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Article

Convergence or divergence: how does China analyse innovation concerns in merger review?

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ABSTRACT

There have been few systematic studies of how the Chinese merger review agencies have analysed innovation-related issues, including the theories of harm, the frequency of challenges and the types of remedies. Since China's Anti-Monopoly Law (AML) took effect in August 2008, China's merger review agencies have imposed remedies in 48 transactions and blocked two transactions. The authors have found that innovation concerns were addressed in 17 transactions where there were remedies. The innovation concerns generally focused on two broad theories of harm: (i) the transaction would reduce the combined firm's incentive to innovate by eliminating an existing or potential competitor, or (ii) the transaction would create incentives for the combined firm to hinder innovation by rivals (eg via a refusal to license the relevant technology to rivals). The Chinese merger review agencies have raised innovation concerns in transactions that were unconditionally approved by the EU or US agencies, and have sometimes unconditionally approved transactions where the EU or US agencies identified innovation as a concern. In addition, the Chinese agencies have utilized both structural and behavioural remedies to resolve innovation concerns, whereas the EU and US agencies have preferred structural remedies.

KEYWORDS: mergers, innovation concerns, China, conditional approval, remedies
JEL CLASSIFICATIONS: L40, L41, L50

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I. INTRODUCTION

It is sometimes claimed that Chinese antitrust agencies find innovation concerns in mergers where the US and EU antitrust agencies do not; that they impose remedies for these innovation concerns where the US and EU agencies do not; and that they have a strong preference for behavioural remedies to address innovation concerns in contrast to the US and EU agencies' strong preference for structural remedies.[1] This article is based on a comprehensive analysis of the 48 merger remedy decisions (as well as the decisions on two blocked mergers) published by the Chinese antitrust agencies since China's AML took effect in August 2008 through August 2020 when this article was drafted. The analysis shows that the differences and similarities in the approaches adopted by the Chinese, US and EU agencies are more complex than is sometimes understood.

The importance of innovation has long been widely recognized by antitrust agencies in the US and EU, particularly in the context of merger reviews. In the US, then Department of Justice (DoJ) Assistant Attorney General for Antitrust Makan Delrahim and Federal Trade Commission (FTC) Chairman Joseph Simons, for example, like several of their predecessors, spoke about challenging mergers that presented risks to innovation.[2] Similarly, officials in the European Commission (EC) view innovation analysis as an important part of the EC's merger control practice, and have explained that innovation competition is particularly at risk in transactions involving close competitors and important innovators in 'concentrated industries with high barriers to entry and well-paced innovation processes'.[3]

As early as 1992 in *DuPont/ICI*, the EC considered innovation as one of the 'driving forces' of the market at issue in that transaction.[4] In the past five years alone, the EC has investigated innovation concerns in at least 11 transactions. The EC's economists have published articles articulating the so-called 'innovation theory of harm',[5] and such theories have been applied in a number of high-profile merger

1 See, eg Davis Polk, 'China Antitrust Review 2017' <https://www.davispolk.com/sites/default/files/2018-01-31_china_antitrust_review_2017.pdf>.

2 Makan Delrahim, '"As Time Goes By" Protecting the Future of Innovation Through Effective Antitrust Enforcement' (Speech at the ABA's 2019 Antitrust Fall Forum, 18 November 2019) <https://www.justice.gov/opa/speech/assistant-attorney-general-makan-delrahim-delivers-remarks-abas-2019-antitrust-fall-forum>; Joseph J. Simons and others, 'Statement of Chairman Joseph J. Simons, Commissioner Noah Joshua Phillips, and Commissioner Christine S. Wilson Concerning the Proposed Acquisition of Allergan plc by AbbVie Inc.' [2020] fn 13 <https://www.ftc.gov/system/files/documents/public_statements/1574619/abbvie-allergan_majority_statement_5-5-20.pdf>; US FTC, 'Online Platforms and Market Power, Part 4: Perspectives of the Antitrust Agencies' [2019] <https://www.ftc.gov/system/files/documents/public_statements/1553856/p180101_house_competition_oversight_testimony_-_platforms_part_4_11-13-2019.pdf>. The DoJ and FTC are referred to collectively as the US antitrust agencies in this article.

3 See, eg Carles Esteva Mosso, 'Innovation in EU Merger Control' (Speech at the ABA Section of Antitrust Law Spring Meeting, 12 April 2018) <https://ec.europa.eu/competition/speeches/text/sp2018_05_en.pdf>. Esteva Mossa stressed that the EC's decisions had 'not been based on any presumptions regarding innovation effects but relied on meticulous, fact-based analysis'.

4 *DuPont/ICI* (Case No IV/M214) Commission Decision 93/9/EEC [1992] OJ L7/13.

5 See, eg Giulio Federico and others, 'Horizontal Mergers and Product Innovation' (2018) 59 International Journal of Industrial Organization 1–23; Giulio Federico and others, 'A Simple Model of Mergers and Innovation' (2017) 157 Economics Letters, 136–40.

investigations, including *Dow/Dupont (2017)*[6] and *Bayer/Monsanto (2018)*.[7] Some have viewed this as signifying key changes in the tools used by the EC to assess harm to innovation and signalling a more aggressive approach to evaluating mergers in sectors where innovation is important.[8]

The US antitrust agencies also have a long tradition of taking action to prevent harm to innovation. According to then FTC Commissioner J. Thomas Rosch, 'the first significant challenge to a merger on a theory that the consolidation would harm competition in an innovation market' occurred in the 1970s in relation to the merger of *Xerox and Rank-Xerox (1997)*.[9] The US antitrust agencies have intensified their efforts to scrutinize and challenge transactions on the basis of innovation concerns in recent years.[10] The US antitrust agencies also now pay close attention to the impact on innovation by so-called 'killer acquisitions', in which a firm may acquire another smaller disruptive firm with a view to terminating or suspending innovative activity or the development of a product perceived to be a competitive threat to the acquiring firm.[11] For example, in *Sabre/Farelogix*, the DoJ alleged in its complaint filed in August 2019 that the acquisition would allow Sabre, the largest airline booking services provider in the US, to eliminate a disruptive technology innovator in the travel industry, and would likely result in higher prices, lower quality, and less innovation for booking services.[12]

While there has been abundant debate and analysis of antitrust enforcement involving innovation issues in merger reviews in the EU and US, few systematic studies to date have focused on how the Chinese merger agencies analyse innovation-related concerns in their merger reviews.[13] This is particularly noteworthy because China is a major jurisdiction for cross-border transactions. China's anti-monopoly legislation explicitly identifies innovation as a dimension in China's merger review, and the Chinese merger agencies have imposed remedies in a substantial number of mergers, at least in part, to resolve innovation concerns.

6 *Dow/DuPont* (Case M.7932) Commission Decision [2017].

7 *Bayer/Monsanto* (Case M.8084) Commission Decision [2018].

8 See eg Fiona Carlin and others, 'EU Merger Control: The Dow/DuPont Theory of Innovation Harm' (2017) <http://awa2018.concurrences.com/IMG/pdf/client_alert__eu_merger_control_-_the_dow_dupont_theory_of_innovation_harm_–_attorney_advertising.pdf>.

9 J. Thomas Rosch, 'Antitrust Regulation of Innovation Markets' (Speech at the ABA Antitrust Intellectual Property Conference 5 February 2009) <https://www.ftc.gov/sites/default/files/documents/public_statements/antitrust-regulation-innovation-markets/090205innovationspeech.pdf>.

10 For a discussion of the increased attention to a merger's effect on innovation, see Rachel Brandenburger and others, 'Merger Control Revisited: Are Antitrust Authorities Investigating the Right Deals?' (2017) 31 Antitrust, 28–36.

11 OECD,'Start-ups, Killer Acquisitions and Merger Control – Note by the United States' 11 June 2020 <https://one.oecd.org/document/DAF/COMP/WD(2020)23/en/pdf>.

12 Complaint, *United States v Sabre Corp*., <https://www.justice.gov/opa/press-release/file/1196816/download>. In April 2020, Judge Leonard Stark of the US District Court in Delaware ruled that Sabre may purchase Farelogix. Reuters, <https://www.reuters.com/article/us-farelogix-m-a-sabre-idUSKBN21Q1RF>. However, UK's Competition and Markets Authority (CMA) blocked Sabre's proposed takeover of Farelogix on the basis that the merger 'could result in less innovation in their services.' CMA, <https://www.gov.uk/government/news/cma-blocks-airline-booking-merger>.

13 Several studies in the literature have provided limited discussion of the loss of innovation as a theory of harm in high-tech remedy cases in China. For example, see Michael Han and Bivio Yu, 'Made in China: The Global Influence of China's Merger Control Regime in the High-Tech Sector' (2019) 3 Antitrust Chronicle 29–41.

Since August 2008 when China's AML took effect, China's State Administration for Market Regulation (SAMR) and one of its predecessors, the Anti-Monopoly Bureau of the Ministry of Commerce (MOFCOM),[14] have reviewed over 3000 merger transactions. The overwhelming majority of these cases were approved with no intervention.[15] As of August 2020, the Chinese merger agencies have conditionally approved 48 transactions with remedies and blocked two transactions. The public decisions on these transactions, although often brief, offer an opportunity to study how innovation concerns are addressed by the Chinese merger agencies. This article performs a systematic review of those decisions, identifies the innovation-related concerns (if any) raised in the decisions, and summarizes the types of remedies that have been used by the Chinese merger agencies.

Several patterns emerge from this analysis. First, a transaction's impact on innovation has been a focus of the merger agencies' reviews in those transactions that ultimately required a remedy: innovation-related issues were raised, and corresponding remedies were imposed in 17 transactions (out of 48, or 35 per cent).[16] Perhaps unsurprisingly, these innovation concerns are clustered in high-tech industries with high market concentration and high entry barriers according to the information disclosed in the published decisions.

Secondly, the Chinese merger agencies focused on two types of innovation harm in their remedy decisions. One is often seen in *horizontal* mergers where the theory of harm is a loss of innovation incentives by the combined firm due to the elimination of an existing or potential competitor. This type of innovation-related theory of harm appears in 11 (or 65 per cent) of the 17 transactions in our analysis. The other type of harm often arises in *vertical* mergers where one of the merging parties has control of key input technology or intellectual property rights (IPR) that could block or hinder innovation by rivals (eg through foreclosing tactics such as a refusal to license and degrading interoperability). The Chinese merger agencies focused on this type of innovation harm in 7 (or 41 per cent) of the 17 transactions.[17]

14 SAMR and MOFCOM are collectively referred to as the Chinese merger agencies in this article.

15 For a systematic summary of the antitrust enforcement in China's merger review in China, see Elizabeth X. Wang and others, 'Antitrust Enforcement in China: Merger Review and the Role of Economic Analysis' (2020) 6 Competition Law & Policy Debate 89–97.

16 Of the two blocked transactions, Coca-Cola/Huiyuan (2009) and P3 Network Shipping Alliance (2014), MOFCOM did not raise innovation-related concerns in the latter case. However, in Coca-Cola/Huiyuan (2009), MOFCOM's decision states that the acquisition 'would squeeze out small and medium-sized domestic fruit juice enterprises and curtail the ability of domestic enterprises to compete and independently innovate in the fruit juice beverage market'. MOFCOM's decision did not provide details for this conclusion. This article focuses on analyzing the 48 remedied transactions. See, MOFCOM, 'MOFCOM Announcement No. 22 of 2009 on Anti-monopoly Review Decision Concerning the Proposed Acquisition of Huiyuan by Coca-Cola' [2009] <http://fldj.mofcom.gov.cn/aarticle/ztxx/200903/20090306108494.html>. See, MOFCOM, 'MOFCOM Announcement No. 46 of 2014 on Decisions of Anti-monopoly Review to Prohibit Concentration of Undertakings by Prohibiting Maersk, MSC and CMA CGM from Establishing a Network Center' [2014] <http://english.mofcom.gov.cn/article/policyrelease/buwei/201407/20140700663862.shtml>.

17 In one transaction, *UTC/Rockwell Collins (2018)*, both 'horizontal' and 'vertical' theories of innovation harm were raised. SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of Equity Interests of Rockwell Collins by UTC' [2018] <http://web.archive.org/web/20181127040647/http:/samr.saic.gov.cn/gg/201811/t20181123_277177.html>.

Thirdly, the Chinese merger agencies have adopted a combination of structural and behavioural remedies (eg divestiture, hold-separate, maintenance of R&D), or sometimes only behavioural remedies, to address the potential effects on loss of innovation incentives in horizontal mergers. To address concerns regarding the merging parties' incentive to hinder innovation by an existing competitor or a potential entrant, the agencies have frequently required behavioural remedies (eg mandatory licensing, maintenance of interoperability, and fair, reasonable, and non-discriminatory (FRAND) commitments).

Lastly, our analysis demonstrates that the Chinese merger agencies have sometimes reached similar decisions with respect to innovation-related issues to the EC and US antitrust agencies that were reviewing the same transaction; other times, they have not. These different outcomes go in both directions: the Chinese merger agencies have sometimes raised innovation concerns where the EC and/or the US antitrust agencies have unconditionally approved the same transaction (eg *Seagate HDD/Samsung HDD (2011)*), and have sometimes unconditionally approved transactions where the EC or the US antitrust agencies identified innovation as a key concern (eg *GE/Alstom (2015)*).

A significant difference between China's antitrust law and the laws in the US and EU is that the AML explicitly identifies non-competition factors such as industrial policy as an aspect to be considered by the Chinese merger agencies during their investigations. This article does not aim to opine on whether industrial policy (a term whose meaning is subject to debate) should or should not be a consideration in merger review. Rather, we conducted a review of the 17 remedy decisions to try to assess whether and how the Chinese merger agencies *might* have considered a merger's impact on the 'Chinese national economy' as well as on competition. We found that, out of these 17 innovation-related remedy decisions, five contain remedy provisions that specifically recognize the interests of a Chinese industry.

To proceed, Section II discusses the innovation-related theories of harm reflected in the Chinese merger agencies' remedy decisions. Section III examines the characteristics of the industries the agencies have highlighted alongside their innovation concerns in the remedy decisions. Section IV discusses the types of remedies the agencies have required to address innovation concerns. Section V compares those findings with the treatment of innovation-related concerns by the EC and US antitrust agencies and summarizes some recent cross-border transactions in which innovation concerns were assessed by the EC and US antitrust agencies as well as the Chinese merger agencies. The article concludes in Section VI.

II. INNOVATION-RELATED THEORIES OF HARM REFLECTED IN CHINA'S REMEDY DECISIONS

The Chinese merger agencies do not currently publicly articulate in depth the economic modelling in their decisions. Relative to their EC and US antitrust agency counterparts, the staff at the Chinese merger agencies have also not published widely in economic literature. However, our review of the publicly available remedy decisions issued by the Chinese merger agencies indicated that their framework for

innovation analysis appears largely consistent with the economic literature that has influenced innovation analysis by the EC and US agencies.

Following seminal works by Schumpeter and Arrow,[18] the extensive economic literature regarding the effects of mergers (and competition in general) on innovation offered mixed conclusions. On the one hand, a merger could reduce price competition in a product market, thus increasing the payoff from successful innovation and enhancing the merging parties' incentive to innovate post-merger ('price coordination effect'). On the other hand, if innovation leads to a better product that could divert existing sales from the merging partner, the combined firm could have reduced incentives to innovate post-merger ('innovation externality effect'). Shapiro pointed out that these two effects are compatible, in the sense that increased contestability of the market and increased appropriability will increase the incentive to innovate.[19] A paper by EC economists Federico and others showed that the 'innovation externality' effect on innovation incentives tends to dominate the 'price coordination effect', and will generally result in an overall curtailment of future innovation.[20] This article formed the foundation of the so-called 'Innovation Theory of Harm' adopted by the EC in its review of the 2017 *Dow/Dupont* merger and the 2018 *Bayer/Monsanto* merger.[21]

While the focus of the 'Innovation Theory of Harm' is on the merging parties' unilateral incentives to innovate in relation to existing or future products, a merger could also negatively impact the innovation process by a rival firm. This could be true particularly when one of the merging parties possesses a key upstream input technology for innovation projects developed by a downstream rival firm. For example, Bryan & Hovenkamp showed that an incumbent could become monopolistic over an innovative technology it acquired from a start-up rather than developed on its own, then refusing its use by rivals.[22] The authors proposed this could be remedied by the acquiring company granting a 'compulsory licensing' of the innovative technology to those who wish to use it.

As discussed in more detail below, the Chinese merger agencies' concerns about innovation appear largely consistent with the economic rationale discussed above:

18 See, eg Joseph A. Schumpeter, *Capitalism, Socialism and Democracy* (Routledge 1942); Kenneth J Arrow, *The Rate and Direction of Inventive Activity: Economic and Social Factors* (Princeton University Press 1962) ch Economic Welfare and the Allocation of Resources for Invention, 609–25.

19 Carl Shapiro, 'Competition and Innovation: Did Arrow Hit the Bull's Eye?' in Josh Lerner and Scott Stern (eds), *The Rate and Direction of Inventive Activity Revisited* (University of Chicago Press 2012), 361–410.

20 Giulio Federico and others, 'Horizontal Mergers and Product Innovation' (2018) 59 International Journal of Industrial Organization 1–23, 2.

21 The potential negative impact of a merger on innovation incentives could also apply to future products. Cunningham and others, in a paper studying innovation in the pharmaceutical industry, documented so-called 'killer acquisitions', that is, acquisitions that are completed with a purpose of pre-empting future competition by terminating the development of the target's innovation projects. The authors found that the target's drug projects are less likely to be developed when they overlap with the acquirer's exiting product portfolio, and that at least 6% of acquisitions in their sample were 'killer acquisitions', cf. Colleen Cunningham and others, 'Killer Acquisitions' (2020) Journal of Political Economy (forthcoming) <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3241707>.

22 Kevin Bryan and Erik Hovenkamp, 'Antitrust Limits on Startup Acquisitions' (2020) 56 Review of Industrial Organization 615–36.

mergers that are deemed likely to (i) reduce innovation incentives *by the merged firm* or (ii) hinder innovation *by rivals* through input foreclosure of a key technology or patent would be subject to close scrutiny—coinciding with the principles in the Interim Provisions on Assessment of the Impact of Concentrations on Competition issued by MOFCOM in August 2011.[23]

The types of innovation concerns as reflected in the published decisions of the Chinese merger agencies

Prior to 2011, the Chinese merger agencies rarely intervened in any transactions on the basis of innovation-related concerns.[24] Since then, there has been a steady flow of transactions where the agencies have raised innovation concerns, reaching a peak in 2017–2018 (with a total number of seven transactions in that period) and coinciding with a global trend of scrutinizing mergers pursuant to innovation theories of harm.

We have reviewed the 48 published decisions where the Chinese merger agencies imposed remedies. We found that innovation concerns were raised in relation to 17 transactions. We categorized the innovation concerns identified by the agencies into two broad categories: (i) in the context of horizontally overlapping products ('horizontal innovation concerns'), where the merger was deemed likely by the agencies to result in reduced R&D, impediments to technological progress, or delays to the introduction of new products by the merging parties; and (ii) in the context where one of the merging parties was the owner of a key upstream input technology or patent ('vertical innovation concerns'), and the agencies found that the parties may have had incentives to foreclose a rival firm through means such as a refusal to license.

As shown in Figure 1 below, of the 17 transactions where innovation concerns were raised, 11 involved horizontal innovation concerns while the rest were vertical innovation concerns (with one where both horizontal and vertical innovation concerns were raised).

23 The Interim Provisions on Assessment of the Impact of Concentrations on Competition clarify the potential effects of a merger on innovation, including potential efficiencies and adverse impact on innovation incentives. See MOFCOM, 'MOFCOM Announcement No. 55 of 2011 on the Interim Provisions on Assessment of the Impact of Concentrations on Competition' [2011] <http://www.mofcom.gov.cn/article/b/c/201109/20110907723440.html>.***Article 8*** *Through concentration, a business operator may better integrate the resources and force of technology research and development, have positive impact on technological progress, and offset the negative impact caused by the concentration on competition. The positive impact of technological progress also helps to enhance the benefit to the consumer. Concentration may also have negative impact on technology advancement through the following ways: lower the competition pressure of the participating business operators and reduce their incentives and investment in technology innovation; a participating business operator may also enhance its market power through the concentration, thereby hindering the investment, research and development, and utilization of the relevant technology by other business operators.*

24 MOFCOM's decision to block the acquisition of Huiyuan Fruit Juice Company Ltd. by the Coca-Cola Company in March 2009 raised the concern that the acquisition would 'curtail the ability of domestic enterprises to compete and independently innovate in the fruit juice beverage market'. No remedy decisions published prior to 2011 cite loss of innovation as a competition concern. See, MOFCOM, 'MOFCOM Announcement No. 22 of 2009 on Anti-monopoly Review Decision Concerning the Proposed Acquisition of Huiyuan by Coca-Cola' [2009] <http://fldj.mofcom.gov.cn/aarticle/ztxx/200903/20090306108494.html>.

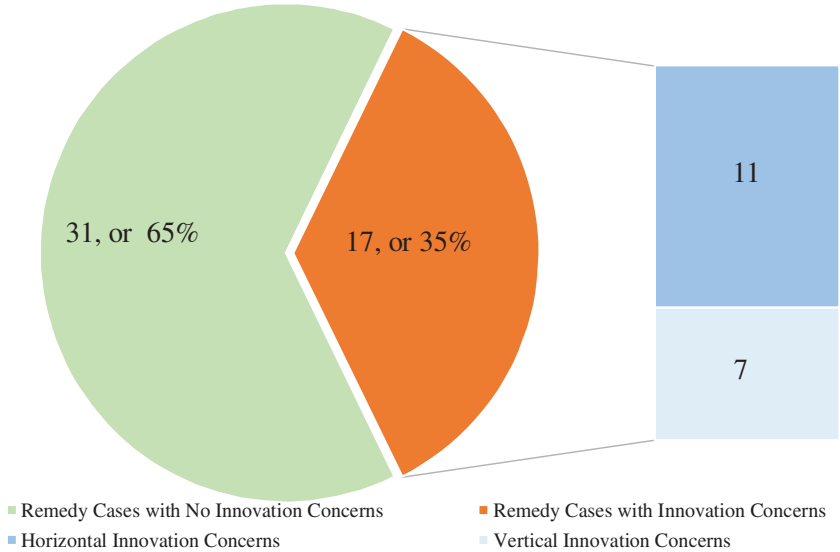

Figure 1. Types of Innovation Concerns in the Chinese Merger Agencies' Remedy Decisions. For one transaction, *UTC/Rockwell Collins (2018)*, both the 'horizontal' and 'vertical' theories of innovation harm were raised.
Source: Chinese merger agencies' decisions.

It should be noted that our analysis does not include mergers abandoned by the parties, even if innovation harm was stated to be a concern. A notable example is the proposed merger between Applied Materials and Tokyo Electron. According to the US DoJ, Applied Materials and Tokyo Electron were two of the largest non-lithography semiconductor manufacturing equipment suppliers, and the proposed merger would potentially have eliminated competition between the two firms, particularly with respect to the development of equipment for next-generation semiconductors.[25] The parties abandoned the merger after the remedy they proposed was rejected by the US DoJ and China's MOFCOM as insufficient to preserve competition and hence innovation in the fast-developing high-tech market.[26]

Specific mechanisms of innovation concerns by the Chinese merger agencies

As illustrated in Table 1 below, the Chinese merger agencies have considered a number of specific mechanisms in evaluating a merger's effect on innovation.

25 Department of Justice Office of Public Affairs, 'Applied Materials Inc. and Tokyo Electron Ltd. Abandon Merger Plans After Justice Department Rejected Their Proposed Remedy' [2015] <https://www.justice.gov/opa/pr/applied-materials-inc-and-tokyo-electron-ltd-abandon-merger-plans-after-justice-department#:~:text=Abandon%20Merger%20Plans%20After%20Justice%20Department%20Rejected%20Their%20Proposed%20Remedy,resolve%20the%20department's%20competitive%20concerns>.

26 MOFCOM, 'Applied Materials Inc. and Tokyo Electron Ltd. Abandon Merger Plans After Failing to Resolve MOFCOM's Anti-monopoly Concerns' [2015] <http://www.mofcom.gov.cn/article/ae/ai/201504/20150400955517.shtml>; Brent Kendall and Don Clark, 'Applied Materials, Tokyo Electron Cancel Merger Plan' [2015] <https://www.wsj.com/articles/applied-materials-tokyo-electron-scrap-merger-plan-1430117758>.

Table 1. China's merger review: theories of innovation arm

Theories of innovation harm		Cases
Horizontal	Elimination of an existing innovator	Bayer/Monsanto (2018) Dupont/Dow (2017) ASE/Siliconware (2017) NXP/Freescale (2015) MediaTek/Cayman Mstar (2013) Western Digital/Hitachi (2012) Seagate/Samsung (2011)
	Elimination of a potential innovator	Danaher/GE Biopharma (2020) UTC/Rockwell Collins (2018) Essilor/Luxottica (2018) BD/Bard (2017)
Vertical	Restriction on the use of the relevant technology	KLA/Orbotech (2019) GE (China)/China Shenhua (2011)
	Degradation of interoperability	UTC/Rockwell Collins (2018) Broadcom/Brocade (2017)
	Licensing with excessive pricing or unfair terms	Nokia/Alcatel-Lucent (2015) Microsoft/Nokia (2014) Google/Motorola (2012)

Source: Chinese merger agencies' decisions.

First, a merger could be regarded as resulting in a unilateral reduction in innovation by the combined firm following the elimination of an existing innovator. In *Dow/DuPont (2017)*, Dow and DuPont were both major innovators in pesticides for rice and selected herbicides for rice prior to the transaction, and the Chinese merger agencies expressed concerns that the merger would 'decrease the input in the current parallel innovation fields' and impede technological research and development efforts.[27] Similar concerns were raised by the agencies in *Bayer/Monsanto (2018)*, where Monsanto and Bayer were important innovators in digital agriculture, and therefore there was a concern that Bayer would reduce its investment in innovation, thereby harming technological progress.[28]

Secondly, a merger could also be regarded as reducing the acquirer's incentive to innovate by eliminating a potential competitor. In the case of *BD/Bard (2017)*, the Chinese merger agencies stated that the transaction would reduce Becton's R&D incentives because Bard would maintain its leadership in China's core needle biopsy

27 MOFCOM, 'MOFCOM Announcement No. 25 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Proposed Merger Between the Dow Chemical Company and E.I. Du Pont De Nemours And Company' [2017] <http://english.mofcom.gov.cn/article/policyrelease/buwei/201705/20170502577349.shtml>.

28 MOFCOM, 'MOFCOM Announcement No. 31 of 2018 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Monsanto Company by Bayer Aktiengesellschaft Kwa Investment Co' [2018] <http://english.mofcom.gov.cn/article/policyrelease/announcement/201803/20180302719967.shtml>.

equipment market after eliminating its biggest potential threat, namely that posed by Becton.[29] Similarly, in *Danaher/GE Biopharma (2020)*, Danaher was developing a related product in the hollow fibre tangential flow filter market, which would be considerably more advanced than existing products. SAMR indicated that Danaher's incentives to innovate would be undermined if it could obtain GE Biopharma's hollow fibre tangential flow filter products through the acquisition—at a minimum resulting in delays in Danaher investments in R&D and commercialization of new products.[30]

Thirdly, the Chinese merger agencies have identified a number of ways in which a transaction could create a detrimental effect on rivals' innovation or entry.

1. Restricting the use of relevant technology by a rival. In the case of *KLA/Orbotech (2019)*, a potential post-merger concern was that the merged entity would engage in foreclosure against other etching and deposition equipment manufacturers by refusing to provide them with process control equipment and associated services, thereby impeding their efforts to develop etching and deposition equipment.[31] In the case of *GE (China)/China Shenhua (2011)*, the transaction was cleared on the condition that the combined entity would not restrict the supply of raw coal for the coal–water slurry gasification technology or condition licenses on the supply of raw coal to raise rivals' production costs, which would potentially reduce their ability and incentive to innovate.[32]
2. Degrading interoperability with a rival's product. The *Broadcom/Brocade (2017)* transaction is a prime example of this concern. According to the Chinese merger agencies, to ensure service quality through optimal interoperability between fibre channel switches and adaptors from different vendors, it was essential to guarantee cooperation and coordination among fibre channel switch suppliers at all stages of R&D and operation of fibre channel adaptors. The Chinese merger agencies were concerned that Broadcom would have the incentive and ability to reduce its switch product's interoperability with third-party fibre channel adaptors following the transaction, and required Broadcom to maintain interoperability between

29 MOFCOM, 'MOFCOM Announcement No. 92 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Proposed Merger Between Becton-Dickinson Company and the United States Bud Company' [2017] <http://fldj.mofcom.gov.cn/article/ztxx/201712/20171202691390.shtml>.

30 SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of GE Biopharma's Life Science and Biopharmaceutical Business by Danaher' [2020] <http://www.samr.gov.cn/fldj/tzgg/ftjpz/202002/t20200228_312297.html>.

31 SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of Equity Interests of Orbotech by KLA' [2019] <http://gkml.samr.gov.cn/nsjg/xwxcs/201902/t20190220_290940.html>.

32 MOFCOM, 'MOFCOM Announcement No. 74 of 2011 on Anti-monopoly Review Decision Concerning the Conditional Approval of the joint venture between GE China and Shenhua Coal' [2011] <http://fldj.mofcom.gov.cn/aarticle/zcfb/201111/20111107824342.html>.

its own switches and third-party adaptors no lower than the level of interoperability with its own adopters.[33]

3. Licensing technology with excessive pricing or unfair terms. For example, *Nokia/Alcatel-Lucent (2015)* involved concerns regarding increased or unreasonable standard essential patent (SEP) licensing fees.[34] MOFCOM found that, as licensees were generally dependent on communication standards (and the underlying SEPs) and had limited bargaining power, unreasonable changes in Nokia's licensing patterns could raise the IP cost of downstream mobile terminal manufacturers and wireless communication network equipment manufacturers in China, impeding the ability of other firms to compete, thereby harming consumers. A similar concern was raised in *Microsoft/Nokia (2014)*, where MOFCOM determined that Microsoft's dependency on smartphone manufacturers to market its own smart terminal operating systems would be reduced post-transaction. If Microsoft increased licensing fees to other smart terminal device manufacturers to benefit its own position, MOFCOM concluded that the transaction would restrict or eliminate competition in the smartphone market.[35]

III. HIGH-RISK AREAS FOR INNOVATION CONCERNS IN CHINA

Like the EC and the US antitrust agencies, Chinese merger agencies often pay close attention to market concentration and entry barriers in the evaluation of a merger's effect on innovation. Among the 17 remedy cases where the Chinese merger agencies have specifically examined the mergers' impact on innovation, almost all have involved industries where the Chinese merger agencies found the following characteristics: (i) high-tech products or services, (ii) high market concentration, and (iii) high entry barriers.

High-tech products or services

Potential loss or reduction in innovation was considered in many remedy cases involving high-tech products and services. These sectors are characterized by intensive R&D investment for product innovation. Product life cycles also play an important role, with firms constantly competing to introduce both new and improved products to the market.

As illustrated in Table 2, the vast majority of the remedy cases where the Chinese merger agencies raised innovation concerns are in high-technology industries,

33 MOFCOM, 'MOFCOM Announcement No. 46 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Brocade Communications Systems Limited by Broadcom Co., Ltd.' [2017] <http://www.mofcom.gov.cn/article/b/c/201708/20170802632069.shtml>.

34 MOFCOM, 'MOFCOM Announcement No. 44 of 2015 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Alcatel-Lucent by Nokia' [2015] <http://fldj.mofcom.gov.cn/article/ztxx/201510/20151001139743.shtml>.

35 MOFCOM, 'MOFCOM Announcement No. 24 of 2014 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Nokia's Device and Service Businesses by Microsoft' [2014] <http://fldj.mofcom.gov.cn/article/ztxx/201404/20140400542415.shtml>.

Table 2. Industries with innovation concerns

Industry	Count	Cases
Semiconductor	4	KLA/Orbotech (2019); ASE/Siliconware (2017); NXP/Freescale (2015); MediaTek/Cayman Mstar (2013)
Telecommunication	3	Nokia/Alcatel-Lucent (2015); Microsoft/Nokia (2014); Google/Motorola (2012)
Electrical	3	Broadcom/Brocade (2017); Western Digital/Hitachi Storage (2012); Seagate/Samsung (2011)
Chemical	2	Bayer/Monsanto (2018); Dupont/Dow (2017)
Medical	1	BD/Bard (2017)
Aviation	1	UTC/Rockwell Collins (2018)
Optical	1	Essilor/Luxottica (2018)
Energy	1	GE (China)/China Shenhua Coal (2011)
Life Science	1	Danaher/GE Biopharma (2020)

Source: Chinese merger agencies' decisions.

including semiconductor (4 cases), telecommunication (3 cases), electrical (3 cases), chemical (2 cases), aviation (1 case), and life science (1 case).

High market concentration

The merging parties' market shares and measures of market concentration have often formed the basis for the Chinese merger agencies' concerns about innovation. High levels of market concentration, significant increases in concentration following the acquisition, and the existence of few competitors (and potentially innovators) all appear to have attracted innovation-centric scrutiny from the agencies. Many of the relevant markets where innovation issues were raised are those where the merging parties' combined market shares exceeded 40 per cent and/or ranked the highest (ie No.1) post-merger within the industry. For example, in *Essilor/Luxottica (2018)*, the combined entity would have had a 40–45 per cent combined share in the wholesale supply of medium to high-end optical lenses in China, and would have been the No.1 wholesale supplier of low-end optical lens as well as medium to high-end sunglasses in China.[36] Likewise, BD and Bard would likely have had a combined market share greater than 50 per cent in China after the transaction.[37]

36 SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Merger Between Essilor and Luxottica' [2018] <http://www.samr.gov.cn/fldj/tzgg/ftjpz/202003/t20200309_312682.html>.

37 MOFCOM, 'MOFCOM Announcement No. 92 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Proposed Merger Between Becton-Dickinson Company and the United States Bud Company' [2017] <http://fldj.mofcom.gov.cn/article/ztxx/201712/20171202691390.shtml>.

High entry barriers

Many of the remedy decisions addressing innovation issues specifically have related to situations involving high entry barriers for rivals. Absent potential rivals with the ability to innovate, the merger agencies concluded the merging parties would face less competitive pressure if the combined firm curtailed its innovation efforts post-merger.

Several factors, including a rival's technical strength/industry expertise, financial strength, R&D capacity, IPR portfolio, and user switching costs were often considered by the Chinese merger agencies as key barriers to entry. In particular, as shown in Table 3, technical strength/industry expertise was considered in 14 (or 82 per cent) of all 17 cases, followed by R&D capacity (11 cases, or 65 per cent), financial strength (9 cases, or 53 per cent), IPR (7 cases, or 41 per cent), and user switching cost (5 cases, or 29 per cent). Among them, some cases may have exhibited multiple factors considered by the Chinese merger agencies. Cases considering technical strength/industry expertise included *KLA/Orbotech (2019)* and *Essilor/Luxottica (2018)*. Cases considering R&D capacity included *Bayer/Monsanto (2018)* and *ASE/Siliconware (2017)*. Examples of cases where financial strength was considered were *UTC/Rockwell Collins (2018)* and *Dupont/Dow (2017)*; examples of cases concerning IP were *NXP/Freescale (2015) and Microsoft/Nokia (2014)*; and examples of cases concerning user switching cost were *BD/Bard (2017) and MediaTek/Cayman Mstar (2013)*.

The Chinese merger agencies' decisions have also mentioned other factors that may lead to entry barriers. For example, in *BD/Bard (2017)*, competing in the supply of core needle biopsy equipment requires a production license, which is not easy to obtain in a short period of time. In the two cases involving the hard disk drive industry, *Western Digital/Hitachi (2012) and Seagate/Samsung (2011)*, economies of scale were considered as a potential barrier to entry.

IV. REMEDIES TO ADDRESS INNOVATION CONCERNS IN CHINA

The Chinese merger agencies have imposed structural remedies, behavioural remedies, and a combination of both to address their innovation concerns. Table 4 summarizes the forms of remedies used in the 17 cases where innovation was a key concern.

In general, for mergers in which the theory of harm was a decrease in innovation incentives due to the elimination of an existing or potential competitor, the Chinese merger agencies have almost always required divestiture of overlapping R&D facilities or the relevant overlapping business to a third-party buyer, or imposed 'hold separate' remedies which stipulated that the merging parties keep all or a portion of their businesses (including R&D assets and research staff) independent and continue to operate as separate entities after completion of the merger until the order is lifted. These remedies are meant to preserve the parties' incentives to innovate following the merger. For example, to maintain pre-transaction innovation levels, in *Bayer/Monsanto (2018)*, the parties were required 'to divest Bayer's business of corn, soybean, cotton and oilseed trait business worldwide, including relevant facilities, personnel, IPRs (including patents, know-how and trademarks) and other tangible and

Table 3. Entry barriers for rival firms

Cases	Technical strength /Industry expertise	Financial strength	R&D capacity	IPR	User switching cost
Danaher/GE Biopharma (2020)					
KLA/Orbotech (2019)	√	√	√		
UTC/Rockwell Collins (2018)	√	√			
Essilor/Luxottica (2018)	√	√	√		
Bayer/Monsanto (2018)	√	√	√		
BD/Bard (2017)	√				√
ASE/Siliconware (2017)	√	√	√		√
Dupont/Dow (2017)	√	√	√	√	
Broadcom/Brocade (2017)	√	√	√		
NXP/Freescale (2015)	√			√	√
Nokia/Alcatel-Lucent (2015)					
Microsoft/Nokia (2014)		√	√	√	
MediaTek/Cayman Mstar (2013)	√	√	√	√	√
Google/Motorola (2012)	√				√
Western Digital/Hitachi (2012)	√		√	√	
Seagate/Samsung (2011)	√		√	√	
GE/China Shenhua (2011)	√		√	√	

Source: Chinese merger agencies' decisions.

intangible assets'.[38] In *ASE/Siliconware (2017)*, Advanced Semiconductor and Siliconware were both considered important innovators and R&D leaders in the semiconductor and test industry, especially in the fast-growing 'SIP, and WLCSP and the recently-released 3DIC technology'. They were therefore required to 'maintain the legal person statuses' as independent competitors and to 'carry out independent operation according to their respective operation modes and market practices before the transaction and compete in the market within the restricted period (24 months)'.[39]

Notably, the Chinese merger agencies have also imposed behavioural remedies, such as requiring maintenance of R&D to address the concern of diminished innovation by the merging parties. For example, in *Danaher/GE Biopharma (2020)*, Danaher and the combined entity committed to continuing to pursue R&D through an existing innovation-intensive project for a period of 24 months after the transaction, in addition to transferring relevant know-how to the purchaser of the divested

38 MOFCOM, 'MOFCOM Announcement No. 31 of 2018 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Monsanto Company by Bayer Aktiengesellschaft Kwa Investment Co' [2018] <http://english.mofcom.gov.cn/article/policyrelease/announcement/201803/20180302719967.shtml>.

39 MOFCOM, 'MOFCOM Announcement No. 81 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Siliconware Precision Industries Co., Ltd by Advanced Semiconductor Engineering, Inc' [2017] <http://fldj.mofcom.gov.cn/article/ztxx/201711/20171102675701.shtml>.

Table 4. Theories of innovation harm and corresponding remedies

Theories of innovation harm		Cases	Remedies	Divestiture of overlapping R&D or Business	Hold separate	Maintenance of R&D	Mandatory licensing	FRAND commitment	Maintenance of interoperability
Horizontal	Elimination of an existing innovator	Bayer/Monsanto (2018)	Structural/ Behavioral	√				√	
		Dupont/Dow (2017)	Structural	√					
		ASE/Siliconware (2017)	Behavioral		√				
		NXP/Freescale (2015)	Structural	√					
		MediaTek/Cayman Mstar (2013)	Behavioral		√				
		Western Digital/ Hitachi (2012)	Structural/ Behavioral	√	√	√			
		Seagate/Samsung (2011)	Behavioral		√	√			
	Elimination of a potential innovator	Danaher/GE Biopharma (2020)	Structural/ Behavioral	√		√			
		UTC/Rockwell Collins (2018)	Structural/ Behavioral	√		√			
		Essilor/Luxottica (2018)	Behavioral					√	
		BD/Bard (2017)	Structural	√					

(*Continued*)

Table 4. (continued)

Theories of innovation harm		Cases	Remedies	Divestiture of overlapping R&D or Business	Hold separate	Maintenance of R&D	Mandatory licensing	FRAND commitment	Maintenance of interoperability
Vertical	Restriction on the use of relevant technology	KLA/Orbotech (2019)	Behavioral					√	
		GE (China)/China Shenhua (2011)	Behavioral					√	
	Degradation of interoperability	UTC/Rockwell Collins (2018)	Behavioral						√
		Broadcom/Brocade (2017)	Behavioral						√
	Excessive pricing or unfair licensing	Nokia/Alcatel-Lucent (2015)	Behavioral				√		
		Microsoft/Nokia (2014)	Behavioral				√	√	
		Google/Motorola (2012)	Behavioral				√	√	

Source: Chinese merger agencies' decisions.

business.[40] In *UTC/Rockwell Collins (2018)*, the parties were required to continue to 'invest in R&D and innovation in China to promote the R&D and innovation of China's aviation industry and China's aircraft platform'. [41]

In contrast, in mergers where the concern was the combined firm having control of key upstream input technology or IPR that it could use to block or hinder innovation by rivals via restrictions on the use of the relevant technology, degradation of interoperability, or licensing with excessive pricing or unfair terms, the Chinese merger agencies have used behavioural remedies. These remedies are meant to maintain rivals' ability to continue to compete with the merging parties as they did prior to the merger. The common forms of behavioural remedies in such cases include:

- mandatory licensing such as a requirement to license certain technology or assets (eg patents, proprietary techniques, or other IPRs), and are intended to alleviate concerns regarding access to a key technology necessary for rivals to effectively compete via innovation. For example, one remedy in *Nokia/Alcatel-Lucent (2015)* was that the parties committed not to stop the implementation of standards through SEP injunctions, unless 'the licensor has already provided conditions based on FRAND conditions but the potential licensee does not sign the FRAND licenses or comply with the terms in good faith'.[42] Likewise, in *Microsoft/Nokia (2014)*, Microsoft committed to continuing to uphold its commitments to the standards setting organizations (SSOs) not to seek injunctions or exclusion orders of its SEPs against smartphones made by Chinese manufacturers.[43]
- maintenance of interoperability, including requirements to make their products be compatible with those of rivals to ensure their continued ability to compete. For example, in *Broadcom/Brocade (2017)* the Chinese merger agencies were concerned that the transaction posed a risk of reduced interoperability between Broadcom's fibre channel switches and competing fibre channel adaptors. The Chinese merger agencies therefore required Broadcom to commit to maintaining interoperability between its own fibre channel switches and third-party fibre channel adaptors at a level 'no less than' the interoperability with its own fibre channel adaptors, and to not discriminate against third-party fibre channel adaptors. [44]

40 SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of GE Biopharma's Life Science and Biopharmaceutical business by Danaher' [2020] <http://www.samr.gov.cn/fldj/tzgg/ftjpz/202002/t20200228_312297.html>.

41 SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of Equity Interests of Rockwell Collins by UTC' [2018] <http://web.archive.org/web/20181127040647/http:/samr.saic.gov.cn/gg/201811/t20181123_277177.html>.

42 MOFCOM, 'MOFCOM Announcement No. 44 of 2015 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Alcatel-Lucent by Nokia' [2015] <http://fldj.mofcom.gov.cn/article/ztxx/201510/20151001139743.shtml>.

43 MOFCOM (n 35).

44 MOFCOM, 'MOFCOM Announcement No. 46 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Brocade Communications Systems Limited by Broadcom Co., Ltd.' [2017] <http://www.mofcom.gov.cn/article/b/c/201708/20170802632069.shtml>.

- licensing with FRAND commitments where the parties are required to make their patents or key technology available to all interested third parties, not to discriminate between licensees, and to offer a license on fair and reasonable terms. For example, in *Google/Motorola (2012)*, Google was required to continue to comply with Motorola Mobile's current FRAND obligations in patent licensing post-transaction.[45] Likewise, in *KLA/Orbotech (2019)*, the parties were required to continue to provide, in a stable manner, semiconductor process control equipment and related services to deposition and/or etching equipment manufacturers in the China market on a FRAND basis.[46]

A significant difference between China's antitrust law and the laws in the US and EU is that the AML identifies non-competition factors such as industrial policy as an aspect to be considered by the Chinese merger agencies during their investigations. In particular, the AML (Article 27) states that the Chinese merger agencies should consider 'the impact of the concentration on the development of the [Chinese] national economy', in addition to competition factors such as market shares, market power, concentration of the relevant market, and impact on market entry and technological progress.[47]

'Industrial policy' is often not a clearly defined term. According to a report of an OECD Global Forum on 'Competition Policy, Industrial Policy and National Champions,' the expression 'industrial policy' can 'mean different things to different people' and depends on the context:

> 'it may refer to government interventions influencing business decisions, from general measures such as across-the-board investment incentives to more targeted, sector-specific incentives, or "nationalist" policies such as domestic content requirements for public procurement, the direct or indirect subsidisation of specific companies, or dirigiste policies such as the creation of national champions and their protection from competitors and foreign acquirers.'[48]

This article does not aim to opine on whether or not industrial policy should or should not be a consideration in merger review. Rather, we conducted a review of the 17 remedy decisions to try to assess whether and how the Chinese merger agencies *might* have considered a merger's impact on the 'Chinese national economy' as well as on competition. We found that, for five transactions (ie *Microsoft/Nokia (2014), Nokia/Alcatel-Lucent (2015), Bayer/Monsanto (2018), UTC/Rockwell Collins*

45 MOFCOM, 'MOFCOM Announcement No. 25 of 2012 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the case of proposed acquisition of Motorola Mobile by Google' [2012] <http://fldj.mofcom.gov.cn/aarticle/ztxx/201205/20120508134324.html>.

46 SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of Equity Interests of Orbotech by KLA' [2019] <http://gkml.samr.gov.cn/nsjg/xwxcs/201902/t20190220_290940.html>.

47 China's AML, <http://gkml.samr.gov.cn/nsjg/fgs/201908/t20190819_306107.html>.

48 OECD, 'Roundtable on Competition Policy, Industrial Policy and National Champions' [2009], <https://www.oecd.org/daf/competition/44548025.pdf>, p 25.

(2018), and KLA/Orbotech (2019)), the innovation-related remedy terms specifically recognize the interests of a *Chinese* industry. In particular, the innovation-related remedy included provisions that required the merged firm, among other things, to (i) refrain from seeking injunctions against Chinese smartphone manufacturers (eg *Microsoft/Nokia (2014)*[49]), (ii) provide FRAND access of certain patents or technology to Chinese entities (eg *KLA/Orbotech (2019), Bayer/Monsanto (2018)*[50] and *Nokia/Alcatel-Lucent (2015)*[51]), or (iii) promote R&D and innovation in a particular industry in China (eg *UTC/Rockwell Collins (2018)*[52]).

We further note that the same OECD report points out that where industrial policies 'are consistent with enhancing long-term consumer welfare and efficiency', there will be 'rarely a conflict with competition policy'.[53] Whether or not the consideration of industrial policy in China's AML is consistent with that finding is a controversial topic, and the limited amount of publicly available information does not lend itself to an easy or reliable evaluation. One commentator has noted, pragmatically, that industrial policy is 'an integral feature of the Chinese law itself, and can (and should be) dealt with through patient advance planning and proactive outreach, rather than treated as fodder for post hoc grumbling about fairness concerns'.[54]

V. DIFFERENCES AND SIMILARITIES IN THE TREATMENT OF INNOVATION-RELATED CONCERNS BY THE CHINESE MERGER AGENCIES, THE EC AND THE US ANTITRUST AGENCIES

The theories of harm in relation to innovation considered by the Chinese merger agencies that we analysed appeared to be largely in consonance with the merger guidelines issued by the EC and the US antitrust agencies, respectively. The EC and US antitrust agencies' guidelines take a balancing approach to assessing the potential effects of a merger on innovation—addressing how the agencies will assess potential harm to innovation, as well as any innovation benefits and efficiencies that may arise as a result of the merger.

49 The remedy requires that the merged firm refrain from seeking injunction or exclusion orders of its SEPs against smartphones made by Chinese manufacturers, and provide Chinese smartphone manufacturers with non-exclusive licenses for certain non-SEPs. MOFCOM, 'MOFCOM Announcement No. 24 of 2014 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Nokia's Device and Service Businesses by Microsoft' [2014] <http://fldj.mofcom.gov.cn/article/ztxx/201404/20140400542415.shtml>.

50 MOFCOM (n 28).

51 MOFCOM, 'MOFCOM Announcement No. 44 of 2015 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Acquisition of Equity Interests of Alcatel-Lucent by Nokia' [2015] <http://fldj.mofcom.gov.cn/article/ztxx/201510/20151001139743.shtml>.

52 The remedy requires that the merged firm continue to 'invest in R&D and innovation in China to promote the R&D and innovation of China's aviation industry and China's aircraft platform.' SAMR, 'Notice of the State Administration for Market Regulation of the People's Republic of China on the Conditional Approval of the Proposed Acquisition of Equity Interests of Rockwell Collins by UTC' [2018] <http://web.archive.org/web/20181127040647/http:/samr.saic.gov.cn/gg/201811/t20181123_277177.html>.

53 OECD, 'Roundtable on Competition Policy, Industrial Policy and National Champions' [2009], <https://www.oecd.org/daf/competition/44548025.pdf>, p 11.

54 Andrew L Foster, 'Navigating the Unique Features of China's Competition Landscape' (2017) 31 Antitrust 79–86, 2.

Innovation concerns raised in a horizontal merger: The EC's 2004 Horizontal Merger Guidelines look unfavourably on mergers that would be likely to 'diminish innovation'.[55] The Guidelines mention a number of factors to be considered in evaluating innovation-related concerns, including market shares[56] and barriers to entry.[57] The degree to which incumbents have preferential access to innovation and R&D should also be taken into account when assessing barriers to entry.[58] Similar to the EC's Horizontal Merger Guidelines, the 2010 US Horizontal Merger Guidelines, which were jointly issued by the DoJ and FTC, also regard diminished innovation as among the potential harms to competition that can result from a merger. According to the DoJ/FTC Horizontal Merger Guidelines, a reduction in existing innovation efforts is most likely 'if at least one of the merging firms is engaging in efforts to introduce new products that would capture substantial revenues from the other merging firm' (ie cannibalization).[59]

Innovation concerns raised in a vertical merger: With respect to vertical mergers, the EC's Non-Horizontal Merger Guidelines assert that mergers that would be likely to result in 'diminished innovation' would result in harm to consumers.[60] Similarly, the US Vertical Merger Guidelines echo the concern that rivals could lose significant sales if they are deterred from innovation due to the merged firm's ability to foreclose or raise rivals' costs.[61] The EC's Non-Horizontal Merger Guidelines also acknowledge possible efficiencies arising from a vertical (or conglomerate) merger, where efforts to increase sales at one level (eg improve service or expand innovation) may provide a greater reward for an integrated firm that will also realize corresponding benefits accruing at other levels.[62] Similarly, the US Vertical Merger Guidelines

55 Council Regulation 2004/C31/03 of 5 February 2004 Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings [2004] OJ C31/5 para 8.

56 Both the EC and DoJ/FTC Horizontal Merger Guidelines also acknowledge that a firm may be a strong innovator even if it lacks significant market share. For example, the EC Guidelines explain that a firm with a 'relative small market share may nevertheless be an important competitive force if it has promising pipeline products'. Council Regulation 2004/C31/03 of 5 February 2004 Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings [2004] OJ C31/5 para 38. The DoJ/FTC Guidelines assert that the agencies will also consider 'whether a merger will diminish innovation competition by combining two of a very small number of firms with the strongest capabilities to successfully innovate in a specific direction'. US FTC and DoJ, 'Horizontal Merger Guidelines' [2010] s 6(4) <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>.

57 Council Regulation 2004/C31/03 of 5 February 2004 Guidelines on the assessment of horizontal mergers under the Council Regulation on the control of concentrations between undertakings [2004] OJ C31/5 paras 15, 71.

58 ibid, para 71.

59 US FTC and DoJ, 'Horizontal Merger Guidelines' [2010] s 6(2) <https://www.justice.gov/atr/horizontal-merger-guidelines-08192010>.

60 Council Regulation 2008/C265/07 of 18 October 2008 Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings [2008] OJ C265/6 para 10.

61 US FTC and DoJ, 'Vertical Merger Guidelines' [2020] <https://www.ftc.gov/system/files/documents/reports/us-department-justice-federal-trade-commission-vertical-merger-guidelines/vertical_merger_guidelines_6-30-20.pdf>.

62 Council Regulation 2008/C265/07 of 18 October 2008 Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings [2008] OJ C265/6 para 13.

state that vertical mergers 'may also be able to create innovative products in ways that would not likely be achieved through arm's-length contracts'.[63]

Remedies: Table 5 includes an overview of the 17 transactions with innovation-related remedies imposed by the Chinese merger agencies that we analysed and compares the outcomes where the EC and/or the US antitrust agencies also reviewed the same transaction.

Table 5 shows that, unlike the Chinese merger agencies, the EC and US antitrust agencies have demonstrated a strong preference for structural remedies to address innovation concerns arising in horizontal mergers. The table demonstrates that, while the Chinese merger agencies imposed both structural and behavioural remedies to address the horizontal innovation concerns in the cases analysed, the EC and the US antitrust agencies relied exclusively on structural remedies.

Furthermore, the Chinese merger agencies also raised vertical innovation concerns regarding, and utilized behavioural remedies to prevent, the merging parties' incentive to hinder innovation by an existing competitor or a potential entrant (eg potentially through refusal of licensing or excessive pricing of the relevant technology to a rival). In contrast, for the three transactions where the Chinese merger agencies required the merged firm to make FRAND commitments in licensing, no remedies were required by the EC or the US antitrust agencies.

Cross-border mergers: In the following section, we summarize some recent cross-border mergers that were reviewed by the Chinese merger agencies, the EC and the US antitrust agencies. In each of these cases, innovation concerns were raised by at least one of the reviewing agencies. We have analysed whether and how the agencies differed in their assessments of the innovation concerns and associated remedies.

The analysis found that, although the general framework for innovation analysis was largely consistent across the Chinese, EU, and US jurisdictions, the ultimate conclusions regarding competitive harm, and the remedies imposed to resolve such harm in specific transactions, could differ.

Seagate HDD/Samsung HDD (2011) and Western Digital/Hitachi Storage (2011)

In April 2011, Seagate announced its proposed acquisition of Samsung, a competing hard disk drive (HDD) manufacturer for approximately $1.375 billion. Specifically, Seagate proposed to acquire substantially all Samsung assets (whether owned or leased) used exclusively in the research and development, manufacture and sale of HDDs. A month earlier in March 2011, Western Digital had announced its acquisition of Hitachi Global Storage Technologies, including Hitachi's HDD business for approximately $4.3 billion.

EU: According to the EC, a combined Seagate/Samsung[64] would have had a significant market share in the overall market for HDDs, particularly in 3.5″ desktop

63 US FTC and DoJ, 'Vertical Merger Guidelines' [2020] <https://www.ftc.gov/system/files/documents/reports/us-department-justice-federal-trade-commission-vertical-merger-guidelines/vertical_merger_guidelines_6-30-20.pdf>.

64 *Seagate/HDD Business of Samsung* (Case No COMP/M.6214) Commission Decision [2011] OJ C154.

Table 5. Remedies to address innovation concerns: China, US, and EUBlank means that no remedies were imposed to address *innovation* concerns NR = 'Not Reviewed by the Agency'

Cases	Type	Structural remedies			Behavioural remedies		
		China	US	EU	China	US	EU
UTC/Rockwell Collins (2018)	Horizontal	√		√	√		
Bayer/Monsanto (2018)	Horizontal	√	√	√	√		
BD/Bard (2017)	Horizontal	√	√	√			
Dupont/Dow (2017)	Horizontal	√	√	√			
NXP/Freescale (2015)	Horizontal	√	√	√			
Western Digital/Hitachi (2012)	Horizontal	√	√	√	√		
Danaher/GE Biopharma (2020)	Horizontal		√	√	√		
Essilor/Luxottica (2018)	Horizontal				√		
ASE/Siliconware (2017)	Horizontal			NR	√		NR
MediaTek/Cayman Mstar (2013)	Horizontal		NR	NR	√	NR	NR
Seagate/Samsung (2011)	Horizontal				√		
KLA/Orbotech (2019)	Vertical		NR	NR	√	NR	NR
Broadcom/Brocade (2017)	Vertical				√	√	√
Nokia/Alcatel-Lucent (2015)	Vertical				√		
Microsoft/Nokia (2014)	Vertical				√		
Google/Motorola (2012)	Vertical				√		
GE (China)/China Shenhua (2011)	Vertical		NR	NR	√	NR	NR

Source: Chinese merger agencies', EC's, and US antitrust agencies' decisions.

HDDs where it would face only two competitors post-transaction (Western Digital and Hitachi). The EC considered whether the transaction would reduce the combined firm's incentives to innovate in the market. On 19 October 2011, the EC unconditionally approved *Seagate/Samsung (2011)* based on its conclusion that the transaction would not negatively impact innovation in 3.5″ desktop HDDs and 2.5″ mobile HDDs because OEMs and distributors did not view Samsung as a strong innovator.[65]

In the *Western Digital/Hitachi Storage (2011)* transaction, the EC concluded that the transaction would have created the world's market leader in the HDD market. For 3.5″ desktop HDDs, the only remaining competitor would have been the combined Seagate/Samsung entity. For 2.5″ mobile HDDs, the combined Western Digital/Hitachi would have faced only Seagate/Samsung and Toshiba as competitors. The EC was particularly concerned that the transaction would have had a negative impact on customers' ability to obtain better prices and on suppliers' incentives to continue competing through the development of innovative products.[66]

65 ibid cf regarding the 3.5" Desktop HDDs, para 422 ff. and regarding the 2.5" Mobile HDDs para 448 ff.

66 The EC's market investigation revealed concerns that the combined entity would source fewer heads from the merchant market. At the time, SAE Magnetics (HK) Limited (TDK) was the only provider of read/write heads in the merchant market. Toshiba and Samsung relied exclusively on TDK's heads. All

The EC approved *Western Digital/Hitachi Storage (2011)*, conditioned on the divestment of production assets for 3.5″ HDDs, including a production plant and accompanying measures, such as the transfer or licensing of the IPR used by the divestment business, the transfer of Western Digital personnel and the supply of HDD components to the divestment buyer.

US: Just under three months after unconditionally clearing Seagate's acquisition of Samsung's HDD business, the FTC required a divestiture as a condition of approving Western Digital's proposed acquisition of Hitachi's HDD business. The FTC concluded that the transaction 'would consolidate two of the three remaining desktop HDD suppliers in the market' and result in a firm with a combined share of 50 per cent.[67] In crafting the divestiture remedy (which was similar to that required by the EC), the FTC included several elements designed to ensure that Toshiba would be positioned to carry on the innovation and development activities conducted by Hitachi pre-transaction. In particular, the FTC required that Western Digital and Hitachi provide Toshiba with access to Hitachi or Western Digital employees involved in research and development; and cross-license to Toshiba all IP necessary to manufacture and sell desktop HDDs.[68]

China: The *Seagate HDD/Samsung HDD (2011) and Western Digital/Hitachi Storage (2011)*[69] transactions were cleared by MOFCOM in 2011 and 2012 respectively, with unprecedented hold-separate remedies and requirements on R&D imposed on the merging parties.

MOFCOM noted that innovation was a significant driver of the HDD industry. To stay competitive and profitable, hard disk manufacturers were motivated to reduce costs through innovation. With only five players in the market, the merger of Seagate and Samsung would have potentially compromised competition and hence the manufacturers' willingness to innovate. MOFCOM imposed hold-separate orders and specific R&D requirements as conditions to clearing both transactions. Seagate was required to establish an independent subsidiary for the sale of Samsung products, while Viviti (a wholly-owned subsidiary of Hitachi) was mandated to conduct business independently. Seagate, Western Digital and Viviti were also required to maintain pre-transaction levels of R&D

other HDD suppliers were able to self-supply a majority of their read/write head needs, but this production was reserved for internal use only. However, they also purchased TDK heads to manage peaks in demand and to keep up with competitive technologies. In combination with the *Seagate/Samsung* transaction, this could have impacted TDK's ability as a supplier to invest in the development of more innovative heads and, therefore, Toshiba's ability to compete in the HDD market given its dependence on TDK heads (including potential price increases). *Western Digital Irland/Viviti* Technologies (Case No COMP/M.6203) Commission Decision [2011] OJ C241 paras 88 and 947 ff.

67 US FTC, 111-0122, Docket No C-4350, Complaint, 5 March 2012 <https://www.ftc.gov/sites/default/files/documents/cases/2012/03/120305westerndigitalcmpt.pdf>.

68 US FTC, 111-0122, Analysis of Agreement Containing Consent Order to Aid Public Comment, In the Matter of Western Digital Corporation, 5 March 2012 <https://www.ftc.gov/sites/default/files/documents/cases/2012/03/120305westerndigitalanal.pdf>.

69 *'Western Digital/Hitachi Storage (2011)'* was used to reference the transaction in all relevant jurisdictions, although the transaction was cleared in China in 2012.

investment.[70] Notably, Seagate also promised to invest at least $800 million annually in R&D for three consecutive years.

GE/Alstom (2014)

In April 2014, General Electric (GE) announced its proposed acquisition of Alstom's power business in a transaction valued at approximately $13.7 billion. This transaction would have brought together two major thermal power players, including in the market for 50 Hertz heavy duty gas turbines (HDGTs), which are mainly used in gas-fired power plants. The EC found that only four full technology HDGT competitors existed at the time and there were significant entry barriers, including 'large upfront investments in R&D'.[71]

EU: With regard to innovation, the EC concluded, among other things, that Alstom's technology was distinctive and best in class in many respects, and that Alstom had higher R&D spend and greater development capabilities than its market shares would suggest. Thus, the EC found that there was a risk that the transaction would have significantly reduced R&D investment and innovation among HDGT manufacturers, including the potential that GE would not bring Alstom's advanced HDGT technology, which was then in development, to market. To address the EC's concerns, the parties agreed to divest the most technologically advanced components of Alstom's HDGT business, as well as key personnel for its further development, together with Alstom's Power Systems Manufacturing (PSM) servicing business based in Florida, US.[72] The EC concluded that these assets would enable Ansaldo, the divestment purchaser, to gain 'advanced R&D capabilities and incentives to continue pushing innovation on this important market for Europe'.[73] The EC noted the 'particular close and successful co-operation' with the DoJ 'leading to satisfactory and mutually aligned remedy solutions for both EU and US concerns'.[74]

70 MOFCOM, 'MOFCOM Announcement No. 90 of 2011 on Anti-monopoly Review Decision Concerning the Conditional Approval of the Proposed Acquisition of Samsung's HDD Businesses by Seagate' [2019] <http://www.mofcom.gov.cn/article/b/c/201112/20111207874295.shtml>; MOFCOM, 'MOFCOM Announcement No. 9 of 2012 on Anti-monopoly Review Decision Concerning the Conditional Approval of Concentration of Undertakings in the Case of Proposed Acquisition of Hitachi by Western Digital' [2012] <http://www.mofcom.gov.cn/article/b/fwzl/201203/20120307993792.shtml>.

71 EC, 'Mergers: Commission clears GE's acquisition of Alstom's power generation and transmission assets, subject to conditions' [2015] <https://ec.europa.eu/commission/presscorner/detail/en/IP_15_5606>.

72 The EC approved Ansaldo as a suitable purchaser in its decision on 22 October 2015 and accepted the requests for (i) the change in the list of Key Personnel, (ii) the modifications as regards the Pipeline Projects that relate exclusively to the Retained Business and (iii) the modifications as regards the trademarks to be licensed back to GE by its decision on 24 February 2016. EC, 'Case M.7278 - GENERAL ELECTRIC / ALSTOM (THERMAL POWER - RENEWABLE POWER & GRID BUSINESS. Approval of Ansaldo Energia S.pA. as purchaser of Divested Business following your letter of 02.10.2015 and the Trustee's opinion of 09.10.2015' [2015] <https://ec.europa.eu/competition/mergers/cases/decisions/m7278_6893_3.pdf>. EC, 'Case M.7278 - GENERAL ELECTRIC / ALSTOM (THERMAL POWER - RENEWABLE POWER & GRID BUSINESS). Your requests of 10.02.2016 and 11.02.2016 for modification of the commitments annexed to the Commission decision of 08.09.2015' [2016] <https://ec.europa.eu/competition/mergers/cases/decisions/m7278_6857_3.pdf>.

73 EC, 'Mergers: Commission clears GE's acquisition of Alstom's power generation and transmission assets, subject to conditions' [2015] <https://ec.europa.eu/commission/presscorner/detail/en/IP_15_5606>.

74 3ibid.

US: In contrast, the DoJ did not find competition concerns on the HDGT market. It instead objected to the fact that the transaction would have eliminated GE's primary competitor in the supply of aftermarket parts and services for GE gas turbines in the US, by eliminating PSM, a US subsidiary of Alstom, 'as a vigorous product innovator for the GE installed base and likely would reduce GE's incentive to innovate in response to PSM'.[75] The DoJ explained that 'PSM has led innovation for aftermarket parts for GE 7FA turbines' and that '[s]ome of the aftermarket parts developed by PSM for GE turbines are superior in performance to GE parts'.[76] To resolve this concern, GE was required to divest PSM. The PSM business was bought by the purchaser of Alstom's HDGT business (see above).

China: Unlike in the EU and US, the deal was unconditionally approved by MOFCOM.[77] Because the Chinese antimonopoly agencies do not issue explanations for transactions approved unconditionally, little public information is available. However, it is reasonable to infer that no significant competitive concerns were found in China, including no significant innovation concerns. The deal was approved in China before the EC and DoJ reached their decisions.

Dow/DuPont (2017)

In December 2015, Dow and DuPont announced a merger that would combine two major agrochemical companies in a deal worth approximately $130 billion.

EU: The EC raised concerns that the merger would lead to reduced innovation in crop protection. Dow and DuPont were important innovators in the crop protection industry, which was characterized by a limited number of global companies with significant R&D capabilities. According to the EC, the transaction would have eliminated one of the few companies able to develop and launch new active ingredients.[78]

To resolve these concerns, Dow and DuPont agreed to divest assets including a significant portion of DuPont's pesticide business, comprised of manufacturing facilities and relevant personnel, as well as an exclusive license to DuPont's product for rice cultivation in the European Economic Area to address the concerns relating to fungicides, and most of its global research and development operations in the crop-protection space.[79]

DuPont entered into an agreement under which the US chemical maker FMC bought DuPont's crop-protection business, including its R&D operations. In exchange, DuPont agreed to purchase FMC's health and nutrition business.[80]

75 DC Cir., 1:15-cv01460-RMC, *US DoJ v General Electric Company, Alstom S.A., and Power Systems Mfg., LLC* Complaint, 8 September 2020, para 2 <https://www.justice.gov/atr/case-document/file/768396/download>.

76 ibid, para 25.

77 MOFCOM, '2015Q3 Unconditional Approval Case List' [2015] <http://fldj.mofcom.gov.cn/article/zcfb/201510/20151001128985.shtml>.

78 EC, 'Mergers: Commission clears merger between Dow and DuPont, subject to condition' [2017] <https://ec.europa.eu/commission/presscorner/detail/pl/IP_17_772>.

79 ibid.

80 EC, 'Mergers: Commission conditionally clears both FMC's acquisition of parts of DuPont's crop protection business and DuPont's acquisition of FMC's Health and Nutrition business' [2017] < https://ec.europa.eu/commission/presscorner/detail/en/IP_17_2182>.

US: The DoJ alleged that the transaction would have reduced innovation in crop protection chemicals, including acid copolymers and ionomers.[81] With respect to acid copolymers, post-transaction Dow–DuPont would have had approximately 99 per cent market share. The DoJ also alleged that customers had benefited from competition between Dow and DuPont 'to assist customers with the development of new uses for existing acid copolymer products', as well as to develop new acid copolymer products.[82] Dow and DuPont were also each other's only competitor with respect to ionomers—where the parties also competed to 'develop new products from ionomers and new uses for ionomer products', which requires specialized know-how.[83]

Dow and DuPont reached a settlement with the DoJ in June 2017. Under the terms of the settlement, 'DuPont must divest its market-leading Finesse herbicide and Rynaxypyr insecticide products to a buyer to be approved by the United States', which, according to the DoJ, 'would preserve competition in US markets for broadleaf herbicides for winter wheat and insecticides for chewing pests'. The settlement further required Dow to divest its US acid copolymers and ionomers business.[84]

China: The Chinese merger agencies also analysed the potential innovation harm in investigating the transaction and agreeing to remedies. In particular, the Chinese merger agencies highlighted the potential adverse impact on technology progress in selective herbicides and pesticides, where Dow and DuPont were leading R&D forces.[85] The transaction was conditionally approved with remedies, including the companies fulfilling their commitments to the EC (eg divesting DuPont's crop protection business to FMC to address these innovation-related concerns).[86]

VI. CONCLUSION

China has rapidly emerged as a major antitrust jurisdiction in global M&A activities since the AML came into effect in August 2008. Like in the EU and US, China's merger guidelines and, unlike in the EU and US, also its legislation, have identified innovation as a key dimension in merger review. Out of over 3000 transactions reviewed by the Chinese merger agencies since 2008, 48 transactions have been approved with remedies and two have been blocked as of August 2020.

81 DC Cir., 1:17-cv-01176, *US DoJ, Iowa, Miss., Mont. v The Dow Chemical Company and E.I. Du Pont De Nemours and Company* Complaint, 15 June 2017 <https://www.justice.gov/opa/press-release/file/973936/download>.

82 US DoJ, Case 1:17-cv-01176, *US DoJ Iowa, Miss., Mont. v The Dow Chemical Company and E.I. Du Pont De Nemours and Company* Competitive Impact Statement, 15 June 2017 <https://www.justice.gov/opa/press-release/file/973926/download>.

83 ibid at 16–17.

84 US DoJ, 'Justice Department Requires Divestiture of Certain Herbicides, Insecticides, and Plastics Businesses in Order to Proceed with Dow-Dupont Merger' [2017] <https://www.justice.gov/opa/pr/justice-department-requires-divestiture-certain-herbicides-insecticides-and-plastics>.

85 MOFCOM, 'MOFCOM Announcement No. 25 of 2017 on Anti-monopoly Review Decision Concerning the Conditional Approval of the Proposed Merger between Dow and DuPont' [2017] <http://www.mofcom.gov.cn/article/b/c/201705/20170502568059.shtml>.

86 DuPont's Form 10-Q with US Securities and Exchange Commission [2017] https://www.sec.gov/Archives/edgar/data/30554/000003055417000035/dd-2017630x10q.htm>.

Through analysing the Chinese merger agencies' decisions in relation to those 48 remedied transactions, we have found that the Chinese merger agencies have—in 17 transactions—raised innovation-related concerns that fall into two broad categories: a merger would reduce the combined firm's incentives to innovate by itself (ie stemming from the elimination of an existing or potential competitor), or (2) a merger would create an incentive for the combined firm to hinder innovation by rivals (eg via a refusal of licensing the relevant technology to a rival). These innovation concerns were most frequently raised in high-tech industries characterized by high concentration and entry barriers.

While the Chinese merger agencies came to similar conclusions to the EC and the US antitrust agencies in several of the transactions, they have also raised innovation concerns where the other two jurisdictions unconditionally cleared the same transaction. Conversely, the Chinese merger agencies sometimes also unconditionally cleared transactions in which the EC and/or US antitrust agencies identified innovation as a concern. Also, the Chinese merger agencies adopted a combination of structural and behavioural remedies to address the loss of innovation incentives, and a variety of behavioural remedies to address the merged firm's incentive to hinder innovation by an existing competitor or a potential entrant whereas the EC and US antitrust agencies showed a marked preference for structural remedies.

These similarities and differences are complex and can have significant consequences for a transaction that is reviewable in China, the EU and the US. Companies contemplating cross-border mergers involving China would therefore be well advised to tailor their M&A strategies to take account of the increasing decisional practice of the merger agencies in each of the three jurisdictions, as well as their respective laws and guidance.

CONFLICT OF INTEREST

The authors advised on a number of the cases discussed, including Seagate/Samsung, GE/Alstom and Bayer/Monsanto (Elizabeth Wang and Kun Huang) and GE/Alstom (Rachel Brandenburger in her capacity as Senior Advisor & Foreign Legal Consultant to Hogan Lovells US LLP). More generally, Compass Lexecon and Hogan Lovells each act for clients in complex mergers and acquisitions.