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DBIQ Index Guide

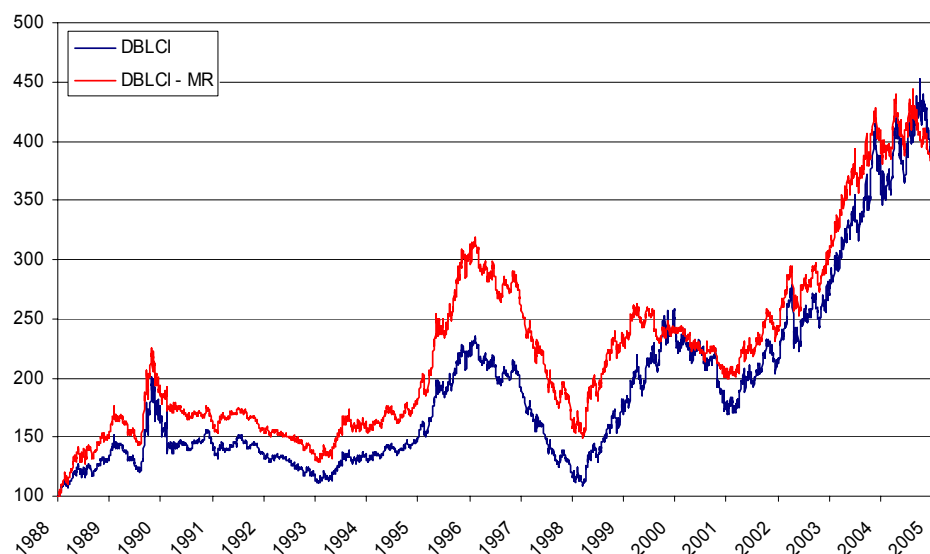
DBLCI Commodity Indices

Table of Contents

Introduction to DBIQ	2
DBLCI Commodities	
Index Introduction	2
Index Calculation and	
Rules	4
Disclosures.....	11

- Deutsche Bank Liquid Commodities Indices (DBLCI) includes the benchmark DBLCI, systematic strategy DBLCI-MR and single commodity indices.
- The DBLCI index tracks the performance of six commodity futures: Sweet Light Crude Oil (WTI), Heating Oil, Aluminium, Gold, Wheat and Corn.
- All DBLCI indices are available in USD and hedged/un-hedged in EUR, JPY and GBP.
- DBLCI MR index invests in the same six commodities as the DBLCI. The weights of the commodities in the DBLCI MR index are systematically adjusted depending on the relative richness or cheapness of the commodity.

DBLCI and DBLCI MR Excess Return Index Levels



Source: Deutsche Bank

Daniel Arnold

Index Research
+1 212 250 2776

Aram Flores

US Head Index Research
+1 212 250 0630

Waqas Samad

EU Head Index Research
+44 20 7545 4939

Fergus Lynch

Global Head Index Research
+44 20 7545 8765

David Folkerts-Landau

Managing Director
Global Head of Research

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Introduction to DBIQ

DBIQ is Deutsche Bank's powerful Web-based platform that provides sophisticated support for index and portfolio analysis. The site allows users to report on index, portfolio, pricing and bond level information in an intuitive, transparent and customisable way. The ease of use, speed, flexibility and wealth of data make the DBIQ system a compelling investment tool for money managers everywhere.

The DBIQ index family covers the global fixed income, FX, commodities and derivatives world. All indices are designed to be transparent and market reflective.

DBLCI Commodities Index Introduction

The Deutsche Bank suite of commodities indices includes the Deutsche Bank Liquid Commodities (DBLCI) benchmark index, the DBLCI MR Strategy index and individual DBLCI commodity indices. Both excess return (unfunded) and total return (funded) index levels based in USD are available. Further to this, hedged and un-hedged levels are available in EUR, GBP and JPY.

The DBLCI index tracks the performance of six commodity futures: Sweet Light Crude Oil (WTI), Heating Oil, Aluminium, Gold, Wheat and Corn. These cover the biggest commodity sectors and are held in fixed notional amounts which reflect world production and inventories in these sectors.

The DBLCI MR index invests in the same six commodities as the DBLCI. The weights of the commodities in the DBLCI MR index are systematically adjusted depending on the relative richness or cheapness of each commodity. The commodity weight is linked to the ratio between a one-year and five-year moving average price. Relatively expensive commodities have lower weights; conversely, relatively cheap commodities have higher weights.

DBLCI and DBLCI MR indices excluding Gold are also available. These follow a similar methodology to the standard indices except they do not include the Gold contract.

The six DBLCI individual commodity indices track the performance of the single commodities. The rules and procedures for these indices are the same as with the DBLCI except all the index holding is in a single commodity.

The commodity futures used in the indices are traded on some of the largest and most transparent exchanges in the world. The maturity of each instrument and the roll frequency have been chosen to enhance the returns of the index and to track the underlying cash commodities as closely as possible. Sweet Light Crude Oil (WTI) and Heating Oil are rolled on a monthly basis. Aluminium, Gold, Wheat and Corn are rolled on an annual basis over the same period as the annual rebalancing.

In the annual rebalancing all commodities have their future contracts rolled. For the DBLCI index the commodity weights are also reset to their rebalancing weights. Throughout the rest of the year the commodity weights for the DBLCI fluctuate as prices move. Since November 2004 the annual rebalancing occurs between the 2nd and 6th index business day of November. Prior to November 2004 the annual rebalancing occurred between the 2nd and 6th index business day of December. The DBLCI rebalancing weights are defined in Exhibit 1. These weights are used as reference rates for the DBLCI MR index. The Ex Gold indices' commodity weights are increased proportionally from the standard index weights.


Exhibit 1: DBLCI Commodity Membership List

Commodity	Symbol	Exchange	Rebalancing Weights	
			Standard	Ex Gold
Energy				
Sweet Light Crude Oil (WTI)	CL	NYMEX	35.00%	38.89%
Heating Oil	HO	NYMEX	20.00%	22.22%
Precious Metals				
Gold	GC	COMEX	10.00%	0.00%
Base Metals				
Aluminium	MAL	LME	12.50%	13.89%
Grains/Softs				
Corn	C	CBOT	11.25%	12.50%
Wheat	W	CBOT	11.25%	12.50%

Source: DB Global Markets Research

The index is calculated on each index business day using the exchange closing prices. Index business days are weekdays when banks in NYC are open. If it is an exchange holiday but an index business day, the exchange close price from the previous index business day is used.

Historical Analysis

Historic daily index levels are available from 01-Dec-1988. From March 2003, closing price data for the underlying commodities have been captured from the exchanges. Prior to March 2003, the sources LIM, Bloomberg, and Reuters were used to obtain the closing price data. The index calculation methodology and commodity future selection are the same prior to and following March 2003.

Exhibit 2: DBLCI Excess Return Index Statistics

	Annualised Return	Volatility	Average Monthly Return	Months with Positive Return	Average Monthly Positive Return	Average Monthly Negative Return
DBLCI	8.89%	20.42%	0.85%	53.17%	4.92%	-3.78%
DBLCI - MR	8.79%	17.05%	0.81%	49.76%	4.67%	-3.00%
DBLCI ex gold	9.68%	22.18%	0.94%	53.66%	5.37%	-4.19%
DBLCI - MR Ex Gold	8.93%	18.54%	0.85%	51.71%	4.88%	-3.47%
DBLCI CL	16.25%	34.51%	1.68%	59.02%	7.70%	-7.01%
DBLCI HO	10.48%	33.73%	1.28%	55.61%	7.63%	-6.69%
DBLCI MAL	-2.56%	17.80%	-0.14%	43.41%	4.38%	-3.61%
DBLCI GC	-2.21%	13.34%	-0.16%	42.93%	3.14%	-2.64%
DBLCI W	-2.88%	20.63%	-0.09%	49.27%	4.71%	-4.75%
DBLCI C	-7.87%	19.28%	-0.53%	47.80%	3.99%	-4.68%

Source: DB Global Markets Research, Returns between Index Dec 1988 and Dec 2005

This data does not include transaction costs.

Index Calculation and Rules

Index Calculation

The excess return is equal to the percentage change of the underlying commodity futures market values. On a normal index calculation day there will be six commodity futures contracts in the DBLCI and DBLCI MR indices. During the annual rebalancing period both the old and new contracts are present for each commodity, resulting in twelve commodity futures contracts in the index. During the monthly roll periods of Sweet Light Crude Oil and Heating Oil, both new and old commodity contracts are present for these commodities. This results in eight commodity contracts being present in the DBLCI and DBLCI MR indices. The DBLCI single commodity indices have two contracts throughout roll periods and one contract on other days.

The excess return index level in USD is expressed as

$$ILer(t) = \frac{\sum_i PC(t,i) * N(t-1,i)}{\sum_i PC(t-1,i) * N(t-1,i)} * ILer(t-1)$$

Where:

ILer(t)	= Excess Return Index level on day t
ILer(t-1)	= Excess Return Index level on index calculation day t-1
PC(t,i)	= Close price of commodity future i on day t
PC(t-1,i)	= Close price of commodity future i on index calculation day t-1
N(t-1,i)	= Notional holding of commodity future i on index calculation day t-1

The total return index level in USD is expressed as

$$ILtr(t) = \left(\frac{ILer(t)}{ILer(t-1)} + Rt(t) \right) * (1 + Rt(t))^{d(t,t-1)} * ILtr(t-1)$$

$$Rt(t) = \left(1 - \frac{91}{360} y(t-1) \right)^{-\left(\frac{1}{91}\right)} - 1$$

Where:

ILtr(t)	= Total Return Index level on day t
ILtr(t-1)	= Total Return Index level on index calculation day t-1
Rt(t)	= T-bill return on day t
d(t,t-1)	= Number of calendar days between day t and index calculation day t-1 excluding day t
y(t-1)	= 3-month benchmark T-bill yield on index calculation day t-1

Hedged and Un-Hedged Index Levels

The total and excess return hedged and un-hedged index levels are calculated using a similar methodology. The hedged and un-hedged indices are calculated on a month-to-date basis.

The return from the FX hedge is accrued over the month on an ACT/ACT basis. The hedged index is expressed as

$$ILh(t) = [1 + RetIL(t) + RetIL(t) * FXr(t) + FXhr(t)] * ILh(r)$$

The un-hedged index is expressed as

$$ILuh(t) = (1 + RetIL(t)) * (1 + FXr(t)) * ILuh(r)$$

Where:

ILh(t) = Hedged return index level on day t

ILh(r) = Hedged return index level on last calendar day of last month r

ILuh(t) = Un-hedged return index level on day t

ILuh(r) = Un-hedged return index level on last calendar day of last month r

$$RetIL(t) = \frac{ILl(t)}{ILl(r)} - 1$$

ILl(t) = Local index level on day t

ILl(r) = Local index level on last calendar day of last month r

$$FXr(t) = \frac{FX(t)}{FX(r)} - 1$$

FX(t) = FX rate on day t quoted Index Currency: Hedge Currency

FX(r) = FX rate on last calendar day of last month r quoted Index Currency: Hedge Currency

$$FXhr(t) = \left(\frac{FXh(r)}{FX(r)} - 1 \right) * \frac{dy(t)}{TD}$$

FXh(r) = One-month FX forward rate on last calendar day of last month r quoted Index Currency: Hedge Currency

dy(t) = Number of calendar days between t and last calendar day of last month r

TD = Number of calendar days in month

DBLCI Benchmark Index Rebalancing and Rolls

Commodity future positions are adjusted during the annual index rebalancing period and the monthly index rolls. The rebalancing and rolls occur between the 2nd and 6th index business day of the month.

When neither an annual index rebalancing nor a monthly index roll is occurring, the notional holding of each commodity future remains constant.

$$N(t, i) = N(t - 1, i)$$

Annual Index Rebalancing Period

The annual index rebalancing takes place between the 2nd and 6th business day of the rebalancing month. From November 2004 the rebalancing month is November; prior to November 2004 it is December. The new Sweet Light Crude Oil (CL) and Heating Oil (HO) futures contracts are selected as the future contracts with an expiry month two months following the rebalancing month. The new Gold (GC), Aluminium (MAL), Corn (C) and Wheat (W) futures contracts are selected as the future contracts with an expiry in the December of the following year.

On each day during the rebalancing period the new notional holding of each commodity is calculated. The calculations for the old commodities that are leaving the index and the new commodities that are entering are different.

The notional of the old commodities is expressed as:

$$N(t,i) = N(t-1,i) * \frac{6 - db(t)}{7 - db(t)}$$

The notional of the new commodities is expressed as:

$$N(t,j) = N(t-1,j) + \frac{MVo(t) * CW(j)}{PC(t,j) * (7 - db(t))}$$

$$MVo(t) = \sum_i PC(t,i) * N(t-1,i)$$

where

$N(t-1,i)$	= Notional holding of old commodity future i on index calculation day t-1
$N(t,i)$	= Notional holding of old commodity future i on index calculation day t
$N(t-1,j)$	= Notional holding of new commodity future j on index calculation day t-1
$N(t,j)$	= Notional holding of new commodity future j on index calculation day t
$db(t)$	= Number of index business days in the month up to and including day t
$MVo(t)$	= Total market value of all old commodities in index on day t
$CW(j)$	= Rebalancing weight for commodity j
$PC(t,i)$	= Close price of old commodity future i on day t
$PC(t,j)$	= Close price of new commodity future j on day t

Monthly Index Roll Period

On each month that is not an annual index rebalancing, the monthly index roll occurs. This takes place between the 2nd and 6th business day of the month. During the roll, the old commodity future contracts for Sweet Light Crude Oil and Heating Oil are substituted with new contracts. The new Sweet Light Crude Oil and Heating Oil contracts are selected as the contracts that expire in two months.

On each day during the roll period the new notional holdings of the Sweet Light Crude Oil and Heating Oil contracts are calculated. The calculations for the old commodities that are leaving the index and the new commodities that are entering are different.

The notional of the old commodities is expressed as:

$$N(t,i,c) = N(t-1,i,c) * \frac{6 - db(t)}{7 - db(t)}$$

The notional of the new commodities is expressed as:

$$N(t,j,c) = N(t-1,j,c) + \frac{PC(t,i,c) * N(t-1,i,c)}{PC(t,j,c) * (7 - db(t))}$$

where

$N(t-1,i,c)$	= Notional holding of old commodity future i of commodity type c on index calculation day t-1
$N(t,i,c)$	= Notional holding of old commodity future i of commodity type c on index calculation day t
$N(t-1,j,c)$	= Notional holding of new commodity future j of commodity type c on index calculation day t-1
$N(t,j,c)$	= Notional holding of new commodity future j of commodity type c on index calculation day t
$db(t)$	= Number of index business days in the month up to and including day t
$PC(t,i,c)$	= Close price of old commodity future i of commodity type c on day t

$PC(t,j,c)$ = Close price of new commodity future j of commodity type c on day t

For all other commodity future contracts the notional holding of the commodity future remains constant.

$$N(t,i) = N(t-1,i)$$

Initial Index Notional

The index inception date is 01-Dec-1988. On this date the initial commodity notionals were calculated using:

$$N(t,i) = \frac{100 * CW(i)}{PC(t,i)}$$

where

$N(t,i)$ = Notional holding of commodity future i on index calculation day t

$CW(i)$ = Rebalancing weight for commodity i

$PC(t,i)$ = Close price of commodity future i on day t

DBLCI MR Index Rebalancing and Rolls

The DBLCI MR index has a systematic weight strategy based on the commodities' moving averages. The systematic weight changes occur when a divergence tick for one of the commodities changes. As with the DBLCI benchmark index, commodity future positions are adjusted during the annual index rebalancing period and the monthly index rolls. The rebalancing and rolls occur between the 2nd and 6th index business day of the month. Systematic weight changes cannot occur during the rebalancing or roll periods.

When neither an annual index rebalancing nor a monthly index roll nor a systematic weight change is occurring, the notional holding of each commodity future remains constant.

$$N(t,i) = N(t-1,i)$$

Annual Index Rebalancing and Monthly Index Roll Periods

The commodity weights are maintained throughout the annual rebalancing and monthly roll periods. The calculation of the notional holding for each commodity contract is the same for the annual rebalancing and monthly roll.

The annual index rebalancing takes place between the 2nd and 6th business day of the rebalancing month. From November 2004 the rebalancing month is November; prior to November 2004 it is December. The new Sweet Light Crude Oil (CL) and Heating Oil (HO) futures contracts are selected as the future contracts with an expiry month two months following the rebalancing month. The new Gold (GC), Aluminium (MAL), Corn (C) and Wheat (W) futures contracts are selected as the future contracts with an expiry in the December of the following year.

On each month that is not an annual index rebalancing, the monthly index roll occurs. This takes place between the 2nd and 6th business day of the month. During the roll, the old commodity future contracts for Sweet Light Crude Oil and Heating Oil are substituted with new contracts. The new Sweet Light Crude Oil and Heating Oil contracts are selected as the contracts that expire in two months.

On each day during the rebalancing/roll period the new notional holding of each commodity that is being rebalanced/rolled is calculated. The calculations for the old commodities that are leaving the index and the new commodities that are entering are different.

The notional of the old commodities is expressed as:

$$N(t, i, c) = N(t-1, i, c) * \frac{6 - db(t)}{7 - db(t)}$$

The notional of the new commodities is expressed as:

$$N(t, j, c) = N(t-1, j, c) + \frac{PC(t, i, c) * N(t-1, i, c)}{PC(t, j, c) * (7 - db(t))}$$

where

$N(t-1, i, c)$	= Notional holding of old commodity future i of commodity type c on index calculation day t-1
$N(t, i, c)$	= Notional holding of old commodity future i of commodity type c on index calculation day t
$N(t-1, j, c)$	= Notional holding of new commodity future j of commodity type c on index calculation day t-1
$N(t, j, c)$	= Notional holding of new commodity future j of commodity type c on index calculation day t
$db(t)$	= Number of index business days in the month up to and including day t
$PC(t, i, c)$	= Close price of old commodity future i of commodity type c on day t
$PC(t, j, c)$	= Close price of new commodity future j of commodity type c on day t

During the monthly roll, for all other commodity future contracts apart from Sweet Light Crude Oil and Heating Oil the notional holding of the commodity future remains constant.

$$N(t, i) = N(t-1, i)$$

Systematic Weight Strategy

The systematic weight strategy is based on the commodity divergence ticks. The divergence tick is a measure of the ratio of the 5yr and 1yr commodity moving average. The divergence tick is expressed as:

$$dk(t, i) = \text{trunc} \left(\frac{MA1(t, i) / MA5(t, i) - 1}{f} \right)$$

where:

$dk(t, i)$	= Divergence tick of commodity i on day t
$MA1(t, i)$	= One-year moving average of commodity i on day t
$MA5(t, i)$	= Five-year moving average of commodity i on day t
f	= 0.05

The one-year moving average uses the new commodity price from the first business day in the rebalancing/roll month. Prior to December 1988 the one-year average was based off a DB approximation. This average was proportionally weighted in the moving average calculation until December 1989.

The five-year moving average uses the new commodity price from the first of either the day after the old contract's expiry or the first business day in the month following the rebalancing/roll. Prior to December 1988 the five-year average was based off a DB

approximation. This average was proportionally weighted in the moving average calculation until December 1993.

When a divergence tick for a commodity changes between t-1 and t, the new target weight is calculated. The target weight is expressed as:

$$W(t,i) = \frac{CW(i) * e^{-dk(t,i)*k}}{\sum_j CW(j) * e^{-dk(t,j)*k}}$$

where:

W(t,i) = Target weight of commodity i on day t
k = 0.3

The DBLCI MR commodities weights will rebalance on the next business day, provided this is not a rebalancing/roll date. The new notional is expressed as:

$$N(t+1,i) = \frac{100 * W(t,i)}{PC(t+1,i)}$$

Initial Index Notional

The index inception date is 01-Dec-1988. On this date the initial commodity notionals were calculated using:

$$N(t,i) = \frac{100 * CW(i)}{PC(t,i)}$$

where

N(t,i) = Notional holding of commodity future i on index calculation day t
CW(i) = Rebalancing weight for commodity i
PC(t,i) = Close price of commodity future i on day t

DBLCI Single Commodity Index Rebalancing and Rolls

As with the DBLCI benchmark index, commodity future positions are adjusted during the annual index rebalancing period. Monthly rolls only occur for the Sweet Light Crude Oil (CL) and Heating Oil (HO) indices. The rebalancing and rolls occur between the 2nd and 6th index business day of the month.

When neither an annual index rebalancing nor a monthly index roll nor a systematic weight change is occurring, the notional holding of each commodity future remains constant.

$$N(t,i) = N(t-1,i)$$

Annual Index Rebalancing and Monthly Index Roll Periods

The annual index rebalancing takes place between the 2nd and 6th business day of the rebalancing month. From November 2004 the rebalancing month is November; prior to November 2004 it is December. The new Sweet Light Crude Oil (CL) and Heating Oil (HO) futures contracts are selected as the future contracts with an expiry month two months following the rebalancing month. The new Gold (GC), Aluminium (MAL), Corn (C) and Wheat (W) futures contracts are selected as the future contracts with an expiry in the December of the following year.

On each month that is not an annual index rebalancing, the monthly index roll occurs for the Sweet Light Crude Oil (CL) and Heating Oil (HO) indices. This takes place between the 2nd and 6th business day of the month. During the roll, the old commodity future contracts for Sweet Light Crude Oil and Heating Oil are substituted with new contracts. The new Sweet Light Crude Oil and Heating Oil contracts are selected as the contracts that expire in two months.

On each day during the rebalancing/roll period the new notional holding of each commodity that is being rebalanced/rolled is calculated. The calculations for the old commodities that are leaving the index and the new commodities that are entering are different.

The notional of the old commodities is expressed as:

$$N(t, i, c) = N(t-1, i, c) * \frac{6 - db(t)}{7 - db(t)}$$

The notional of the new commodities is expressed as:

$$N(t, j, c) = N(t-1, j, c) + \frac{PC(t, i, c) * N(t-1, i, c)}{PC(t, j, c) * (7 - db(t))}$$

where

$N(t-1, i, c)$	= Notional holding of old commodity future i of commodity type c on index calculation day t-1
$N(t, i, c)$	= Notional holding of old commodity future i of commodity type c on index calculation day t
$N(t-1, j, c)$	= Notional holding of new commodity future j of commodity type c on index calculation day t-1
$N(t, j, c)$	= Notional holding of new commodity future j of commodity type c on index calculation day t
$db(t)$	= Number of index business days in the month up to and including day t
$PC(t, i, c)$	= Close price of old commodity future i of commodity type c on day t
$PC(t, j, c)$	= Close price of new commodity future j of commodity type c on day t

Initial Index Notional

The index inception date is 01-Dec-1988. On this date the initial commodity notionals were calculated using:

$$N(t, i) = \frac{100}{PC(t, i)}$$

where

$N(t, i)$	= Notional holding of commodity future i on index calculation day t
$PC(t, i)$	= Close price of commodity future i on day t



Certifications

The views expressed in this report accurately reflect the relevant quantitative research model(s). In addition, the undersigned lead analyst(s) has not and will not receive any compensation for providing a specific recommendation or view in this report.

Daniel Arnold

Disclosures

Additional Information Available upon Request



Contacts

Name	Title	Telephone	Email	Location
Europe				
Fergus Lynch	Global Head of Index Development	44 20 7547 8765	fergus.lynch@db.com	London
Dipak Chauhan	Index Development	44 20 7547 7132	dipak.chauhan@db.com	London
Waqas Samad	Head of European Index Development	44 20 7545 4939	waqas.samad@db.com	London
Jorge Sarmiento	Index Development	44 20 7545 2081	jorge.sarmiento@db.com	London
North American				
Aram Flores	Head of Americas Index Development	212 250 0630	aram.flores@db.com	New York
Daniel J Arnold	Index Development	212 250 2776	daniel.j.arnold@db.com	New York
Rob McCullough	Index Development	212 250 0569	robert-f.mccullough@db.com	New York
Yi Zhang	Index Development	212 250 7204	yi.zhang@db.com	New York

David Folkerts-Landau
Managing Director
Global Head of Research
London Tel: (44) 20 7545 5502

Stuart Parkinson
Chief Operating Officer
London Tel: (44) 20 7545 7303

Fergus Lynch
Research Relationship Management
London Tel: (44) 20 7545 8765

Company Research Europe

Guy Ashton
London Tel: (44) 20 7547 2867

Economics, Rates, EM, FX & Commodities

Marcel Cassard
London Tel: (44) 20 7545 5507

Credit Strategy

Gary Jenkins
London Tel: (44) 20 7545 2322

Principal Locations

**Deutsche Bank AG
London**
1 Great Winchester Street
London EC2N 2DB
Tel: (44) 20 7545 8000
Fax: (44) 20 7545 6155

**Deutsche Bank AG
Frankfurt**
Grosse Gallusstrasse 10-14
Frankfurt am Main 60311
Germany
Tel: (49) 69 910 00
Fax: (49) 69 910 34225

Company Research Americas

David Manlowe
New York Tel: (1) 212 250 8782

Securitisation

Karen Weaver
New York Tel: (1) 212 250 3125

Tactical Asset Allocation

James Barty
London Tel: (44) 20 7545 2089

**Deutsche Bank AG
New York**
60 Wall Street
New York, NY 10005
United States of America
Tel: (1) 212 250 2500

**Deutsche Bank AG
Boston**
225 Franklin Street
Boston MA 02110
United States of America
Tel: (1) 617 217 6100
Fax: (1) 617 217 6200

Company Research GEMs

Dave Murray
Hong Kong Tel: (852) 2203 6128

Quantitative Credit

Jean-Paul Calamaro
London Tel: (44) 20 7545 1555

Asia Macro & Strategy

Michael Spencer
Hong Kong Tel: (852) 2203 8303

**Deutsche Bank AG
Hong Kong**
Cheung Kong Center, 2
Queen's Road Central
China
Tel: (852) 2203 8888
Fax: (852) 2203 7300

**Deutsche Bank AG
Singapore**
5 Temasek Boulevard
Suntec Tower Five
Singapore 038985
Tel: (65) 6423 8001
Fax: (65) 6883 1615

Company Research Japan

Greg Jones / Fumiaki Sato
Tokyo Tel: (813) 5156 6718
Tokyo Tel: (813) 5156 6703

CROCI

Pascal Costantini
London Tel: (44) 20 7545 1576

Equity Strategy Japan

Ryoji Musha
Tokyo Tel: (813) 5156 6697

**Deutsche Bank AG
Japan**
Sanno Park Tower, 2-11-1
Nagatacho
Chiyoda-ku, Tokyo 100-6171
Tel: (81) 3 5156 6701
Fax: (81) 3 5156 6700

**Deutsche Bank AG
Australia**
Deutsche Bank Place, Level 16
Corner of Hunter & Phillip Streets
Sydney NSW 2000
Tel: (61) 2 8258 1234
Fax: (61) 2 8258 1400

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