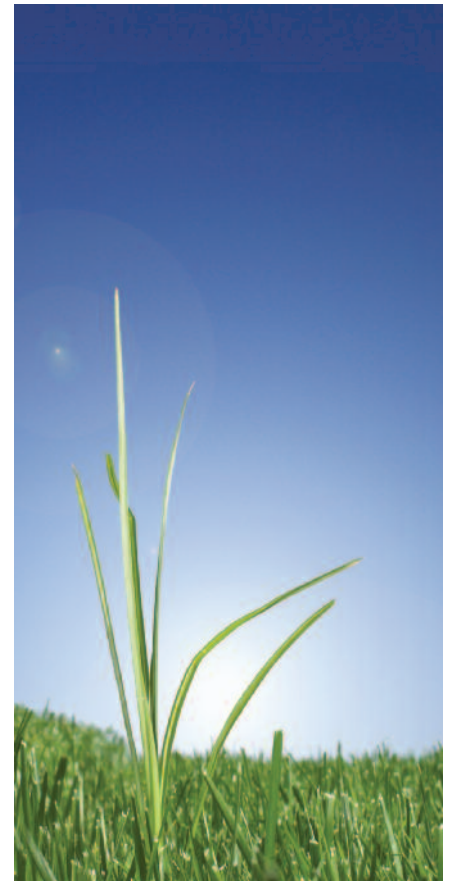# db Currency Returns

A Passion to Perform.

Deutsche Bank

DBCR Component Strategies

Carry

- One of the most widely known and profitable strategies in currency markets are carry trades, where one systematically sells low interest rate currencies and buys high interest rate currencies.

- Such a strategy exploits what academics call "forward-rate bias" or the "forward premium puzzle", that is, the forward rate is not an unbiased estimate of future spot. Put another way, contrary to classical notions of efficient markets, carry trades have made money over time.

- Academics believe the reason this is possible is that investors who employ the carry trade expose themselves to currency risk. Investors taking this risk are rewarded by positive returns over time.

Parallel: Bond Indices – Investors can earn a higher 'term premia' by increasing duration

Momentum

- A widely observed feature of currency markets is that many exchange rates trend on a multi-year basis. Therefore, a strategy that follows the trend, typically makes positive returns over time.

- The segmentation of currency market participants with some acting quickly on news while others respond more slowly is one reason why trends emerge and can be protracted.

Parallel: Equity Indices – Investing in a market capitalisation weighted equity index is effectively employing a long momentum strategy

Valuation

- In the long-run, currencies tend to move towards their "fair value". Consequently, systematically buying "undervalued" currencies and selling "overvalued" currencies is profitable in the medium-term.

- One of the strongest conclusions in academia is that fundamentals tend not to work for currencies in the short-to medium-term, yet they do long-term. One of the oldest measures of "fair value", purchasing power parity, has been shown to work in the long-run.

Parallel: Equity Indices – Similar to incorporating a 'fundamental' metric such as earnings or revenues

DBCR Historical Returns

- There are 20 years of data on freely floating currencies (since the end of Bretton Woods) by which to assess the performance of systematic strategies for investing in currencies

- 3 strategies reflect the most widely used FX investment styles - Carry, Momentum and Valuation

- These form the core investment approach of many FX only funds and are supported by decades of academic work*

- Long term, there is a low correlation between the returns of employing these strategies and the returns gained from investing in more traditional asset classes such as equities and bonds

- **DBCR provides benchmark exposure to these systematic strategies**

* Meese and Rogoff (1983), "Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample?"

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Performance of the DBCR
Excess Returns from June 1989 – February 2009
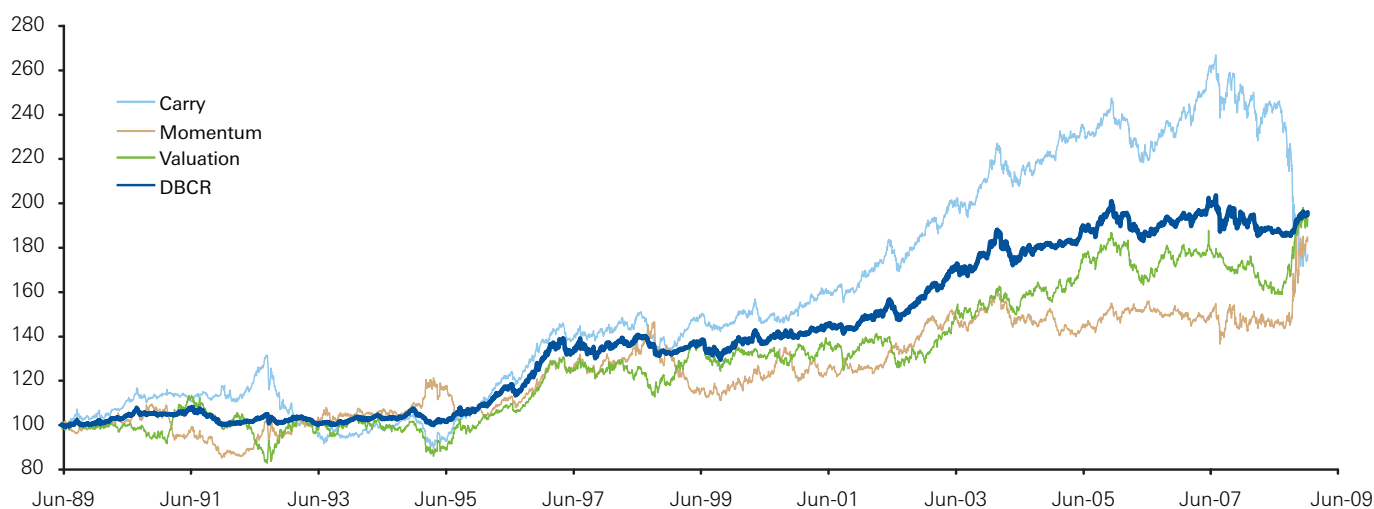
Source: Deutsche Bank

DBCR Performance Statistics	Carry	Momentum	Valuation	DBCR
Annualised Total Return in USD	7.27%	7.61%	7.82%	7.91%
Annualised Excess Return	2.77%	3.11%	3.32%	3.41%
Annualised Volatility	9.60%	10.22%	9.33%	5.28%
Sharpe Ratio	0.29	0.30	0.36	0.65
Correlation Daily Returns to DBCR	0.59	0.44	0.61	1.00
% Down months	39%	45%	46%	37%
% Up months	61%	55%	54%	62%
Biggest Monthly Gain	6.29%	14.50%	8.61%	3.44%
Mean Monthly Return	0.25%	0.28%	0.28%	0.27%
Biggest Monthly Loss	-14.45%	-9.22%	-7.03%	-4.11%
Longest Profitable Streak (Months)	12	7	7	12
First Start	Jul-95	Aug-96	Aug-96	Jul-95
End	Jul-96	Feb-97	Feb-97	Jun-96
Run-up	31.31%	17.27%	19.78%	15.15%
Longest Losing Streak (Months)	7	5	6	6
First Start	Dec-05	Jan-99	Jul-91	Aug-91
End	Jun-06	May-99	Dec-91	Jan-92
Run-down	-10.09%	-13.63%	-12.48%	-5.79%
Maximum Drawdown	-37.07%	-23.89%	-26.40%	-8.91%

Source: Deutsche Bank, June 1989 to February 2009

DBCR Index Construction

The DBCR is an investable index that captures the long term systematic returns available by investing in the world's currency markets. It replicates the three strategies most widely employed in the FX market and wraps them all into a single non-discretionary index with daily liquidity.

DB Currency Returns Index

- The DBCR index is quoted in EUR or USD notional and in excess return terms, representing the returns of an unfunded investment

- DBCR invests in one third of each of the following 3 indices on a daily basis:
  - DB Currency Carry Index,
  - DB Currency Momentum Index,
  - DB Currency Valuation Index

- The pool of currencies eligible for inclusion in each of these indices is:
  USD, EUR, JPY, GBP, CHF, AUD, NZD, CAD, NOK, SEK

- Daily index closing levels are published to DBIQ and Bloomberg

DB Currency Carry Index

- Re-balance every 3 months, with the Roll Dates set as the third Wednesday of March, June, September and December

- Rank each Currency by its 3m Libor Rate on the Observation Date (1 week before the quarterly IMM date)

- Allocate a 1/3 long position to each of the 3 currencies with the highest 3m Libor rate

- Allocate a 1/3 short position to each of the 3 currencies with the lowest 3m Libor rate

- Transact Forwards in each currency to the next Roll Date

DB Currency Momentum Index

- Re-balance every month, with the Roll Dates set as the third Wednesday of each month

- Rank each Currency by its 12 month Spot Return vs. the USD on the Observation Date (1 week before the monthly IMM date)

- 12 month Spot Return vs. the USD is defined as : Current spot level of the currency versus the USD [in CCY/USD terms] divided by the spot level for the currency versus the USD 12 months ago [in CCY/USD terms], minus 1

- Allocate a 1/3 long position to each of the 3 currencies with the highest 12 month Spot Return vs. the USD

- Allocate a 1/3 short position to each of the 3 currencies with the lowest 12 month Spot Return vs. the USD

- Transact Forwards in each currency to the next Roll Date

DB Currency Valuation Index

- Re-balance every 3 months, with the Roll Dates set as the third Wednesday of March, June, September and December

- Rank each Currency by its Valuation on the Observation Date (1 week before the quarterly IMM date). The most undervalued currency is represented by the lowest Valuation

- Valuation is defined as : Average spot level of the currency versus the USD [in CCY/USD terms] over the last 3 months divided by the latest OECD Purchasing Power Parity figure for that currency versus the USD [in CCY/USD terms]

- Allocate a 1/3 long position to each of the 3 currencies with the lowest Valuation

- Allocate a 1/3 short position to each of the 3 currencies with the highest Valuation

- Transact Forwards in each currency to the next Roll Date

Timeline for re-balancing

Wed	Thu	Fri	Mon	Tue	Wed IMM	Thu	Fri	Mon
Observation Date (IMM – 5 days) Currencies are ranked		Two Roll Dates within the Roll Window are determined	Roll Window					The two chosen Roll Dates are made public

DBCR Historical Composition

On the right is a table outlining the percentage of time each currency has spent at each allocation level. At any point in time a currency's allocation in the DBCR can range from being long one third of the index notional when it is selected as a 'Long currency' in all three component strategies, to being short one third of the index notional when it is selected as a 'Short Currency' in all three component strategies.
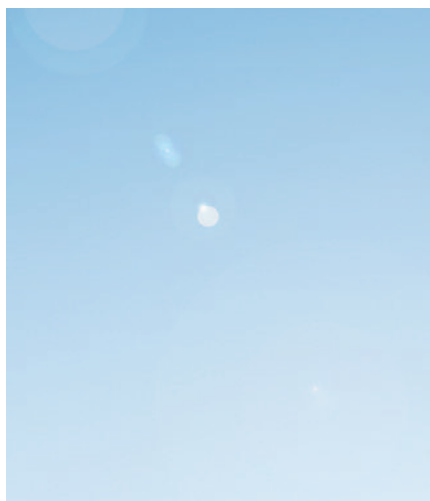
Percentage of Time Spent at Each Allocation Level
June 1989 to February 2009

DBCR										
Index Allocation	**AUD**	**CAD**	**CHF**	**EUR**	**GBP**	**JPY**	**NOK**	**NZD**	**SEK**	**USD**
Long 1/3 MAX	10%	0%	0%	0%	0%	0%	0%	23%	0%	4%
Long 2/9	25%	16%	0%	2%	27%	3%	3%	31%	2%	13%
Long 1/9	29%	39%	0%	19%	29%	3%	24%	34%	17%	33%
Neutral	32%	33%	40%	53%	35%	42%	40%	9%	36%	33%
Short 1/9	5%	11%	36%	26%	7%	31%	23%	3%	38%	17%
Short 2/9	0%	1%	21%	0%	1%	22%	10%	0%	7%	0%
Short 1/3 MIN	0%	0%	3%	0%	0%	0%	1%	0%	0%	0%
Total Long	63%	56%	0%	21%	57%	6%	26%	89%	18%	50%
Total Neutral	32%	33%	40%	53%	35%	42%	40%	9%	36%	33%
Total Short	5%	12%	60%	26%	8%	53%	33%	3%	45%	17%

Carry										
	AUD	**CAD**	**CHF**	**EUR**	**GBP**	**JPY**	**NOK**	**NZD**	**SEK**	**USD**
Long	55%	4%	0%	8%	60%	0%	43%	77%	31%	20%
Neutral	40%	87%	20%	59%	40%	1%	54%	23%	50%	32%
Short	5%	9%	80%	34%	0%	99%	4%	0%	19%	48%

Momentum										
	AUD	**CAD**	**CHF**	**EUR**	**GBP**	**JPY**	**NOK**	**NZD**	**SEK**	**USD**
Long	26%	26%	41%	31%	23%	34%	27%	37%	25%	29%
Neutral	39%	43%	37%	45%	50%	26%	50%	29%	49%	32%
Short	35%	31%	22%	24%	27%	39%	23%	34%	26%	39%

Valuation										
	AUD	**CAD**	**CHF**	**EUR**	**GBP**	**JPY**	**NOK**	**NZD**	**SEK**	**USD**
Long	60%	64%	0%	1%	24%	9%	0%	88%	0%	51%
Neutral	40%	36%	1%	84%	76%	27%	42%	12%	42%	45%
Short	0%	0%	99%	15%	0%	64%	58%	0%	58%	4%

Source: Deutsche Bank

DBCR Correlation to Other Asset Classes
## Correlations between January 2007 and February 2009

		S&P500	EuroStoxx50	Nikkei	US 2 Yr Swap	US 10 Yr Swap	DBLCI-OY	DXY Index	DBCR
Equities:	S&P500	100%	48%	11%	42%	41%	26%	-7%	5%
	EuroStoxx50	48%	100%	46%	18%	21%	36%	-28%	20%
	Nikkei	11%	46%	100%	-2%	6%	25%	-27%	16%
Interest Rates:	US 2 Yr Swap	42%	18%	-2%	100%	83%	11%	15%	9%
	US 10 Yr Swap	41%	21%	6%	83%	100%	19%	11%	8%
Commodities:	DBLCI-OY	26%	36%	25%	11%	19%	100%	-46%	4%
Currencies:	DXY Index	-7%	-28%	-27%	15%	11%	-46%	100%	12%
	DBCR	5%	20%	16%	9%	8%	4%	12%	100%

Source: Deutsche Bank

DBCR Variants

- The core principles of simplicity and non optimisation are maintained
- The paths to augment the basic benchmark strategy are:
  1. Expand the investable currency universe beyond G10: **DBCR+**
 2. Overlay a dynamic allocation between the three sub-strategies: **DBCR Dynamic**
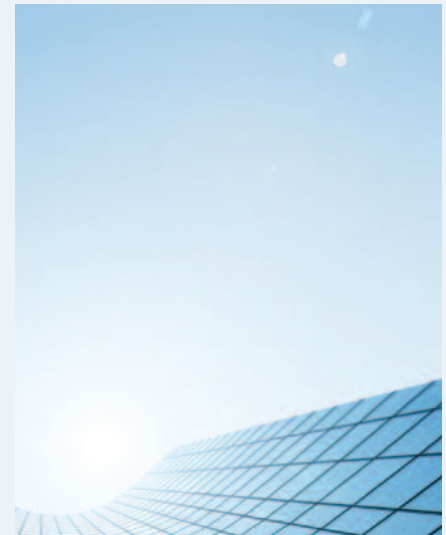
DBCR+

DBCR+ is constructed in the same way as DBCR, the only differencebeing G10 Harvest is replaced by Balanced Harvest as the carry component. DBCR+ is still an equally weighted index of carry, momentum and valuation strategies.

DBCR Dynamic

The DBCR Dynamic uses the same underlying G10 Carry, Momentum and Valuation strategies as the DBCR, but rather than having fixed, equal weights in each, it makes a variable allocation between strategies determined by logical rules based on the previous year's performance.

Performance of the DBCR
Excess Returns from October 1997 – February 2009

Source: Deutsche Bank
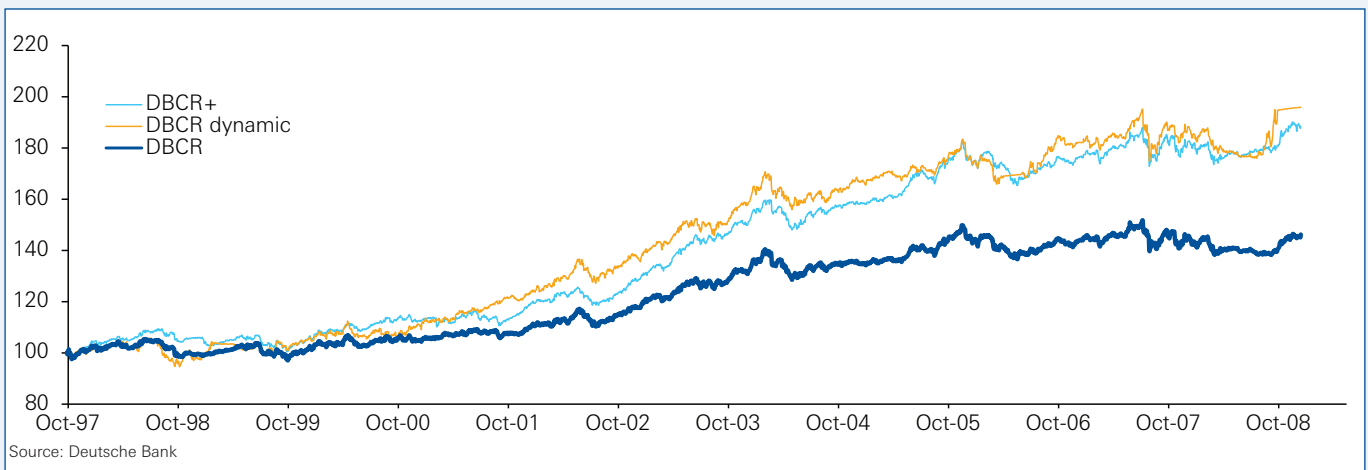
Statistics from October 1997 - February 2009

DBCR Performance Statistics	DBCR	DBCR+	DBCR Dynamic
Annualised Total Return in USD	7.79%	10.21%	10.60%
Annualised Excess Return	3.39%	5.71%	6.10%
Annualised Volatility	5.58%	5.69%	7.05%
Sharpe Ratio	0.59	1.00	0.87
% Down months	36%	33%	36%
% Up months	64%	67%	64%
Biggest Monthly Gain	3.44%	4.30%	4.72%
Mean Monthly Return	0.28%	0.47%	0.47%
Biggest Monthly Loss	-3.73%	-3.39%	-4.75%
Longest Profitable Streak (Months)	7	8	13
First Start	Aug-02	Sep-99	Oct-00
End	Feb-03	Apr-00	Oct-01
Run-up	9.81%	8.16%	14.54%
Longest Losing Streak (Months)	4	3	7
First Start	Jul-98	Jul-01	Jan-08
End	Oct-98	Sep-01	Jul-08
Run-down	-5.90	-3.98%	-5.68%
Max Peak-Trough Drawdown	-8.91%	-9.23%	-10.61%

Source: Deutsche Bank

DBCR+
Strategy

The carry strategy benefits most from an expansion of the eligible currency universe due to potentially wider yield differentials by including EM currencies and hence generally higher net carry.

- The Balanced Harvest Index, traded since 2005, includes some emerging market currencies and has a proven track record as a more efficient carry index. The DBCR+ Index uses the Balanced Currency Harvest Index as the carry component instead of the G10 Currency Harvest Index.

- The Balanced Currency Harvest Index invests in the 2 highest yielding G10 currencies and then the 3 remaining highest yielders, while borrowing and shorting the 2 lowest yielding G10 currencies and then the 3 remaining lowest yielders from a 20 currency, geographically diverse universe.

- The broader pool of currencies available in the Balanced Currency Harvest Index and that they can be drawn from outside the G10 space improves the overall diversification for the DBCR+ index, keeping the expected risk and drawdown profiles similar to the standard DBCR Index while greatly improving the return profile.

Annualised Excess Returns 1997 – 2008
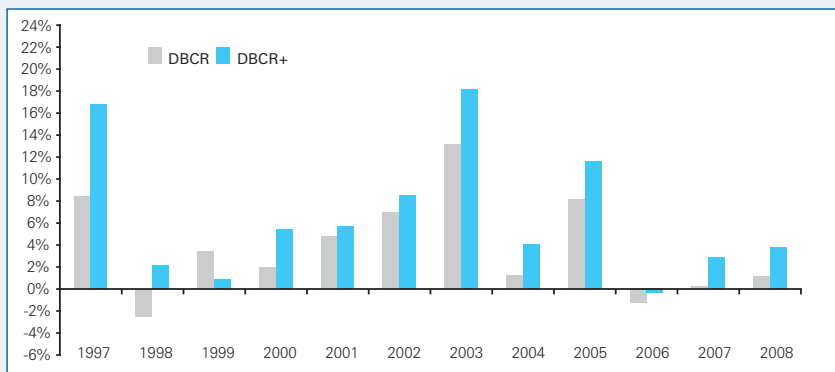
Source: Deutsche Bank

Index Construction

- DBCR+ is constructed in the same way as DBCR, the only difference being G10 Harvest is replaced by Balanced Harvest as the carry component.

- DBCR+ is still an equally weighted index of carry, momentum and valuation strategies.

DBCR Dynamic
Strategy

The approach is simple: apply a filter based on the known return characteristics of each sub-index to determine the weight to apply to each at any point in time rather than always being invested 1/3 in Carry, 1/3 in Momentum and 1/3 in Valuation.

Carry Filter

The Carry index has a tendency to trend for long periods of time interrupted by short sharp periods of underperformance. For this reason a momentum filter makes most sense, allowing DBCR Dynamic to remain invested in carry while it is performing and to reduce exposure during times of underperformance.

Momentum Filter

The Momentum index tends to drift sideways with occasional periods of sharp positive performance, therefore a mean reversion filter is applied which takes profit on the momentum index after a period of positive returns and reinvests only after a period of underperformance.

Valuation Filter

The Valuation Index exhibits a similar return distribution to Momentum: a sideways trend punctuated by periods of sharp positive returns when valuations 'snap' back to fair value quickly after prolonged periods of slowly becoming stretched. Therefore the same mean reversion filter is applied to the Valuation index, investing after periods of underperformance and taking profit after a period of strong returns.

Index Construction

- Observe whether each filter condition is satisfied every month one week prior to the IMM week.
- The filter condition is based on published rolling 12 month returns of each sub-index.
- Invest equally between strategies that meet the filter condition.
- If no sub-strategies meet the filter condition then the strategy is to remain 'un-invested' for that month (i.e. apply 0% weights to each).
- As with all DB FX indices, the DBCR Dynamic index utilises the innovative Roll Window feature to effect the rebalancing during the IMM week.

Annualised Excess Returns 1997 – 2008
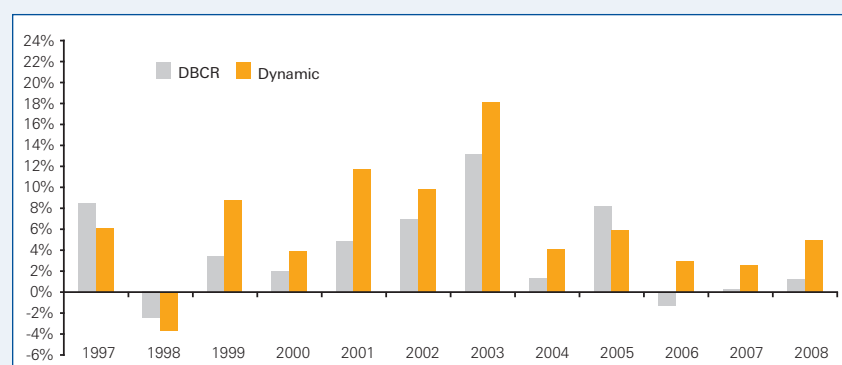
Source: Deutsche Bank

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Index Name	Bloomberg Ticker
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DB Currency Returns USD	DBCRUSI Index <Go>
DB Currency Carry EUR	DBHTG10U Index <Go>
DB Currency Carry USD	DBHTG10E Index<Go>
DB Currency Momentum EUR	DBMOMEUF Index<Go>
DB Currency Momentum USD	DBMOMUSF Index<Go>
DB Currency Valuation EUR	DBPPPEUF Index <Go>
DB Currency Valuation USD	DBPPPUSF Index<Go>
DBCR+ EUR	DBCRPLE Index <Go>
DBCR+ USD	DBCRPLU Index <Go>
DBCR Dynamic EUR	DBCRDNE Index <Go>
DBCR Dynamic USD	DBCRDNU Index <Go>

Appendix:

Currencies: Pensions Saviour? 4th August 2006	DB Global Markets Research
Currency Markets: Is Money Left On the Table? 13th March 2007	DB Global Markets Research
Currency: Carry Investing, 28th March 2007	DB Global Markets Research
Currency: Momentum Investing, 28th March 2007	DB Global Markets Research
Currency: Value Investing, 28th March 2007	DB Global Markets Research
Benchmarking Currencies: The Deutsche Bank Currency Returns (DBCR) Index, 28th March 2007	DB Global Markets Research

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