



Rabobank

Mmm...MT

Not-so Modern Monetary Theory

RaboResearch

Global Economics & Markets

mr.rabobank.com

Michael Every

Senior Strategist, Asia-Pacific
+852 2103 2612

Summary

- After years in obscurity, MMT is now being discussed --and dismissed-- in high policy circles
- Many would argue its eventual introduction in some form is inevitable
- When looked at in detail MMT is not the simplistic argument its critics present it as
- Some of its fresh, if old, ideas may offer new ways of looking at our present problems
- However, MMT will also risk creating as many problems as it solves
- As such, just try saying MMT without saying 'Mmm'!

Mmm...MT

For those who haven't noticed, there has been a lot of discussion about Modern Monetary Theory (MMT) in the press of late. The following headlines have appeared in the past few weeks alone:

[Alexandria Ocasio-Cortez is a fan of a geeky economic theory called MMT;](#)

[Kuroda Foe Says Japan Will Prove MMT a Mistake;](#)

[MMT Finds an Embrace in an Unexpected Place Wall Street](#)

[This is How MMT Applies to Emerging Markets; and](#)

[MMT is Not a Recipe for Doom](#)

Clearly **MMT, which has actually been around for decades, is currently a hot topic at the highest levels.**

However, even a cursory glance above shows that it is not something there is any *agreement* over. By contrast, it's divisive and very controversial.

One can also see that public interest in MMT is spiking too. Google Trends interest over time in "Modern Monetary Theory" has shot up since the end of 2018 (see Figure 1) despite it being an obscure, dry, theoretical--and yet controversial-- economic-policy framework.

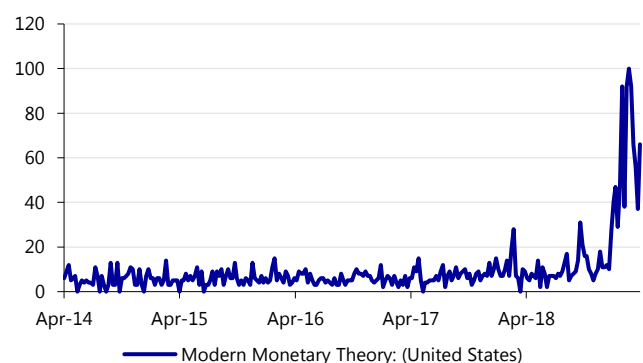
That is arguably the case in the US because MMT is now *politically* linked to US Democratic Congresswoman Alexandria Ocasio-Cortez's "**Green New Deal**", with its multi-trillion USD price-tag and radically transformative agenda.

But what is MMT?

We can agree interest in MMT is picking up, and not everyone likes it, but what exactly *is* it?

The answer is complicated as there is no central MMT textbook. Neither is it an accepted school of thought within market economics, or in orthodox economics departments at universities. As such, most working economists have only a passing familiarity with the name at best, and there is misunderstanding about what MMT does and doesn't actually encompass.

Figure 1: Mmm...MT!



Source: Google Trends

So let's start with some basics of what MMT believes before proceeding any further. As we shall see, **the premises of MMT are very simple – but the implications for policy and for markets are staggering.**

Don't tax, but spend

Fundamentally, MMT argues the following three things:

- **Sovereign currency-issuing governments, such as the US, are *financially unconstrained*;**
- **Taxes are *not needed* to finance government spending;** and
- **The role of taxes is to drain money out of the economy after the government has spent it in order to manage aggregate demand and keep it in line with available supply of resources.**

In short, MMT argues the government can finance any budget deficit by *de facto* monetization and hence has no *monetary* limits. That might sound ridiculous in Eurozone countries because they no longer have monetary sovereignty. However, *technically* this is true for economies that control their own currency. Their governments do not need to raise taxes before spending: they spend first and then tax. Moreover, such governments *can* provide an unlimited stock of their own currency, if needed.

For example, **if a major war were to break out tomorrow, governments would immediately run very large budget deficits without worrying about how to finance them via taxation first.** History shows this to be the case. So the issue is then *political*: what constitutes an emergency that society should focus its resources on?

Following on, if taxation is not required to finance state spending then tax is a quasi-hydraulic act to drain liquidity similar to central-bank Open Market Operations. Indeed, MMT argues that tax that is thus drained is effectively 'destroyed' rather than being saved, as is the case when liquidity injections are returned to the central bank via quantitative tightening (QT) after quantitative easing (QE). (Note after injecting trillions of USD into markets, the Fed's QT is proving impossible to sustain for exactly that reason.)

From a [sectoral balances](#) perspective Godley (2005) also shows **a public deficit allows the private sector to run an off-setting surplus;** conversely, public *austerity* means the private sector must *borrow*. Given the public sector can monetize its debts and the private sector can't, MMT says governments *should* deficit spend. (Though there is also an international dimension to this we will touch on ahead.)

Of course, **this is highly controversial in an age defined by worries over high public debt levels** and a push for 'prudence' and austerity; and readers who pay taxes will not be happy with the idea that these are destroyed rather than spent!

ProbleMMs?

So is MMT a "magic money tree"? No. MMT is more nuanced than that. For example, it recognizes that there are indeed limitations to what a government can do fiscally.

Primary is a real resource constraint: if there is no spare capacity in the economy, or the materials the government wishes to procure do not exist, fiscal sovereignty is an illusion. A poor country with no natural resources or industry and with an uneducated population cannot simply print money to build infrastructure or good universities. However, *if a developed economy is suffering from high unemployment and/or a low level of capacity utilisation the same argument clearly does not apply.*

MMT also recognises there is another limit to the government's ability to finance itself: inflation. MMT fully recognises inflation is not desirable above a certain level and once self-financed fiscal stimulus exceeds what the real economy can supply such spending would have to be cut back to avoid damaging wage-price spirals – or taxation would have to increase.

Even so, from a traditional economic point of view there are still many obvious criticisms of MMT. First, is the argument that **governments cannot create money because true money is exogenous:** the public being able to conjure up money is 'voodoo'. Anyone believing there is no such thing as a free lunch has a powerful gut reaction to MMT.

Money for nothing?

Although we use the word 'Modern' in MMT, this is a very old debate. Plato argued money was a representation of value rather than real, while Aristotle countered money should be a real commodity itself. In our age of fiat currencies, credit cards, and now digital currencies, economics textbooks still teach the history of money as being *barter* > *gold* > *credit*. In other words, we are Platonic but like to think we are still Aristotelian.

By contrast, MMT is based on [chartalists](#) such as Knapp (1925), Lerner (1943), who argue money is always a *political* construct. Polanyi (1944) and Graeber (2011) also demonstrate the *actual* historical record of money is chartalist: **there was never a transition *barter* > *gold* > *credit*;** with the exception of the gold standard (1815-1931) the norm across human societies has been to *start* with local credit, rarely repaid, in order to keep the economy moving. That is a tradition which MMT builds on.

That is also a red pill/blue pill moment for many!

More ProblemMs

Second is the argument that **MMT is simply “Keynesian” fiscal stimulus via bond issuance renamed**, already a well-established theory even if has become politically unacceptable in many countries obsessed with austerity. However, the ‘taxation is not needed’ argument takes us well beyond simple Keynesian fiscal multipliers.

MMT notably also does not believe in the ‘loanable funds’ view that bank loans require savings first, and that banks intermediate between savers and borrowers rather than creating money (in the form of debt) when they make loans *de novo*. Notably, while economics textbooks still teach loanable funds, **the Bank of England admits this is not how money creation and banking operates – it is *de novo***; MMT then posits the government has greater powers of money creation than banks in this regard given public liquidity does not require a liability to be created at the same time. If a bond is issued under Keynesian theory then a liability and an asset are created; but that bond can be bought by the central bank with electronically ‘printed’ money and the liability *de facto* removed under MMT. Just think of the **trillions** of USD of QE injected by central banks, which is now NOT to be reversed by QT.

Yet that leads to the third criticism, the government is not the actor that would finance itself: that role falls to the central bank. Naturally, **central bank independence would have to end under MMT**. While a dual inflation and full-employment mandate already exists at key central banks such as the Fed, and inflation-targeting might still be built into a new MMT policy framework, clearly the central bank would be primarily focused on aggregate demand by providing blank cheques to government spending, not CPI.

Fourth, and a crucial corollary, **interest rates become largely irrelevant under MMT**. The cost of money would not matter as much as the quantity of money (i.e., the supply of funds into the real economy fiscally). Indeed, **MMT suggests that interest rates should be set to zero**. If not, mixed fiscal-monetary targets would prove confusing.

Yet a fifth issue then emerges: **how would the government yield curve respond under MMT?** The curve would start very low and flat. However, *what if MMT succeeds in achieving inflation?* Bond yields would rise – and could the government then cover higher debt-servicing costs if the resources/inflation threshold has been successfully breached, meaning MMT must be ‘turned off’? If so, the economy would lurch back into recession again – necessitating more MMT!

And MMore ProblemMs

Or would we instead need to see bond yields capped – as in Japan today under their policy of Yield Curve Control (YCC)? If so, that would likely destroy a real market for benchmark government bonds.

Of course, the government yield curve is not the only one that matters. **How would the corporate bond market respond to this kind of MMT environment?** Would the state have to step in and cap private-sector bond yields too? And what about asset prices such as property? What would be done there?

There are also other issues. Consider that **a key part of MMT is a commonly-linked policy of funds being used for a public Employer of Last Resort or Jobs Guarantee programme** to generate non-inflationary full employment. That is certainly part of the proposed US Green New Deal, for example.

The issues here should be obvious. **While the Phillips curve is broken under our present global model that strengthens capital vis-à-vis labour bargaining power, under MMT it would rapidly return**. Wage inflation would then rise again – and all of the interest rate/yield curve issues mentioned above would arise with it.

At the same time, as the government plays a larger role in the economy, as in the proposed Green New Deal, **it risks genuinely crowding out the private sector, not from a financing perspective but in physical terms**. Even if the state is merely financing private firms to do the required work, in infrastructure, for example, elements of political direction would no doubt still occur over time.

Clearly, the overarching question that needs to be answered is **what kind of institutional architecture can be created for MMT to work through the economic cycle without warping markets (further than QE already has)?** How can one ensure that fiscal taps are turned off once inflation appears, and that the state does not distort both the real economy and financial markets? Fiscal policy has far longer lag times than interest rates, for example: would it really be more efficient to build half a bridge and then stop because inflation rose too fast?

In short, this would require ***an entirely new political economy*** that remains elusive in its definition if not in its ambition: that has been clear since Lerner (1943) and Kalecki (1943). Yet as shown, that utopian new institutional framework could produce its own instability even as it cures our present New Normal.

Zero rates, zero alternatives?

While this is a strong theoretical rebuttal of MMT, **interest rates in Japan and Europe are nonetheless already negative, and in other economies the drift towards 'Japan-ification' seems inexorable.** In short, we seem to be heading in the direction for an MMT starting base (zero rates) whether we like it or not. Once the US Fed starts cutting interest rates again, that dynamic will become even more obvious. This is no surprise to MMT: Kalecki (1943) recognised giving capital too much power relative to labour would ultimately lead to such outcomes *decades* ago.

For MMT sceptics consider that the BoJ, despite its denials of using such a policy, already holds around 43% of the JGB market and effectively finances Japan's permanent, large fiscal deficits. Likewise, the Chinese economy is a quasi-MMT experiment given its quantity-not-price fiscal-monetary policy mix has been responsible for much of its growth since 2008 (e.g., *Chinese total social financing was 9% of GDP in Q1 2019*).

At the same time, there is a broadening consensus that even extraordinary central-bank monetary policy has done all it can do and **more fiscal measures will be required going forwards.**

In turn, that is linked to growing concern that our current socio-economic paradigm is unsustainable. Such a pessimistic view was also stated at Davos in January; hedge-fund manager Ray Dalio has argued US capitalism is structurally broken and its wealth and income inequality is a "national emergency"; and the OECD states "*Today the middle class looks increasingly like a boat in rocky waters. Governments must listen to people's concerns and protect and promote middle class living standards,*" **arguing in favour of significant fiscal expansion despite zero rates and high debt levels.**

The IMF's latest Global Economic Outlook also posits "*This is a delicate moment for the global economy. If...any of the major risks materialize...policymakers will need to adjust. Depending on circumstances, this may require synchronized though country-specific* **fiscal stimulus across economies, complemented by accommodative monetary policy.**"

In short, all these paths seem to lead us back towards MMT one way or another, politically, even if there is a refusal to accept the broader implications and assumptions of that framework.

Yes, but (and it's a big but)

Of course, **there is one other huge issue to address: external restraints.**

If we were to see a larger MMT-financed public-sector deficit this would suggest that there will be a current account deficit too. That is because of the following known identity: **Current account balance = Public-sector balance + Private-sector balance.**

It is possible a large public-sector deficit could see the private sector run an offsetting surplus as profits and wages rise rapidly – as MMT sectoral balances imply. However, at the microeconomic level that implies the need for protectionist policies to keep the benefits of extra domestic liquidity at home, e.g., tariffs, subsidies, or non-tariff barriers - *just as we see in China today.* Without that, MMT leans towards larger current-account deficits.

Crucially, **current-account deficits represent the kind of resource constraint that limits MMT.** The US, with its "exorbitant privilege" of the USD as global reserve currency, would be able to use MMT to expand its fiscal deficit: it can borrow in its own currency; and MMT would see it importing more from other countries who would need to hold USD reserves as a result.

Yet **smaller economies/emerging markets could not use MMT without being punished by financial markets.**

Their current-account deficits would have to be covered with foreign borrowing, and the more MMT they used, the more their currency would weaken. Recent volatility in the Turkish currency after a period of fiscal stimulus and external borrowing, absent MMT, shows the dangers.

Crucially, the only way to avoid such risks would be to run a private-sector surplus resulting in a current-account surplus. Consequently, in a global downturn requiring MMT smaller economies would have to choose between no MMT; using MMT and protectionism; or coming under the wing of currency blocks who *can* run MMT. Notably, that was a development we saw in the 1930s when global trade fragmented into gold, Sterling, Nazi, Communist, and Yen blocks.

As such, **MMT appears to offer a painless way to address inequality within the US economy, but it could reinforce an international pecking-order of winners and losers, worsen global inequality, and break-up global trade.**

Indeed, **MMT could even cause the USD to lose its "privilege" over time,** which would again risk fragmenting global markets. That is unlikely, at least near-term given the lack of any credible USD alternatives, but it remains a *longer-term* risk one cannot ignore lightly.

Conclusion

Like it or not, after decades in obscurity MMT is now being openly discussed --and dismissed-- in high policy circles. Yet many would argue that MMT's eventual introduction in some form is inevitable given other economic alternatives appear to have failed. As Gandhi said: *"First they ignore you. Then they laugh at you. Then you win."*

Indeed, Japan and China are already heading down the MMT road, even if they deny it; the inability of central banks to reverse QE via QT suggests the same underlying dynamic; and once the Fed starts cutting, the volume of these discussions will only increase further.

Of course, the rise of global political populism is likely to accelerate that development given MMT promises easy answers to complex socio-economic problems.

Certainly, when looked at in detail **MMT is not the simplistic 'free money' argument that some of its critics present it as**, and arguably contains some fresh, if old, economic thinking that could provide some solutions to some of our structural problems. *At the very least, an MMT critique of our current paradigm is a useful starting base for everyone.*

However, it can also be seen that **MMT could create as many problems as it solves when dealing with our New Normal**. From increasing market volatility to destroying functioning bond markets; and from revolutionising our entire political economy to potentially shattering world trade, the risks are there to be seen if one looks carefully enough.

MMT is arguably not something to be dismissed out of hand; but neither is it something to be embraced without question.

Indeed, just **try saying MMT without saying 'Mmm'!**

RaboResearch

Global Economics & Markets
mr.rabobank.com

Global Head

Jan Lambregts

+44 20 7664 9669
Jan.Lambregts@Rabobank.com

Macro Strategy

Europe

Elwin de Groot

Head of Macro Strategy
Eurozone, ECB
+31 30 712 1322
Elwin.de.Groot@Rabobank.com

Bas van Geffen

Quantitative Analyst
ECB
+31 30 712 1046
Bas.van.Geffen@Rabobank.com

Alexandra Dumitru

Economist
UK, Ireland
+31 30 216 0441
Alexandra.Dumitru@Rabobank.nl

Americas

Philip Marey

Senior Market Strategist
United States, Fed
+31 30 712 1437
Philip.Marey@Rabobank.com

Mauricio Oreng

Senior Market Strategist
Brazil
+55 11 5503 7315
Mauricio.Oreng@Rabobank.com

Asia-Pacific

Michael Every

Senior Market Strategist
Asia, Australia, New Zealand
+852 2103 2612
Michael.Every@Rabobank.com

FX Strategy

Jane Foley

Head of FX Strategy
G10 FX
+44 20 7809 4776
Jane.Foley@Rabobank.com

Stefan Koopman

Market Economist
Eurozone, UK
+31 30 712 1328
Stefan.Koopman@Rabobank.com

Wim Boonstra

Senior Advisor
Germany
+31 30 216 2666
Wim.Boonstra@Rabobank.nl

Maartje Wijffelaars

Senior Economist
Italy, Spain, Portugal, Greece
+31 30 216 8740
Maartje.Wijffelaars@Rabobank.nl

Hugo Erken

Head of International Economics
United States
+31 30 215 2308
Hugo.Erken@Rabobank.nl

Björn Giesbergen

Senior Economist
China, Japan
+31 30 216 2562
Bjorn.Giesbergen@Rabobank.nl

Piotr Matys

FX Strategist
Central & Eastern Europe FX
+44 20 7664 9774
Piotr.Matys@Rabobank.com

Teeuwe Mevissen

Senior Market Economist
Eurozone
+31 30 712 1509
Teeuwe.Mevissen@Rabobank.com

Koen Verbruggen

Economist
France
+31 6 129 73 956
Koen.Verbruggen@Rabobank.nl

Michiel van der Veen

Economist
Eurozone
+31 6 831 34 616
Michiel.van.der.Veen@rabobank.nl

Christian Lawrence

Senior Market Strategist
Canada, Mexico
+1 212 808 6923
Christian.Lawrence@Rabobank.com

Hugo Erken

Head of International Economics
India
+31 30 215 2308
Hugo.Erken@Rabobank.nl

Christian Lawrence

Senior Market Strategist
LatAm FX
+1 212 808 6923
Christian.Lawrence@Rabobank.com

Rates Strategy

Richard McGuire

Head of Rates Strategy
+44 20 7664 9730
Richard.McGuire@Rabobank.com

Lyn Graham-Taylor

Senior Rates Strategist
+44 20 7664 9732
Lyn.Graham-Taylor@Rabobank.com

Matt Cairns

Senior SSA Strategist
+44 20 7664 9502
Matt.Cairns@Rabobank.com

Credit Strategy & Regulation

Ruben van Leeuwen

Head of Credit Strategy
ABS, Covered Bonds
+31 30 712 1391
Ruben.van.Leeuwen@Rabobank.com

Vaclav Vacikar

Analyst
Financials
+31 30 712 1519
Vaclav.Vacikar@Rabobank.com

Hyung-Ja de Zeeuw

Senior Strategist
Corporates
+31 30 712 1555
Hyung-Ja.de.Zeeuw@Rabobank.com

Bas van Zanden

Senior Analyst
Pension funds, Regulation
+31 30 712 1869
Bas.van.Zanden@Rabobank.com

Cas Bonsema

Analyst
ABS
+31 30 712 1849
Cas.Bonsema@Rabobank.com

Energy Markets

Ryan Fitzmaurice

Energy Strategist
+1 212 916 7874
Ryan.Fitzmaurice@Rabobank.com

Agri Commodity Markets

Stefan Vogel

Head of ACMR
+44 20 7664 9523
Stefan.Vogel@Rabobank.com

Carlos Mera

Senior Commodity Analyst
+44 20 7664 9512
Carlos.Mera@Rabobank.nl

Michael Magdovitz

Commodity Analyst
+44 20 7664 9969
Michael.Magdovitz@Rabobank.com

Client coverage

Wholesale Corporate Clients

| | | | |
|-----------------|------------------------|------------------|------------------------------|
| Martijn Sorber | Global Head | +31 30 712 3578 | Martijn.Sorber@Rabobank.com |
| Hans Deusing | Netherlands | +31 30 216 9045 | Hans.Deusing@Rabobank.com |
| David Kane | Europe | +44 20 7664 9744 | David.Kane@Rabobank.com |
| Neil Williamson | North America | +1 212 808 6966 | Neil.Williamson@Rabobank.com |
| David Teakle | Australia, New Zealand | +61 2 8115 3101 | David.Teakle@Rabobank.com |
| Ethan Sheng | Asia | +852 2103 2688 | Ethan.Sheng@Rabobank.com |
| Ricardo Rosa | Brazil | +55 11 5503 7150 | Ricardo.Rosa@Rabobank.com |

Financial Institutions

| | | | |
|-------------------|------------------------------|------------------|--------------------------------|
| Eddie Villiers | Global Head | +44 20 7664 9834 | Eddie.Villiers@Rabobank.com |
| Roeland Bronsveld | Benelux | +31 30 216 9030 | Roeland.Bronsveld@Rabobank.com |
| Krishna Nayak | Germany, Austria, CEE | +44 20 7664 9883 | Krishna.Nayak@Rabobank.com |
| Philippe Macart | France | +44 20 7664 9893 | Philippe.Macart@Rabobank.com |
| Mauro Giachero | Italy | +44 20 7664 9892 | Mauro.Giachero@Rabobank.com |
| Martin Best | UK, Scandinavia, Middle East | +44 20 7809 4639 | Martin.Best@Rabobank.com |
| Paul Duddy | USA | +1 212 916 3799 | Paul.Duddy@Rabobank.com |
| Wouter Eijsvogel | Treasury Sales Europe | +31 30 216 9723 | Wouter.Eijsvogel@Rabobank.com |
| David Pye | Central Banks | +44 20 7664 9865 | David.Pye@Rabobank.com |

Capital Markets

| | | | |
|---------------------|---------------------------------------|------------------|----------------------------------|
| Herald Top | Global Head of Capital Markets | +31 30 216 9501 | Herald.Top@Rabobank.com |
| Nader Pasdar | Capital Markets USA | +1 212 808 6861 | Nader.Pasdar@Rabobank.com |
| Adam Wotton | Capital Markets Asia | +852 2103 2629 | Adam.Wotton@Rabobank.com |
| Willem Kröner | Global Head of Equity Capital Markets | +31 30 712 4783 | Willem.Kroner@Rabobank.com |
| Crispijn Kooijmans | DCM FIs & SSAs | +31 30 216 9028 | Crispijn.Kooijmans@Rabobank.com |
| Bjorn Alink | DCM Securitisation & Covered Bonds | +31 30 216 9393 | Bjorn.Alink@Rabobank.com |
| Othmar ter Waarbeek | DCM Corporate Bonds | +31 30 216 9022 | Othmar.ter.Waarbeek@Rabobank.com |
| Joris Reijnders | DCM Corporate Loans | +31 30 216 9510 | Joris.Reijnders@Rabobank.com |
| Brian Percival | DCM Leveraged Finance | +44 20 7809 3156 | Brian.Percival@Rabobank.com |

Disclaimer

Non Independent Research

This document is issued by Coöperatieve Rabobank U.A. incorporated in the Netherlands, trading as Rabobank (Rabobank) a cooperative with excluded liability. The liability of its members is limited. Rabobank is authorised by De Nederlandsche Bank (DNB) and the Netherlands Authority for the Financial Markets (AFM). Rabobank London Branch (RL) is authorised by the Prudential Regulation Authority (PRA) and subject to limited regulation by the Financial Conduct Authority (FCA) and PRA. Details about the extent of our authorisation and regulation by the PRA, and regulation by the FCA are available from us on request. RL is registered in England and Wales under Company no. FC 11780 and under Branch No. BR002630. This document is directed exclusively to Eligible Counterparties and Professional Clients. It is not directed at Retail Clients.

This document does not purport to be impartial research and has not been prepared in accordance with legal requirements designed to promote the independence of Investment Research and is not subject to any prohibition on dealing ahead of the dissemination of Investment Research. This document does NOT purport to be an impartial assessment of the value or prospects of its subject matter and it must not be relied upon by any recipient as an impartial assessment of the value or prospects of its subject matter. No reliance may be placed by a recipient on any representations or statements made outside this document (oral or written) by any person which state or imply (or may be reasonably viewed as stating or implying) any such impartiality.

This document is for information purposes only and is not, and should not be construed as, an offer or a commitment by RL or any of its affiliates to enter into a transaction. This document does not constitute investment advice and nor is any information provided intended to offer sufficient information such that it should be relied upon for the purposes of making a decision in relation to whether to acquire any financial products. The information and opinions contained in this document have been compiled or arrived at from sources believed to be reliable, but no representation or warranty, express or implied, is made as to their accuracy, completeness or correctness.

The information contained in this document is not to be relied upon by the recipient as authoritative or taken in substitution for the exercise of judgement by any recipient. Any opinions, forecasts or estimates herein constitute a judgement of RL as at the date of this document, and there can be no assurance that future results or events will be consistent with any such opinions, forecasts or estimates. All opinions expressed in this document are subject to change without notice.

To the extent permitted by law, neither RL, nor other legal entities in the group to which it belongs accept any liability whatsoever for any direct or consequential loss howsoever arising from any use of this document or its contents or otherwise arising in connection therewith.

Insofar as permitted by applicable laws and regulations, RL or other legal entities in the group to which it belongs, their directors, officers and/or employees may have had or have a long or short position or act as a market maker and may have traded or acted as principal in the securities described within this document (or related investments) or may otherwise have conflicting interests. This may include hedging transactions carried out by RL or other legal entities in the group, and such hedging transactions may affect the value and/or liquidity of the securities described in this document. Further it may have or have had a relationship with or may provide or have provided corporate finance or other services to companies whose securities (or related investments) are described in this document. Further, internal and external publications may have been issued prior to this publication where strategies may conflict according to market conditions at the time of each publication.

This document may not be reproduced, distributed or published, in whole or in part, for any purpose, except with the prior written consent of RL. By accepting this document you agree to be bound by the foregoing restrictions. The distribution of this document in other jurisdictions may be restricted by law and recipients of this document should inform themselves about, and observe any such restrictions.

Please email fm.global.unsubscribe@rabobank.com to be removed from this mailing list

A summary of the methodology can be found on our website www.rabobank.com

© Rabobank London, Thames Court, One Queenhithe, London EC4V 3RL +44(0) 207 809 3000