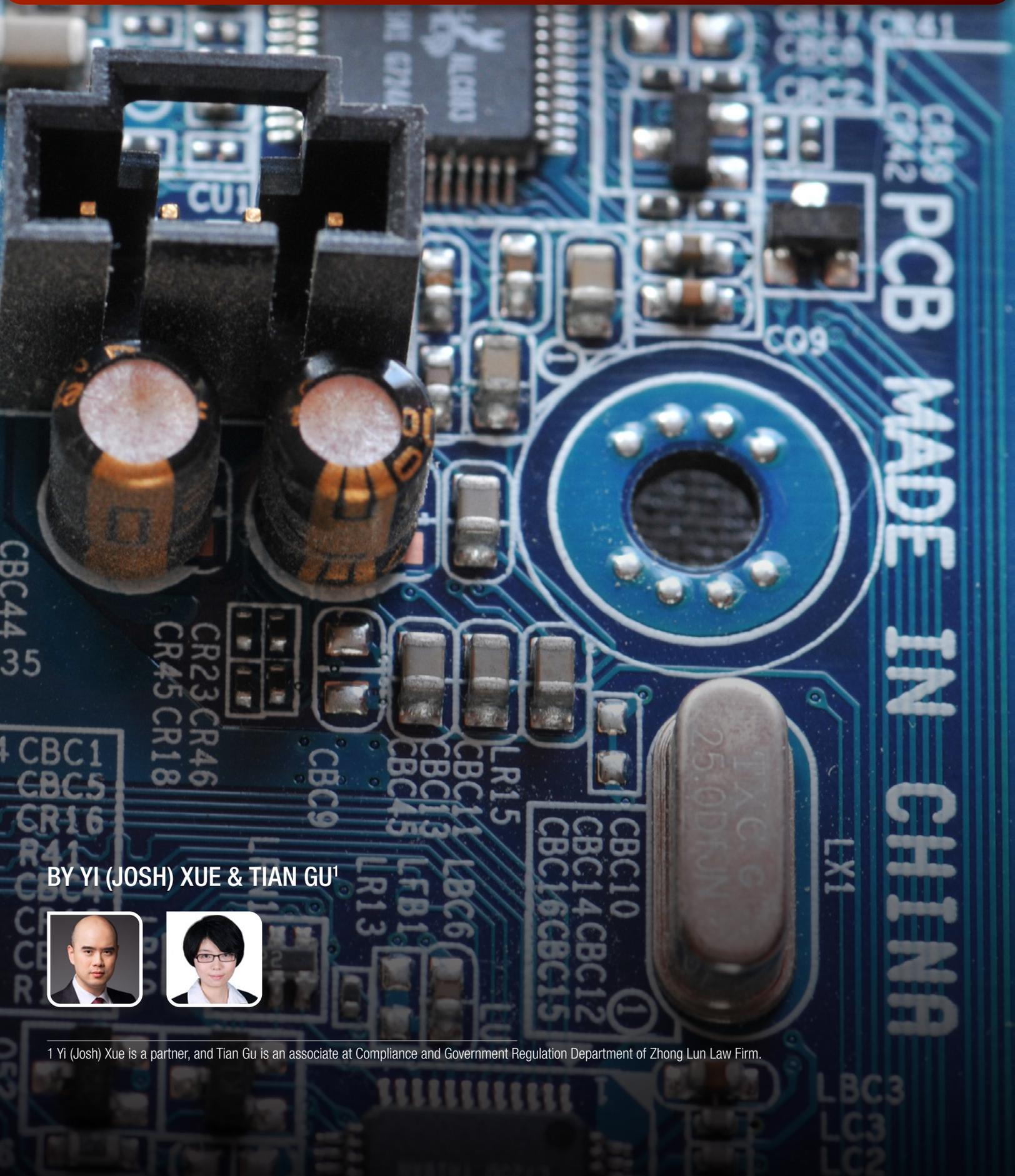


CHINA: TOUGHER MERGER CONTROL ENFORCEMENT IN THE SEMICONDUCTOR INDUSTRY?



BY YI (JOSH) XUE & TIAN GU¹



¹ Yi (Josh) Xue is a partner, and Tian Gu is an associate at Compliance and Government Regulation Department of Zhong Lun Law Firm.

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China: Tougher Merger Control Enforcement in the Semiconductor Industry?

By Yi (Josh) Xue & Tian Gu

The COVID-19 pandemic did not slow down M&A in the semiconductor industry. To the contrary, 2020 saw semiconductor M&A deals reaching an all-time high of \$118 billion in terms of total deal value. Undoubtedly, the big news for 2021 will be which of those deals will be approved. It is commonly believed that one of the biggest challenges may come from China. This article provides an overview of how Chinese competition enforcers have applied merger control rules in the semiconductor sector. It also analyzes the major challenges faced by enterprises in the semiconductor industry in merger control and strategies to solve these challenges.

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I. INTRODUCTION

The COVID-19 pandemic did not slow M&A in the semiconductor industry. On the contrary, 2020 saw semiconductor M&A deals setting an all-time high of \$118 billion in terms of total deal value. According to a report by IC Insights,² a semiconductor market research firm, the five mega-deals announced in the second half of the last year had a combined value of \$94 billion, accounting for about 80 percent of the total for the entire year. Among these M&A transactions, NVIDIA's \$40 billion acquisition of processor-design technology supplier ARM from Softbank is the most watched deal. Other high-profile deals also include AMD's all-stock deal worth \$35 billion to buy Xilinx, Intel's sale of its NAND flash memory business and 300mm wafer fabrication plant for producing microchips in China to SK Hynix for \$9 billion, ADI's acquisition of Maxim for \$21 billion, and Marvell Technology's acquisition of Inphi³ for \$10 billion.

The wave of industry consolidation in 2020 was driven by the integrated circuit ("IC") giants' strategy to build their future competitiveness in emerging and high-growth market segments, such as embedded machine-learning and AI, automatic driving, data centers and the Internet of Things. Accordingly, the M&As are mainly characterized by strong alliance or complementary advantages between leading companies in each segment. However, those transactions are far from the final landing—the last but also the most critical and difficult hurdle will be obtaining the applicable antitrust approval(s). Undoubtedly, the big news for 2021 should be which of those deals will be approved?

From the perspective of competition concerns that may be caused by the transactions, NVIDIA's intended acquisition of ARM, which would be the biggest deal in the semiconductor industry if completed, seems to be most problematic.⁴ According to public information, NVIDIA's deal is subject to antitrust clearance from competition authorities of UK, EU, U.S. and China. It is commonly believed that one of the biggest challenges may come from China. Some voices even indicate that it is unlikely that China will approve the transaction. Why is China? What factors make the antitrust review process of cases involving semiconductor industry in China more complicated?

In recent years, U.S. companies have always maintained the highest share of M&A in the semiconductor industry. Japanese and Korean companies are also revitalizing their semiconductor industry through M&As. However, for reasons known to all, Chinese semiconductor enterprises are difficult to participate in overseas M&As, also struggling to acquire supplies and expand the business landscape. It takes little imagination to foresee the impact on China's semiconductor industry once these industry giants build a diversified chip industry chain and then enter the Chinese market with competitive product portfolios. In this sense, this round of consolidation in the semiconductor industry do have special competition concerns for the Chinese market, and tougher merger control enforcement in the semiconductor industry seems on the horizon.

This article provides an overview of how Chinese competition authority have enforced merger control rules in the semiconductor sector. It also analyzes the major challenges faced by enterprises in the semiconductor industry in the merger control enforcement and the strategies to solve these challenges.

² Available at <https://www.icinsights.com/news/bulletins/Value-Of-Semiconductor-Industry-MA-Agreements-Sets-Record-In-2020/>.

³ A high-speed interconnect and mixed-signal integrated circuit supplier.

⁴ It is reported that the *AMD/Xilinx* deal also caused some concerns among the industry insiders.

II. OVERVIEW OF MERGER CASES IN THE SEMICONDUCTOR INDUSTRY

The semiconductor industry is worth a huge value and critical to many of the products that we use most in our daily lives. Countries therefore tend to give strategic significance to the semiconductor industry. Accordingly, any monopoly in this industry will not be only detrimental to consumer welfare in a common meaning but also to a country's overall economic benefit. It is notable that the review standards specified by the Anti-Monopoly Law of China (the "AML") include not only competition-related factors of a transaction, but also public interests and the impact on the development of the national economy,⁵ which explains semiconductor mergers being continuously under strict antitrust scrutiny in China.

A. Overview of Remedy Cases in the Semiconductor Industry

Since the AML came into force, China's merger control enforcement authority, SAMR (and formerly MOFCOM), have announced 48 conditional clearances up to the end of 2020, out of which ten cases involve the semiconductor industry, higher than the number of remedy cases in other industries.

Year	Remedy Cases	Total Remedy Cases	Percentage
2020	<ul style="list-style-type: none">Infineon/CypressNvidia/ Mellanox	4	50%
2019	<ul style="list-style-type: none">II-VI/FinisarKLA-Tencor/Orbotech	5	40%
2017	<ul style="list-style-type: none">Ase Semiconductor/Siliconware Broadcom/Brocade	7	29%
2015	<ul style="list-style-type: none">NXP/Freescale	2	50%
2013	<ul style="list-style-type: none">Media Tek/MStar	4	25%
2012	<ul style="list-style-type: none">Western Digital	6	17%
2011	<ul style="list-style-type: none">Seagate /Samsung's HDD Business	4	25%

The above table shows that in recent ten years remedy cases in the semiconductor industry account for a relatively high share of the total remedy cases in each year. Notably, the big deals in the semiconductor industry that have been challenged due to competition concerns identified in the merger review process are in fact more than those listed in the above table. In 2018, the famous *Qualcomm/NXP* deal collapsed for failing to secure the approval of Chinese antitrust authority. In 2016, another two high-profile merger deals, the *Applied Materials/Tokyo Electron* deal and the *Lam Research/KLA-Tencor* deal were dropped by the merging parties for the same reason.

B. Observations on Procedural Aspects of Remedy Cases

1. The Time Frame

Under the AML, in general, the maximum statutory review period for the notification of a transaction can be as long as 180 days after SAMR formally accepts the case.⁶ However, SAMR can in practice take a longer time than 180 days by requiring the notifying party to withdraw and re-file the notification, where SAMR is running out of the time to complete its review owing to complex remedy negotiations.

⁵ SAMR considers the following factors as provided in Article 27 of the AML: (1) market shares and controlling power of the relevant market of undertakings to concentration; (2) degree of concentration of relevant market; (3) impact of the concentration of undertakings on market entry and technical progress; (4) impact of the concentration of undertakings on consumers and other relevant undertakings; (5) impact of the concentration of undertakings on the national economy; and (6) other factors which have an impact on market competition and that the anti-monopoly enforcement agency designated by the State Council deems should be considered.

⁶ The clock for review will not start to run until SAMR declares the materials and information submitted by the merger parties are complete.

Remedy cases in the semiconductor industry even saw longer time frame than the average. Among all 48 remedy cases, 21 cases experienced the withdraw-and-refile process and seven of them involve semiconductor industry. The average review period⁷ for the conditionally approved cases is 259 days while the number for cases involving the semiconductor industry is 303 days, indicating that cases involving the semiconductor industry may cause more significant competition concerns and thus need a more complicated remedy negotiation.

Cases	Withdraw-and-Refile	Time Frame
Nvidia/ Mellanox (2020)	Yes	358 days
Infineon/Cypress (2020)	No	238 days
II-VI/Finisar (2019)	Yes	263 days
KLA-Tencor/Orbotech (2019)	Yes	301 days
Ase Semiconductor/Siliconware (2017)	Yes	456 days
Broadcom/Brocade (2017)	No	221 days
NXP/Freescale (2015)	Yes	236 days
Media Tek/MStar (2013)	Yes	416 days
Western Digital/Hitachi Storage (2012)	Yes	335 days
Seagate/Samsung's HDD Business (2011)	No	207 days

2. Solicitation of Stakeholders' Opinions

As explained above, SAMR also evaluates the impact of a transaction on public interests and the development of the national economy, and therefore SAMR takes into account and gives weight to the feedback it receives from the key stakeholders in its consultation process. Moreover, opinions solicited from the stakeholders also play an important role in assessing the proposed remedy proposal. If the feedback is positive from all stakeholders, SAMR will clear the transaction with the proposed remedies imposed.

SAMR usually solicits opinions from government agencies regulating the industry involved, trade associations, key suppliers and customers, competitors and sometimes industry experts.⁸ It is particularly important to solicit the opinions of stakeholders in the merger case involving sensitive sectors such as the semiconductor industry when identifying competition concerns and assessing the effectiveness of the proposed remedies.

In reviewing merger cases in the semiconductor industry, SAMR usually seeks opinions from the Ministry of Industry and Information Technology ("MIIT"), the Ministry of Science and Technology ("MST") and the National Development and Reform Commission ("NDRC"). The most influential trade association is China Semiconductor Industry Association("CSIA").

3. Engagement of Independent Third-Party Consulting Agencies

Based on our review of the decisions of the cases approved with conditions, the authority mentioned in ten decisions that it engaged independent third-party consulting agency to conduct an economic analysis on the competition issues of the case. Overall, it is not a very high proportion against the total 48 remedy cases. However, it is notable that four semiconductor cases involve engagement of independent third-party consulting agency, including Media Tek/MStar, Ase Semiconductor/Siliconware Precision Industry, II-VI/Finisar, and Nvidia/Mellanox, maintaining a high presence among cases in other industries.

The economic analysis conducted by the third-party consulting agency plays an important role in identifying and quantifying the harm to the competition. For instance, in the *Ase Semiconductor/Siliconware Precision Industry* deal, a horizontal merger, the economic analysis shows that the profit margins of Ase Semiconductor and silicon Precision Industry to Chinese customers are relatively close, and the correlation coeffi-

⁷ From the date of submission.

⁸ In *NXP/Freescale*, MOFCOM solicited for opinions from industry experts additionally.

cient of profit margins in China is 0.72 (1 is exactly the same), together with a strong correlation between the profit margins of both sides over time, indicating that they are close competitors in the Chinese market. Based on such observation, MOFCOM concluded that the concentration would eliminate the close competition between the merging parties and thus will cause damage to Chinese market even though the relevant geographical market should be defined as global. In the *II-VI/Finisar* case, SAMR concluded that there is fierce price competition between the merging parties in the relevant market based on the economic analysis on the relevant bidding data which indicate that with II-VI to participate in the bidding, Finisar's willingness to cut prices has increased significantly. Furthermore, as with the practice of the competition authority in other antitrust jurisdiction, in non-horizontal mergers, the economic analysis could also serve as a useful tool, for example to identify the intent of the merged firm to exercise foreclosure behaviors.

C. Observations on Theories of Harm Applied in Remedy Cases

1. Competitive Concerns Identified in the Remedy Cases

Theories of Harm, which can generally be divided into unilateral effects and coordinated effects, provide an analytical framework to assess whether and if so, how a merger would eliminate or restrict the effective competition in the relevant market. However, the specific competition concerns that may be caused by a horizontal merger are usually different from those of a non-horizontal merger. The below table summarizes the competitive concerns underlying the SAMR/MOFCOM's enforcement decisions involving the semiconductor industry.

Cases	Business Relationship of Merging Parties	Competitive Concerns
Nvidia/Mellanox (2020)	Vertical/Neighboring	Tying and bundling sale, refusal to deal, degradation of interoperability and gaining access to competitively sensitive information of its rivals to seek unfair competitive advantage
Infineon/Cypress (2020)	Horizontal/Neighboring	Tying and bundling sale, refusal to deal, degradation of interoperability, and developing the all-in-one product and ceasing to sell each complementary product separately
I-VI/Finisar (2019)	Horizontal/Vertical/Neighboring	Significantly increasing market concentration, eliminating close competition between the merging parties, and coordinated conducts
KLA-Tencor/Orbotech (2019)	Vertical/Neighboring	Vertical foreclosure, tying and bundling sale and gaining access to competitively sensitive information of its downstream rivals
Ase Semiconductor/Siliconware (2017)	Horizontal	Reducing customer's alternative choice of suppliers; eliminating close competition between the merging parties and enhancing the ability of differential pricing
Broadcom/Brocade (2017)	Vertical/Neighboring	Tying and bundling sale, degradation of interoperability and gaining access to competitively sensitive information of its rivals to seek unfair competitive advantage
NXP/Freescale (2015)	Horizontal	Enhancing market control; eliminating close competition between the merging parties; reducing customer's alternative choice of suppliers; loss of innovation
Media Tek/MStar (2013)	Horizontal	Eliminating the major competitor; making the buyer gain market dominance and significantly change the market structure; restricting the customers' choices

Western Digital/Hitachi Storage (2012)	Horizontal	Reducing an important competitor and weakens the competitive pressure of the remaining competitors in the relevant market; enhancing the possibility for both parties to slow down the speed of innovation; increasing the possibility of market competitors to engage in collusive behaviours through coordination
Seagate /Samsung's HDD Business (2011)	Horizontal	Reducing an important competitor and weakens the competitive pressure of the remaining competitors in the relevant market; increasing the possibility of market competitors to engage in collusive behaviours through coordination

2. Competitive Concerns Identified by SAMR/MOFCOM in Horizontal Mergers

In reviewing of horizontal mergers, SAMR/MOFCOM basically used the similar theories of harm to assess both unilateral effects and coordinated effects of a merger as with its counterparts in other antitrust jurisdictions.

With regard to unilateral effects, the competitive concerns with high frequency are elimination of close competition between the merging parties; reduction of alternative choices for customers resulting in a higher procurement risk; and loss of innovation. The market structure has always been an important factor in assessing whether the merged firm has the ability to engage in anti-competitive practices. Another key indicator to evaluate the unilateral effect is the extent of close competition between the merging parties. As noted above, SAMR/MOFCO may use various economic tools to test if the merging parties closely compete with each other.

Coordinated effects are not commonly discussed in the enforcement decisions. Among seven cases involving horizontal overlaps, only the recent case of *II-VI/Finisar*, and two much more earlier cases of *Western Digital/Hitachi Storage* and *Seagate /Samsung's HDD Business* mentioned that the merger might lead to collusive practices. To our observation, the relevant markets in those cases show clear signs of vulnerability to coordinated conduct such as oligopoly structure, high degree of market transparency and lack of buyer's countervailing power.

3. Competitive Concerns Identified by SAMR/MOFCOM in Non-Horizontal Mergers

In line with the general trend of industry integration, most remedy cases in the semiconductor industry in recent years are non-horizontal mergers. In our view, the recent cases, on the one hand, reflect the latest development of the enforcement practices in assessing competition impact of non-horizontal mergers in major antitrust jurisdictions, and on the other hand show certain special competition concerns of Chinese competition authority.

In the remedy cases involving vertical or complementary integration, competitive concerns typically identified in the unilateral effect analysis include vertical foreclosure, degradation of interoperability, and gaining access to competitively sensitive information of upstream or downstream rivals. These competitive concerns are also highlighted in the relevant vertical merger guidelines in U.S. and EU.

In addition to the common theories of harm also shared by other jurisdictions, Chinese competition authority tends to assume that the merged firm would leverage its market dominance in one market to gain unfair competitive advantages in another neighboring market by abusive behaviors of tying and bundling. SAMR/MOFCOM raised this concern in all the remedy cases in a vertical or neighboring nature in the semiconductor industry. It is reasonable to infer that the concern of potential abusive behaviors may come from the feedback it receives from the key stakeholders in its consultation process. With a view to prevent the abusive behaviors in advance, identifying such competition concern helps to impose concrete behavioral remedies such as "no tying and bundling" commitment. An antitrust investigation against abusing dominance conducts can be much more challenging for the competition authority as tying and bundling sale is not an illegal *per se* conduct, even for dominant enterprises.

D. Observations on Remedies Imposed on Conditionally Approved Transactions

As noted above, it is widely recognized that the Chinese competition authority appears to have a stronger preference for behavioral remedies than any other competition authority. Remedy cases in the semiconductor industry reflect such preference in a more obvious way. Among the ten semiconductor related remedy cases, nine cases, including both horizontal and non-horizontal mergers involve behavioral remedies. The only one case that was imposed a structural remedy of business divestiture is *NXP/Freescale* deal. The behavioral remedies imposed in semiconductor cases above mainly include commitments:

Commitment	Cases
Hold separate (some argue that this is a quasi-structural remedy)	II-VI/Finisar Ase Semiconductor/Siliconware Media Tek/MStar Western Digital/Hitachi Storage Seagate /Samsung's HDD Business
No tying or bundling, or any other abusive conducts	Nvidia/ Mellanox Infineon/Cypress KLA-Tencor/Orbotech Broadcom/Brocade
Comply with the FRAND principles	Nvidia/ Mellanox Infineon/Cypress KLA-Tencor/Orbotech
Maintain interoperability/ compatibility/open-source commitment	Nvidia/ Mellanox Infineon/Cypress Broadcom/Brocade
Take protective measures on information accessed from upstream/downstream rivals	Nvidia/ Mellanox KLA-Tencor/Orbotech Broadcom/Brocade

III. MERGER CONTROL ENFORCEMENT TRENDS AND TAKEAWAYS FOR ENTERPRISES

By observing those conditional clearances, one can reach conclusions about the general trends in merger remedy cases in the semiconductor industry in China. The enterprises in this industry considering M&A deals should get well prepared for the challenges that may encounter in the merger review process.

First, it is reasonable to foresee tougher merger control enforcement in the semiconductor industry due to its strategic sensitivity to the national economy. However, it does not mean that SAMR will necessarily give higher weight to industrial policy than competition policy when reviewing transactions in the semiconductor industry. A more reasonable interpretation is that the competition authority tends to pay a close attention to the potential competitive concerns that the proposed transaction may bring about to the Chinese market even though the relevant geographical market for semiconductor-related products should normally be defined as global. Therefore, the special competition environment faced by the enterprises operated in China's semiconductor industry chain, for instance, U.S. export restrictions and foreign investment restrictions driven by national security concerns, high dependence on foreign suppliers of domestic downstream customers, should be considered with prudence.

Second, SAMR is paying more attention to non-horizontal deals today and thus the merging parties should get prepared and expect more rigorous antitrust review of deals especially those involving significant vertical or neighboring relationships and thus it is important for the parties to make strategies for proactively addressing the competition concerns that SAMR may raise.

Third, SAMR is actively coordinating with other competition authorities with regard to the scope of remedies when reviewing global deals. However, it is not uncommon for SAMR to impose remedies out of the scope of the remedy packages imposed by other antitrust authorities to cope with the competitive concerns specific to Chinese markets. Notably, the commitment of “no tying or bundling” or any other abusive conducts has become increasingly common in the high-profile mergers involving complementary product portfolios. The logic behind such remedy measure is to prevent abusive behaviors that might occur after the merger, and to a certain extent, it also reflects the consistent style of Chinese law enforcers that attach importance to proactive regulation and supervision.

Fourth, statistics show that the time taken for SAMR to review semiconductor-related cases are relatively longer. Parties to a transaction with competition concerns should therefore be prepared for a degree of uncertainty when it comes to the merger review time frames in China. The rights and obligations related to obtaining antitrust approval under the transaction agreement should be designed with care. Furthermore, it is highly recommended that the parties to the transaction to identify the potential competition concerns, to build the defending strategy under the assistant of antitrust counsel and economic consulting firm, and to plan the proposal for remedies at early stage.



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