drifts. Similarly, the opposite effects were found for correlations that were more negative than -0.3.

Over shorter horizons such as five years, the threshold correlation is -0.15, a level that was often penetrated on the downside in the years prior to 1990. With equity/rate correlations below this -0.15 level, the five-year returns would be adversely affected by any significant upward drift in rates.

While we hope that this analysis can shed some light on certain facets of the highly complex equity/rate relationship, our model clearly only captures a fraction of the many different sources of volatility that drive equity returns.

Moreover, there are many situations and feedback loops that are outside the narrow bounds of this paper's basic model. One example is that of an improving growth cycle that can transform both real and nominal rates from positive correlations into negative correlations that ultimately hamper both equity valuations and the underlying growth prospects.

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Stock Rating Category	Coverage Universe		Investment Banking Clients (IBC)		
	Count	% of Total Count	Count	% of Total IBC	% of Rating Category
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<b>Equal-weight/Hold</b>	<b>1263</b>	<b>44%</b>	<b>485</b>	<b>47%</b>	<b>38%</b>
<b>Not-Rated/Hold</b>	<b>109</b>	<b>4%</b>	<b>24</b>	<b>2%</b>	<b>22%</b>
<b>Underweight/Sell</b>	<b>469</b>	<b>16%</b>	<b>123</b>	<b>12%</b>	<b>26%</b>
<b>Total</b>	<b>2,861</b>		<b>1042</b>		

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## Martin Leibowitz

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Prior to joining Morgan Stanley, Mr. Leibowitz was vice chairman and chief investment officer of TIAA-CREF from 1995 to 2004, with responsibility for the management of over \$300 billion in equity, fixed income, and real estate assets. Previously, he had a 26-year association with Salomon Brothers, where he became director of global research, covering both fixed income and equities, and was a member of that firm's Executive Committee.

Mr. Leibowitz received both A.B. and M.S. degrees from The University of Chicago and a Ph.D. in mathematics from the Courant Institute of New York University.

He has written over 150 articles on various financial and investment analysis topics, and has been the most frequent author published in both the Financial Analysts Journal as well as the Journal of Portfolio Management. In 1992, *Investing*, a volume of his collected writings, was published with a foreword by William F. Sharpe, the 1990 Nobel Laureate in Economics. In 1996, his book *Return Targets and Shortfall Risks* was issued by Irwin Co. In 2004, two of his books were published: a compilation of studies on equity valuation, titled *Franchise Value* (John Wiley & Co.), and a revised edition of his study on bond investment, *Inside the Yield Book* (Bloomberg Press). The first edition of *Inside the Yield Book* was published in 1972, went through 21 reprintings, and remains a standard in the field. The new edition includes a foreword by noted economist Henry Kaufman.

Ten of his articles have received the Graham and Dodd Award for excellence in financial writing. The CFA Institute (formerly the Association for Investment Management Research) singled him out to receive three of its highest and most select awards: the Nicholas Molodowsky Award in 1995, the James R. Vertin Award in 1998, and the Award for Professional Excellence in 2005. In October 1995, he received the Distinguished Public Service Award from the Public Securities Association, and in

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