

Leverage matters: shocks, policy and inflation

– For professional investor use only –

05/19

May 2019

How could leverage change the way central banks conduct monetary policy?

p.05

At a glance

- A stark rise in leveraging in by non-financial corporations and households globally since the 2008 financial crisis has raised concerns. While we do not believe that high leverage will be the source of the next crisis, we caution that very high leverage does increase the global economy's vulnerability to shocks.
- Risks from an interest rate shock are well-recognised, but we highlight that an income shock could damage the economy more. The collapse of the US housing market in 2006-2008 provides a good example of how harmful a combination of income and interest rate shocks can be.
- High levels of leverage are already changing the way central banks conduct monetary policy, both during the current cycle and more structurally.
- In the longer-term, the global economy (in particular, countries such as China) will need to de-lever. Different forms of de-leveraging are possible with varying implications for investors.
- Macroprudential policies are better at preventing the excessive accumulation of leverage before it becomes a destabilising force, rather than reducing it.
- Allowing inflation to settle higher is one solution to force a faster reduction in indebtedness and central banks can play a very powerful role.

• Stark rise in global leverage	2
• Leverage and shocks	3
• Addressing leverage	6
• Implications for investors	7
• Appendix 1	8

Increased leverage makes the economy more vulnerable to potential shocks.

For professional investor use only. Please see important information at the end of this document.

This document has been prepared by:

Salman Ahmed

Chief Investment Strategist at Lombard Odier Investment Management (Europe) Ltd.

For further information, please visit www.loim.com

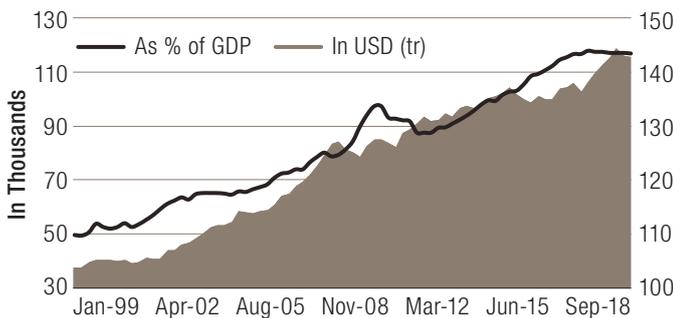
Stark rise in global leverage

Since the financial crisis in 2008-2009, the non-financial sector globally has witnessed a dramatic increase in the amount of leverage.¹ According to the Bank for International Settlements (BIS), non-financial sector debt has risen by USD 67 trillion since the fourth quarter of 2007. The expansion was driven by an increase in private sector debt held by corporates and households of about USD 37 trillion; and a rise in public sector or government debt of about USD 30 trillion.

As a result, the debt-to-GDP ratio, or leverage, of the non-financial sector has jumped to almost 220% from about 180% over the same period. For the private, non-financial sector comprised of households and corporations, the ratio has risen to almost 145% from 125%.

In this paper, our focus is on private sector debt in non-financial corporations and households. We argue that increased leverage in this sector makes the economy less resilient to potential shocks.

FIG. 1 GLOBAL NON-FINANCIAL PRIVATE SECTOR LEVERAGE



Source: BIS, Bloomberg.

The countries most at risk

While the overall increase in leverage is important, aggregate measures mask details at the country level as well as across sectors within a country. To focus on countries most at risk, we develop a debt vulnerability index (see Appendix 1) that takes into account variables such as:

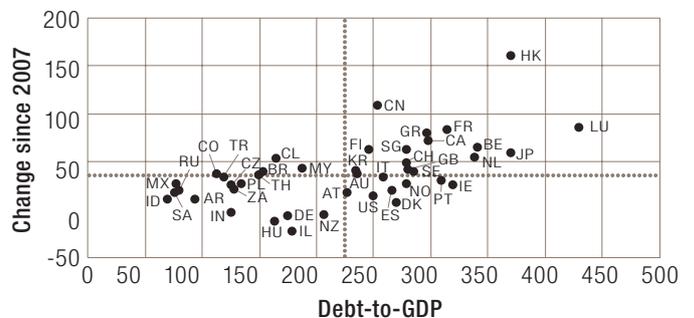
1. Level of debt-to-GDP: measures the amount of private leverage in the economy.
2. Change in the level of debt-to-GDP since Q4 2007: measures how much new leverage has been accumulated since the financial crisis (see Fig. 2 and Fig. 3).
3. Level of debt-service-ratio: measures the capacity of the private sector to service debt and adjust to shocks, either from interest rates or income.
4. Change in interest rate between the pre-financial crisis and the post-financial crisis period.
5. Credit-to-GDP gap: measures the difference between the credit-to-GDP ratio and its long-term trend, using BIS estimates.

Combining these measures to evaluate 30 countries, we find the following 10 countries are most at risk from excess leverage: Hong Kong, the Netherlands, Sweden, Canada, Norway, Belgium, China, Switzerland, France and Korea. Interestingly, these countries also rank highest in indebtedness for both households and corporates, suggesting that the increase in leverage has been broad-based.

However, individual factors driving the structurally high debt vulnerability of certain countries also need to be taken into account. For example, the Netherlands has elevated levels of corporate debt because of the strong presence of headquarters of multi-national companies in the country; the same applies to Switzerland and Hong Kong. In Switzerland, the tax structure on housing could likewise have contributed to greater household leverage compared to other countries. In Canada, the commodity sector comprises a bigger hare of the economy and could explain the higher level of corporate debt relative to other countries in the sample.

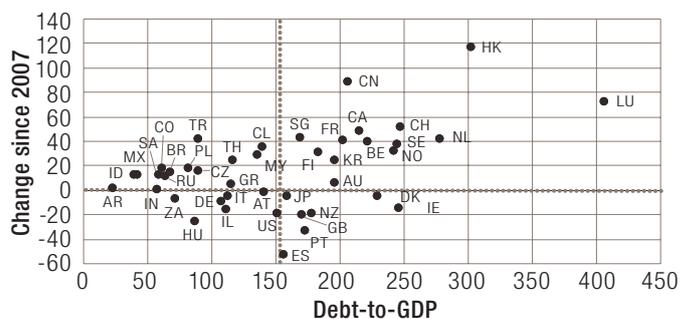
Such individual factors are important and provide structural explanations for high indebtedness. Given these considerations, we also take into account the change in indebtedness since the financial crisis.

FIG. 2 TOTAL NON-FINANCIAL LEVERAGE (GOVERNMENT, HOUSEHOLDS AND CORPORATES)



Source: BIS, Bloomberg. Dotted lines represent the average Debt-to-GDP ratio and the average change since 2007.

FIG. 3 PRIVATE LEVERAGE (HOUSEHOLDS AND CORPORATES)



Source: BIS, Bloomberg. Dotted lines represent the average Debt-to-GDP ratio and the average change since 2007.

¹ Leverage measures borrowing relative to income, company earnings or a country's GDP. Private leverage measures debt relative to individual income. Company leverage typically measures the ratio of a corporate's debt relative to earnings (such as EBITDA). Government leverage is usually measured by the ratio of government borrowing relative to GDP.

Leverage and shocks

Many investors are concerned that increased leverage will be the seed of the next crisis.² Our view is more nuanced. We believe increased levels of indebtedness make the global economy more vulnerable to a shock, as it can amplify the impact of that shock on the economy. This is very similar to what happens with derivatives trades which have latent leverage.

We consider two types of shock that could destabilise the global economy due to pronounced leverage: an interest rate shock and an income shock.

Interest rate shock

An increase in interest rates has been a particular focus with regard to the backdrop of very high and rising leverage. The higher the indebtedness, the more the economy becomes sensitive to changes in the cost of servicing that debt. This is important for monetary policy because increased leverage reduces the neutral rate, or the rate at which the economy reaches an equilibrium between demand and supply, leading to stable inflation. The magnitude of sensitivity to change depends on the proportion of borrowing at a variable rate and the average maturity.

As we will argue later in this paper, this increased sensitivity impacts how central banks conduct monetary policy. Already, some central banks like the Bank of Canada, and even the Federal Reserve, are finding that the economy is much more reactive to rate hikes than expected, suggesting gradualism will be important, especially when compared to the pre-crisis era.

However, interest rate rises do not necessarily need to be destabilising. As long as increases in interest rates are gradual, economic agents will adjust their spending, meaning weaker discretionary spending for households and weaker profits and investment for corporations as the business cycle runs its course.

The main risk is if interest rates jump suddenly higher, or the speed of rate rises is faster than debt holders are expecting. We sense that, increasingly, a number of central banks are aware of this context and are resorting to a more “patient” approach to policy setting. However, a shock to market confidence (like that of the 2013 taper tantrum) could manifest itself in rising long-term rates, which may in turn lead to tightening of financial conditions.

Higher interest rates could also negatively affect the economy, even if the borrowing is at a fixed interest rate and over a long period, such as US mortgages, which are typically financed for 30 years at a fixed rate. In this case, the higher interest rate has no direct impact on the debt-service ratio of the borrower. However, since mortgages are not portable (ie the mortgage cannot be transferred when purchasing a

new property), higher interest rates will negatively impact affordability and act as a tax on transactions. This explains, in part, the recent underperformance of the US housing market. The dynamic could reduce the incentives for households to move, even if the move is to find a better job, ultimately affecting the flexibility of the labour market.

From a long-term perspective, the current period could mark the beginning of an important regime shift in interest rates. Since the mid 1980s, borrowers have, more often than not, been able to refinance their borrowing at much lower interest rates. Figure 2 shows the change in the rate of borrowing in basis points over a 5 year period. Lower refinancing stems in part from the gradual decline in inflation and the real rate over the period. This regime is changing, however, and borrowers today are more likely to witness stable nominal rates, at best. Notably, the downside to rates is limited because of the zero bound constraint.

FIG. 4 5 YEAR CHANGE IN US CONVENTIONAL MORTGAGE RATE (IN BASIS POINTS)



Source: BIS, Bloomberg.

Income shock

A decline in income is a second risk to leveraged borrowing. This often over-looked risk has the potential to be much more damaging, in our view.

Given the high level of debt and the heavy level of the debt-to-service ratio, any loss of income could have a dramatic impact on the capacity of highly indebted agents to service their debt, leading to default. This scenario would require a negative exogenous shock, which could arrive in a variety of ways. In China, it could arise from an escalation of the trade war leading to a dramatic loss of revenue for exporters, for example (risks of which seem to be reducing). In other countries, a rise in unemployment might accompany a recession. Potentially, the increased default rate could create weaker growth, prompting further income losses and eventually, a negative feedback loop.

We do not expect a large income shock to the global system in 2019, however we do expect this issue to remain a key structural challenge as the current business cycle moves forward.

² For more on corporate leverage, please see LOIM paper titled: Assessing corporate leverage trends.

US housing collapse: the double shock

The collapse of the US housing market in 2006-2008 provides a good example of how both shocks impacted the economy, bearing in mind that history rarely repeats itself perfectly.

The first shock to the housing market was an interest rate shock from adjustable-rate mortgage (ARM) products. ARMs offered an initial, low teaser rate that subsequently reset at a sharply higher rate, causing an initial interest rate shock. Such products were mainly extended to subprime borrowers who often over-leveraged, not understanding that the monthly payment would leap higher once the teaser rate expired. When the rate re-set, it led to an increase in defaults.

This unleashed panic in short-term funding markets in the summer of 2007, as investors started to question the exposure of their counterparties. The freezing of the funding market led to a sharp economic slowdown and recession in early 2008.

In turn, an income shock was set in motion, as the unemployment rate shot up rapidly. As the increase in joblessness started to impact household income, more and more households fell behind on their mortgage payments. Increased losses from the housing market led to further pressure on banks and, in turn, on the funding market. Eventually, financial giants such as Bear Stearns, American International Group and Lehman Brothers collapsed. Further rises in unemployment led to further default and weakness, deepening the recession.

This example illustrates that the interest rate re-set provided the initial shock, but the income shock pushed the crisis to a deeper level. In the next crisis, the income shock could occur first. What is important to keep in mind is how leverage exacerbated the initial shock, without being its direct cause.

How could leverage change central banks' monetary policy?

Impact on monetary policy

High levels of leverage are changing the way central banks conduct monetary policy, both during the current cycle and more structurally. Some central banks have already expressed concern and warned about the impact of increased leverage. The Bank of Canada, the Reserve Bank of Australia, the Riksbank, the Swiss National Bank, and the Bank of England have been amongst the most vocal, and their policy most impacted.

Increased sensitivity to interest rates

High levels of leverage make the economy more sensitive to rate hikes and reduce the neutral rate, as previously outlined. This increases uncertainty about the impact of policy decisions. Because the neutral rate is unobservable, central bank models rely on historical elasticities that may not fully account for the current economic reaction to higher interest rates.

The situation increases the risk of a policy mistake (hiking rates too quickly or beyond neutral, for instance) and may warrant central banks taking a very gradual and cautious approach to normalising monetary policy – a dynamic which seems to be taking hold. The dramatic pivot executed by the Federal Reserve earlier this year is in part a consequence of those changes, as the central bank is having difficulty determining the level of the neutral rate, and estimating the impact of tighter policy on the economy.

At the same time, central banks need to be careful not to keep interest rates too low for too long, thereby continuing to fuel the debt binge. This is a delicate balancing act and will force central banks to look beyond traditional monetary tools to control leverage. We believe that central banks who are not in control of some macroprudential levers will start to request changes and added responsibilities in that area.

Paths to de-leveraging

In the longer-term, the global economy will need to de-leverage, meaning credit growth will need to be weaker than economic growth for a period of time. This can take two forms:

1. A soft deleveraging where credit grows more slowly than GDP.
2. A hard deleveraging where credit declines sharply, and faster than GDP.

Soft deleveraging is clearly preferable to hard deleveraging, as the latter scenario involves a collapse of the debt bubble, with pronounced, negative economic consequences.

Nevertheless, soft deleveraging takes time. China provides an apt example for simulation. The ratio of private non-financial debt to GDP in the country is about 200% and we assume an objective of reducing the ratio toward the current global average of 150%. If credit growth were to slow by 2 percentage points relative to GDP growth, it would take 16 years to reduce the ratio to 150%. If credit growth were 3 percentage points slower (vs GDP), it would take 11 years, and if it were 4 percentage points, it would take 9 years. As a comparison, credit growth has been 12% on average over the past 3 years compared to 6.7% for GDP growth over the same period. As such, a marked adjustment is needed to shrink indebtedness.

This example illustrates that vulnerabilities caused by high indebtedness will take time to dissipate in a soft deleveraging scenario. Moreover, the objective of 150% of GDP may still be too high considering the level was closer to 135% in the mid-2000s and peaked at 150% at the start of the global financial crisis in 2008.

Another important question concerns how slower credit growth impacts GDP growth. Given the amount of credit needed for each unit of GDP growth in recent years, slower credit growth would make weaker GDP growth very likely.

Addressing leverage

Macroprudential policy and regulation

Since the 2008 financial crisis, there has been a global push for greater banking regulation to make the banking sector more resilient to shocks and prevent future bank failures. Greater regulation, while worthwhile, has done little to constrain the growth in indebtedness globally, however.

The situation raises an important question: could a highly-leveraged financial system generate losses that exceed banks' recently-imposed capital buffers, should an income shock occur? Secondly, while banks may be safer, are other sectors of the financial system more at risk, given the marked level of leverage in the system?

As mentioned previously, macroprudential measures could be required to limit growth in leverage and control further increases in indebtedness. These measures could take the form of increased capital buffers for banks, altered lending policies (for instance, revised mortgage insurance rules in Canada), and changes in regulation – with the aim of limiting the increase in lending to economy.

An obvious advantage of macroprudential policies is that they can be targeted at specific parts of the lending market (such as mortgage or corporate financing), leaving less troubled parts unaffected. This is more appealing than an increase in policy rates that affects the entire lending market. For this reason, macroprudential means are more appealing to central banks, as they are an extra tool to manage the economy. But not all central banks have access to macroprudential tools: the Bank of England can set the cyclical capital buffer of banks, while the Bank of Canada cannot.

That said, macroprudential policies are undoubtedly better at preventing the excessive accumulation of leverage before it becomes a destabilising force, rather than reducing it. Even so, risks around implementation exist as constraining the availability of credit could have an adverse impact on the economy if borrowers are unable to rollover their existing loans or if new conditions are too stringent.

Could higher inflation help?

Allowing inflation to settle higher is one solution proposed by economists to force a faster reduction in indebtedness and reduce vulnerability to shocks. This is where central banks could play a powerful role.

The point here is that, while economists think in real terms, debt and the agent's relationship to it (interest rate, debt-service ratio and debt-to-income ratio) are all based on nominal measures. A classic example from behavioural economics is that if agents are asked to choose between 2% wage growth with 0% inflation and 4% wage growth with 2% inflation, the vast majority of respondents prefer the second option, even though both options are equivalent on an inflation-adjusted basis (in real terms). Economists refer to this preference as monetary illusion.

The fuller picture, however, is more complex. While higher inflation would push nominal GDP growth higher, it would also firm credit growth, leaving the rate of convergence in the indebtedness ratio potentially unchanged on aggregate. Nevertheless, individual borrowers that do not increase their borrowing would see a much faster decline in indebtedness levels because of the more rapid rise in nominal income. Note this argument is based on the premise that higher inflation will also lead, or come to, higher nominal income growth, which is not necessarily certain or may happen with lags.

Boosting inflation is not a panacea either. Higher inflation will lead to greater nominal interest rates, which in turn will cause a higher debt-service ratio, with the increase proportional to the size of the debt burden. While this initial shock would be negative on spending, the higher growth rate for nominal income would lead to a faster decline in debt-service ratio, albeit from a higher starting point. The magnitude of the negative impact from higher nominal interest rates would depend on whether the borrowing is fixed or variable, and whether it needs to be re-financed and how often.

Inflation could also play a role in preventing the excessive accumulation of debt in the first place. Higher nominal interest rates would negatively impact the affordability of new debt, and could prevent agents from overstretching themselves. Moreover, a higher growth rate of nominal income would bring a faster reduction in indebtedness ratio and debt-service ratio, in other words a faster reduction of vulnerabilities.

Higher inflation would also provide a greater buffer for central banks to use conventional monetary policy and avoid reaching the effective lower bound in case of a recession.³

Finally, a critical point is how central banks would engineer a controlled increase in inflation. In the current context, most central banks in the developed world are still dealing with stubbornly low inflation, despite continued accommodative monetary policy.

³ Please see paper titled: Could a higher inflation target enhance macroeconomic stability?, BIS Working Papers, no 720, May 2018.

Implications for investors

Leverage in the global economy has increased significantly since the financial crisis. While it is reaching unprecedented levels in many countries, we do not believe leverage will be the source of the next crisis. However, pronounced leverage does increase the economy's vulnerability to shocks. Risks from an interest rate shock are well-recognised, but we highlight that an income shock could damage the economy more - on this front, China is vulnerable, especially as another round of stimulus makes its way through the system.

High leverage also impacts the way central banks conduct monetary policy, as leverage reduces the economy's neutral rate and increases the elasticities of growth to interest rate changes.

This means that rates are likely to increase more slowly and by less than in previous tightening cycles because the increase in policy uncertainty raises the likelihood of a policy mistake. The dovish pivot in the Federal Reserve's policy in Q1 2019 has been a key development, in our view.⁴ This limits the prospects of higher global interest rates, supporting fixed income securities and leading investors to "search for yield."

Moreover, there could be scope for some central banks to look at letting inflation run at the top end of their inflation target to speed up the nominal deleveraging of the economy. In those countries, investors should be looking at inflation protection, such as inflation-linked bonds, we believe.

⁴ Please see LOIM paper titled: Global quarterly outlook: low rates, pro-risk.

Appendix 1

TABLE 1 DEBT VULNERABILITY INDEX

	RANKS						AVERAGE RANK (EX RATES)				
	DEBT-TO-GDP		DEBT-SERVICE RATIO		CHANGE IN RATES	CREDIT-TO GDP GAP	VULNERABILITY SCORE				
	LATEST	CHANGE SINCE 2007	LATEST	CHANGE SINCE 2007							
Australia	195.3	7.1	21.3	-2.4	-222.0	-9.4	18	42	53.6	74.6	
Belgium	221.8	52.3	21.2	3.4	-246.3	-12.3	10	57	70.8	98.4	
Brazil	67.7	20.2	16.7	4.8	-711.6	-5.0	16	21	24.9	34.9	
Canada	213.5	51.4	24.2	3.3	-263.8	7.5	6	60	74.2	96.4	
China	204.4	87.7	19.5	6.4	-26.9	12.3	5	66	81.0	103.9	
Hong Kong	293.8	116.9	26.3	7.8	-289.7	22.7	1	94	114.9	145.7	
Czech Republic	90.2	21.1	7.4	0.7	-248.2	-0.1	19	24	29.7	39.6	
Denmark	228.5	-2.2	22.6	-7.5	-289.7	-29.9	19	42	54.8	83.0	
Finland	181.7	36.5	16.6	0.5	-287.2	-4.7	15	46	57.5	78.3	
France	203.0	46.1	19.0	2.3	-264.5	3.2	10	55	67.8	89.4	
Germany	108.2	-8.8	9.7	-1.6	-292.6	-0.5	22	21	27.2	36.4	
Hungary	86.1	-22.3	7.3	-7.0	-260.3	-27.2	28	7	11.0	23.7	
India	57.1	4.2	7.2	0.0	38.1	-8.0	25	12	15.1	22.8	
Indonesia	40.3	14.0	4.2	1.1	-330.7	6.6	20	13	16.3	19.5	
Italy	111.7	-1.1	10.3	-3.2	-146.7	-17.5	24	20	25.9	40.3	
Japan	158.9	-2.4	14.2	-1.6	-51.1	7.3	18	35	44.5	56.9	
Korea	198.1	37.3	20.2	0.8	-238.6	-0.9	12	51	63.7	85.2	
Malaysia	135.4	24.9	13.3	2.5	-27.5	5.0	14	36	44.7	57.9	
Mexico	41.5	13.3	5.2	1.6	-303.6	5.3	20	13	16.3	20.0	
Netherlands	273.5	41.6	28.4	4.2	-280.5	-21.6	9	65	80.5	114.5	
Norway	236.0	34.2	25.6	-1.3	-306.3	-9.1	13	57	71.7	98.6	
Poland	81.5	24.5	7.3	1.1	-385.5	-7.3	21	21	26.5	37.8	
Portugal	168.7	-28.0	15.6	-5.3	25.2	-48.9	24	20	26.9	52.1	
Russia	63.8	14.3	7.9	1.1	-761.3	-7.4	21	16	19.7	28.7	
South Africa	56.3	10.2	N/A	N/A	-209.7	-0.6	21	22	22.0	33.3	
Spain	153.3	-52.5	14.1	-10.6	-153.5	-49.0	26	11	16.5	38.3	
Sweden	246.7	55.7	21.5	1.8	-286.0	-5.7	8	64	79.6	108.0	
Switzerland	246.7	50.6	17.8	1.2	-209.3	12.7	7	66	82.0	105.0	
Thailand	116.1	25.3	9.8	0.6	-105.5	5.4	16	31	39.2	50.4	
United Kingdom	169.8	-16.8	15.2	-5.0	-245.2	-14.7	22	30	38.4	56.1	
United States	150.4	-18.1	14.7	-3.6	-319.9	-6.6	22	27	35.1	49.0	

Source: LOIM.

IMPORTANT INFORMATION

For professional investor use only.

This document has been issued by Lombard Odier Funds (Europe) S.A. a Luxembourg based public limited company (SA), having its registered office at 291, route d'Arlon, L-1150 Luxembourg, authorized and regulated by the CSSF as a Management Company within the meaning of EU Directive 2009/65/EC, as amended.

Lombard Odier Investment Managers ("LOIM") is a trade name.

This document is provided for informational purposes only and does not constitute an offer or a recommendation to purchase or sell any security or service. It is not intended for distribution, publication, or use in any jurisdiction where such distribution, publication, or use would be unlawful. This document does not contain personalized recommendations or advice and is not intended to substitute any professional advice on investment in financial products. Before entering into any transaction, an investor should consider carefully the suitability of a transaction to his/her particular circumstances and, where necessary, obtain independent professional advice in respect of risks, as well as any legal, regulatory, credit, tax, and accounting consequences. This document is the property of LOIM and is addressed to its recipients exclusively for their personal use. It may not be reproduced (in whole or in part), transmitted, modified, or used for any other purpose without the prior written permission of LOIM. The contents of this document are intended for persons who are sophisticated investment professionals and who are either authorised or regulated to operate in the financial markets or persons who have been vetted by LOIM as having the expertise, experience and knowledge of the investment matters set out in this document and in respect of whom LOIM has received an assurance that they are capable of making their own investment decisions and understanding the risks involved in making investments of the type included in this document or other persons that LOIM has expressly confirmed as being appropriate recipients of this document. If you are not a person falling within the above categories you are kindly asked to either return this document to LOIM or to destroy it and are expressly warned that you must not rely upon its contents or have regard to any of the

matters set out in this document in relation to investment matters and must not transmit this document to any other person. This document contains the opinions of LOIM, as at the date of issue. The information and analysis contained herein are based on sources believed to be reliable. However, LOIM does not guarantee the timeliness, accuracy, or completeness of the information contained in this document, nor does it accept any liability for any loss or damage resulting from its use. All information and opinions as well as the prices indicated may change without notice. Neither this document nor any copy thereof may be sent, taken into, or distributed in the United States of America, any of its territories or possessions or areas subject to its jurisdiction, or to or for the benefit of a United States Person. For this purpose, the term "United States Person" shall mean any citizen, national or resident of the United States of America, partnership organized or existing in any state, territory or possession of the United States of America, a corporation organized under the laws of the United States or of any state, territory or possession thereof, or any estate or trust that is subject to United States Federal income tax regardless of the source of its income.

Source of the figures: Unless otherwise stated, figures are prepared by LOIM.

Although certain information has been obtained from public sources believed to be reliable, without independent verification, we cannot guarantee its accuracy or the completeness of all information available from public sources.

Views and opinions expressed are for informational purposes only and do not constitute a recommendation by LOIM to buy, sell or hold any security. Views and opinions are current as of the date of this presentation and may be subject to change. They should not be construed as investment advice.

No part of this material may be (i) copied, photocopied or duplicated in any form, by any means, or (ii) distributed to any person that is not an employee, officer, director, or authorised agent of the recipient, without Lombard Odier Funds (Europe) S.A. prior consent.

©2019 Lombard Odier IM. All rights reserved.