



RBC Europe Limited

James Ashley
Senior European Economist
+44 20 7029 0133
james.ashley@rbccm.com

Jens Larsen
MD, Chief European Economist
+44 20 7029 0112
jens.larsen@rbccm.com

April 12, 2012

How things have changed...

Financial market economists as users of economic statistics

Abstract

We consider, from a financial market economist's perspective, how the use of statistics has evolved over the recent past. The emphasis on a coherent and persuasive narrative underpinned by a broader range of statistics, at the expense of a narrower focus on signal extraction for key macro variables, means that the demand is for more comprehensive data that are comparable across sectors, economies and over time. The implications for the data providers are that the priorities should be production and presentation of more complex data, rather than an ever increasing amount of high-frequency indicators.

"Anyone who cannot speak clearly and simply should say nothing and continue to work until he can do so."

Sir Karl Popper (1994)

"Most questions of public policy relate to uncertainties. Answers depend upon an ability to understand and evaluate those uncertainties. Yet many commentators and members of the public want to believe in certainties. They want to cut through the thickets of caveats and technical difficulties to the 'bottom line'."

Mervyn King (2010)

Col. Jessep: "You want answers?"

Lt. Kaffee: "I want the truth!"

Col. Jessep: "You can't handle the truth!"

A Few Good Men (1992)

1 Introduction

It is not often that financial market economists are asked to be philosophical¹. But the questions of what service we provide and what value we add are particularly pertinent in an environment where resources are tight. Statistics – facts – fortunately play an important role, but as we will argue in this paper, financial market economists' use of the data has changed substantially as the nature of our role has evolved.

In this paper, we will discuss the changing role of financial market economists in the years since the onset of the financial and sovereign crisis, where the much-touted “Great Moderation” became a matter of historical study. From that, we will outline how our use of statistics has changed in light of that, and set out where improvements in the provision of statistics have helped us, and where we think there is still some distance to go. Our perspective is firmly non-academic, and really reflects our perceptions: we will surely have missed some important progress made in the last few years, and may well have missed major programmes currently in place. Whether that reflects our negligence, a need for better communications effort, or both, we leave to the readers to decide.

2 What financial sector economists did before the crisis

To fix ideas, we offer a highly stylised, partial and unfair characterisation of the framework applied by financial sector economists before and after the financial crisis. As a side remark, we note that much of this characterisation would have applied to the economics community more generally and, to some extent, to the academic world.

In our stylised pre-crisis world, the financial sector economist viewed the economy in terms of three essential relationships and two policy response functions: the economic relationships govern the demand for goods (an IS curve), supply (potential output), and provide a link from real to nominal outcomes (a Phillips curve). The monetary and fiscal policy response functions complete that conceptual framework, tying down the policy stance. That is sufficient to generate a set of economic outcomes and, in principle, also explain and predict asset prices.

Assume, for a moment, that the broad structure is “known” – or at least that this view of the structure is widely shared – but the parameters of the structure and the data are not. In that context, the financial sector economist's job is to produce estimates of both, by providing useful forecasts of current and future data, and subsequently to draw conclusions of the likely policy (re)action. She hands those estimates over to her clients, who can draw on a number of economists with broadly comparable views, in reaching their own judgment.

Here everyone has roughly the same “canonical model” of how the economy operates, although differences of view will arise: that provides scope for the financial sector economist to market her “non-consensus views” – they are likely to be based on relatively small differences in interpretation of the data or the underlying policy reaction functions, not a fundamentally different interpretation of the economy. As a result, the nature and the extent of uncertainty are limited. Consequently, communication – whether for the policymaker or the financial market economist – is relatively straightforward, because the “storytelling” that is employed is similar. It would run along lines such as these: “the economy was hit by a (say) positive demand shock that led to less spare capacity. In order to control inflation, interest rates will go up, and fiscal policy is likely to be tightened”.

What is the role of statistics for market economists in this environment? Statistics in this artificial construct are mostly about extracting a signal about the key data – “now casting” or very short-term forecasting of GDP and inflation, rather than understanding or explaining the consequences of those data. The priority is on reliable and timely headline measures, with much less emphasis on cross-country, cross-sectional or longer-term perspectives.

¹ Throughout this essay, we will be taking the view of a financial market macroeconomist, as opposed to the much wider category of financial market analysts or participants. This obviously affects our perspective – which is distinctly macroeconomic – but we believe that the points we make are applicable more widely.

3 What the financial market economist does now

That approach suits a stable environment where economic outcomes and policy are relatively straightforward to predict. The crisis has made clear that the world is anything but that, and the job of financial markets has become commensurately more challenging and exciting. But on reflection it is clear that even in the old world, the approach was insufficient, even if back then we could afford to be “lazy”. The reality check provided by the crisis has certainly led to a re-assessment of economic paradigm, and hence on what we as financial market economists should focus. Financial market economists have responded by changing their approach in a number of ways. Some examples:

- The data are more “imprecise” statistically and conceptually than most were willing to acknowledge. There is significant academic literature dealing with data uncertainty, and the insights from that work are substantially reflected in policy making. That is increasingly being recognised in financial market economic analysis, both in terms of the economic assessment and in making policy predictions. But it is fair to say the point is underappreciated by market participants more widely.
- The much bigger issue of conceptual or model uncertainty is subject to increasingly sophisticated academic analysis. But the impact of this work remains, in our view, relatively limited in terms of policy making and that way of thinking is not really embraced for financial market economists. The intellectual and the communication challenges that this work presents for the financial market economist are substantial, and the typical approach is to stick firmly to one paradigm: a clear, consistent story with a “bottom line” is paramount in communicating with clients. Clients are then choosing between different economists’ paradigms, rather than, more narrowly, their interpretation of the most recent data.
- Reflecting a much more complex economic reality, the policy responses that are relevant for a financial market economist are multidimensional: as an example, it is no longer sufficient to make a call on where the ECB will take interest rates next because the ECB is changing its policies more widely, with a significant impact on the size and shape of the balance sheet. In the fiscal policy space, the strategy the UK government is adopting in reducing the deficit is more important than the precise tax and spending measures. In general, the focus is more on strategy – which approach the policymaker is taking over the longer term – rather than the immediate policy decision.

These factors make the job of a financial market economist much more challenging. The economist’s natural inclination is to stress uncertainty – but as the quotes at the beginning of this paper suggest, the demand is for certainty, or at least clarity. Even if the ‘truth’ is unknowable, ‘answers’ are required. What’s the best solution?

In our experience, successful market economists have responded by providing a broader narrative. A strong demand for providing a narrowly defined take on the immediate outlook for growth or inflation still remains. But contextualising – by providing comparisons across time, across sector and country, and by relating to different strains of thinking – is much more valued than it was before the crisis. The strength, coherence and plausibility of the narrative, and in particular the factual, statistical underpinning, have assumed greater importance.

4 So how does this matter for the use of statistics?

The most basic function of financial market economists remains that of acting as a data filter on the ‘traditional’ set of economic statistics, sifting out the noise from the signal, and determining how the latest information refines any given view of GDP growth, inflation, unemployment and other headline statistics. But that in itself is now only one element of the whole: with the changes in the economic environment, the financial market economist has become more demanding, and if data producers want their output to remain relevant to the consumers of their output, then the provision of statistics must necessarily evolve accordingly.

We are of course acutely aware that ours is a partial view and that these issues have been the subject of extensive discussion and that very substantial progress is being made – indeed the Fifth ECB Conference on Statistics in 2010 covered the issue extensively (see ECB 2011). What we discuss here is what the priorities should be, from our perspective. Broadly speaking, one area relates to improvement in the accessibility and presentation of the data, while the second area relates to coverage. In a world of

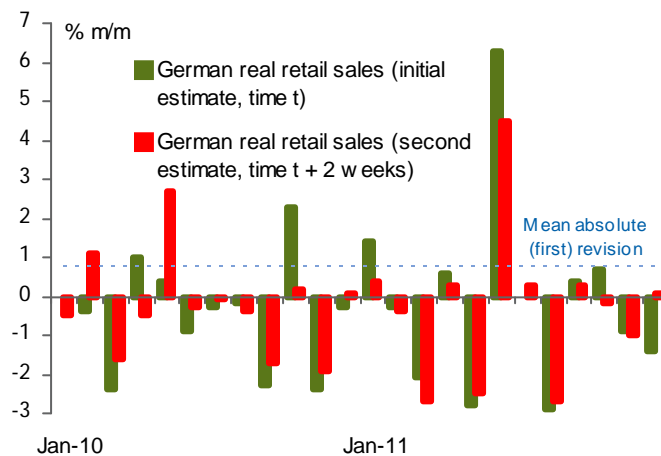
unconstrained resources, such demands could be accommodated easily enough; but in a world of scarcity, that may necessitate a reallocation of priorities.

4.1 Less of the same, but better

The timeliness, accuracy and coherence of the data we know and love can always be improved. As mentioned, a lot of progress has already been made in the area of data uncertainty and in core statistical concepts. From a financial market economist's perspective, her job can only be made easier if the providers of statistics continue to provide 'more of the same' while striving – as ever – to raise the overall quality of the statistics being produced. Who would not want more timely GDP estimates that are less prone to revisions?

But, in light of the pressure on resources and the changing priorities, there are arguments for reconsidering whether the current trade-off between timeliness and accuracy of statistics is optimal. We venture that there would be few complaints from financial market economists if, in certain specific cases, data were less timely but were more accurate as a result. To select but one example, Chart 1 suggests that German retail sales are prone to frequent and significant revisions within a fortnight of the first estimates having been published, so the actual information content in the first release is probably quite low. And in such cases, not publishing the statistics at the earliest opportunity may plausibly free up resources – not just for the producers of the data but also for the distractable consumers, including the financial market economist.

Chart 1: German real retail sales estimates



Source: Bloomberg, Haver, RBC Capital Markets

4.2 Easier access and better presentation: let the data speak

The time thus freed up by reappraising priorities and re-allocating resources might be used sensibly to improve the life of the users further by enhancing presentation and accessibility of the statistics. This is not to suggest that data users ought to be spoon-fed, but it is incumbent upon data providers to make their output readily available and understandable, at the very least to an informed and interested audience.

This, of course, is an area where the combination of technology and a change in philosophy has transformed the landscape. The huge increase in data availability and the increased capacity to display data dynamically and interactively has led to a revolution in the way information can be conveyed. This is not our field of endeavour, so we cannot give an account of the evolution of thought and practice there – but in the academic/intellectual field, the likes of Edward Tufte and Hans Rosling² have provided inspiration for displaying complex and rich data sets in innovative ways. The official sector also provides good examples of this new practice – e.g., with the IMF/World Bank interactive data mapping tools, and similar initiatives from a number of other agencies³. And outside the official sector, public data are also being made available

² See <http://www.edwardtufte.com/tufte/> and <http://www.gapminder.org/> for relevant home pages.

³ The IMF Data Mapper can be found here: <http://www.imf.org/external/datamapper/index.php>.

in more accessible, interactive formats⁴. In the field of economics and finance, the press has been making significant advances in displaying complex data – think of the numerous interactive displays of the BIS data of bank holdings of debt, which has become a key tool for understanding interdependencies between the financial and sovereign sector. The ECB interactive and dynamic yield curve tool is another example of making complex, multidimensional data available in a user-friendly format⁵.

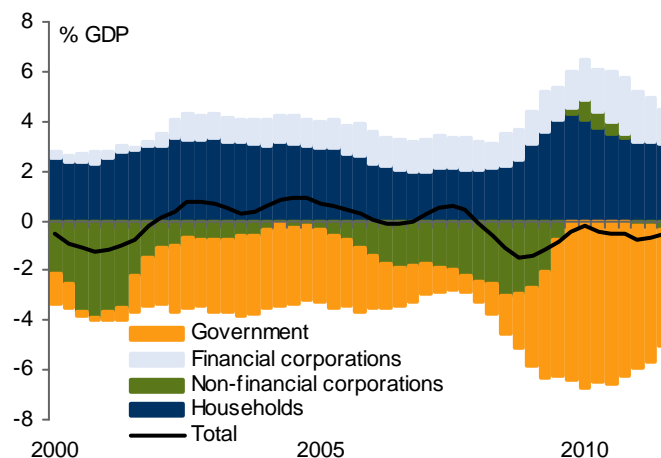
We would argue that the statistical authorities are generally somewhat lacking in this field, even if progress is being made. Sure, there is a strong argument for distinguishing between data assimilation/provision and presentation. On that argument, part of the job of the market economist (or the policymaker or the journalist for that matter) is to make sense of the statistics, while it is the job of the statistician to provide the high quality data in a timely manner. But we are of the view that the increasing complexity of the data means that the statistics providers themselves should provide not just better access but also better presentation of the data. Not only would that make our job easier, it might even improve our analysis.

4.3 Better coverage and comparability

But the more mundane topic of partial (or sometimes complete) absence of relevant and timely statistics remains an issue. This is obviously a huge international challenge, particularly in areas where resources and technical capacity constrain statistical providers. Globally, there are gaps in the existing data and, as will be discussed at this conference, the crisis has led to the identification of whole new areas where statistical gaps exist. We are well aware of the strides that are being made in this area at the European level and internationally – e.g., through the IMF's programme on Financial Soundness Indicators – dating back at the very least to the Asian financial crisis in the late 1990s. But there are strong arguments for attaching higher priority to this, and for improving communication.

European statistical provision is comparatively well-advanced, but even here there are gaps in what we consider basic macroeconomic statistics that need filling. One example is the lack of comparable and comprehensive data on the income side of the national accounts. Chart 2 shows euro area sectoral balances – the savings-investment imbalance of the key sectors in the economy – at the euro area level as a whole. It is important in telling the story about how the different sectors are responding to crisis conditions: the fiscal expansion is visible, as is the retrenchment by the private sector. These data are clearly important in forming a view on the outlook for the euro area economy and the likely policy response.

Chart 2: Sectoral balances - euro area



Note: Contributions of sectors to the net lending (+) / net borrowing (-) of the euro area (as a percentage of gross domestic product, based on four-quarter-cumulated sums).

Source: Eurostat

⁴ The Public Data Explorer by Google is one such prominent facility, where a wide range of public data are now available. See <http://www.google.com/publicdata/directory>

⁵ The ECB's yield curve tool can be found here: <http://www.ecb.int/stats/money/yc/html/index.en.html>.

But those data are surely even more relevant when looking at individual economies across the euro area. The lack of up-to-date and harmonised information across euro area economies has long been problematic to those seeking to undertake serious economic analysis; but in a rebalancing environment where deleveraging of the private sector across swathes of the euro area is an important theme, then the absence of comparable and comprehensive statistics presents a significant challenge. We are not party, of course, to the discussions that statisticians have about how to make progress in these areas, nor do we know what plans are in train for addressing them. But when we are unable to compare even the most basic of balance sheet information across economies in a timely fashion, our analysis surely suffers.

Other such examples include the ECB balance sheet – admittedly, understanding a central bank balance sheet is a complicated task at the best of times, and the structure of the European System of Central Banks of course makes this challenge bigger. But it remains a matter of some concern that – at a point where the Eurosystem’s balance sheet is expanding significantly – it remains such a tricky task to assess the individual euro area central banks’ balance sheets on a comparable basis.

5 Conclusion

In summary, life for the financial market economist has become more challenging and exciting, as the analytical requirements have moved away from a narrow interpretation of the data in the context of a canonical economic model towards a broader-based, more thematic analysis of economic developments. With that comes changing statistical requirements and interests – we continue to work the indicators hard to extract as much signal as possible about the outlook for activity and inflation, but the demand is for a more complex storytelling that draws on a wider range of information. Obtaining, manipulating, presenting – and of course understanding – more complex data is key.

In terms of the provision and presentation of statistics, there has been significant progress. But in our view, there is a strong case for moving the emphasis away from the provision of high-frequency updates of macroeconomic variables, and instead moving towards a broader provision of data, comparable across country, sector and across time. Better access and presentation surely also should be a higher priority. These views will doubtless not come as a surprise to statistical producers – but we hope that the emphasis from the “applied” end of the data-user spectrum will help these developments along.

References

Aikman, D, Baret, P, Kapadia, S, King, M, Proudman, J, Taylor, T, de Weymarn, I and Yates, T (2010), "Uncertainty in macroeconomic policy making: art or science?", paper delivered to the Royal Society Conference on "Handling Uncertainty in Science, 22 March, London.

Popper, K (1994), "In search of a better world, Routledge, London", page 83.

ECB (2011), "Central bank statistics – what did the financial crisis change?", Conference volume Fifth ECB Conference on Statistics, October 2010.

RBC Capital Markets, LLC:

Stevyn Schutzman	Global Head of FIC Strategy & Research and Chief Macro Strategist	(212) 618-2553	stevyn.schutzman@rbccm.com
------------------	---	----------------	----------------------------

Europe**RBC Europe Limited:**

James Ashley	Senior European Economist	+44-20-7029-0133	james.ashley@rbccm.com
Norbert Aul	European Rates Strategist	+44-20-7029-0122	norbert.aul@rbccm.com
Gustavo Bagattini	European Economist	+44-20-7029 0147	gustavo.bagattini@rbccm.com
Adam Cole	Head of G10 FX Strategy	+44-20-7029-7078	adam.cole@rbccm.com
Sam Hill, CFA	UK Fixed Income Strategist	+44-20-7029-0092	sam.hill@rbccm.com
Christophe Duval Kieffer	Global Inflation Linked Strategist	+44 20-7029-0184	christophe.duval-kieffer@rbccm.com
Jens Larsen	Chief European Economist	+44-20-7029-0112	jens.larsen@rbccm.com
Elsa Lignos	Senior Currency Strategist	+44-20-7029-7077	elsa.lignos@rbccm.com
Peter Schaffrik	Head of European Rates Strategy	+44-20-7029-7076	peter.schaffrik@rbccm.com
Nikhil Talwar	Fixed Income Strategist	+44-20-7029-0049	nikhil.talwar@rbccm.com

Asia-Pacific**Royal Bank of Canada - Sydney Branch:**

Su-Lin Ong	Head of Australian and New Zealand FIC Strategy	+612-9033-3088	su-lin.ong@rbccm.com
Michael Turner	Fixed Income & Currency Strategist	+612-9033-3088	michael.turner@rbccm.com

Royal Bank of Canada - Hong Kong Branch:

Brian Jackson, CFA	Senior Strategist China, India, Indonesia, Singapore, South Korea	+852-2848-5173	brian.jackson@rbccm.com
Sue Trinh	Senior Currency Strategist	+852-2848-5135	sue.trinh@rbccm.com

North America**RBC Dominion Securities Inc.:**

Mark Chandler	Head of Canadian FIC Strategy	(416) 842-6388	mark.chandler@rbccm.com
Stewart Hall	Senior Currency Strategist	(416) 842-6631	stewart.hall@rbccm.com
Ian Pollick	Fixed Income Strategist	(416) 842-6362	ian.pollick@rbccm.com
George Davis	Chief Technical Analyst	(416) 842-6633	george.davis@rbccm.com
Paul Borean	Associate	(416) 842-2809	paul.borean@rbccm.com
Nick Chamie, CFA	Global Head of FX Strategy	(416) 842-2802	nick.chamie@rbccm.com
Daniel Carabjal	Associate		daniel.carabjal@rbccm.com

RBC Capital Markets, LLC:

Michael Cloherty	Head of US Rates Strategy	(212) 437-2480	michael.cloherty@rbccm.com
Tom Porcelli	Chief US Economist	(212) 618-7788	tom.porcelli@rbccm.com
Jacob Oubina	Senior US Economist	(212) 618-7795	jacob.oubina@rbccm.com
Dan Grubert	Associate Strategist	(212) 618-7764	dan.grubert@rbccm.com
Yiran Wang	Associate	(212) 618-7897	yiran.wang@rbccm.com
Chris Mauro	Head of US Municipals Strategy	(212) 618-7729	chris.mauro@rbccm.com
Joshua Acheatel	Associate	(212) 618-3556	joshua.acheatel@rbccm.com

Required Disclosures

Conflicts Disclosures

The analyst(s) responsible for preparing this research report received compensation that is based upon various factors, including total revenues of the member companies of RBC Capital Markets and its affiliates, a portion of which are or have been generated by investment banking activities of the member companies of RBC Capital Markets and its affiliates.

Conflicts Policy

RBC Capital Markets Policy for Managing Conflicts of Interest in Relation to Investment Research is available from us on request. To access our current policy, clients should refer to <https://www.rbccm.com/global/file-414164.pdf> or send a request to RBC CM Research Publishing, P.O. Box 50, 200 Bay Street, Royal Bank Plaza, 29th Floor, South Tower, Toronto, Ontario M5J 2W7. We reserve the right to amend or supplement this policy at any time.

Dissemination of Research and Short-Term Trade Ideas

RBC Capital Markets endeavors to make all reasonable efforts to provide research simultaneously to all eligible clients, having regard to local time zones in overseas jurisdictions. RBC Capital Markets' research is posted to our proprietary websites to ensure eligible clients receive coverage initiations and changes in ratings, targets and opinions in a timely manner. Additional distribution may be done by the sales personnel via email, fax or regular mail. Clients may also receive our research via third-party vendors. Please contact your investment advisor or institutional salesperson for more information regarding RBC Capital Markets' research. RBC Capital Markets also provides eligible clients with access to SPARC on its proprietary INSIGHT website. SPARC contains market color and commentary, and may also contain Short-Term Trade Ideas regarding the securities of subject companies discussed in this or other research reports. SPARC may be accessed via the following hyperlink: <https://www.rbcinsight.com>. A Short-Term Trade Idea reflects the research analyst's directional view regarding the price of the security of a subject company in the coming days or weeks, based on market and trading events. A Short-Term Trade Idea may differ from the price targets and/or recommendations in our published research reports reflecting the research analyst's views of the longer-term (one year) prospects of the subject company, as a result of the differing time horizons, methodologies and/or other factors. Thus, it is possible that the security of a subject company that is considered a long-term 'Sector Perform' or even an 'Underperform' might be a short-term buying opportunity as a result of temporary selling pressure in the market; conversely, the security of a subject company that is rated a long-term 'Outperform' could be considered susceptible to a short-term downward price correction. Short-Term Trade Ideas are not ratings, nor are they part of any ratings system, and RBC Capital Markets generally does not intend, nor undertakes any obligation, to maintain or update Short-Term Trade Ideas. Short-Term Trade Ideas discussed in SPARC may not be suitable for all investors and have not been tailored to individual investor circumstances and objectives, and investors should make their own independent decisions regarding any Short-Term Trade Ideas discussed therein.

Analyst Certification

All of the views expressed in this report accurately reflect the personal views of the responsible analyst(s) about any and all of the subject securities or issuers. No part of the compensation of the responsible analyst(s) named herein is, or will be, directly or indirectly, related to the specific recommendations or views expressed by the responsible analyst(s) in this report.

Disclaimer

RBC Capital Markets is the business name used by certain branches and subsidiaries of the Royal Bank of Canada, including RBC Dominion Securities Inc., RBC Capital Markets, LLC, RBC Europe Limited, RBC Capital Markets (Hong Kong) Limited, Royal Bank of Canada, Hong Kong Branch and Royal Bank of Canada, Sydney Branch. The information contained in this report has been compiled by RBC Capital Markets from sources believed to be reliable, but no representation or warranty, express or implied, is made by Royal Bank of Canada, RBC Capital Markets, its affiliates or any other person as to its accuracy, completeness or correctness. All opinions and estimates contained in this report constitute RBC Capital Markets' judgment as of the date of this report, are subject to change without notice and are provided in good faith but without legal responsibility. Nothing in this report constitutes legal, accounting or tax advice or individually tailored investment advice. This material is prepared for general circulation to clients and has been prepared without regard to the individual financial circumstances and objectives of persons who receive it. The investments or services contained in this report may not be suitable for you and it is recommended that you consult an independent investment advisor if you are in doubt about the suitability of such investments or services. This report is not an offer to sell or a solicitation of an offer to buy any securities. Past performance is not a guide to future performance, future returns are not guaranteed, and a loss of original capital may occur. RBC Capital Markets research analyst compensation is based in part on the overall profitability of RBC Capital Markets, which includes profits attributable to investment banking revenues. Every province in Canada, state in the U.S., and most countries throughout the world have their own laws regulating the types of securities and other investment products which may be offered to their residents, as well as the process for doing so. As a result, the securities discussed in this report may not be eligible for sale in some jurisdictions. This report is not, and under no circumstances should be construed as, a solicitation to act as securities broker or dealer in any jurisdiction by any person or company that is not legally permitted to carry on the business of a securities broker or dealer in that jurisdiction. To the full extent permitted by law neither RBC Capital Markets nor any of its affiliates, nor any other person, accepts any liability whatsoever for any direct or consequential loss arising from any use of this report or the information contained herein. No matter contained in this document may be reproduced or copied by any means without the prior consent of RBC Capital Markets.

Additional information is available on request.

To U.S. Residents: This publication has been approved by RBC Capital Markets, LLC (member FINRA, NYSE, SIPC), which is a U.S. registered broker-dealer and which accepts responsibility for this report and its dissemination in the United States. Any U.S. recipient of this report that is not a registered broker-dealer or a bank acting in a broker or dealer capacity and that wishes further information regarding, or to effect any transaction in, any of the securities discussed in this report, should contact and place orders with RBC Capital Markets, LLC.

To Canadian Residents: This publication has been approved by RBC Dominion Securities Inc. (member of IIROC, CIPF). Any Canadian recipient of this report that is not a Designated Institution in Ontario, an Accredited Investor in British Columbia or Alberta or a Sophisticated Purchaser in Quebec (or similar permitted purchaser in any other province) and that wishes further information regarding, or to effect any transaction in, any of the securities discussed in this report should contact and place orders with RBC Dominion Securities Inc., which, without in any way limiting the foregoing, accepts responsibility for this report and its dissemination in Canada.

To U.K. Residents: This publication has been approved by RBC Europe Limited ('RBCCEL') which is authorized and regulated by Financial Services Authority ('FSA'), in connection with its distribution in the United Kingdom. This material is not for general distribution in the United Kingdom to retail clients, as defined under the rules of the FSA. However, targeted distribution may be made to selected retail clients of RBC and its affiliates. RBCCEL accepts responsibility for this report and its dissemination in the United Kingdom.

To Persons Receiving This Advice in Australia: This material has been distributed in Australia by Royal Bank of Canada - Sydney Branch (ABN 86 076 940 880, AFSL No. 246521). This material has been prepared for general circulation and does not take into account the objectives, financial situation or needs of any recipient. Accordingly, any recipient should, before acting on this material, consider the appropriateness of this material having regard to their objectives, financial situation and needs. If this material relates to the acquisition or possible acquisition of a particular financial product, a recipient in Australia should obtain any relevant disclosure document prepared in respect of that product and consider that document before making any decision about whether to acquire the product.

To Hong Kong Residents: This publication is distributed in Hong Kong by RBC Investment Services (Asia) Limited, RBC Investment Management (Asia) Limited and RBC Capital Markets (Hong Kong) Limited, licensed corporations under the Securities and Futures Ordinance or, by the Royal Bank of Canada, Hong Kong Branch, a registered institution under the Securities and Futures Ordinance. This material has been prepared for general circulation and does not take into account the objectives, financial situation, or needs of any recipient. Hong Kong persons wishing to obtain further information on any of the securities mentioned in this publication should contact RBC Investment Services (Asia) Limited, RBC Investment Management (Asia) Limited, RBC Capital Markets (Hong Kong) Limited or Royal Bank of Canada, Hong Kong Branch at 17/Floor, Cheung Kong Center, 2 Queen's Road Central, Hong Kong (telephone number is 2848-1388).

To Singapore Residents: This publication is distributed in Singapore by the Royal Bank of Canada, Singapore Branch and Royal Bank of Canada (Asia) Limited, registered entities granted offshore bank and merchant bank status by the Monetary Authority of Singapore, respectively. This material has been prepared for general circulation and does not take into account the objectives, financial situation, or needs of any recipient. You are advised to seek independent advice from a financial adviser before purchasing any product. If you do not obtain independent advice, you should consider whether the product is suitable for you. Past performance is not indicative of future performance. If you have any questions related to this publication, please contact the Royal Bank of Canada, Singapore Branch or Royal Bank of Canada (Asia) Limited.

To Japanese Residents: Unless otherwise exempted by Japanese law, this publication is distributed in Japan by or through RBC Capital Markets (Japan) Ltd., a registered type one financial instruments firm and/or Royal Bank of Canada, Tokyo Branch, a licensed foreign bank.

® Registered trademark of Royal Bank of Canada. RBC Capital Markets is a trademark of Royal Bank of Canada. Used under license.

Copyright © RBC Capital Markets, LLC 2012 - Member SIPC
Copyright © RBC Dominion Securities Inc. 2012 - Member CIPF
Copyright © RBC Europe Limited 2012
Copyright © Royal Bank of Canada 2012
All rights reserved