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Equity Risk Premia

An Alternative Approach to Equity Market Beta June 30, 2014

Motivation

-- Investors are increasingly aware of the need to diversify away from traditional assets

-- Traditional portfolios of equities and bonds can be dominated by equity risk in times of market stress

-- Alternative investments have become a step toward the solution

-- Allocation to alternatives can be diversifying, but may require a significant cost to access

-- However, even the "Yale Model" of seeking diversification through allocation to alternative investments --hedge funds, private equity funds, commodities and real estate -- proved ineffective during the most recent financial crisis

-- Is true diversification fundamentally unachievable?

-- Gradually, a new paradigm may be emerging -- diversification through investment in risk factors, or risk "premia" -- Old ideas, applied in new ways

-- Capturing liquid, uncorrelated sources of return -- Simple, logical and well documented strategies -- Portfolios constructed to maximize diversification benefits

What Do We Mean By Risk Premia?

-- A premium generated for taking a certain type of risk

-- Persistent source of potential return that can be accessed systematically, also referred to as a risk factor or alternative beta

-- Some risk factors represent simple exposure to the excess return of an asset class, such as the equity risk premium or the credit risk premium

-- Others represent systematic investment in assets with certain characteristics or trading of related instruments to capture relative value: -- Equity investment strategies such as value, size and momentum

-- Convertible arbitrage and merger arbitrage strategies

-- Implied/realized volatility strategies

-- Also present beyond the equity space, in strategies such as FX carry and rates term structure carry

-- Most well-known risk factors have been analyzed extensively in academic and practitioner literature

The Investment Universe

Market Risk, Alternative Beta and Alpha

-- The investment universe can be divided into three categories:

Alpha

+

Alternative Beta

+

Market Risk -- "Beta"

-- Pure alpha is what is left after market risk and alternative beta are accounted for -- A valuable manager is one who can provide alpha over and above the various beta premiums

-- A valuable manager should be able to offer market timing expertise

-- A high management fee is justifiable for a valuable manager providing pure alpha, while efficient capture of market risk and alternative beta can be achieved without involving managers -- The primary focus of DB's approach is efficient alternative beta captured in a cost-effective way

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Identifying Risk Factors

-- When identifying risk factors for investment, it is important that they meet several criteria: -- Explainable: risk factors should have a strong basis for existence

-- Persistent: there must be a rationale for the persistence of the risk factor

-- Attractive risk/return: it is important for risk factors to have attractive return characteristics in isolation

-- Unique: in the portfolio framework it is important to find uncorrelated sources of return -- risk factors should exhibit low correlations to traditional market betas and to other risk factors being considered for investment

-- Accessible: risk factors must be accessible at a level of cost that is sufficiently low to avoid dilution of the return

-- The explanations for why a premium exists can generally be placed into one of the following: -- Risk-Based: The premium is a compensation for taking on a systematic risk

-- Behavioral : The premium occurs due to persistent behavior of investors in the market place

-- Structural : The premium results from industry structure, constraints or targets

-- Often more than one of the categories apply to any one risk factor, and sometimes all three categories are applicable

Implementing Risk Factors

-- The key to efficient risk factor implementation is taking a disciplined and systematic approach --skill lies in designing strategies that are simple and robust

-- Our approach is to isolate factors that meet the following criteria:

-- Fully transparent: strategies are fully systematic and work within well-defined rules

-- Liquid: strategies are designed to allow cost-efficient entry and exit to investors with no lock-ups

-- Low cost: a well-defined systematic approach allows efficient transactions costs

-- Flexible access: strategies can be accessed in a variety of formats -- either funded or unfunded as a portfolio overlay and in a variety of wrappers

-- Portfolio construction then involves combining a range of these return generators that are designed to capture different sources of risk premium

-- By creating a portfolio of liquid risk factors it is possible to build a more diversified portfolio, thereby reducing drawdown risk and improving risk-adjusted returns

Equity Risk Factors

Examples

-- DB has surveyed a universe of well documented equity risk factors

-- Value

-- The concept of value investing is founded on the belief that cheap stocks outperform expensive stocks in the long-run. The landmark Fama-French paper from 1992 identified a systematic approach to value investing

-- An example of traditional measures of value are ratios such as Price-to-Earnings and Enterprise Value-to-EBITDA where investment are made into companies that are viewed as cheap

-- Growth

-- Growth investing involves investing in stocks whose earnings are expected to grow at an above-average rate as compared to their industry or overall market

-- Examples of measuring growth include 12-month trailing EPS growth, long-term EPS growth, current P/E vs. 5Y P/E and 12-month trailing dividend growth

-- Quality

-- In reporting seasons, earnings quantity tends to get the most attention -- in reality though the quality of earnings is a better gauge of future earnings performance

-- Accruals -- the difference between cash and accounting earnings -- can be a good inverse measure of earnings quality. Accrual earnings have been less reliable than cash earnings because they involve subjective judgments regarding the period in which revenues and expenses are recognized

-- Academic research (Sloan) has highlighted that earnings performance related to accruals exhibits lower persistence than earnings attributed to cash flow

Equity Risk Factors

Examples (con't)

-- Momentum

-- Prior stock returns have been shown to have explanatory power -- this temporal pattern in prices is referred to as momentum

-- Jegadeesh and Titman (1993) show that a strategy that simultaneously buys past winners and sells past losers generates significant abnormal returns over holding periods of 3 to 12-months

-- Size

-- The Fama-French (1992) paper argues that investors have historically received additional returns by investing in stocks of companies with relatively small market capitalization

-- Low Beta/Volatility

-- Historical long term studies (Baker) show that low volatility and low beta portfolios can offer a combination of high average returns coupled with low drawdowns

-- Explanations for structural alpha in low-risk stocks appear to be rooted in irrational investor behavior leading to market inefficiency

-- Metrics used to monetize the low risk factor include realized volatility and market beta

Equity Risk Premia

Investment Choices

-- The following risk factors in particular have been found to generally display persistent and attractive risk-return characteristics: -- Value

-- Low Beta -- Quality -- Momentum

-- Investors can look at investing in risk factors in multiple ways

-- One option would be to look at each individual risk factor -- Assess an existing portfolio for specific risk factor exposures

-- Use individual risk factors to address over- or under-exposures in the portfolio

-- Another option is to allocate to a basket of investible risk factors

-- The investor may benefit from low correlation between factors in the basket

-- The correlation of the basket to the existing portfolio may also be low

Note: The Value Index did not exist prior to July 1, 2013 (the "Live Date"). The Value Index has very limited performance history and no actual investment which allowed tracking of the performance of the Value Index was possible before the Live Date. All results prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index will perform in the future. The performance of any investment product based on the Value Index would have been lower than the Value Index as a result of fees and/or costs. See Risk Factors for more information. "MSCI World 'ER'" is the cumulative daily Page 10 return of the MSCI World TR Net USD Index over the Fed Funds Effective Rate. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

	DB Equity Value Factor	MSCI World "ER"
	Jan 6, 2000 - Jun 30, 2014	
Return Over Period	326.6%	25.1%
Annualized Return	10.5%	1.6%
Volatility	9.6%	17.4%
Sharpe Ratio	1.1	0.1
Max. Drawdown	-20.5%	-59.0%
Start Date	Jan 10, 2000	Nov 1, 2007
End Date (Recovery)	Nov 13, 2000	Aug 2, 2013
Monthly Returns		
% Positive	64.2%	57.8%
Best	13.8%	11.2%
Worst	-9.9%	-19.0%
Correlation to Factor		0.07

Performance Analysis

Equity Value Factor Index

Retrospective Performance

(BBG: DBGLSNVU)

Performance Annual Returns

12-Month Volatility

Equity Low Beta Factor Index

Retrospective Performance

(BBG: DBGLSTBU)

Performance Annual Returns

Note: The Low Beta Index did not exist prior to July 1, 2013 (the "Live Date"). The Low Beta Index has very limited performance history and no actual investment which allowed tracking of the performance of the Low Beta Index was possible before the Live Date. All results prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index will perform in the future. The performance of any investment product based on the Low Beta Index would have been lower than the Low Beta Index as a result of fees and/or costs. See Risk Factors for more information. "MSCI World 'ER'" is the cumulative Page 11 daily return of the MSCI World TR Net USD Index over the Fed Funds Effective Rate. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

	DB Equity Low Beta Factor	MSCI World "ER"
	Feb 7, 2000 - Jun 30, 2014	
Return Over Period	160.3%	22.8%
Annualized Return	6.9%	1.4%
Volatility	7.4%	17.5%
Sharpe Ratio	0.9	0.1
Max. Drawdown	-26.9%	-59.0%
Start Date	Jun 5, 2007	Nov 1, 2007
End Date (Recovery)	Feb 28, 2013	Aug 2, 2013
Monthly Returns		
% Positive	66.9%	58.1%
Best	5.1%	11.2%
Worst	-7.3%	-19.0%
Correlation to Factor		0.34

Performance Analysis 12-Month Volatility

Equity Quality Factor Index

Retrospective Performance

(BBG: DBGLSNQU)

Performance Annual Returns

Performance Analysis 12-Month Volatility

	DB Equity Quality Factor	MSCI World "ER"
	Feb 7, 2000 - Jun 30, 2014	
Return Over Period	92.1%	22.8%
Annualized Return	4.6%	1.4%
Volatility	7.4%	17.5%
Sharpe Ratio	0.6	0.1
Max. Drawdown	-24.2%	-59.0%
Start Date	Oct 11, 2002	Nov 1, 2007
End Date (Recovery)	Jul 11, 2008	Aug 2, 2013
Monthly Returns		
% Positive	60.5%	58.1%
Best	8.1%	11.2%
Worst	-7.1%	-19.0%
Correlation to Factor		-0.19

Note: The Quality Index did not exist prior to July 1, 2013 (the "Live Date"). The Quality Index has very limited performance history and no actual investment which allowed tracking of the performance of the Quality Index was possible before the Live Date. All results prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index will perform in the future. The performance of any investment product based on the Quality Index would have been lower than the Quality Index as a result of fees and/or costs. See Risk Factors for more information. "MSCI World 'ER'" is the cumulative daily Page 12 return of the MSCI World TR Net USD Index over the Fed Funds Effective Rate. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

Equity Momentum Factor Index

Retrospective Performance

(BBG: DBGLSNMU)

Performance Annual Returns

Performance Analysis 12-Month Volatility

	DB Equity Momentum Factor	MSCI World "ER"
	Jan 9, 2001 - Jun 30, 2014	
Return Over Period	25.6%	47.8%
Annualized Return	1.7%	2.9%
Volatility	8.7%	17.6%
Sharpe Ratio	0.2	0.2
Max. Drawdown	-27.1%	-59.0%
Start Date	Jul 15, 2008	Nov 1, 2007
End Date (Recovery)	Jun 30, 2014	Aug 2, 2013
Monthly Returns		
% Positive	56.5%	59.0%
Best	7.9%	11.2%
Worst	-7.4%	-19.0%
Correlation to Factor		-0.03

Note: The Momentum Index did not exist prior to July 1, 2013 (the "Live Date"). The Momentum Index has very limited performance history and no actual investment which allowed tracking of the performance of the Momentum Index was possible before the Live Date. All results prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index will perform in the future. The performance of any investment product based on the Momentum Index would have been lower than the Momentum Index as a result of fees and/or costs. See Risk Factors for more Page 13 information. "MSCI World 'ER'" is the cumulative daily return of the MSCI World TR Net USD Index over the Fed Funds Effective Rate. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

DB Equity Risk Premia 5% VT Portfolio

Retrospective Performance

(BBG: DBGLRP5U)

Performance Annual Returns

Performance Analysis 12-Month Volatility

	DB Equity Risk Premia 5% VT Portfolio	MSCI World "ER"
	Feb 20, 2002 - Jun 30, 2014	
Return Over Period	172.8%	92.7%
Annualized Return	8.5%	5.4%
Volatility	5.1%	17.8%
Sharpe Ratio	1.7	0.3
Max. Drawdown	-8.5%	-59.0%
Start Date	Nov 20, 2008	Nov 1, 2007
End Date (Recovery)	Sep 14, 2010	Aug 2, 2013
Monthly Returns		
% Positive	73.6%	61.5%
Best	4.2%	11.2%
Worst	-3.5%	-19.0%
Correlation to Factor		0.24

Note: The Risk Premia Portfolio did not exist prior to September 30, 2013 (the "Live Date"). The Risk Premia Portfolio has very limited performance history and no actual investment which allowed tracking of the performance of the Risk Premia Portfolio was possible before the Live Date. All results prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index will perform in the future. The performance of any investment product based on the Risk Premia Portfolio would have been lower than the Risk Premia Portfolio as a result of fees and/or costs. See Risk Page 14 Factors for more information. "MSCI World 'ER'" is the cumulative daily return of the MSCI World TR Net USD Index over the Fed Funds Effective Rate. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

Implementation

The Impact of a Shift to Risk Premia

Reduction of Drawdowns

-- By diversifying away from traditional equity beta it is possible to construct a portfolio that significantly reduces drawdowns

-- The chart below shows the historical drawdowns of the Risk Premia Portfolio compared to a long equity exposure (MSCI World)

Drawdowns of DB Equity Risk Premia Portfolio compared to MSCI World

Note: The Risk Premia Portfolio did not exist prior to September 30, 2013 (the "Live Date"). The Risk Premia Portfolio has very limited performance history and no actual investment which allowed tracking of the performance of the Risk Premia Portfolio was possible before the Live Date. All results prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index will perform in the future. The performance of any investment product based on the Risk Premia Portfolio would have been lower than the Risk Premia Portfolio as a result of fees and/or costs. See Risk Page 16 Factors for more information. "MSCI World 'ER'" is the cumulative daily return of the MSCI World TR Net USD Index over the Fed Funds Effective Rate. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

Implementation Example

-- As an example, we proxy a basic 60% equity and 40% fixed income portfolio and quantify the impact of a portfolio reallocation and the addition of a risk premia overlay -- We move 5% of the portfolio's notional from the equity allocation into cash and add a 25% risk premia allocation as an overlay -- The risk reduction in the overall portfolio allows for a substantial allocation to be made to the DB Equity Risk Premia 5% VT Portfolio

-- The 25% allocation to the risk premia overlay would have resulted in both an overall risk reduction and improvement in returns (see returns on next page)

Initial Portfolio

Investment Proxy Capital Notional Allocation Exposure

Equity MSCI World Index 60% 60%

Fixed Income JPM Global Aggregate Bond Index 40% 40%

Reallocated Portfolio

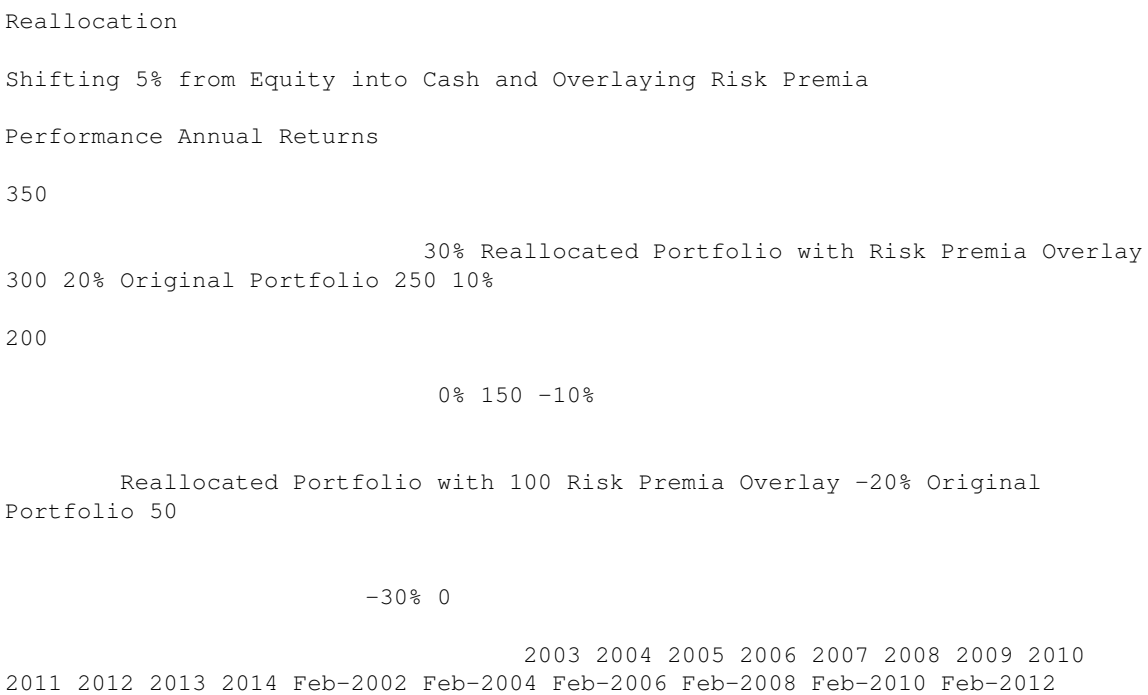
Investment Proxy Capital Notional Allocation Exposure

Equity MSCI World Index 55% 55% Fixed Income JPM Global Aggregate Bond Index 40% 40% Cash DB Fed Funds Index 5% 5%

Risk Premia DB Equity Risk Premia 5% VT

0% 25% Overlay Portfolio

Note: The portfolios are calculated on a total return basis and are rebalanced annually Page 17



Performance Analysis 12-Month Volatility

	Reallocated Portfolio 30% with Risk Premia Overlay	Original Portfolio	Reallocated Portfolio with Risk Premia Overlay 25%
	Feb 20, 2002 - Jun 30, 2014		
Original Portfolio Return Over Period	209.8%	149.6%	20%
Annualized Return	9.6%	7.7%	
Volatility	9.8%	10.3%	15%
Sharpe Ratio	0.8	0.6	
Max. Drawdown	-33.5%	-36.6%	
Start Date	Nov 1, 2007	Nov 1, 2007	10%
End Date	Sep 24, 2010	Oct 14, 2010	
Monthly Returns 5%	% Positive	67.6%	62.8%
Best	6.3%	7.0%	0%
Worst	-10.7%	-12.1%	

Feb-2003 Feb-2005 Feb-2007 Feb-2009 Feb-2011 Feb-2013

Note: The Risk Premia Portfolio used for calculating the Reallocated Portfolio with Risk Premia Overlay did not exist prior to September 30, 2013 (the "Live Date"). The Risk Premia Portfolio has very limited performance history and no actual investment which allowed tracking of the performance of the Portfolio was possible before the Live Date. All results with respect to the Risk Premia Portfolio and the Reallocated Portfolio with Risk Premia Overlay prior to the Live Date were retrospectively calculated. Accordingly, the results shown during the retrospective period are hypothetical and do not reflect actual returns. Past performance is not necessarily indicative of how an index or a portfolio will perform in the future. The Page 18 performance of any investment product based on the Risk Premia Portfolio would have been lower than the Risk Premia Portfolio as a result of fees and/or costs. Source: Deutsche Bank, Bloomberg Finance L.P., 2014

Appendix I

Equity Risk Factors: In-Depth Analysis

DB Equity Value Factor

Introduction

-- The landmark paper on Value investing (in a systematic context) is the original Fama-French paper from 1992 which argued that cheap stocks outperform expensive stocks in the long-run

-- Explanations for the premium:

-- Risk-based: the Value premium is a rational phenomenon, which is priced in equilibrium, and represents compensation for systematic risk (exposure to financial distress, gearing, cash flow risk, volatility risk)

-- Behavioral: investor overreaction

-- Structural: money managers and pension funds gravitating towards successful growth-orientated names. VAR limits may prevent investors from accessing cheap assets

-- Risk-based explanations have significant support in academia. There has been increasing evidence of the Value premium being explained by modeling economic uncertainty (eg. Bali and Zhou (2012))

-- The Value premium has all the characteristics of a "true" premium: It is not confined to one market or geography; it is not limited to one size segment. Value strategies have been successful in sector and country selection. And finally, there is burgeoning evidence of a value premium across asset classes (for example, see "Value and Momentum Everywhere", Asness et al, 2010)

Page 20 Source: Deutsche Bank

DB Equity Value Factor

Metrics

-- There are various valuation metrics that can be used to gauge the relative cheapness or expensiveness of a company

-- The DB Equity Value Factor scores stocks based on one defensive and one cyclical measure of value -- Defensive: 12-month Trailing Dividend Yield

-- Cyclical: EV/EBITDA (the inverse, EBITDA/EV is used to score the stocks)

-- Why EV/EBITDA?

-- P/E ratios are impacted by a company's choice of capital structure; companies that raise money via debt will have lower P/E's than companies that raise an equivalent amount of money by issuing shares

-- Enterprise Value includes the value of debt

-- EBITDA excludes interest payments on that debt and also excludes the cost of upfront investments or capital expenditures which can make it a more appropriate measure of a business's underlying profit potential

Page 21 Source: Deutsche Bank

DB Equity Value Factor

Sector Neutralization

-- Value tends to tilt toward specific sectors due to structural industry biases -- For example: Technology vs. Financials vs. Industrials

-- Younger technology companies may have a smaller focus on earnings and dividend yields -- Industrials may focus heavily on earnings -- Financials may focus more on dividends -- These sector biases are not necessarily reflective of relative value of the companies cross-sector

-- The Value score of each stock is adjusted to take into account the average score for that stock's sector, in order to mitigate the sector bias inherent in the value metrics

Page 22 Source: Deutsche Bank

DB Equity Value Factor

Index Construction

-- For the MSCI World universe of stocks, we determine the 12-month Trailing Dividend Yield and EBITDA/EV

-- The metrics are then normalized and sector-adjusted to get a Value score

-- We rank the stocks according to their Value score

-- The universe is then divided into five quintiles based on that score

-- The stocks in the Top quintile (high Value score) constitute the Long Value basket, and the stocks in the Bottom quintile (low Value score) constitute the Short Value basket

-- The process is repeated every month and the stocks in both baskets are equally weighted

-- The Long and Short baskets are then combined to form the aggregated Value Factor

Page 23 Source: Deutsche Bank

DB Equity Low Beta Factor

Introduction

-- The Low Beta anomaly is often considered to be one of the greatest anomalies in finance -- Based on a study of stock returns between 1968 and 2008, Baker et al. (2011) find that low volatility and low beta portfolios offer an enviable combination of high average returns and small drawdowns

-- Although the anomaly has received particular interest in recent years, it was actually pointed out decades ago (eg. Black, Jensen and Scholes (1972), Haugen and Baker (1991))

-- Explanations for the premium:

-- Behavioral and Structural: Attention bias and overconfidence

-- One of the main reasons behind the Low Beta premium are institutional constraints. Fixed-benchmark mandates (capitalization weighted) discourage investments in low-volatility stocks and are usually accompanied by leverage constraints

-- The Low Beta premium appears robust to time periods, geographies, and even asset classes, rendering it a powerful candidate for a consistent return source (Frazzini and Pedersen (2011)) -- Structural conditions suggest future persistence of the premium: -- Popular benchmarking methods would inhibit many "smart" investors from exploiting it

-- For the low beta anomaly to erode significantly, either the market capitalization benchmark would need to be gradually abolished, or a separate allocation to low risk (low beta/low volatility) strategies would need to be made an essential part of strategic asset allocation frameworks

Page 24 Source: Deutsche Bank

DB Equity Low Beta Factor

Beta Neutralization

-- A simple long-low-beta/short -high-beta strategy fails to generate abnormal returns, despite the long leg exhibiting significantly higher risk-adjusted returns compared to the short leg -- A reason for this lies in the asymmetry of the volatilities of both legs, as well as the inherent negative beta exposure of the strategy

-- To mitigate the asymmetry, the exposure to the long leg is kept at 100%, and the exposure to the short leg is reduced to match the long leg's beta

Page 25 Source: Deutsche Bank

DB Equity Low Beta Factor

Index Construction

-- On a monthly basis, the 5-year rolling beta of each stock, in relation to the MSCI World Equal Weight Index, is computed using daily returns

-- We rank the stocks according to their Beta, low to high -- The universe is then divided into five quintiles

-- The stocks in the Top quintile (low Beta) constitute the Long Beta basket, and the stocks in the Bottom quintile (high Beta) constitute the Short Beta basket

-- To address turnover control, the ranking is further split into deciles

-- If a stock's beta moves to an adjacent quintile, there is minimal impact on the strategy's profile

-- For existing constituents, unless its Beta moves below (above) the 4(th) (6(th)) decile, it will not be removed from the long (short) portfolio upon rebalancing

-- The process is repeated every month and the stocks in both baskets are equally weighted

-- To neutralize beta, the exposure to the Short basket is reduced by a factor equivalent to the ratio of the overall beta of the Long basket to the overall beta of the Short basket -- The difference in exposure between the two baskets is made up by adding a cash component to the short basket

-- The Long basket and the Short basket are combined to create the aggregated Low Beta Factor

Page 26 Source: Deutsche Bank

DB Equity Quality Factor

Introduction

-- The strength and composition of a company's balance sheet, the source of its earnings, the ability of a company to generate profits, the rate at which it turns over its assets, and the reputation of its management could all be considered aspects of a company's "quality"

-- Explanations for the premium

-- Behavioral: There is an attention bias; investors tend to look more at earnings quantity versus earnings quality (Sloan, "Do Stock Prices Fully Reflect Information in Accruals and Cash Flow about Future Earnings?", The Accounting Review, July 1996)

-- From a rational expectations point of view, quality is about changing expectations of future cash flows, and changing perceptions of quality should be expected to move stock prices

-- The Quality anomaly seems to be a strong predictor of returns in international stock markets, across various time periods and market segments

Page 27 Source: Deutsche Bank

DB Equity Quality Factor

Metrics

-- The DB Equity Quality Factor uses a measure of earnings quality and a measure of profitability -- Earnings Quality: represented by Accruals as an inverse indicator

-- Profitability: represented by Return on Invested Capital

-- Accrual accounting attempts to match expenses with associated revenues, with a substantial amount of discretion left to managers -- Revenues and expenses for a certain financial year can be recognized more or less aggressively with the consequence that subsequent years will depend on bookings from the previous years

-- The degree to which a company relies on accruals to boost net income results in lower quality earnings

-- Accruals are represented by the year on year Change in Net Operating Assets, normalized by the previous year's Net Operating Assets -- Operating assets are calculated as the residual from total assets after subtracting financial assets, and operating liabilities are the residual amount from total assets after subtracting equity and financial liabilities

Page 28 Source: Deutsche Bank

DB Equity Quality Factor

Sector Neutralization

-- Quality tends to tilt toward specific sectors due to structural industry biases

-- For example, industrial companies may operate businesses with stricter accounting rules with less potential for accruals, while technology or service companies may operate businesses with less strict accounting rules and more potential for accruals

-- These sector biases are not necessarily reflective of relative quality of the companies cross-sector

-- The Quality score of each stock is adjusted to take into account the average score for that stock's sector, in order to mitigate the sector bias inherent in the Quality metrics

Page 29 Source: Deutsche Bank

DB Equity Quality Factor

Index Construction

-- For the MSCI World Universe of stocks, the accruals and profitability score are determined and then adjusted for sector

-- The normalized and sector-adjusted accruals score is then subtracted from the normalized and sector-adjusted profitability score to arrive at the final Quality score of the stock

-- The stocks are ranked according to their Quality score, high to low -- The universe is then divided into five quintiles based on that score

-- The stocks in the Top quintile (high Quality score) constitute the Long Quality basket, and the stocks in the Bottom quintile (low Quality score) constitute the Short Quality basket

-- The process is repeated every month and the stocks in both baskets are equally weighted

-- The Long and Short baskets are then combined to form the aggregated Quality Factor

Page 30 Source: Deutsche Bank

DB Equity Momentum Factor

Introduction

-- Prior stock returns have been shown to have explanatory power in the cross section of common stock returns (eg. Jegadeesh and Titman's (1993), Carhart (1997)) independent of market, size, or value factors. An abundance of empirical evidence in favor of the Momentum factor exists in the academic literature

-- Explanations for the premium:

-- Risk-Based: momentum profits represent reward for priced business cycle risk, and trends in the business cycle drive trends in prices (and vice versa). Momentum is related to economic distress risk and consumption risk

-- Behavioral: initial under-reaction followed by over-reaction induces price trends. Overconfidence leads to extrapolation of past price trends

-- Structural: closet index tracking by fund managers (market indices exhibit momentum)

-- It is likely that none of the above explanations in their own right are adequate to explain the existence and persistence of this phenomenon over time
-- Momentum is one of the strongest premiums/anomalies, which though less profitable over the past decade, still may persist in the future based on its pervasiveness across assets, geographies, and time periods

Page 31 Source: Deutsche Bank

DB Equity Momentum Factor

Horizon Performance

-- First-11-Month Momentum, despite its popularization in both academic and investment circles following the Carhart (1997) publication, has remained the most profitable look-back window to define momentum stocks

-- All else being equal, we give preference to a longer look-back horizon because it will require less turnover and, on average, impose less transaction costs

Return to momentum across different look-back horizons Sharpe ratios across different look-back horizons

1.00% 0.6

0.4 0.50% 0.2
0.00% 0 return spread (%) Annualized Sharpe Ratio -0.2 -0.50%
Average monthly long/short decile -0.4 -1.00% -0.6
1 Month 3-1 Month 6-1 Month 9-1 Month 12-1Month 1 Month 3-1 Month 6-1 Month 9-1 Month 12-1Month Momentum Momentum Momentum Momentum Momentum Momentum Momentum Momentum Momentum Momentum Momentum Momentum

Page 32 Source: Axioma, Bloomberg Finance LLP, Compustat, IBES, S&P, Thomson Reuters, MSCI, BMI, Deutsche Bank

DB Equity Momentum Factor

Performance and Risk

-- The strong positive returns of momentum strategies are punctuated with strong reversals, or "crashes. " Like the returns to the carry trade in currencies, momentum returns are negatively skewed

-- These drawdowns in the strategy coincide with periods of strong and sudden reversals in market sentiment or investor risk aversion -- For example: the technology bubble crash starting in the spring of 2000; the re-risking episode after the end of the bear market at the end of 2002; the re-risking episode in the spring of 2009 following the financial crises

-- Additionally, the momentum portfolio will typically be concentrated in stocks with attributes that are common across relative winners (e.g. defensive stocks, growth stocks) -- For example, when market sentiment is strong and investor risk appetite is high, momentum strategies commonly have a strong tilt towards higher volatility stocks (e.g. technology bubble period); similarly, when investors are decreasing risk appetite, momentum strategies will align themselves with a tilt towards less volatile stocks (e.g. early to end of 2008)

Page 33 Source: Deutsche Bank

DB Equity Momentum Factor

Risk Neutralization

-- According to academic research, momentum is to a great extent related to sector effects (Moskowitz and Grinblatt, 1999) as well as country exposures -- Constraints on region and sectors mitigate the drawdown, but suppresses performance

-- We utilize a factor neutralization approach to reduce exposure to market beta/volatility

-- Our momentum metric is the traditional First-11-Month Momentum, uncontrolled for sector or region

-- We use idiosyncratic (stock-specific) volatility, measured as the volatility of each stock relative to a market, as a proxy for risk

-- We compute a risk-neutralized Momentum score incorporating each stock's momentum and idiosyncratic volatility and the relationship between that volatility and market momentum generally

Page 34 Source: Deutsche Bank

DB Equity Momentum Factor Index Construction

-- Using the MSCI World universe, with total returns in USD, the risk-neutralized Momentum scores are calculated -- Correlations and volatilities needed for the neutralization are computed based on 1-year rolling daily returns

-- The stocks are ranked according to their Momentum score, high to low -- The universe is then divided into five quintiles based on that score

-- The stocks in the Top quintile (high Momentum score) constitute the Long Momentum basket

-- The process is repeated every month and the stocks in Long basket are equally weighted

-- The strategy is long the Long Momentum basket and short the benchmark (MSCI World)

Page 35 Source: Deutsche Bank

Appendix II

Portfolio Construction

Effect of Combining Individual Risk Factors

-- By combining risk factors, it is possible to achieve a significant diversification benefit and improved risk adjusted returns Performance 12-Month Volatility

	Risk Premia Basket	DB Equity Value Factor	DB Equity Low Beta Factor	DB Equity Quality Factor	DB Equity Momentum Factor
			Feb 20, 2002 - Jun 30, 2014		
Return Over Period	83.1%	149.7%	103.3%	39.9%	15.1%
Annualized Return	5.0%	7.7%	5.9%	2.8%	1.1%
Volatility	3.3%	9.1%	7.7%	7.0%	9.0%
Sharpe Ratio	1.5	0.8	0.8	0.4	0.1
Max. Drawdown	-7.2%	-16.6%	-26.9%	-24.2%	-27.1%
Start Date	Nov 20, 2008	May 25, 2007	Jun 5, 2007	Oct 11, 2002	Jul 15, 2008
End Date (Recovery)	Sep 17, 2010	Apr 2, 2009	Feb 28, 2013	Jul 11, 2008	Jun 30, 2014
Monthly Returns					
% Positive	73.6%	61.5%	64.8%	60.0%	55.9%
Best	2.9%	13.8%	4.2%	8.1%	4.8%
Worst	-3.0%	-4.8%	-7.3%	-7.1%	-7.4%
Correlation to Basket		0.31	0.63	0.43	0.28

Individual Risk Factor Correlations

	Quality	Momentum	Low Beta
Value	1.2%	-45.2%	-0.3%
Quality		-21.1%	-3.6%
Momentum			11.4%

The Risk Premia Basket contains the Equity Value, Equity Low Beta, Equity Quality and Equity Momentum factor indices. The factor indices are weighted proportionally to the inverse of their historical realized volatilities, rebalanced monthly. Volatility is calculated on a rolling 1-year basis using daily returns.
Source: Deutsche Bank, Bloomberg Finance L.P., 2014

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Portfolio Construction: Introduction

-- When constructing a diversified portfolio of investments we seek to: -- Maximize the benefits of diversification and low correlation between portfolio constituents

-- Increase the likelihood of positive returns

-- Reduce the likelihood of significant losses

-- Equally weighting exposure across investments is an unbiased and simple approach but does not capture the full benefits of diversification where assets have different volatilities

-- One traditional tool for portfolio construction is mean-variance optimization (MVO)

-- However, MVO-based optimizations can be very sensitive to input parameters, so we tend to avoid this approach

-- A Risk Parity approach seeks to construct a portfolio that allocates risk evenly between its components

-- Although somewhat simplistic, Risk Parity avoids some of the sensitivity to inputs of other methods

Inverse Volatility Risk Parity

-- Risk Parity is a dynamic allocation mechanism which determines the weights of the portfolio components in such a way that the "risk" is distributed evenly among its components

-- "Risk distribution" is achieved by assigning a lower weight to components with a high historical volatility and a higher weight to components with a low historical volatility

Equal Weighted Portfolio Risk Parity Weighted Portfolio

Asset Volatility Weight Risk Allocation Asset Volatility Weight Risk Allocation (Volatility x Weight) (Volatility x Weight)

A 40% 33.3% 13.3% A 40% 14.3% 5.7% B 20% 33.3% 6.7% B 20% 28.6% 5.7% C 10% 33.3% 3.3% C 10% 57.1% 5.7%

[] Equal nominal weights do not ensure equal risk [] Risk Parity weights are proportional to the inverse allocation of the volatility of each asset

[] Asset A dominates risk whereas Asset C [] Risk Parity seeks to ensure that investment risk of contributes much less to the risk of the index the index is well distributed among its components

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Volatility Targeting

-- With the aim of stabilizing the volatility and also to create an index with a volatility comparable to a diversified hedge fund portfolio, we created the DB Equity Risk Premia 5% VT Portfolio (the "Portfolio"), which targets an annualized volatility of 5%

-- On a monthly basis, we determine a risk-parity based allocation to the four individual risk factor indices (the "risk-parity basket")

-- We then calculate a hypothetical trailing 1-year volatility of the risk-parity basket

-- The Portfolio increases (or decreases) its overall exposure to the risk-parity basket such that the historical volatility would have equaled 5%

-- The exposure to the risk-parity basket is capped at 2 and floored at 0.5

Risk Factors

THE PORTFOLIO INDEX AND THE RISK PREMIUM INDICES ARE SUBJECT TO STRATEGY RISK -- The Deutsche Bank Equity Risk Premia 5% VT Portfolio Index (the "Portfolio Index") and Deutsche Bank Value Factor Index, Quality Factor Index, Low Beta Factor Index and Momentum Factor Index (each a "Risk Premium Index") aim to generate returns by identifying persistent risk premia in the equity markets and implementing systematic strategies to access them. However, the risk premia may not persist and the Portfolio Index and the Risk Premium Indices Deutsche Bank develop to access them may fail to generate positive returns associated with such risk premia.

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