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**SEMICONDUCTORS –
INCREASING
GOVERNMENTAL AND
REGULATORY SCRUTINY**



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SEMICONDUCTORS – INCREASING GOVERNMENTAL AND REGULATORY SCRUTINY

Semiconductors are essential for many aspects of our lives – work, communication, energy production, healthcare and travel – as well as national security systems and military hardware. A global shortage of semiconductors and increasing protectionism means that the industry is of major strategic and geopolitical importance to governments. In this paper, we take a look at increasing regulation, what it means for M&A and some of the challenges that lie ahead.

Chip shortages

Over the last few years, the semiconductor industry has been navigating serious supply shortages, increased costs of components and metals, and disruption of supply chains due to the pandemic. Supply chain risk doesn't just impact tech companies: reliable supplies are critical for a wide range of sectors including automotive, consumer goods, healthcare and national infrastructure.

Supply shortages have led to cuts in automobile production and higher prices for consumer and healthcare electronics. In 2021, semiconductor supply chain disruptions alone are calculated to have caused an estimated loss of \$240 billion to the US GDP and chips have been in such limited supply that the CEO of a European producer of chip manufacturing equipment recently reported that large industrial companies have been acquiring high-end washing machines in bulk to strip out microchips and repurpose them.

The situation has been exacerbated by export restrictions between the US and China, and certain businesses have recently come under pressure from the US to halt exports to Chinese chipmakers.

The semiconductor supply chain is complex and barriers to entry (for example, capital intensity, highly specialised know-how and vertically integrated competitors) mean that it can be inflexible and lack resilience when confronted with extraordinary shocks such as natural disasters, pandemic lockdowns, or sudden spikes in demand.

Whilst the US designs 60% of global microprocessors and other logic chips and South Korea designs 65% of global memory chips (DRAM and NAND), global production is highly concentrated in East Asia – mainly Taiwan and South Korea. Europe accounts for just 9% of production (down from 44% in 1990). Meanwhile China is ramping up production and will add 40% capacity in the next decade.

The private sector has been taking steps to ensure supply chain resilience. Major chipmakers are developing or acquiring the capacity for at-scale manufacturing of custom chips, as well as developing stronger links with third-party foundries. Manufacturers dependent on semiconductors are investing in long-term partnerships, joint ventures and collaborations, such as the recent joint venture entered into between Stellantis (the parent company of Fiat, Maserati and Peugeot) and Foxconn to design a family of purpose-built semiconductors for the automaker and third-party customers, and a recent agreement between Volkswagen and STMicroelectronics.

Shifting government policies

The reliance on foreign production capabilities has raised concerns among politicians in the EU and the US, particularly given rising tensions between China and Taiwan. U.S. Senator John Cornyn went as far as to say that if "the US lost access to advanced semiconductors (none made in US) in the first year, GDP could shrink by 3.2 percent and [the US] could lose 2.4 million jobs." The Senator went on to

say that GDP loss would be three times larger (US\$718 billion) than the estimated \$240 billion of US GDP lost in 2021 due to the ongoing chip shortage. The US Government is proposing to address semiconductor supply chain issues by formalising a US-led strategic semiconductor alliance with South Korea, Japan and Taiwan. Other governments around the world are also attempting to reverse this trend by mobilising tens of billions of dollars in public and private investments and introducing new legislation. Action includes:

- **US CHIPS and Science Act:** Over \$52 billion in incentives has been allocated to strengthen domestic semiconductor manufacturing incentives and research investments under the US CHIPS and Science Act, passed by the US Congress in July 2022. The final package includes \$39 billion to build semiconductor facilities, \$10 billion for regional technology hubs, \$11 billion in semiconductor R&D investments, \$200 million for a semiconductor workforce and education fund, \$2 billion for the US Department of Defence, \$500 million for international technology security and supply chains, and a 25% investment tax credit for semiconductor manufacturing facilities. Recipients of US funding under the legislation are prohibited from material expansions of new semiconductor manufacturing facilities in China and certain other countries.
- **EU Chips Act:** This proposal will be supported by €43 billion of public and private investments with the goal of doubling the EU's share of global microchip production to 20% by 2030, providing direct funding and pooling resources from EU and third countries, along with private sector funding (a €3.3 billion 'Chips for Europe Initiative'). The plan also includes a dedicated €2 billion 'Chips Fund', European Investment Bank loans and other financing and grants for start-ups. There will also be fast-tracked approvals for chip production facilities to attract large manufacturers to build "first-of-a-kind" facilities in Europe. The EU Commission also proposes special treatment for such facilities under state aid rules. In the wake of this proposed

program, there have already been announced investments by companies including Intel, Bosch, STMicroelectronics, GlobalFoundries in multi-billion Euro chip manufacturing facilities across the EU. The proposed regulations also include a mechanism to coordinate between EU member states and the Commission and monitor supply of microchips, anticipate shortages and coordinate emergency responses. Measures under discussion include centralised EU procurement on behalf of EU countries, asking EU suppliers to prioritise supply of chips in critical EU sectors and even tackling shortages by imposing potential export restrictions.

- **Germany:** Germany has announced that it will invest €3 billion under the EU State Aid IPCEI initiative (Important Projects of Common European Interest) in domestic production across the full semiconductor production value chain.
- **Japan:** Japan has approved 774 billion yen (US\$6.8 billion) to fund domestic semiconductor production, with 617 billion yen earmarked to fund up to half of the investment required for a planned semiconductor venture between TSMC and Sony.
- **UK:** In May 2022, the UK Business, Energy and Industrial Strategy (BEIS) Committee launched an inquiry into the strengths and weaknesses of the semiconductor industry and its supply chain in the UK and is expected to publish a report on its findings.

M&A activity

The semiconductor industry has been reshaped by a sustained period of mergers and acquisitions as well as an expected wave of government subsidies (EU Chips Act, US Chips Act, etc.). Although deal activity has declined from a record setting year in 2020, the past few years have seen hundreds of billions of dollars in M&A and SPAC transactions across the US, UK, Europe and Asia, and major players have indicated they expect to continue this acquisition streak.

Deal activity in the sector is being driven by a combination of factors:

- Economies of scale and pooling of resources to tackle rising costs of

resource-intensive R&D, design and manufacturing.

- Huge demand for ever greater connectivity in everything from mobile phones to automobiles to household appliances, as well as next generation technologies such as 5G, internet of things (IoT), and augmented reality.
- Ensuring supply chain security.
- A desire to expand product portfolios beyond microchips (e.g., SaaS products).
- Growing demand for custom chips and foundries.
- Acquiring highly specialised talent.
- Demand for cloud and data centre management technologies.
- Public subsidies and geopolitical tensions that may favour national or state-owned investors.
- Managing ESG concerns and environmental impacts.

Tougher regulatory scrutiny

Against the background of a chip shortage and increased semiconductor M&A activity, cross-border M&A and foreign direct investment (FDI) are subject to increasing scrutiny worldwide, primarily driven by competition, national security and industrial policy concerns. Regulators are particularly stringent where advanced or sensitive technologies are

concerned, and semiconductor M&A falls squarely within the scope of the regulatory regimes.

Competition authorities are also interested in semiconductor deals, raising concerns about consolidation and access to IP used by companies that produce semiconductor chips and related products.

Chipmakers and investors alike will need to seek expert advice on their high-stakes transactions as they are increasingly the focus of challenges by governments and regulators, which result in increased scrutiny, uncertainty and risk for transactions. A recent example is Nvidia's failed attempt to acquire UK chip designer Arm in 2021, after US, UK and EU regulators raised concerns about the impact on competition of what would have been the largest ever semiconductor deal. SoftBank, owner of Arm, has since announced that it has considered seeking an IPO of Arm. However, investors seeking an exit by way of an IPO route may find that it does not always reduce regulatory risk.

In addition to competition risk, there has been a proliferation of FDI and other investment screening regimes globally which investors will need to take into account. In the UK, in particular, investors will need to consider potential scrutiny under the UK national security regime for investments above certain shareholding thresholds. Since the adoption of the

UK Case Study: Nexperia's acquisition of Newport Wafer Fab (NWF)

Nexperia's acquisition of NWF is a clear example of the complex regulatory environment surrounding semiconductor M&A. NWF is reported to be the UK's largest producer of silicon wafers and specialises in high-end silicon semiconductor chips. In July 2021, Nexperia announced that it had acquired 100% ownership of NWF. Nexperia is a Dutch company; however, it is ultimately owned by Wingtech Technology, a Shanghai-listed company. In April 2022, the Foreign Affairs Committee of the UK House of Commons issued a report recommending that the UK Government call in the acquisition for urgent review.

In May 2022, this transaction was 'called in' by the UK Government in its first public exercise of its call-in powers under the NSIA and, as there have been no further announcements, it appears that the outcome of that review remains pending. The assessment period of 30 working days expired in July 2022, and it has been reported that the Secretary of State has extended it. The matter has become increasingly sensitive, with implications for US-UK trade relations; according to news reports, members of the US Congress have warned President Biden of security risks linked to the acquisition of NWF by Wingtech Technology and urged the President to take action to prevent the transaction, including reconsidering the UK's place on a Committee of Foreign Investment in the United States (CFIUS) "white list" and restricting exports to NWF.

National Security and Investment Act 2021 (NSIA) which fully came into force in January 2022, the UK Government has been particularly active in its exercise of its new powers. As of March 2022, it had already called in 17 transactions, including those in advanced technologies such as semiconductors. The reach of the NSIA is very broad and likely to catch even minority investments in targets which research, develop or produce semiconductors; develop or produce anything designed to be used for the purpose of producing semiconductors or as an enabler; or own, create, supply or exploit IP in relation to semiconductors in the UK. The UK Government has, for the first time, blocked an acquisition of sensitive intellectual property relating to vision sensing technology under a license from the University of Manchester to Beijing Infinite Vision Technology Company.

Intellectual Property

Semiconductors can comprise millions of components. Accordingly, there are a significant number of different IP rights that subsist in the technology. General IP rights (e.g., patents, trade secrets, designs etc.) cover each stage and layer of the process of a chip's development and manufacture, including the design of the chip but also any inventive manufacturing methods used in the process.

Various legislation exists regarding the semiconductor topography IP right that relates solely to semiconductors. Matter specific IP protection for the layout design (topographies) of semiconductors was first seen with the introduction of the Semiconductor Chip Protection Act 1984 in the US, which provides IP protection for "mask works" (i.e. templates used to create the complex 2D or 3D layouts for chip circuits). This was followed by the European Council Directive 87/54/EEC of 16 December 1986 on the legal protection of topographies of semiconductor products. In 1989, the Washington Treaty on Intellectual Property in Respect of Integrated Circuits was adopted (although not ratified) to provide protection for integrated circuit topographies. In 1995, the Agreement on Trade-Related Aspects of Intellectual Property Rights (Annex 1C to

the World Trade Organization (WTO) Agreement) went into force, requiring WTO members to protect the layout of semiconductor chip products in accordance with key parts of the Washington Treaty.

Typical IP rights subsisting in semiconductors

In addition to the semiconductor topography right, there a number of other IP rights that can subsist in semiconductors:

- **Patents:** covering the high-level functional design of a chip, function of electrical circuits, testing machinery, and packaging materials that provide required mechanical and electrical protection for the chip, (key players in chip design invest significantly in patent protection, with patent filing increasing around the world).
- **Trade secrets:** covering the manner in which the function of the circuit is provided, source code of proprietary software, the methods of making the pure silicon crystalline material and of producing uniform wafer, inventive aspects of the manufacturing and testing machinery and processes of manufacturing and testing.
- **Designs:** covering the chip layout, circuit design and circuit diagrams.
- **Copyright:** covering proprietary software (e.g., source code; object code) and pinout data.

In addition to the above, IP rights subsist in the "semiconductor intellectual property core" (also known as an "IP Core" or "IP Block"); this is a reusable unit of cell, logic, or chip layout design created and owned by one party; the rights in the IP Core can then be licensed to others to be used as building blocks for their larger design. These IP Cores are combined to create chip-based systems ("system on a chip", or "SoCs"), application-specific integrated circuits, and application-specific standard products, all of which are fundamental to the manufacture of electronic devices. There has been a growing initiative to create IP Cores under free and open-source software-licences allowing for better access, greater

collaboration and more efficient improvements in chip technology.

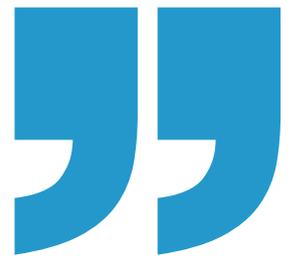
All of the above IP rights provide businesses with a means to protect their technology. In addition, IP rights can be monetised via licensing arrangements throughout the development and supply chain. Further, cross-licence agreements are often used within the semiconductor industry as a means by which to obtain freedom to operate and avoid patent litigation.

Managing the risks

Given the importance of semiconductors to a multitude of technologies, and the supply chain challenges the semiconductor industry has been navigating, businesses producing or relying on semiconductors should be engaging in proactive management of the related legal risks and considerations.

As businesses enter into more collaborative arrangements on a national, and international, scale to improve the resiliency of supply chains and ensure

access to markets, new technological developments and greater innovation, strong IP protection will be essential, and those with IP rights in semiconductor technology may find that enforcement of their IP rights becomes fundamental to safeguard their business. Businesses providing or relying on semiconductors should be aware that, in addition to creating operational challenges, semiconductor supply chain issues can raise significant legal risks in terms of failures to meet contractual commitments to customers and can lead to high-stakes litigation. Businesses can help to mitigate these risks by proactive management of the contractual terms governing continuity of production, diversification of suppliers and strategic M&A, as well as joint venture and collaboration arrangements. When engaging in strategic M&A and investments related to semiconductors, appropriately navigating relevant laws (including competition and FDI regimes) will be a key success factor, alongside skilled due diligence to understand key rights and contractual arrangements.



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