

CIO Viewpoint

US/China "chip" race centres on Taiwan's expertise

Investment Solutions

15 August 2022

When US House speaker Nancy Pelosi visited Taiwan earlier this month, increasing geopolitical tensions with China, her schedule included an appointment with the management of TSMC, the world's largest maker of semiconductors, or computer chips. The meeting underlined the strategic and economic importance of Taiwan and its semiconductor know-how.

Headlines focused on the potential for Taiwan's status to spark more direct confrontation between the US and China. "The world faces a choice between democracy and autocracy," said Mrs Pelosi during her visit. "America's determination to preserve democracy here in Taiwan and around the world remains ironclad." Since the civil war, China's communist government has considered Mandarin-speaking Taiwan, an island of 28 million people, a rogue region. In support of its "One China" principle, and to demonstrate its displeasure at the US politician's visit, China launched a series of military drills around Taiwan. Formally, the US pursues a policy of "strategic ambiguity" over its willingness to defend militarily the status-quo in the Taiwan Strait, and in recent days a delegation of five American congressional lawmakers arrived in Taipei.

But there was another justification for Mrs Pelosi's visit. Taiwan is the world's largest and most sophisticated manufacturer of semiconductors. Computer chips are both key to Taiwan's economic success and integral to its geopolitical survival. The world's electronics depend on chips to operate and communicate. Any threat to Taiwan's autonomous status – it is recognised as a nation by only 13 small countries – endangers the global economy.

Semiconductors or "integrated circuits" are minute, typically no larger than a fingernail, and can incorporate more than 8 billion transistors. The more sophisticated semiconductors come in two main types: the first are memory chips physically constrained by the need for capacitors to store a charge. The second, more complex "logic chips," are the focus of governments' efforts in the US, Europe and China to catch-up with Taiwan, and then scale-up capacity.

Where memory chips are bigger than 10 nanometres (nm) thick - or 10 billionths of a metre - "leading edge" logic chips can be as little as half that size. For comparison, [a sheet of paper is typically around 100,000 nm thick](#). Just three firms globally can manufacture "leading edge" chips: Taiwan Semiconductor Manufacturing Company (TSMC), Samsung and Intel, and only TSMC can make the very thinnest chips, measured at 5 nm, and plan to reach 3 nm by 2025. Samsung, SK Hynix and US-based Intel are investing heavily to catch up. The latter reports that it will be able to make 7 nm chips by 2023.



Stéphane Monier
Chief Investment Officer, Lombard Odier Private Bank

Key takeaways

- US/China tensions over Taiwan's status highlight the island's strategic importance as a global supplier of semiconductor chips
- The US, China and Europe are all investing in semiconductor production to build their strategic resilience
- The complexities of chip manufacturing mean that it will take years to increase expertise and capacity: the US has started to coordinate with allies, excluding China
- Semiconductors illustrate how economies remain interdependent in the global trade system. While geopolitical tensions continue, financial markets will price this premium.

Important information: Please read the important information at the end of the document.

Weekly publication of Lombard Odier – Contacts: Investment Solutions, investment-solutions@lombardodier.com

Data as of 15 August 2022 unless otherwise stated.

Lombard Odier · CIO Viewpoint · 15 August 2022

The complexities of making increasingly powerful chips at ever-smaller scales demands ever-more sophisticated manufacturing techniques. These include silicon nanosheets to conduct signals, photo-resistant coatings, lithography, or atomic layer deposition and "dry-etching" technologies to construct the layers that create a semi-conductor. "Moore's Law," named after Gordon E. Moore, a founder of Intel, refers to his observation in 1965 that the number of transistors on a chip doubles roughly every two years, while its cost simultaneously halves. Nearly six decades later, the observation still holds true.

Tanks and fridges

Taiwan manufactures an estimated 20% of the world's semiconductors, and around three-fifths of outsourced chips. Semiconductors are vital to electronics. Without them, everything from car airbags and parking cameras, to computers and mobile phones would be useless. Chips are as fundamental to weapons systems as they are to fridges and dishwashers. They can even be interchangeable: Western export sanctions have led to reports that [Russia is using chips from kitchen appliances to maintain its tanks in Ukraine](#).

More significantly from the strategic point of view, Taiwan's companies, dominated by TSMC, supply 92% of the market for the most sophisticated logic chips, according to estimates by Boston Consulting. The remaining 8% market share is held by Samsung in South Korea.

Demand is also growing and expected to rise 10% in 2022 to more than USD 600 billion worldwide, according to accounting firm Deloitte. The importance of semiconductors was illustrated by their shortage during the pandemic, which stalled production - and the economic recovery - at automakers. That lack [inflated the prices of second-hand vehicles](#) and reduced revenues by USD 210 billion in 2021.

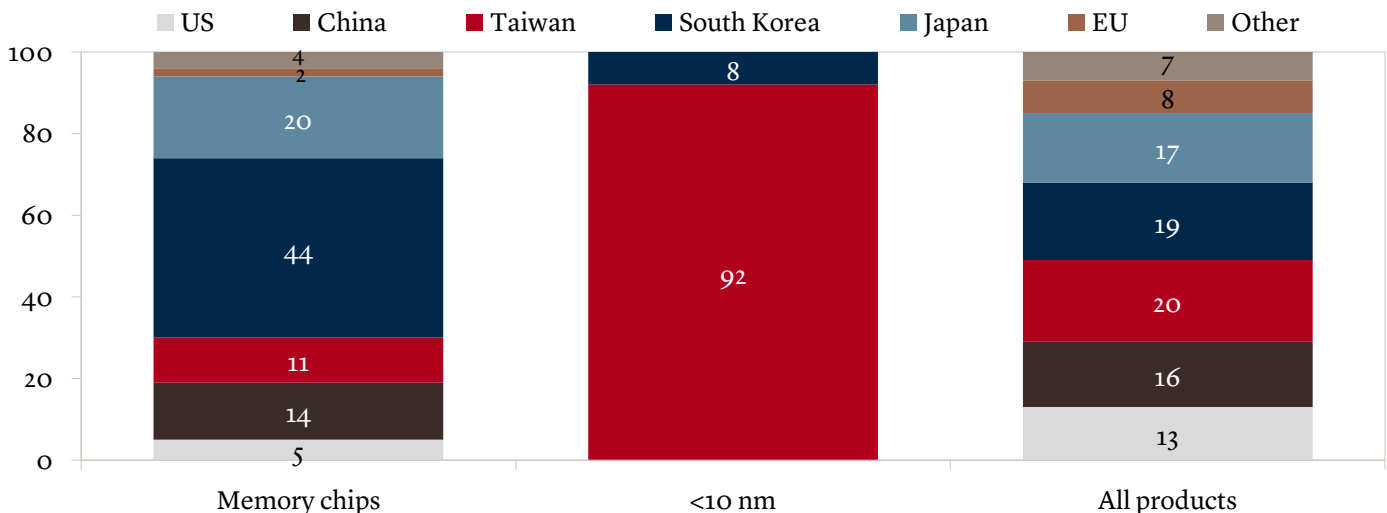
Still, there are signs that in the short run, the rush to meet the pandemic's demand is leading to some slowing of demand in consumer computing and entry-level smartphones.

"Risk of disruption"

In June 2021 the Biden administration published [a review of US supply chains](#), spelling out the risk to the American economy in blunt terms. The US "is heavily dependent on a single company - TSMC - for producing its leading-edge chips." Along with smaller supplies from Samsung, that "puts at risk the ability to supply current and future national security and critical infrastructure needs." The administration fears that the fragility of the supply chain for semiconductors "puts virtually every sector of the economy at risk of disruption." In March 2022, the US Commerce Department set out a strategic plan to improve domestic manufacturing capacities generally, and in semiconductors specifically. As part of that effort, the US is trying to make the semiconductor supply chain more robust in coordination with South Korea, Japan and Taiwan in a grouping labelled "Chip 4."

The world's major economies are all investing in their capacity to build chips. Still, a semiconductor fabrication plant or "fab" takes around two-years to build, assuming the expertise is available, and can cost as much as USD 12 billion. On 9 August, the Biden administration signed into law the US "[CHIPS and Science Act](#)," to support new and greater domestic "fab" capacity, designed to benefit Intel and Micron Technology Inc., among others. The legislation will, according to the White House, cut costs, boost jobs, reinforce supply chains "and counter China." The same day, [Micron announced a USD 40 billion investment](#) to build "leading edge" manufacturing capacity in the US, funded by the Act, by 2030. That means that the CHIPS Act's total budget of USD 52.7 bn, deployed over a decade, will take several years to begin closing the gap

1. Global production of memory and "leading edge" logic semiconductors vs total



Source: Boston Consulting Group

with Taiwan and South Korea. TSMC, in comparison, plans a three-year investment of USD 110 bn.

The European Union has proposed similar legislation and Japan passed an economic security law in May 2022. European Commission President Ursula von der Leyen in February described the bloc's dependence on a limited number of foreign exporters as "unacceptable." The bloc, which currently accounts for around 10% of all types of semiconductor production globally, expects demand to double by 2030 and plans investments worth EUR 43 billion in public and private initiatives.

China has set itself a target of 80% chip self-sufficiency through a range of programmes under its "Made in China 2025" strategic initiative. China has created state funds worth almost USD 180 billion [by some counts](#), as well as offering tax incentives, local subsidies and trade barriers to boost investments in manufacturing. As a result, China's domestic infrastructure for chip production is accelerating, but still lags. In 2021, by some estimates, just 16% of China's semiconductors were made domestically, and two-thirds of those were built in conjunction with foreign suppliers.

The net result of all these initiatives in the US, Europe and China is that, over time, we are likely to see two independent or "decoupled" semiconductor-manufacturing networks, reflecting wider political alliances.

One economic lesson of 2022's geopolitical tensions may be that every economy remains dependent on the liberal trade system, at least for now. The question is whether democratic allies can collectively defend and maintain their technological lead. Although the danger that tensions turn into conflict by a military mistake or miscalculation around Taiwan cannot be excluded, we see intermittent Chinese military exercises around Taiwan as [the most likely scenario](#), rather than more direct confrontation. In the meantime, the tensions can only complicate any solution to the existing US/Chinese tariffs and Chinese company listings on US markets. At this stage, that continues to justify the political risk premium evident in today's financial markets.

Important information

This is a marketing communication issued by Bank Lombard Odier & Co Ltd (hereinafter "Lombard Odier"). It is not intended for distribution, publication, or use in any jurisdiction where such distribution, publication, or use would be unlawful, nor is it aimed at any person or entity to whom it would be unlawful to address such a marketing communication. This marketing communication is provided for information purposes only. The contents of this marketing communication have not been reviewed by any regulatory authority in any jurisdiction. It does not constitute an offer or a recommendation to subscribe, purchase, sell or hold any security or financial instrument. It contains the opinions of Lombard Odier, as at the date of issue. **These opinions and the information contained herein do not take into account an individual's specific circumstances, objectives, or needs. No representation is made that any investment or strategy is suitable or appropriate to individual circumstances or that any investment or strategy constitutes personalised investment advice to any investor.** Each investor must make his/her own independent decisions regarding any securities or financial instruments mentioned herein. Tax treatment depends on the individual circumstances of each person and may be subject to change in the future. Lombard Odier does not provide tax advice. Therefore, you must verify the above and all other information provided in the marketing communication or otherwise review it with your external tax advisors. Some investment products and services, including custody, may be subject to legal restrictions or may not be available worldwide on an unrestricted basis. The information and analysis contained herein are based on sources considered reliable. Lombard Odier uses its best effort to ensure the timeliness, accuracy, and comprehensiveness of the information contained in this marketing communication. Nevertheless, all information and opinions as well as the prices, market valuations and calculations indicated herein may change without notice.

Investments are subject to a variety of risks. Before entering into any transaction, an investor should consult his/her investment advisor and, where necessary, obtain independent professional advice in respect of risks, as well as any legal, regulatory, credit, tax, and accounting consequences. The investments mentioned in this marketing communication may carry risks that are difficult to quantify and integrate into an investment assessment. In general, products such as equities, bonds, securities lending, forex, or money market instruments bear risks, which are higher in the case of derivative, structured, and private equity products; these are aimed solely at investors who are able to understand their nature and characteristics and to bear their associated risks. On request, Lombard Odier will be pleased to provide investors with more detailed information concerning risks associated with given instruments. **Past performance is no guarantee of current or future returns, and the investor may receive back less than he/she invested.** The value of any investment in a currency other than the base currency of a portfolio is subject to the foreign exchange rates. Exchange rates may fluctuate and adversely affect the value of the investment when it is realised and converted back into the investor's base currency. The liquidity of an investment is subject to supply and demand. Some products may not have a well-established secondary market or in extreme market conditions may be difficult to value, resulting in price volatility and making it difficult to obtain a price to dispose of the asset. **This marketing communication is not issued by the organisational unit of the Bank Lombard Odier & Co Ltd responsible for the production of financial research**, as defined under the Swiss Bankers Association Directives on the Independence of Financial Research. Consequently, it is not prepared in accordance with the provisions of the referred Directives or any other legal requirements designed to promote the independence of the production of financial research. Opinions expressed in this marketing communication may differ from the opinions expressed by other divisions of Lombard Odier, including Bank Lombard Odier & Co Ltd's Research Department. Nevertheless, if opinions from financial analysts belonging to the Research Department are contained herein, such analysts attest that all of the opinions expressed accurately reflect their personal views about any given instruments. In order to ensure their independence, financial analysts are expressly prohibited from owning any securities that belong to the research universe they cover. Lombard Odier may hold positions in securities as referred to in this marketing communication for and on behalf of its clients and/or such securities may be included in the portfolios of investment funds as managed by Lombard Odier or affiliated Group companies. Lombard Odier recognises that conflicts of interest may exist as a consequence of the distribution of financial instruments or products issued and/or managed by entities belonging to the Lombard Odier Group. Lombard Odier has a Conflict of Interests policy to identify and manage such conflicts of interest.

European Union Members: This marketing communication has been approved for use by Lombard Odier (Europe) S.A. in Luxembourg and by each of its branches operating in the following territories: **Belgium:** Lombard Odier (Europe) S.A. Luxembourg · Belgium branch; **France:** Lombard Odier (Europe) S.A. · Succursale en France; **Italy:** Lombard Odier (Europe) S.A. · Italian Branch; **Spain:** Lombard Odier (Europe) S.A. · Sucursal en España. Lombard Odier (Europe) S.A. is a credit institution authorised and regulated by the Commission de Surveillance du Secteur Financier (CSSF) in Luxembourg. In addition, this marketing communication has also been approved for use by the following entity domiciled within the European Union: **Spain:** Lombard Odier Gestión (España) S.G.I.I.C., S.A.U., an investment management company authorised and regulated by the Comisión Nacional del Mercado de Valores (CNMV), Spain.

Hong Kong: This marketing communication is distributed in Hong Kong by Lombard Odier (Hong Kong) Limited, a licensed corporation registered by the Securities and Futures Commission of Hong Kong (“SFC”) to carry on Type 1, Type 4 and Type 9 regulated activities under the Securities and Futures Ordinance (“SFO”) in Hong Kong.

Singapore: This marketing communication is distributed in Singapore by Lombard Odier (Singapore) Ltd for the general information of accredited investors and other persons in accordance with the conditions specified in Sections 275 and 305 of the Securities and Futures Act (Chapter 289). Recipients in Singapore should contact Lombard Odier (Singapore) Ltd, an exempt financial adviser under the Financial Advisers Act (Chapter 110) and a merchant bank regulated and supervised by the Monetary Authority of Singapore, in respect of any matters arising from, or in connection with this marketing communication. The recipients of this marketing communication represent and warrant that they are accredited investors and other persons as defined in the Securities and Futures Act (Chapter 289). **This advertisement has not been reviewed by the Monetary Authority of Singapore.**

Panama: This marketing communication has been approved for use in Panama by Lombard Odier (Panama) Inc., an entity authorised and regulated by the Superintendencia del Mercado de Valores de Panamá. Licensed to operate as an Investment Adviser. Res. SMV No.528-2013.

Israel: This marketing communication has been approved for use in Israel by the Israel Representative Office of Bank Lombard Odier & Co Ltd, an entity not supervised by the Bank of Israel, but by the Swiss Financial Market Supervisory Authority, which supervises the activities of Bank Lombard Odier & Co Ltd.

South Africa: This marketing communication has been approved for use in South Africa by the South Africa Representative Office of Bank Lombard Odier & Co Ltd, an authorised financial services provider Registration number 48505.

Switzerland: This marketing communication has been approved for use in Switzerland by Bank Lombard Odier & Co Ltd Geneva, a bank and securities firm authorised and regulated by the Swiss Financial Market Supervisory Authority (FINMA).

United Kingdom: This marketing communication has been approved for use in the United Kingdom by Lombard Odier (Europe) S.A. – UK Branch, a bank authorised and regulated by the Commission de Surveillance du Secteur Financier (“CSSF”) in Luxembourg and authorised in the UK by the Prudential Regulation Authority (“PRA”). Subject to regulation by the Financial Conduct Authority (“FCA”) and limited regulation by the Prudential Regulation Authority. Financial Services Firm Reference Number 597896. **Details about the extent of our authorisation and regulation by the Prudential Regulation Authority and regulation by the Financial Conduct Authority are available from us on request.**

United States: Neither this document nor any copy thereof may be sent to, 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 organised or existing in any state, territory or possession of the United States of America, a corporation organised 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.

This marketing communication may not be reproduced (in whole or in part), transmitted, modified, or used for any public or commercial purpose without the prior written permission of Lombard Odier.

Data protection: You may be receiving this communication because you have provided us with your contact details. If this is the case, note that we may process your personal data for direct marketing purposes. If you wish to object to this processing, please address your objection to the Group’s Data Protection Officer: Bank Lombard Odier & Co Ltd, Group Data Protection Officer, 11, Rue de la Corraterie, 1204 Geneva, Switzerland. E-Mail: group-dataprotection@lombardodier.com. For more information on Lombard Odier’s data protection policy, please refer to www.lombardodier.com/privacy-policy.

© 2022 Bank Lombard Odier & Co Ltd – all rights reserved. Ref. *LOCH/LOESA/LOASIA-MWNPR-en-032022*.

SWITZERLAND

GENEVA

Bank Lombard Odier & Co Ltd¹

Rue de la Corraterie 11 · 1204 Genève · Suisse
geneva@lombardodier.com

Lombard Odier Asset Management (Switzerland) SA

Avenue des Morgines 6 · 1213 Petit-Lancy · Suisse
Support-Client-LOIM@lombardodier.com
Management Company regulated by the FINMA.

FRIBOURG

Banque Lombard Odier & Cie SA · Bureau de Fribourg¹

Rue de la Banque 3 · 1700 Fribourg · Suisse
fribourg@lombardodier.com

LAUSANNE

Bank Lombard Odier & Co Ltd¹

Place St-François 11 · 1003 Lausanne · Suisse
lausanne@lombardodier.com

VEVEY

Banque Lombard Odier & Cie SA · Agence de Vevey¹

Rue Jean-Jacques Rousseau 5 · 1800 Vevey · Suisse
vevey@lombardodier.com

ZURICH

Bank Lombard Odier & Co Ltd¹

Utoschloss · Utoquai 29-31 · 8008 Zürich · Schweiz
zurich@lombardodier.com

EUROPE

BRUSSELS

Lombard Odier (Europe) S.A. Luxembourg · Belgium branch²

Avenue Louise 81 · Box 12 · 1050 Brussels · Belgium
brussels@lombardodier.com

Credit institution supervised in Belgium by the National Bank of Belgium (NBB) and the Financial Services and Markets Authority (FSMA).

LONDON

Lombard Odier (Europe) S.A. · UK Branch²

Queensberry House · 3 Old Burlington Street · London
W1S 3AB · United Kingdom
london@lombardodier.com

The Bank is authorised in the UK by the Prudential Regulation Authority (PRA). Subject to regulation by the Financial Conduct Authority (FCA) and limited regulation by the Prudential Regulation Authority. Financial Services Firm Reference Number 597896. Details about the extent of our authorisation and regulation by the Prudential Regulation Authority and regulation by the Financial Conduct Authority are available from us on request.

Lombard Odier Asset Management (Europe) Limited

Queensberry House · 3 Old Burlington Street · London
W1S 3AB · United Kingdom
london@lombardodier.com

Investment firm authorised and regulated by the Financial Conduct Authority (FCA register No.515393).

LUXEMBOURG

Lombard Odier (Europe) S.A.

291, route d'Arlon · 1150 · Luxembourg · Luxembourg
luxembourg@lombardodier.com

Credit institution authorised and regulated by the Commission de Surveillance du Secteur Financier (CSSF) in Luxembourg.

Lombard Odier Funds (Europe) S.A.

291, route d'Arlon · 1150 · Luxembourg · Luxembourg
luxembourg@lombardodier.com

MADRID

Lombard Odier (Europe) S.A. · Sucursal en España²

Paseo de la Castellana 66 · 4ª Pl. · 28046 Madrid · España · madrid@lombardodier.com
Credit institution supervised in Spain, by the Banco de España and the Comisión Nacional del Mercado de Valores (CNMV).

Lombard Odier Gestión (España) S.G.I.I.C, S.A.U.

Paseo de la Castellana 66 · 4ª Pl. · 28046 Madrid · España · madrid@lombardodier.com
Management Company supervised by the Comisión Nacional del Mercado de Valores (CNMV).

MILAN

Lombard Odier (Europe) S.A. · Succursale in Italia²

Via Santa Margherita 6 · 20121 Milano · Italia
milano-cp@lombardodier.com
Credit institution supervised in Italy by the Commissione Nazionale per le Società e la Borsa (CONSOB) and la Banca d'Italia.

PARIS

Lombard Odier (Europe) S.A. · Succursale en France²

8, rue Royale · 75008 Paris · France. RCS PARIS
B 803 905 157 · paris@lombardodier.com
Credit institution supervised in France by the Autorité de contrôle prudentiel et de résolution (ACPR) and by the Autorité des Marchés Financiers (AMF) in respect of its investment services activities. Business permit No.23/12. Registered in Luxembourg · No.B169 907. Insurance intermediary authorised by the Commissariat aux Assurances (CAA) No.2014 CM002. The registration with the CAA can be verified at www.orias.fr.

AFRICA | AMERICAS | MIDDLE EAST

ABU-DHABI

Bank Lombard Odier & Co Ltd · Abu Dhabi Global Market Branch

Al Maryah Island · Abu Dhabi Global Market Square · Al Khatem Tower · 8th floor · P.O. Box 764646 · Abu Dhabi · UAE · abudhabi@lombardodier.com
Arranging Deals in Investments · Advising on Investment or Credit · Arranging Credit. Regulated by the ADGM Financial Services Regulatory Authority.

BERMUDA

Lombard Odier Trust (Bermuda) Limited

3rd Floor, Victoria Place · 31 Victoria Street · Hamilton
HM 10 · Bermuda · bermuda@lombardodier.com
Licensed to conduct Trust, Investment and Corporate Service Provider Business by the Bermuda Monetary Authority.

BRASIL

Lombard Odier (Brasil) Consultoria de Valores Mobiliários Ltda.

Avenida 9 de Julho No. 3624, Torre DGN 360, 6º andar · Jardim Paulista · CEP 01406-000 · São Paulo · Brasil
sao.paulo.office@lombardodier.com
Supervised by the Comissão de Valores Mobiliários of Brazil.

DUBAI

Bank Lombard Odier & Co Ltd · Representative Office Dubai

Conrad Business Tower · 12th Floor · Sheikh Zayed Road · P.O. Box 212240 · Dubai · UAE
dubai@lombardodier.com
Under the supervisory authority of the Central Bank of the UAE.

ISRAEL

Israel Representative Office ·

Bank Lombard Odier & Co Ltd
Alrov Tower 11th floor · 46 Rothschild Blvd. · Tel Aviv
6688312 · Israel · telaviv@lombardodier.com
Not supervised by the Bank of Israel, but by Swiss Financial Market Supervisory Authority which supervises the activities of Bank Lombard Odier & Co Ltd.

JOHANNESBURG

South Africa Representative Office ·

Bank Lombard Odier & Co Ltd
4 Sandown Valley Crescent · Sandton · Johannesburg
2196 · South Africa · johannesburg@lombardodier.com
Authorised financial services provider Registration number 48505.

NASSAU

Lombard Odier & Cie (Bahamas) Limited

Lyford Cay House · Western Road · P.O. Box N-4938 · Nassau · Bahamas · nassau@lombardodier.com
Supervised by the Central Bank of the Bahamas and the Securities Commission of the Bahamas.

PANAMA

Lombard Odier & Cie (Bahamas) Limited · Representative Office in Panama

Oceania Business Plaza Torre 2000 · Oficina 38-D · Blvd. Pacifica · Urb. Punta Pacifica · Corregimiento de San Francisco · Panamá · panama@lombardodier.com
Supervised by the Central Bank of the Bahamas and the Superintendencia de Bancos de Panamá.

Lombard Odier (Panama) Inc.

Oceania Business Plaza Torre 2000 · Oficina 38-D · Blvd. Pacifica · Urb. Punta Pacifica · Corregimiento de San Francisco · Panamá · panama@lombardodier.com
Supervised by the Superintendencia del Mercado de valores de Panamá. Licensed to operate as an Investment Adviser. Res. SMV No.528-2013.

ASIA - PACIFIC

HONG KONG

Lombard Odier (Hong Kong) Limited

1601 Three Exchange Square · 8 Connaught Place · Central · Hong Kong · hongkong@lombardodier.com
A licensed entity regulated and supervised by the Securities and Futures Commission in Hong Kong.

SINGAPORE

Lombard Odier (Singapore) Ltd.

9 Raffles Place · Republic Plaza #46-02 · Singapore
048619 · singapore@lombardodier.com
A merchant bank regulated and supervised by the Monetary Authority of Singapore.

TOKYO

Lombard Odier Trust (Japan) Limited

Izumi Garden Tower 41F · 1-6-1 Roppongi, Minato-ku · Tokyo 106-6041 · Japan · tokyo@lombardodier.com
Regulated and supervised by the Financial Services Agency (FSA) in Japan. It holds a trust business license (FSA No.208) and is registered with Kanto Local Finance Bureau for Financial Instruments Business Operator (No.470).

¹ Private bank and securities firm authorised and regulated by the Swiss Financial Market Supervisory Authority (FINMA).

² Branch of Lombard Odier (Europe) S.A., a credit institution based in Luxembourg, authorised and regulated by the Commission de Surveillance du Secteur Financier (CSSF) in Luxembourg.