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Playing offence: China's battle to (merger) control semiconductors and critical technologies

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In October 2020, SK hynix announced it would acquire Intel's NAND memory and storage business to enhance the competitiveness of its NAND flash solutions. The deal would make SK hynix second only to Samsung among the world's largest NAND memory makers. A number of competition authorities reviewed the deal.[1] In May 2021, the European Commission and Korea's antitrust agency cleared the deal without any issues. The UK's Competition and Markets Authority followed suit and found that there would be 'strong remaining competitors' who had their own plans to 'expand their capacity'.[2] The Committee on Foreign Investment in the United States (CFIUS) also weighed in with approval.

China was the final antitrust hurdle. As with many other semiconductor reviews before it, the State Administration for Market Regulation (SAMR) approved the *SK hynix/Intel* deal a year later but imposed a range of behavioural

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1 Other than China, the deal was subject to merger control clearance in the European Union, South Korea, Taiwan, Brazil, the United Kingdom and Singapore, which all cleared the transaction.

2 'Anticipated acquisition by SK hynix Inc of Intel Corporation's NAND and SSD business' (Competition & Markets Authority, 30 July 2021), see https://assets.publishing.service.gov.uk/media/6103c0288fa8f504411ef4c6/SK_hynix_Decision_-_FINAL_300721.pdf.

conditions to address competition concerns (not identified elsewhere) and security of supply. SK hynix was required to continue supplying all products in China on fair, reasonable and non-discriminatory (FRAND) terms and to expand its output of peripheral component interconnect express (PCIe) and serial advanced technology attachment (SATA) enterprise-class solid state drive products. Most notably, SK hynix was asked to facilitate entry of an unnamed local third-party competitor into relevant markets. Commentators considered the remedy radical because it effectively opened the doors for Chinese competitors, including potential national champions such as Yangtze Memory Technologies Corp (YMTC), to penetrate the market. Others suggested that CFIUS should have revisited its original position of not intervening as SAMR's remedies were still unknown when CFIUS concluded its deliberation on the deal:

> 'The situation reflects the weaknesses of CFIUS – and the degree to which China plays both offense and defense in its regulatory reviews where the United States tends to just play defense. China, as this example underscores, uses so-called antitrust measures to bolster its domestic ecological ecosystem where the US approach to antitrust only undermines its major tech players.'[3]

If there's a single industry that has been subject to heightened antitrust risks in China as a result of politics and continued trade tensions, it's semiconductors. Of all semiconductor cases in which remedies were imposed in China since 2019, other countries identified no concerns and cleared the transactions unconditionally. Since the introduction of its merger control regime in 2008, China initially followed the lead of other antitrust jurisdictions, particularly the European Union. Things prominently changed in 2018 when Qualcomm terminated its proposed acquisition of NXP after failing to obtain clearance from China's competition authority before the transaction's termination (long-stop) date. Since then, China's antitrust authority has shown an increased appetite to act separately and independently in semiconductor cases. In 2021, US-based Applied Materials failed to obtain timely clearance in China for its proposed acquisition of Japanese semiconductor equipment provider Kokusai Electric Corporation. A year later, US-based DuPont terminated its agreement to acquire specialty materials leader Rogers after receiving all approvals except from China.

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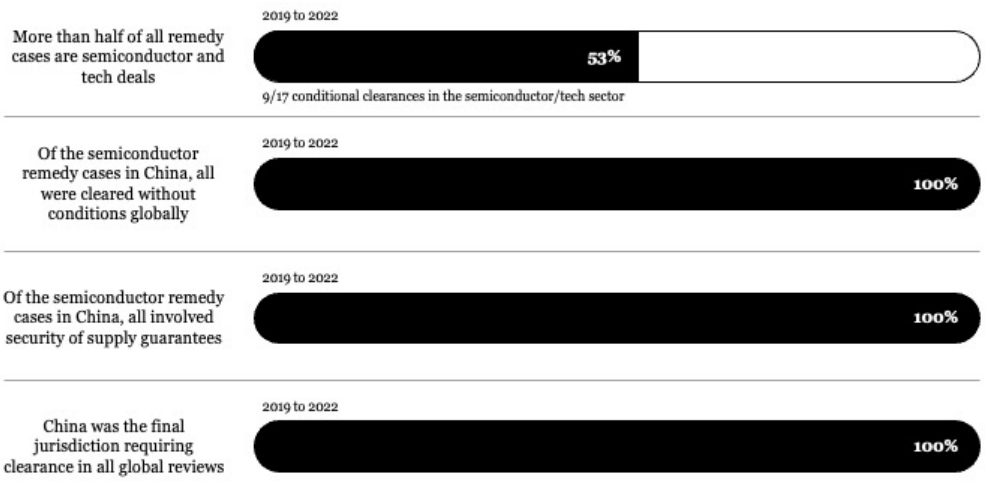
3 Roslyn Layton, 'CFIUS Should Revisit Intel-SK Hynix Merger Given China's '3rd Party' Remedy' (*Forbes*, 6 January 2022), see www.forbes.com/sites/roslynlayton/2022/01/06/cfius-should-revisit-intel-sk-hynix-merger-given-chinas-3rd-party-remedy/?sh=105925308b1d.

The politics of semiconductor deals

Today, it would seem uncontroversial to say that China's tough stance on semiconductor deals has shifted with the political climate and regulatory actions taken globally. While China remains the principal focus of global efforts to review deals in sensitive sectors from a foreign investment policy and regulatory perspective, the nature of those concerns are typically within the remit of merger control in China. Unlike other merger control regimes, industrial policy and non-competition factors policy are catered for under China's merger control rules. Article 7 of China's Anti-Monopoly Law (AML) allows the government to protect industries which have a bearing on the lifeline of the national economy, national security, and industries with monopolies over the production and sale of certain commodities. As production and supply of semiconductors have been a key focus for the Chinese government for some time, the increased politicisation of merger control is correlated to the global trade environment becoming less supportive.

Figure 1: China's say and influence in global semiconductor deals



China's semiconductor industry is the largest in the world in terms of consumption. In light of this, two factors have historically driven antitrust scrutiny of semiconductor deals:

- more than half of all semiconductors manufactured globally are being consumed in China, a slice which is expected to increase in the future; and
- China is dependent on imported semiconductor products and technology as most semiconductors consumed in China are manufactured by foreign players.

Numerous efforts have been made to bridge the gap between China's heavy consumption of semiconductors and its reliance on external semiconductor demand, which has influenced the merger control review of semiconductor deals and fuelled complaints by third-party stakeholders. In *MKS/Atotech* (2022), third parties reportedly raised security of supply concerns due to MKS' exposure to export-related restrictions despite the absence of any real competition issues. MKS' SEC filings suggested that the company was suffering from loss of business, which represented supply disruptions to Chinese customers, who subsequently complained. The deal was ultimately cleared but not without challenge.

Complaints by third parties have only intensified in merger reviews as a result of a proliferation of regulations and controls that have disrupted supply chains in China. Recent developments include the addition by the US Bureau of Industry and Security of China-based Huawei Technologies Co Ltd (Huawei), Semiconductor Manufacturing International Corporation (SMIC), YMTC and many of their respective affiliates onto its Entity List.[4] The regulations also introduced new and novel restrictions related to end-uses in semiconductor, semiconductor manufacturing, supercomputer and advanced computing, along with equipment used to develop them. Foreign direct investment controls have also proliferated globally and targeted Chinese investments.

Antitrust assessment of semiconductor deals

The types of semiconductor devices at the centre of merger control reviews have been varied. Scrutiny may extend to any type of semiconductor product. The Chinese government has not assigned any particular semiconductor products that should warrant particular attention, although it has focused on developing China's memory chip production to compete on a global scale. At around the same time SAMR was reviewing the *SK hynix/Intel* deal, an investigation of suspected abuse of dominance against the world's largest memory chip producers, including US-based Micron Technology and the South Korean Samsung Electronics and SK hynix, was ongoing.[5]

4 See, eg, www.federalregister.gov/documents/2022/12/19/2022-27151/additions-and-revisions-to-the-entity-list-and-conforming-removal-from-the-unverified-list; www.bis.doc.gov/index.php/documents/pdfs/2447-huawei-entity-listing-faqs/file.

5 Ju-Min Park, 'China launches DRAM chip price probe into Samsung Elec, SK Hynix and Micron' (*Reuters*, 5 June 2018), see www.reuters.com/article/samsung-elec-china-idINKCN1J02EA.

In the last few years, the types of semiconductor devices and technologies that were subject to remedies included CO2 laser optics (*II-VI/Coherent*); central processing units (CPUs) and graphics processing units (GPUs) (*Xilinx/AMD; NVDIA/Mellanox*); eight-inch zone melting wafers (*Siltronic/Global Wafers*); flash memory chips (*SK hynix/Intel*); coherent digital signal processors (*Cisco/Acacia*); and automotive, industrial and consumer microcontrollers (*Infineon/Cypress*). The products of concern in other deals subject to in-depth review included semiconductor materials (*CMC Materials/Entegris*); semiconductor equipment (*MKS/Atotech*); fibre optic chips (*Marvell/Inphi*); and analogue integrated circuits (*ADI/ Maxim*).

Conglomerate and vertical mergers

Until 2017, almost all semiconductor deals that were subject to remedies in China involved horizontal concerns.[6] Since then, the large majority (around 80 per cent) involved conglomerate and vertical theories of harm.[7] Differentiated markets generally bode well for antitrust review globally but not necessarily in China. Transaction parties carefully craft their global deal rationale in a manner that frames the products of concern as complementary rather than overlapping in nature. This approach is skewed towards the enforcement practices of the United States and European Union, where non-horizontal mergers are perceived to be benign or create efficiencies. China has largely been suspicious of such impressions. If semiconductor chip technologies do not overlap, then the value and economic benefits of a deal are considered dubious unless there is supporting evidence that suggests otherwise. For that reason, transaction parties often find themselves explaining and contextualising statements about complementariness made in deal announcements, press releases and investor presentations at the request of SAMR's case teams.

SAMR has been sensitive towards potential foreclosure practices that would allow the merged entity to leverage a strong market position from one market into another by tying, bundling or through other exclusionary practices. The most direct way for such foreclosure to take place would be if the post-transaction entity simply refused to supply products on a standalone basis, or tied the products together by technical means, which SAMR has often addressed directly through behavioural remedies. The degradation of interoperability between the merged entity's products and those of competitors has also been an integral feature of

6 See *Seagate/Samsung* (2011); *Western Digital/Hitachi* (2012); *MediaTek/MStar* (2013); *NXP/ Freescale* (2015); *ASE/Siliconware* (2017).

7 See, *KLA/Orbotech* (2019); *II-VI/Finisar* (2019); *Infineon/Cypress* (2020); *NVIDIA/Mellanox* (2020); *Cisco/Acacia* (2021); *AMD/Xilinx* (2022); *II-VI/Coherent* (2022).

the conglomerate theory of harm. Semiconductor deals have been particularly susceptible to issues concerning interoperability given that many of the components are meant to fit together and function as part of a larger product. In *Xilinx/ AMD* (2022) and *NVIDIA/ Mellanox* (2020), the important technical capabilities of the merged entities would have allowed them to engage in foreclosure strategies to degrade essential interoperability of rival products compared to captive use. Remedies were imposed to maintain interoperability so that customers would not prefer the post-transaction entity's bundle of products as they work better together. This included 'flexibility and programmability' of products to ensure their development remains compatible with prevailing processors.[8]

Even where similar conglomerate concerns have been raised in other jurisdictions, SAMR has in some cases identified additional foreclosure practices that have been the subject of separate remedies. In *Broadcom/Brocade* (2017), SAMR and the European Commission were both concerned about the merged entity's ability and incentive to degrade interoperability of its fibre channel switches with competing fibre channel adapters to advantage its own adapters. In addition to these interoperability concerns, SAMR identified bundling risks associated with adapters and switches that had to be remedied by the merging parties – a concern not raised by the European Commission.

Foreclosure also features in vertically related semiconductor markets. SAMR has scrutinised potential input foreclosure arrangements from the perspective of the merged entity raising costs of downstream competitors by restricting their access to an important input. In *KLA/Orbotech* (2019), there were concerns about the merged entity's ability to refuse, limit or delay the supply of certain semiconductor equipment monitoring devices or services that competed with downstream suppliers of semiconductor manufacturing equipment needed, which could hinder the competitors' research and development progress. There were also concerns that downstream competitors could face higher prices, lower quality after-sales services and would be de-prioritised in their access to upstream technology, products and services.[9] Similar concerns were raised more recently in *Cisco/Acadia* (2021) and *II-VI/ Coherent* (2022).

In addition, conglomerate and vertical mergers have often required remedies to restrict access to third-party competitor information where the parties are active in different but related markets. In *NVIDIA/Mellanox* (2020), NVIDIA was active in supplying GPU accelerators while Mellanox was active in supplying certain network interconnection devices. GPU accelerators are meant to interoperate

8 See *Xilinx/AMD* (2022).

9 SAMR also raised conglomerate concerns, noting the risk that the post-transaction entity could bundle process control equipment and deposition and etching equipment, foreclosing competitors from the deposition and etching equipment market.

with network interconnection devices. Post-transaction, in the process of adapting third parties' products for interoperability, the merged entity would have access to sensitive information of other competing third parties and might gain an unfair competitive advantage, such as being able to better predict market trends and technology developments.[10]

Horizontal mergers

SAMR has also raised classic unilateral effects theories of harm when examining horizontal semiconductor mergers involving competing products. The typical concerns relate to loss of competition that could enhance market power to increase prices, reduce customer choice or lessen innovation. In *SK hynix/Intel* (2021), the combined market shares of the parties were less than 45 per cent globally but between 50–60 per cent in China. SAMR was concerned that the transaction would eliminate a close competitor for specific enterprise solid state drives (SSDs) and lead to integration of patents and technical know-how, which were remedied through a range of behavioural fixes.

There are no accepted market share thresholds to screen or indicate market concerns in China. Any overlap can give rise to concerns, although SAMR has typically been highly reliant on economic Herfindahl-Hirschman Index (HHI) and Delta measures to determine concentration levels in markets that might require closer inspection and possibly remedies. In *Siltronic/Global Wafers* (2022), there were concerns about 'market control' of the merged entity due to the combined shares of 55–60 per cent globally and 30–35 per cent in China in the market for eight-inch zone melting wafers. SAMR considered a divestment sufficient to remedy the concerns but Germany failed to provide foreign investment clearance in time, so the transaction was not closed in the end. SAMR has also challenged semiconductor deals below potentially concerning thresholds. In *ASE/Siliconware* (2017), SAMR imposed a hold-separate remedy despite combined market shares of only 25–30 per cent globally and in China. SAMR was concerned that the parties were close competitors and that customer switching was difficult.

Protecting security of supply

The security of supply of semiconductor technologies, materials and equipment has had real implications in recent reviews of semiconductor deals. Since 2019, all semiconductor deals that were conditionally cleared by SAMR involved guarantees to continue the supply of certain products in question or involved maintaining supply on existing or FRAND terms, typically for five to six years.

10 Other key cases include *KLA/Orbotech* (2019), *AMD/Xilinx* (2022) and *II-VI/Coherent* (2022).

Table 1: Semiconductor deals since 2019 required a security of supply guarantee

Semiconductor deal	Security of supply guarantees?	Duration
II-VI/Coherent (2022)	Y	Five years (automatic expiration)
AMD/Xilinx (2022)	Y	Six years (lifting subject to approval)
GlobalWafers/Siltronic (2022)	Y	Five years (lifting subject to approval)
SK hynix/Intel NAND (2021)	Y	Five years (lifting subject to approval)
Cisco/Acacia (2021)	Y	Five years (automatic expiration)
NVIDIA/Mellanox (2020)	Y	Six years (lifting subject to approval)
Infineon/Cypress (2022)	Y	Five years (automatic expiration)
II-VI/Finisar (2019)	Y	Three years (lifting subject to approval)
KLA/Orbotech (2019)	Y	Five years (automatic expiration)

The proposition that supply guarantees are capable of remedying competition concerns about vertical market foreclosure is credible enough. Supply assurances restrict the ability to refuse supply of inputs to downstream rivals. In *Cisco/Acacia* (2021), there were concerns that optical transmission manufacturers in China were heavily reliant on the supply of digital signal processors. If the merged entity restricted supply of these processors (or raised their prices that resulting in increased production costs), optical transmission manufacturers could suffer losses and be squeezed out. While the deal was cleared in all other notifiable jurisdictions without remedies, Acacia was forced to continue servicing existing contracts in China and to continue to supply customers 'in accordance with the principles of fairness, reasonableness and non-discrimination'.[11]

The necessity of supply guarantees outside the context of foreclosure is less straightforward. More recently, supply chain protections have evolved into issues that are not merger-specific and seemingly unrelated to competition.[12]

11 *CISCO/Acacia* (2021).

12 In *SK hynix/Intel* (2021) and *Siltronic/ GlobalWafers* (2022) for instance, supply guarantees and other behavioral remedies were imposed in the absence of any foreclosure concerns.

Ever-increasing and ever-changing export bans and restrictions (emerging primarily from the US) have created hyper-sensitive customers and suppliers of semiconductor technologies in China.[13] The anxiety is not unfounded. Chinese suppliers and customers fear that their ongoing supply could be displaced or withdrawn in the future if regulations expand; others may have been designated to the US Entity List and may lack access to the transaction parties' products. In 2022, US chip designer Marvell and US memory maker Micron significantly scaled down their operations in China.[14] Even if the transaction parties are based outside the US, their products may still fall within export controls if they contain US-original technologies. In any event, other governments have recently adopted export control measures similar to the US, which may expand scrutiny beyond the fixation on foreign semiconductor deals involving US-based acquirers.[15]

Transaction parties are therefore forced to engage in an assessment of their entire supply architecture to give comfort to stakeholders about supply continuity, which includes making difficult predictions and guarantees about supply if more stringent export control rules were to transpire in the future. In practice, there has been value in pointing to future growth plans, investments, and R&D efforts in China to demonstrate commitment to China's supply chains, which are increasingly reflected in deal remedies too (ie committing to promote cooperation with Chinese enterprises,[16] committing to expand production in China[17] or committing to facilitate market entry of local competitors[18]).

Feedback of customers, competitors and other industry stakeholders is therefore paramount – arguably more so in China than in other jurisdictions as SAMR will not unilaterally dismiss any concerns by stakeholders, leaving it to the merging parties to address all issues, including with market players directly. For semiconductor deals, the key stakeholder SAMR will consult is the Ministry of Industry and Information Technology (MIIT) – the regulator in China in charge of the semiconductor industry. MIIT plays a very important role in the

13 In particular, changes were made to the Export Administration Regulations (EAR) in October 2022 that created supply restrictions of semiconductor-related products and materials to China.

14 Josh Horwitz, 'U.S. chipmaker Marvell cutting some R&D roles in China – statement' (Reuters, 27 October 2022), see www.reuters.com/technology/us-chipmaker-marvell-cutting-some-rd-roles-china-statement-2022-10-27/; Yaling Jiang, Che Pan, Ann Cao, see 'US-China tech war: chip maker Micron to close DRAM design operations in Shanghai, move key engineers to US, India', (*South China Morning Post*, 26 January 2022), www.scmp.com/tech/tech-war/article/3164801/us-china-tech-war-chip-maker-micron-close-dram-design-operations.

15 In particular, the Japanese and Dutch governments have adopted measures to curtail exports to China of equipment used to produce advanced semiconductors (www.ft.com/content/768966d0-1082-4db4-b1bc-cca0c1982f9e).

16 See *Xilinx/AMD* (2022).

17 See *SK hynix/Intel* (2021).

18 See *SK hynix/Intel* (2021).

merger review of semiconductor deals, because SAMR needs to obtain a non-objection letter from MIIT to clear any transaction and because MIIT might itself consult with domestic players to provide feedback on a deal. Apart from MIIT, other important stakeholders that have direct influence over the direction of the review include Chinese customers and competitors that often voice their opinions centrally through relevant trade associations, particularly the China Semiconductor Industry Association (CSIA) and China Communications Industry Association (CCIA). In practice, early and active engagement with these industry associations helps move the review forward.

Concerns raised by stakeholders have the capacity to complicate and significantly delay the review process, particularly where issues are related to security of supply and not merger-specific. In *Lite-On Semi/ Diodes* (2020), SAMR initially reviewed the case under the simplified procedure (indicating that competition issues were unlikely), but subsequently reviewed the deal under the normal procedure due to complaints from Chinese industry players and other stakeholders in the semiconductor industry. The transaction was eventually cleared without conditions in September 2020, but deal timelines were delayed by almost a year.

Similar resistance from Chinese stakeholders helped derail the proposed *NVIDIA/ Arm* (2022) transaction, which was ultimately abandoned. China's chipmakers are highly reliant on Arm technology, as almost all of China's advanced chips are designed based on its architecture for processors. Stakeholders were concerned that access to the technology could be restricted if ownership shifted to US-based NVIDIA – or the 'possibility that Arm could be politicised as a US technology weapon against China's technology companies'.[19] Although the deal was eventually abandoned before SAMR reached any decision, there were strong signals that SAMR would have blocked the deal given the broad objections from Chinese industry.

Remedy talks

All semiconductor deals that have been subject to remedies in China were cleared unconditionally elsewhere. Despite this stark statistic, it is not uncommon for transaction parties to react with surprise that remedies might be required in China to address anticompetitive effects. Often, the issue is that other competition authorities have universally identified no competition issues (or, in some cases, also no overlapping markets) rather than the prospect of remedies. The notoriously long, often unpredictable review timeframes are another cause for concern for transaction parties, even where remedies are ultimately not required. Recent experience in *DuPont/*

19 Sam Shead, 'Nvidia's $40 billion Arm acquisition could be targeted by Chinese regulators, analysts say' (*CNBC*, 16 October 2020), see www.cnbc.com/2020/10/16/nvidias-arm-acquisition-could-be-targeted-by-chinese-regulators.html.

Rogers (2022), *NVIDIA/Arm* (2022), and *Applied Materials/Kokusai* (2021) shows that China's protracted review timelines need to be recorded in deal documentation, as termination fees and extensions are a real possibility.

Behavioural remedies and policy choices

Standalone behavioural commitments remain the preferred instrument in the implementation of merger control in China. Structural remedies such as divestitures are quite rare. To date, all conditional clearances in the semiconductor sector have involved behavioural commitments save for one.[20] This includes commitments to ensure continuous supply (including on FRAND terms),[21] maintain interoperability,[22] and/or prohibit bundling and tying practices.[23] Other remedies might include promises to continue developing semiconductor products or maintaining their flexibility and programmability.[24]

The justifications for behavioural remedies are understandable, even practical, despite the resistance to adopt conduct measures in the US and Europe. First, the goal of China's AML is to protect the market economy which differs slightly from popular discourse that antitrust law should protect competition, not competitors. Most of the remedies imposed in recent semiconductor deals are designed to protect security of supply to customers, which may extend to promoting local competitors to safeguard alternative supply chains in China. This broad goal was on full display in the first-ever commitment in *SK hynix/Intel* (2021) to facilitate entry of a third-party competitor among other frequently used conditions such as promises of future supply to customers.[25]

Second, behavioural remedies have a temporal element to them that is less interventionist. Divestments cause permanent changes in market structures, whereas behavioural conditions are more adjustable to prevailing market conditions and can be lifted if they are no longer warranted. SAMR has been concerned that structural fixes could cause 'disproportionate damage to the interests of the notifying party' and, in any case, should only be applied in horizontal mergers.[26]

20 A divesture was required in *NXP/Freescale* (2015) (http://english.mofcom.gov.cn/article/policyrelease/announcement/201512/20151201203768.shtml).

21 Key cases include *KLA/Orbotech* (2019); *II-VI/Finisar* (2019); *Infineon/Cypress* (2020); *Nvidia/Mellanox* (2020); *Cisco/Acacia* (2021); *SK Hynix/Intel* (2021); *AMD/Xilinx* (2022) and *II-VI/Coherent* (2022).

22 Key cases include *Infineon/Cypress* (2020); *Nvidia/Mellanox* (2020) and *AMD/Xilinx* (2022).

23 Key cases include *KLA/Orbotech* (2019); *Infineon/Cypress* (2020); *Nvidia/Mellanox* (2020); *Cisco/Acacia* (2021); *SK Hynix/Intel* (2021); and *AMD/Xilinx* (2022).

24 See *AMD/ Xilinx* (2022).

25 Specifically, SK hynix was required to facilitate entry into the two relevant markets: (1) peripheral component interconnect express(PCIe), enterprise solid-state drives (SSDs); and (2) serial advanced technology attachment (SATA) enterprise SSDs.

26 Charles McConnell, 'Top Chinese official defends use of behavioural remedies' (*Global Competition Review*, 7 July 2021), see https://globalcompetitionreview.com/article/top-chinese-official-defends-use-of-behavioural-remedies.

China's solution to this conundrum has been to create a semi-behavioural remedy in the form of a hold-separate commitment. The remedy – which is unique to China and has not been a feature of other major competition law jurisdictions – is often applied in horizontal mergers and generally requires the merging parties to keep all or a portion of their businesses independent post-merger until the condition is lifted. In *II-VI/ Finisar* (2019), the merging parties promised to continue competing in the market for wavelength selector switches and to keep their management, finance, personnel, pricing, research and development, production, sales and purchases separate. Where a standalone China-specific business cannot be carved out for the purposes of a hold-separate, a broader hold-separate may need to be implemented. In *ASE/Siliconware* (2017), the merging parties were required to hold separate their overlapping semiconductor assembly and testing services business for a period of two years. The order applied to both parties' global businesses as a whole instead of being limited to any China-facing elements, which meant that closer integration was not possible until the order was lifted in 2020.[27]

Timelines and procedural aspects

Remedy negotiations and procedures in China are fairly dynamic. There are no timing constraints for parties to propose remedies and alignment on their scope will be heavily influenced by market participants. This explains the long and unpredictable review timeframes. China was the final antitrust hurdle in all semiconductor deals that have been the subject of remedies since 2019. In the last two years, the average review time of semiconductor remedy cases averaged around 13 months. Pre-case acceptance periods are also longer and now typically take 12 weeks, compared to eight weeks a few years ago.

The reviews of big and complex semiconductor deals have also required transaction parties to 'pull-and-refile' their merger notifications if remedy discussions have not yet concluded by the end the maximum 180-day statutory review period at Phase III. Timing is expected to become more certain following the introduction of 'stop the clock' measures in merger reviews due to recent amendments to the AML. So far, there have been no signs that these new mechanisms will reduce overall timelines as SAMR retains a broad discretion to suspend timelines indeterminately.

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27 'PRC's Anti-Monopoly Bureau Lifts Restrictive Conditions On ASE and SPIL for Forming Holding Company' (ASE Technology Holding Co, 26 March 2020), see www.aseglobal.com/press-room/amb_lift_restrictive-conditions/.

Table 2: Review timelines of conditional clearances of semiconductor deals since 2019

Semiconductor deal	Pre-case acceptance	Review timeframes	Pull and refile?	Global comparison
II-VI/Coherent (2022)	12.5 weeks	12 months	Y	Cleared in three other jurisdictions incl. US and Germany
AMD/Xilinx (2022)	11 weeks	12 months	Y	Cleared in seven other jurisdictions incl. US, EU, UK
GlobalWafers/ Siltronic (2022)	13 weeks	13 months	Y	Cleared in seven other jurisdictions incl. EU, UK
SK hynix /Intel NAND (2021)	13 weeks	12 months	Y	Cleared in seven other jurisdictions incl. South Korea, EU, UK
Cisco/Acacia (2021)	8 weeks	15 months	Y	Cleared in three other jurisdictions incl. US, Germany, Austria
NVIDIA/Mellanox (2020)	16 weeks	12 months	Y	Cleared in four other jurisdictions incl. US, EU, Israel, Mexico
Infineon/Cypress (2022)	9 weeks	8 months	N	Cleared in seven other jurisdictions incl. US, EU, Japan, Taiwan
II-VI/Finisar (2019)	7 weeks	8.5 months	Y	Cleared in four other jurisdictions incl. US, Germany, Mexico
KLA/Orbotech (2019)	8.5 weeks	9.5 months	Y	Cleared in seven other jurisdictions incl. US, Germany, Japan

Source: Fangda research. Pre-notification and review timeframes are estimates based on deal announcements and other public information.

Prolonged review timeframes are not limited to conditional clearances. A number of semiconductor deals with no apparent competition issues have been subject to several months of review (including 'pull-and-refile' situations) because of objections raised by industry players. The estimated review timeframes in *ADI/ Maxim* (2021), *Lumentum/Neotphotonics* (2021) and *MKS/ Atotech* (2022) exceeded eight months despite involving no remedies.[28] Other big deals cleared more quickly

28 Based on Fangda research. Review timeframes are estimates based on deal announcements and other public information.

within five to six months (ie *Entergris/CMC Materials* (2021), *Renesas/Dialog* (2021) and *Marvell/ Inphi* (2021)).

This is not to say that remedies were not a consideration in the review of these decisions. If security of supply remains the core concern of stakeholders but is unsustainable as an antitrust issue, SAMR has been increasingly open to transaction parties entering into 'soft commitments' directly with market players to guarantee supply continuity. These solutions are often brokered as the review is on foot and, if successful, the transaction is cleared without conditions on the record (and therefore without any continuous monitoring).

Conclusion

A common misconception is that merger control in China is interventionist and arbitrary. Reviews of semiconductor deals are often cited to support this view. Yet a deeper look into the analytical frameworks and review mechanics reveals that SAMR's policy philosophy is consistently applied and robustly defended in the antitrust enforcement of semiconductor transactions in the face of increasing regulatory pressure against China's supply chains of semiconductor products. It also appears that the pendulum is slowly swinging to the opposite direction elsewhere as the US and European antitrust regulators take conglomerate theories of harm and behavioural remedies more seriously. Maybe China was right after all.