Globalization of Arms Production and Hierarchical Market Economies: Explaining the Transformation of the South Korean Defence Industry

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Abstract
The global arms industry has experienced a major transformation in the post-Cold War era with production becoming increasingly transnational and larger in scale. While many scholars and policymakers predicted the wide-spread adoption of market-enhancing reforms aimed at increasing domestic competition and attracting FDI, globalization of arms production has not led to a convergence of national defence industries into such a liberal-market model. Drawing on the varieties of capitalism (VoC) literature, recent scholarship has demonstrated how an interdependent web of economic institutions has shaped each country's response in varied ways. This paper builds upon the VoC literature and argues that hierarchical market economy (HME) as a distinct variety serves as a better model for understanding the trajectory of defence industries in many second-tier producers that do not fit the existing categories of VoC. We conduct an in-depth case study of South Korea's defence-industry reform initiated in 2008 and the subsequent threefold increase in its arms exports afterwards. We show that the trajectory of South Korea's defence-industry reform can be seen as the result of an HME's attempt to adapt to the globalization of arms production in ways that preserve its distinct comparative advantage. As the HME model has broad applicability for many countries in Asia and Latin America, our findings have important implications for future developments in the global arms industry.

KEYWORDS: Defence industry; South Korea; Varieties of Capitalism; Hierarchical Market Economies (HME); globalization

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Introduction

The global arms industry has experienced a major transformation in the post-Cold War era. Not only has the size of the arms market expanded dramatically, with sales of the global top 100 firms growing 79 percent from 2002 to 2020,[1] but the nature of production has also undergone fundamental changes in an era of globalization. With the rise in production costs far outpacing the growth rates of most national economies, firms in the defence sector have increasingly globalized their supply chains through foreign direct investment (FDI) to achieve the economies of scale demanded by modern weapons systems.[2] The resulting emergence of global-scale defence multinational corporations (MNCs) has posed serious challenges to regional arms producers with relatively small domestic markets as the traditional model of autonomy and independence in arms production lost viability.

To ensure survival in the face of these challenges, many analysts predicted that defence firms in small and medium-sized states would have to integrate themselves into larger global supply chains.[3] Consequently, the prevailing autarkic model of national defence production would eventually disappear as firms became part of global production networks. Yet, recent developments in many countries defy such predictions. While adjusting to the dictates of the global market and transforming their defence industries, many of the second-tier arms producers, such as South Korea,[4] Israel, and Sweden, have managed to maintain their autonomy and distinct competitiveness in the changing regional and security dynamics of the post-Cold War environment.[5]

Especially notable is the emergence of Korea as an arms export powerhouse on the global scene. After initiating major reforms in 2008, Korean arms sales have increased more than threefold and its global rank rose from 15th to 9th during the 2010s, when comparing the periods 2011-2015 and 2016-2020.[6] Moreover, the expansion of Korean arms exports will likely continue for the foreseeable future. Recently, the country clinched an estimated $3.5 billion deal with the United Arab Emirates to sell the first indigenously manufactured mid-range

surface-to-air missiles (*Cheolmae-2*),[7] secured $788 million and $1.6 billion orders from Australia and Egypt respectively for its K-9 howitzers, and finalized a contract with Poland for its K2 Black Panther tanks, K-9s, and FA-50 light fighter aircrafts amounting to a total of $15 billion.[8] Interestingly, and against the once-prevailing predictions to the contrary, Korea has managed to achieve the above feat while successfully maintaining high-levels of domestic production.[9]

How can we explain Korea's success in maintaining competitiveness in the face of defence-industrial globalization against many predictions to the contrary? By way of addressing this question, the main purpose of this article is to introduce an important theoretical modification to the varieties of defence capitalism (VoDC) framework, which has recently gained prominence in the literature on defence-industry reform through the pioneering work of Marc DeVore.[10] The Korean case serves as both a deviant case study for the original VoDC framework[11] and a plausibility probe analysis of the theoretical amendment that we propose in this article.[12]

DeVore draws on the varieties of capitalism (VoC) literature and its distinction between liberal market economies (LMEs) and coordinated market economies (CMEs) to demonstrate that economic institutional settings shape diverging adjustment pathways in arms production. According to DeVore, LMEs—national economies where markets largely structure the interactions among key economic actors—generally enact defence-industry reforms that enhance the role of the market by, among other things, loosening import and export regulations. LMEs thereby seek to make the best use of their distinct comparative advantage, restructuring itself around exporting niche products for which radical innovation is critical. CMEs—national economies where strategic coordination plays an important role in governing economic relations—likewise tend to implement defence-industry reforms that exploit their comparative advantages. In contrast to LMEs, the strengths of CMEs lie in products demanding incremental

innovation that draws on workers' firm- or industry-specific skills. To maximize these strengths, rather than relying solely on market forces, the state in CMEs collaborate with key stakeholders to open up the economy to FDI and exports in ways that preserve the capacity for incremental innovation.

We argue that DeVore's dichotomous framework insufficiently captures the full variation in reform strategies adopted by different countries and that its analytic limitations can be overcome by bringing in the category of hierarchical market economies (HME)—economies characterized by the centrality of the roles played by the state or family networks—which has relatively greater applicability in Asia.[13] The notable recent developments in Korean defence industry, when analyzed through the lens of the original VoDC framework, appears contradictory. Korean reforms have emphasized liberalization and deregulation as in LMEs, but it has led to a further concentration on platform-based products which involve incremental technological innovation as in CMEs. We show that this seeming contradiction can be reconciled if conceptually analyzed as an HME's attempt to adapt to the globalization of arms production in ways that build on its distinct comparative advantage: namely, the ability to respond quickly to new market opportunities through centralized decision-making and to tailor products to meet the needs of foreign buyers while doing so. The successful pursuit of this strategy was one of the main factors that contributed to the growth of Korean arms exports.

Our analysis of the Korean defence industry's transformation is important for a few reasons. For one, by illustrating how an HME navigates defence industry reform in an era of globalization, it significantly modifies the existing VoDC framework and thereby expands its relevance and applicability to a significant number of countries that do not fit into the LME-CME dichotomy. For another, it highlights and helps to make sense of a high-profile development in the global defence industry—the impressive growth of Korea's military

exports—which defies the predictions offered by the existing theories and has received relatively little scholarly attention.

Lastly, our analysis has broader implications for analyzing defence-industry reform in other regions and reform of other sectors in response to globalization. The state typically plays a greater economic role in the developing world.[14] As such, our discussion of how successful defence-industry reform in HMEs is likely to unfold should be relevant not only for other Asian countries but potentially also for developing countries in different regions. Moreover, in addition to defence, numerous other sectors have long been facing the pressures emanating from globalization. To the extent that these sectors are also governed by the logic of the national political economy within which they are situated, our study should help to illuminate their reform processes as well.

The remainder of this article proceeds as follows. In the next section, we review the debate on whether the rise of MNCs in arms production leads to a convergence or divergence of national defence industries. Afterwards, we provide a brief history of the Korean defence industry and a summary of the reform that was implemented in 2008, and explain why the Korean experience defies both the divergence account based on the original VoDC framework as well as the convergence narrative of liberalization theories. We then describe the distinct logics that characterize HMEs and explain how these logics have largely dictated the defence industry reform strategies that Korea has adopted. We conclude with a discussion of the implications flowing from our study.

Globalization and the Varieties of Defence Capitalism

The post-Cold War era has seen the emergence of the globalization of arms production.[15] Given the rising costs of production and the increasingly sophisticated nature of weapons systems, arms procurement has become much more transnational over the past two decades.[16] As such, what was once the purview of national governments has slowly seen "the emergence of

multinational defence firms, and the internationalization of defence-industrial supply chains [which] have combined to undermine states' ability to equip their armed forces with domestic products."[17] Put differently, the defence industry has shifted toward a global production network and international intra-firm division of labour characterized by licensed production, co-production, and co-development.[18]

Although globalization of the arms industry has been a common process, its effect has been uneven across countries. While the United States and a small number of first-tier suppliers continue to dominate the global arms market and lead the innovation drive for some of the most advanced modern weapons, many smaller states have had difficulty sustaining their defence industries in previously existing forms against growing competitive pressures.[19] Thus, it was generally viewed as unavoidable that these national defence industries would integrate into the global market and undergo fundamental adjustments in the process.[20]

Yet, opinions diverged on how exactly such adjustments would unfold. Initially, many forecasted that countries would be forced to adopt a common set of liberalizing reforms including introduction of greater competition in domestic procurement process, removing barriers to imports and direct investment, and enhancing ties with multinational defence firms from first-tier countries.[21] As the era of globalization has unfolded, however, dissenting views have also become common. Some note there is significant variation in the degree to which national defence industries have become integrated with the global market.[22] It is also pointed out that the adjustment strategies adopted by those embracing globalization look quite different from one another, with some following the liberalization route and others a more collaborative approach to reform among the key stakeholders.[23]

At a higher level, these discussions can be seen as part of a larger debate on how globalization shapes national political economies. Various liberalization theorists claim that competitive market pressures of globalization will force countries to adopt policy reforms that

introduce greater flexibility into the economic system, eventually leading them into a single liberal market model.[24] Against such convergence perspective, VoC theorists have argued for the continued divergence of national political economies. Most prominently, Peter Hall and David Soskice categorized the advanced industrial countries based on the nature of the relationships firms are able to build with other actors in the domestic economy, and claimed that the resulting categories will continue to remain distinct despite globalization.[25] This is because the nature of the ties that firms build with other actors—employees, investors, other firms, and so on—determines how they navigate the numerous coordination problems they face and subsequently shapes their core competencies; any adjustment that occurs will seek to preserve these competencies.

According to VoC theorists, firms and other actors solve coordination problems in two main ways: reliance on market forces or strategic collaboration. Importantly, the mode of coordination in one sphere tends to go along with that prevailing in other spheres due to complementarities that exist among institutions across different parts of the economy. As a result, two broad categories of economies emerge: LMEs, where firms mostly rely on the demand-and-supply pressures of the market to coordinate their activities, and CMEs, where firms depend much more on collaborative relationships with other actors.

As aforementioned, the prevailing mode of coordination forms the basis upon which firms build their core competencies. In LMEs, firms mostly engage in contract-based relationships that can be quickly terminated at the wish of one party. Hence, they tend to hire workers with general skills who can be replaced with relative ease, and pursue radical innovation to stay ahead of the competition, which is enabled by the ample availability of short-term capital as well as the ease of hiring new workers. By contrast, in CMEs, firms generally employ production strategies geared toward the generation of incremental innovation. Such strategies rely on a highly skilled labour force with firm- or industry-specific expertise, which is

unsustainable in the absence of long-term collaborative relationships, not only between workers and firms but also between firms and investors. Since the core competencies of firms derive from the broad economic institutional settings and these institutions tend to be slow-moving due to complementarities with one another, VoC scholars predict that globalization will not lead to a convergence to the liberal market model and that reforms will proceed in ways that preserve the distinct strengths of CMEs.

In his comparative analysis, DeVore utilizes VoC theory to construct his own varieties of defence capitalism framework and demonstrates that national defence industries indeed adapt to globalization in varied ways. Israel's liberal market institutions steered the country toward a path of reform that reinforced the country's comparative advantage as an LME. State leaders introduced greater competition into its procurement process and further liberalized arms exports, and Israeli firms responded by taking full advantage of the country's fluid labour market and easy availability of venture capital. As a result, Israel's defence industry reorganized itself into "one whose core strength lies in fast-moving technological niches," such as unmanned aerial vehicles and military electronics.[26] Sweden was also forced to restructure its defence industry as a response to globalization, but both its approach to reform and the results stood in stark contrast to Israel. Through mutual deliberation, Swedish political and business leaders carved out a plan to invest in process innovations that can substantially lower production costs and to integrate domestic firms into international production networks. Through these reforms, Swedish defence industry further enhanced its existing competences in products that require incremental, evolutionary innovation such as aircrafts and submarines.

The empirical evidence presented by DeVore convincingly demonstrates that convergence toward a liberal model in the realm of defence industries is not occurring, at least for the foreseeable future. Still, questions can be raised as to whether his VoDC framework covers the full spectrum of the global defence-industry reforms on both theoretical and empirical grounds.

Theoretically, the VoC theory itself has often been a target of criticism due to its insufficiency in explaining the political economies that are hard to categorize as an LME or CME.[27] In fact, Hall and Soskice themselves acknowledged that there may be an alternative "institutional clustering as well… [constituting] another type of capitalism,"[28] but neither they nor their collaborators explored this potential cluster of countries in detail.

Empirically, what appears to be one of the most significant developments in the global arms market in the recent decades cannot be explained by the VoDC framework as presented. That is, the reform of the Korean defence sector and its ensuing success in the global market defy the LME-CME dichotomy. As highlighted above and further illustrated in Table 1, Korea has witnessed more than a threefold increase (210 percent change) in its arms export sales from 2011-2015 to 2016-2020. In doing so, it outstripped the growth rates of all other global top twenty exporters. The puzzle lies in that this development follows a major reform implemented in 2008 that introduced greater competition in the government procurement process as in the case of the liberal market economy. In addition, the process did not involve any significant strategic coordination among the stakeholders as in CMEs; rather, the reform was imposed upon the unenthusiastic private businesses by the state. However, contrary to LMEs, resulting growth in exports mostly occurred in artilleries, aircrafts, and ships—products that involve gradual innovation, for which CMEs are supposed to hold a comparative advantage.[29]

Table 1. Change in Global Arms Exports in the 2010s

Rank based on 2011-2015 volume of exports	Country	Average volume of 2011-2015 exports (expressed in SIPRI's trend-indicator value)	Average volume of 2016-2020 exports (expressed in SIPRI's trend-indicator value)	Percent change from 2011-2015 to 2016-2020
1	United States	45022	51993	15.48
2	Russia	36166	28061	-22.41
3	France	7957	11494	44.45
4	China	7857	7248	-7.75

5	United Kingdom	6422	4669	-27.30
6	Germany	6405	7731	20.70
7	Spain	4918	4506	-8.38
8	Italy	3914	3071	-21.54
9	Ukraine	3710	1201	-67.63
10	Netherlands	2870	2696	-6.06
11	Israel	2611	4144	58.71
12	Sweden	2076	959	-53.81
13	Switzerland	1598	1034	-35.29
14	Canada	1291	705	-45.39
15	South Korea	1224	3798	210.29
16	Norway	866	429	-50.46
17	Turkey	805	1048	30.19
18	Belarus	706	463	-34.42
19	South Africa	480	402	-16.25
20	Australia	425	769	80.94

Source: SIPRI, "Top list TIV tables."
Note: According to SIPRI, its trend-indicator value (TIV) is calculated based on "the known unit production costs of a core set of weapons and is intended to represent the transfer of military resources rather than the financial value of the transfer."[30]

What explains the puzzling mix of LME and CME traits evidenced by Korea's defence-industry reform? We argue that the seeming contradictions in the deviant case of Korea can be reconciled within the VoDC framework but only by expanding it to include a third category which encompasses not just Korea but many other countries in Asia. By making clear that an alternative variety of capitalism (and of defence capitalism) exists, and by delineating the distinct logic of this third category, it becomes possible to makes sense of Korea's recent export successes after liberalizing reforms. For this, we now turn to recent efforts to introduce hierarchical market economy (HME) as an additional variety within the VoC framework.

Hierarchical Market Economies and Defence Sector Reform

Recent research on the political economy of developing countries has pointed to the concept of hierarchy as another mode of coordination. According to this extension of the VoC literature, hierarchy permeates the relationships firms build with other economic actors to a much greater degree in developing countries. Ben Schneider thus defines HME as an economy where

"hierarchy often replaces or attenuates the coordinated or market relations found elsewhere."[31] Whereas Schneider mainly focused on the role of family-owned business groups in organizing the economy in a hierarchical manner based on the Latin American experience, Richard Carney, with a focus on Asia, proposes a more general framework for analyzing HMEs by incorporating the state along with business groups in his analysis.[32] We draw on Carney's formulation to theorize a pattern of defence sector reform distinct from LMEs and CMEs yet equally viable.

According to Carney, the difficulties that many developing countries have faced as late industrializers in raising sufficient capital to catch up with the early developers "[led] to the concentration of control over the allocation of credit and the ownership of corporate assets either in the hands of families or the state."[33] States retained strong control over credit allocation as capital was scarce, and credit was directed to a select number of state-owned enterprises or business groups so that they could quickly build their capacities. While Carney further distinguishes between family and state market economies based on corporate ownership patterns, the presence of elite business families and strong state control of the economy are better seen as two critical features that both characterize HMEs, albeit to varying degrees across countries.

Concentrated ownership in the realm of corporate governance combined with a strong role of the state infuses the relationships that firms build among themselves, and with their employees and the state with hierarchical characteristics.[34] In the arena of inter-firm relations, many firms form parts of larger business groups and belong to family-owned parent company as subsidiaries. These subsidiaries often have subsidiaries of their own, and families retain control over the whole business group often through pyramidal ownership. Thus, inter-firm relations are characterized by a strong hierarchy with the owner-manager of the business group at the helm. In regard to employer-employee relations, since hierarchically organized business groups employ production strategies that utilize the vertical and horizontal networks within the

groups, they tend to rely on firm-specific skills. Thus, they prefer to train their own workers and offer strong employment protection to incentivize workers to invest in firm-specific skills, which only returns value to them if they remain employed with the same firm. As for business-state relations, states in HMEs often retain policy tools to (dis)incentivize economic actors to (not) engage in certain endeavors, which can target the major business groups with precision because of their small numbers. Accordingly, states often leverage these tools to prompt business groups to shift their focus into new areas.

Such institutional arrangements give rise to a distinct comparative advantage for firms in HMEs. While engaging in production that entails gradual innovation based on firm-specific skills, these firms can nonetheless respond quickly to new market openings. Concentrated ownership allows firms to take the long-term view and engage in incremental innovation, similar to the case of CMEs. At the same time, it also enables firms to make quick decisions because an owner-manager can call the shots without accommodating the opinions of other actors, unlike in the CMEs. Moreover, since states in HMEs maintain extensive involvement in the economy, they are able to more effectively nudge firms to venture into new business activities such as developing new products and entering new export markets, and also provide extensive support for firms in the process. This further provides firms with an important competitive edge over foreign rivals in targeting foreign markets, especially when the visions of the state and business groups are aligned.

The logic that characterizes HMEs and the associated comparative advantages that it gives rise to lead us to expect that defence-industry reforms in HMEs will also take a distinct form. In response to growing production costs in the global defence industry, rather than diluting concentrated ownership by accepting FDI, defence firms in HMEs will likely seek to achieve economies of scale by increasing exports. To compete with large MNCs in the global market, HME firms will generally adopt a niche strategy, but one that is different from those adopted

in LMEs of creating specialized products based on radical innovation. Rather, defence firms in HMEs will tend to exploit their ability to respond quickly to new market opportunities and make inroads into foreign markets by introducing incremental innovation into existing product lines and catering to the specific needs of foreign buyers. In other words, whereas LME firms follow a niche *product* strategy, HME firms pursue a niche *market* strategy. In this process, the state in HMEs will often serve as the catalyst that facilitates the transition of the previously self-sufficient defence industry to one geared toward the export market. As it becomes increasingly clear that autarky in the defence sector is no longer viable, political leaders in HMEs will try to shake firms out of their reliance on domestic demand by introducing greater competition into the defence procurement process. Simultaneously, utilizing the extensive policy tools available at their disposal, these leaders will aid firms in their new endeavors, such as support for research and development (R&D) or new trade ventures. Table 2 below summarizes our argument about how the characteristics of HMEs shape defence industry reform in those political economies and how HMEs differ from other types in this regard.[35]

Table 2. Defence-Industry Reform in HME and Other Varieties of Capitalism

Variety of Capitalism	Main Mode of Coordination	Comparative Advantage	Trajectory of Defence Industry Reform
HME	Hierarchy	Products that promptly respond to new and specific needs of buyers	Key actors in each VoC utilize the main mode of coordination to enact reforms that take advantage of the VoC's comparative advantage.
LME	Market forces	Products involving radical innovation	
CME	Strategic coordination	Products involving incremental innovation	

To demonstrate the plausibility of our theory of defence-industry reform in HMEs, we conduct a case study of Korea, a mid-level arms producer with a 2.7 percent share in global arms exports (2016-2020).[36] Korea is a prototypical HME where 54.5 percent of publicly traded firms were owned by families as of 2008.[37] Moreover, the revenue of the ten largest *chaebols* (family-owned conglomerates) amounted to 52 percent of the combined revenue of Korea's 500 largest firms in 2017.[38] In addition, the state has traditionally been involved in industrial policies[39] and continues to play an important role in steering the economy, despite some decline in the level of activism in recent times.[40] For these reasons, the Korean case provides an appropriate setting to examine how the institutional features of an HME have shaped defence-industry reform in the face of globalization.

As noted, the case study is intended as a plausibility probe, "an intermediary step between hypothesis generation and hypothesis testing."[41] By showing that the causal mechanisms outlined above indeed operated in the Korean context, we seek to demonstrate the plausibility of the theory and thus its potential applicability to other HMEs.[42] Our focus is on the overall pattern of reform at the national level and we largely rely on official government publications, national and firm-level data published by research institutes and think tanks, and Korean media reports of the major events that occurred in the country's defence sector.

Reform of the Korean Defence Industry

As noted above, an important development in global arms production over the past decade has been the transformation of Korea into a major global arms exporter. Korean weapons sales have seen more than a tenfold increase from 2006 to 2017 from an estimated $250 million to $3.19 billion, with sales to nearly 90 countries worldwide by the end of 2016.[43] Moreover, the Korean defence industry produces and exports more advanced weapons systems, such as *Jang-Bogo*-class submarines and K-9 howitzers, than it did in the past..[44] Today, Korea possesses

"one of the most sophisticated arms industries among the newly industrial countries," with "a high degree of self-sufficiency in defense acquisition."[45]

Yet, Korea's rise in the global arms market is a relatively recent phenomenon and its defence industry only started in earnest during the 1970s with the initiation of the *Yulgok* Project under the Park Chung-hee regime.[46] With the passing of the Special Law on the Promotion of the Defense Production and Procurement (1973),[47] the ambitious drive to establish "a basic foundation for self-defence capability for the twenty-first century" was thus set in motion, with the goal of promoting a "stable business environment" for firms participating in the weapons procurement process.[48]

Local arms production, guided by a twin strategy of "security and development," continued to expand throughout the 1980s and 1990s.[49] To facilitate this process, the Defence Industry Specialization and Serialization Scheme was implemented in 1983. The scheme was designed to protect defence firms from excessive competition and thereby foster their development by creating various categories of defence products and giving certain firms exclusive production rights for each category. The scheme also sought to minimize overlapping investments.[50]

While the drive for greater indigenization led to the guided expansion of the defence sector, Korea faced fundamental problems as a second-tier producer of weapons. Its growing defence industry could not achieve sufficient economies of scale and maintain (or lower) production costs solely on domestic military consumption alone. For instance, at one point in the late 1980s, production facilities "were operating at an average rate of only 59.9 percent."[51] In other words, defence technonationalism in an era globalization was not only costly but also unsustainable in the long run, and Seoul had to push through with a "strategy [of] promotion of arms exports" to survive and remain profitable in the global arms market.[52]

How can we explain Korea's ultimate success in addressing the challenges of globalization? Existing works that focus specifically on the Korean defence industry provide valuable insights

on which policies and external conditions assisted the growth in Korean arms exports. Regarding policies, Ik-Seong Na and Jun-Geun Jang report that export diversification contributed to the increase in Korean arms exports.[53] As for external conditions, Suk-Hyun Kim finds that worldwide military expenditure positively relates to and exchange rates and global economic crisis negatively relate to Korean arms exports, whereas Na and Jang conclude that more democratic and politically stable countries are more likely to import Korean arms.[54] Yet, these works remain limited in that they do not explain why Korea was able to adopt such policies or take better advantage of propitious external conditions than other countries. To address these more fundamental questions, we suggest that there is a need for a broader political-economic framework that highlights the distinct characteristics of Korea as an HME arms producer.

Consistent with the HME framework outlined above, two primary actors were instrumental in the transformation of the Korean defence sector: the state and chaebols. The state introduced free-for-all competition in the domestic procurement process through a major reform initiative intended to shake the defence firms out of their complacency, while simultaneously increasing the incentive and support for firms seeking to venture into the export market. The chaebols also actively responded to globalization and the state's reform initiative by consolidating among themselves to enhance efficiency and achieve synergy.

Role of the state in the transformation of the Korean defence industry

The first important player in the transformation has been the state, which has fundamentally guided the Korean defence industry with a heavy hand since the very start and continues to play a significant role in the industry's recent growth. The state has pursued a two-pronged approach to defence industry reform: fostering greater competition in the domestic procurement process to enhance the global competitiveness of firms, and providing support for firms in R&D and in targeting new export markets. Regarding the former, in 2006, the Roh

Moo-hyun administration decided to phase out the Specialization and Serialization Scheme that had guided the Korean defence industry by 2008,[55] as part of Defense Reform 2020, which aimed to achieve a "self-reliant advanced national defense through the creation of a technology-intensive military structure and future-oriented defense capability."[56] In part, the repeal of the Specialization and Serialization Scheme was a response to criticism that firms lose incentives to innovate and cut costs once becoming designated contractors. In addition, the Roh administration sought to lower entry barriers for new entrants into the domestic procurement market.[57]

Successive administrations also aimed to aid the Korean defence sector in its pursuit of becoming an export-oriented industry, beginning with the establishment of the Defense Acquisition Program Administration (DAPA) in 2006. Through DAPA, the state further streamlined the organizational process and pushed for greater inter-agency cooperation between the different branches, such as Korean Defense Industry Trade Support System and Korea Trade-Investment Promotion Agency, for the efficient export and promotion of weapons technology.[58] Moreover, the centralized organizational structure would allow the state to quickly resolve conflicts of interest between branches in a top-down manner through high-level committees, such as the Defense Industry Development Committee.[59] Such inter-agency reforms allowed for a coordinated arms procurement decision-making process through which long-term defence-related R&D and planning was made much more efficient. The institutional restructuring helped the state prioritize "R&D and production for weapon systems with a long life-cycle… [and] types of weapon and weapons technology which can contribute to the development of indigenous arms production capabilities and offer spin-off benefits for civilian industry."[60]

As the state redirected the defence industry, it provided extensive support in the form of both "direct and indirect subsidies to manufacturers, underwriting defence research and

development planning, and designating firms as monopolistic suppliers of critical military development."[61] For instance, tax breaks of up to 50 percent and low interest rates were introduced to allow exporting firms, particularly small-medium enterprises, to be more globally competitive.[62] The state, moreover, implemented a tailored approach to weapons sales by providing the necessary assistance suited to the buyer country, such as technology transfers and special financial packages.[63]

In sum, the state has coordinated with and provided various incentives for the defence firms in its push to make the Korean defence industry more competitive globally. The recently passed 2021 Law on the Development and Assistance of the Defense Industry makes state support for the defence industry explicit. In particular, Article 16 articulates that, to foster defence industry export cooperation, the state would sanction transfer of defence technology and offer exemptions (or reduction) in the provision of offsets through negotiations.[64] At the sixth Interagency Defense Industry Development Council meeting, then-Minster of Defense Jeong Kyeong-doo succinctly articulated this position by stating that the overarching goal of the Korean defence industry is to transform itself from a "chaser" to a "first mover."[65]

The clearest recent manifestation and culmination of such state-led initiative to promote arms exports is the creation of DAPA's Defense Export Promotion Center (DExPro) in 2018. DExPro was initiated to serve as an avenue for arms manufacturing firms to effectively coordinate with both the government and other relevant domestic players in building an export-led defence industry.[66] As such, the state's ultimate aim was not only to integrate all the key players but also to provide assistance to various associated companies on complex issues such as sales licenses, offsets provision, and transfer of technology to client states.[67] DExPro plays a pivotal role within such state schemes via its active role in promoting inter-agency cooperation and resolving the hurdles that firms face in targeting the export market. Now, Korean defence firms can submit all requests related to arms exports to DExPro, and it is

required to process them either within seven days for requests that are largely administrative in nature or within thirty days for those involving inter-agency coordination or policy decision.[68]

In a nutshell, the state remains firmly entrenched at the heart of the Korean defence industry's transformation into an export-oriented sector in the post-Cold War era. Consistent with the predicted behaviors of states in successful HME cases, the Korean state played a central role in re-orienting the defence sector in face of globalization. Successive Korean administrations initiated legislative reforms to make defence firms globally competitive and fostered greater cooperation with other commercial and industrial sectors for R&D and weapons procurement. Along with such reforms, the state also actively provided the necessary financial and diplomatic assistance to exporting firms.

Role of chaebols in the transformation of the Korean defence industry

Along with the state, the chaebols played an equally significant role in the transformation of the Korean defence industry. Similar to other sectors of the economy, Korean defence sector has been dominated by a small number of large firms affiliated with one of the chaebols. As one example, large firms' share of production in defence industry amounted to between 79.9% and 83.1% from 2008 to 2013.[69] Thus, it is perhaps no surprise that chaebols spearheaded the reform efforts within the industry. From around 2014, the Korean defence industry went through a process of rapid restructuring during which the chaebol-affiliated defence firms consolidated, through a series of friendly takeovers, into a smaller number of larger, more integrated entities with greater global market competitiveness. Such a swift restructuring would not have been possible without the chaebol owners' concentrated decision-making authority.

Among the chaebols, Hanwha has been the central actor in the Korean defence-industry mergers and acquisition (M&A) market, eventually emerging as a global player with substantial size and notable export successes thus far. In 2020, the sales of Hanwha's defence

subsidiaries ($4.3 billion)[70] comprised about one-third of total defence sales in Korea ($13 billion).[71] Korea Aerospace Industries (KAI) came in at a distant second with $2.7 billion. Thus, an analysis of Hanwha's response to globalization of arms production should provide important insights into the reform of the Korean defence-industry as a whole, especially because Hanwha gained its dominant status within the industry during this process.

Before a series of mergers, Hanwha was already a major player in the Korean defence sector with a revenue of $1 billion in 2014, much of it coming from the sale of "ammunition, bomb fuses, rockets and UAVs."[72] However, its defence subsidiaries combined were smaller than other firms such as LIG Nex 1, KAI, and Samsung Techwin, all of which made it to the "2014 Top 100" defence firms list, while Hanwha did not.[73] From 2014, Hanwha started to pursue an aggressive M&A strategy, first by approaching Samsung, which at the time had two subsidiaries in the defence sector: Samsung Techwin, manufacturer of video surveillance systems, gas turbines, and the K-9 howitzer; and, Samsung Thales, a developer of combat and radar systems.[74] Hanwha acquired both firms for about $1.8 billion, which amounted to the largest merger in Korea since the 1997 financial crisis.[75] Shortly afterwards, it also purchased Doosan Defense Systems & Technology (DST), which specialized in armoured vehicles and missile launch systems, for $604 million.[76]

Hanwha's main goal in these M&As was to transform itself into an export-market-oriented, comprehensive defence firm. After being chosen as Doosan DST's preferred bidder, CEO Shin Hyun-Woo of the newly re-named Hanwha Techwin explained that Hanwha sought to "enhance competitiveness by units and improve efficiency to make forays into overseas markets" through the takeover and also stated that the long-term plan was for Hanwha to become a global defence firm.[77] Many observers at the time noted that Hanwha was aiming to bring about a synergy between its existing and newly acquired specializations. Jang Won-joon, a researcher at the Korea Institute of Industrial Economics and Trade, commented that since

"Samsung Thales produces radars, sensors and combat software systems, which are crucial for developing advanced weapons systems," this would allow Hanwha to get "a foothold for developing a full range of modern warfare weapons from sensors to striking weapons."[78]

Likewise, it was pointed out that through the takeover of Doosan DST, Hanwha's "vertical integration ranging from ammunition to weapon, electronic and surveillance system components and complete self-propelled guns will be strengthened further, creating a synergy effect."[79] Hanwha's post-merger rationalization of its various defence units also prioritized maximizing synergies between its technological capabilities.[80] In addition, Hanwha also sought to achieve economies of scale to enhance its global competitiveness. A Hanwha manager explained that "to respond pre-emptively to paradigmatic shifts in the defence sector characterized by increasing enlargement of firms, it is necessary to attain economies of scale that will allow us to achieve competitiveness in technology, sales, and costs, and thereby win the competition in the global market."[81]

Thus, instead of specialization, Hanwha pursued comprehensiveness in response to globalization. This contrasts at once with both defence firms in LMEs, which pivoted to producing niche products that take advantage of radical innovation, and those in CMEs, which have focused on streamlining the manufacturing process of its existing core product lines. In fact, the explicit goal of Hanwha's chairman in pursuing the M&As was to transform the company into a Korean version of Lockheed Martin.[82] However, even with Hanwha's efforts to size up through vertical and horizontal integration, it still cannot match the economies of scale achieved by global defence MNCs, whose revenues are approximately 10 times greater.[83] To overcome this obvious limitation, Hanwha implemented a strategy of responding quickly to new market opportunities and tailoring its products to local needs. For example, in its contract with Finland, Hanwha agreed to supply used K-9s that were upgraded with up-to-date technology to accommodate the budget constraints of the country. Hanwha also promised to

locally produce 50% of the parts for its K-9 exports to India, in line with the Modi government's "Make in India" initiative. Moreover, the K-9 units produced in India have been modified to better withstand the country's heat and desert terrain.[84]

The consolidation of Hanwha's defence business seems to have been a success thus far. In addition to Egypt, Australia, and Poland mentioned above, Hanwha has also exported K-9 howitzers to India, Finland, Norway and Estonia since 2014.[85] Due to these and other export successes, Hanwha Group's defence revenue has nearly tripled between 2014 to 2020 from $1.5 billion to $4.3 billion, and its global ranking rose from 53rd to 28th.[86] Analysts attribute Hanwha's impressive performance to the synergies among its old and new subsidiaries,[87] and the strategy of localization in targeting export markets.[88]

The rapid transformation of Hanwha into a defence firm with global stature and the niche market strategy it adopted would not have been possible without the hierarchical mode of decision-making characteristic of HMEs. Hanwha's Kim Seung-yeon, a second-generation owner, initiated the M&A with Samsung as a way to carry Hanwha forward amid the lagging sales in its other businesses.[89] Kim is reported to have contemplated the takeover for six months, "considering all variables," but once his mind was made up, the rest of the process was a breeze, taking just three months to sign the deal.[90] Likewise, the niche market strategy of responding quickly to new opportunities and catering to local needs would not have been viable without the hierarchical structure that allows rapid decision-making in a top-down manner.

Conclusion

Globalization has brought about a whirlwind of change to the arms industry in the post-Cold War era. With rising production costs and increasingly sophisticated nature of modern weapons technology, the traditional model of domestic arms production has been regarded unsustainable in the long-run. In face of growing defence-industrial globalization, many second-tier arms producers have striven to maintain a balance between autonomy and staying globally

competitive. Yet, much variation exists in how they have adjusted to the changing nature of the global arms market. To capture the full spectrum of the reforms that have taken place, we have expanded the VoDC framework by introducing the category of HMEs, evident in many Asian states. We have argued that the institutional features of HMEs—concentrated ownership in the hands of a small number of families and extensive involvement of the state in the economy—offer a distinct comparative advantage for the defence industry: the ability to respond quickly to new market opportunities through centralized decision-making and to tailor products to meet the needs of foreign buyers while doing so.

To demonstrate our theory, we conducted case study research on the transformation of the Korean defence industry since the country initiated a set of major reforms in 2008. Contrary to existing predictions, the defence industry in Korea, a prototypical HME, was able to transform itself into a global exporter of weapons over the past decade. This reorientation of the defence sector was possible due to changes jointly initiated by the state and the chaebols. The Korean state institutionally restructured and concurrently undertook legislative reforms that made arms procurement more competitive and the decision-making process in the defence sector more centralized and efficient. In addition, the state launched programs to support long-term R&D as well as provide tailored packages to exporting firms to assist with their overseas sales. For their part, the chaebol owners initiated a top-down process of rapid restructuring and domestic mergers. This allowed the defence firms to consolidate their positions as comprehensive firms and effectively target new export markets.

We conclude with two important implications of our study. First, even though this article has only explored the transformation of the Korean defence industry, given that many second and third-tier supplier countries, particularly in Asia, are categorized as HMEs, we believe that our expanded VoDC theory will provide a more comprehensive framework for understanding the global arms market moving forward. Second, our empirical study shows how an aggressive

and tailored strategy has contributed to Korea's success in the global arms market. With the United States and other first-tier suppliers focused on producing the most advanced and sophisticated weapons technology,[91] second-tier suppliers have emerged to meet the strategic and military needs of states left unfulfilled by the first-tier suppliers.[92] Subsequently, we cautiously anticipate other second-tier suppliers to also step in and fill the weapons procurement gap in the future, building on the distinct comparative advantages that arise from the particular institutional settings that characterize their economies.

[1] SIPRI, "Total Arms Sales for the SIPRI Top 100 2002-2020," accessed 5 February 2022, https://sipri.org/sites/default/files/Total-arms-sales-SIPRI-Top-100-2002-2020.xlsx.

[2] Stephen Brooks, *Producing Security: Multinational Corporations, Globalization, and the Changing Calculus of Conflict* (Princeton: Princeton University Press, 2005); Bryan Mabee, *The Globalization of Security: State Power, Security Provisions and Legitimacy* (Basingstoke: Palgrave Macmillan, 2009), 91.

[3] Wally Struys, "The Future of the Defence Firm in Small and Medium Countries," *Defence and Peace Economics* 15, no. 6 (2004): 551-564; Keith Hayward, "The Globalisation of Defence industries," *Survival* 43, no. 2 (2001): 115-132.

[4] Following Keith Krause's definitional type, second-tier suppliers are states that "have a much lower overall R&D, domestic procurement and production base [than first-tier states], and will depend more heavily on exports or state subsidies." Keith Krause, *Arms and the State: Patterns of Military Production and Trade* (Cambridge: Cambridge University Press, 1992), 31-32. As Richard Bitzinger notes, South Korea is one of the few second-tier producers in the Asia-Pacific and is categorized as "newly industrialized economies containing modest (but growing, both in terms of range of production and military capabilities) military-industrial complexes." Richard Bitzinger, *Arming Asia: Technonationalism and Its Impact on Local Defense Industries* (London: Routledge, 2017), 4.

[5] Bee Yun Jo, "Defense-Industrial globalization and the Northeast Asian Varieties of Fighter-Jet Industry: Debating the Exogenous-Endogenous Factors in Determining the Northeast Asian Varieties of F-35 JSF

Acquisition Patterns," *Asian Perspective* 41, no. 4 (2017): 559-591; Marc DeVore, "Reinventing the Arsenal: Defense-Industrial Adaptation in Small States," *Korean Journal of Defense Analysis* 28, no. 1 (2016): 31-48.

[6] SIPRI, "Top List TIV tables," SIPRI Arms Transfers Database, accessed 7 February 2022, https://armstrade.sipri.org/armstrade/page/toplist.php.

[7] Jeremy Binnie, "UAE Announces South Korean M-SAM Order," *Janes*, 16 November 2021, https://www.janes.com/defence-news/news-detail/uae-announces-south-korean-m-sam-order.

[8] Yoon-seung Kang, "South Korea to Supply 30 Units of K-9 Howitzer to Australia under 930 Billion-Won Deal," *Yonhap News Agency*, 13 December 2021, https://en.yna.co.kr/view/AEN20211213002100325; Hong Yoo, "Hanwha to Supply K9 Howitzers to Egypt in Record Deal," *The Korea Herald*, 3 February 2022, http://www.koreaherald.com/view.php?ud=20220203000734; Dong-Hyun Kim, "S. Korean Defense Firms Receive $15 Bn Order from Poland," *The Korea Economic Daily*, 27 July 2022, https://www.kedglobal.com/aerospace-defense/newsView/ked202207270021.

[9] Richard Bitzinger, "The Defense Industry of the Republic of Korea," in *The Economics of the Global Defence Industry*, eds. Keith Hartley and Jean Belin (London: Routledge, 2019), 378-395.

[10] Marc DeVore, "Defying Convergence: Globalisation and Varieties of Defence-Industrial Capitalism," *New Political Economy* 20, no. 4 (2015): 569-593.

[11] Bent Flyvbjerg, "Five Misunderstandings about Case-Study Research," *Qualitative Inquiry* 12, no. 2 (2006): 219-245, see 230-231.

[12] Jack S. Levy, "Case Studies: Types, Designs, and Logics of Inference," *Conflict Management and Peace Science* 25, no. 1 (2008): 1–18, see 6-7.

[13] Richard Carney, "Varieties of Hierarchical Capitalism: Family and State Market Economies in East Asia," *Pacific Review* 29, no. 2 (2016): 137-163.

[14] Alexander Gershenkron, *Economic Backwardness in Historical Perspective* (Cambridge: Harvard University Press, 1962).

[15] Brooks, *Producing Security*; Mabee, *The Globalization of Security*; Soul Park, "Globalization and the Incremental Impact on the Security and Defense Sector," in *Handbook on the Geographies of Globalization*, eds. Richard Kloosterman, Virginie Mamdouh, and Pieter Ternhorst (Cheltenham: Edward Elgar, 2018), 318-328.

[16] DeVore, "Defying Convergence," 570-571; Richard Bitzinger, "The Globalization of the Arms Industry: The Next Proliferation Challenge," *International Security* 19, no. 4 (1994): 170-198; David Kirkpatrick, "Trends in

the Costs of Weapons Systems and the Consequences," *Defence and Peace Economics* 14, no. 3 (2004): 259-273.

[17] Marc DeVore, "Arms Production in the Global Village: Options for Adapting to Defense-Industrial Globalization," *Security Studies* 22, no. 3 (2013): 532-572, see 534-535.

[18] Trevor Taylor, "Defence Industries in International Relations," *Review of International Studies* 16, no. 1 (1990): 59-73.

[19] Richard Bitzinger, "Globalization Revisited: Internationalizing Armaments Production," in *The Global Arms Trade: A Handbook*, ed. Andrew Tan (London: Routledge, 2010), 208-220.

[20] Struys, "The Future of the Defence Firm"; Hayward, "The Globalisation of Defence Industries."

[21] Keith Hartley, "The Future of European Defence Policy: An Economic Perspective," *Defence and Peace Economics* 14, no. 2 (2003): 107-115; Keith Hartley and Todd Sandler, "The Future of the Defence Firm," *Kyklos* 56, no. 3 (2003): 361-380.

[22] Çağlar Kurç, "Between Defence Autarky and Dependency: The Dynamics of Turkish Defence Industrialization," *Defence Studies* 17, no. 3 (2017): 260-281; Richard Bitzinger, "Asian Arms Industries and Impact on Military Capabilities," *Defence Studies* 17, no. 3 (2017): 295-311.

[23] DeVore, "Arms Production"; DeVore, "Defying Convergence."

[24] Lucio Baccaro and Chris Howell, "A Common Neoliberal Trajectory: The Transformation of Industrial Relations in Advanced Capitalism," *Politics and Society* 39, no. 4 (2011): 521-563; Wolfgang Streeck, *Re-forming Capitalism: Institutional Change in the German Political Economy* (Oxford: Oxford University Press, 2009).

[25] Peter Hall and David Soskice, "An Introduction to Varieties of Capitalism," in *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, eds. Peter Hall and David Soskice (Oxford: Oxford University Press, 2001), 1-68.

[26] DeVore "Defying Convergence," 581.

[27] Bruno Amable, *The Diversity of Modern Capitalism* (Oxford: Oxford University Press, 2003), 13-14.

[28] Hall and Soskice, "An Introduction," 21.

[29] Won-joon Jang, Jae-pil Song, and Mi-jung Kim, "2018 KIET Bangwisaneop tongye mit gyeongjaengryeok baekseo" [2018 KIET defence industry statistics and competitiveness white paper], Korea Institute for Industrial Economics and Trade, 30 January 2019, accessed 7 August 2021, https://bit.ly/3OkCESY.

[30] SIPRI, "Sources and Methods," accessed 7 February 2022, https://www.sipri.org/databases/armstransfers/sources-and-methods#Contents.

[31] Ben Schneider, "Hierarchical Market Economies and Varieties of Capitalism in Latin America," *Journal of Latin American Studies* 41, no. 3 (2009): 553-575, see 557.

[32] Carney, "Varieties of Hierarchical Capitalism."

[33] Carney, "Varieties of Hierarchical Capitalism," 142-145.

[34] The discussion of institutional characteristics and the comparative advantages of HMEs in this and the following paragraph are largely based on Carney, "Varieties of Hierarchical Capitalism," 145-150.

[35] It should be noted that our argument is not that all HME arms producers will successfully meet the challenges of globalization. Rather, our point is that successful reform of the defence industry in an HME will look different from that in an LME or a CME. Moreover, an adjustment strategy that maximizes the comparative advantage of HMEs should be seen as a necessary condition for an HME's success in transforming its defence industry, not a sufficient condition. Certainly, other factors will also come into play.

[36] Pieter Wezeman, Alexandra Kuimova, and Siemon Wezeman, "Trends in International Arms Transfer, 2020," (Solna: SIPRI, 2021), accessed 23 October 2021, https://doi.org/10.55163/MBXQ1526.

[37] Carney, "Varieties of Hierarchical Capitalism," 139.

[38] Pyeong-Yang Wi, "Hanguk 500 daegieopui dongtaejeok byeonhwabunseokgwa sisajeom" [An analysis of the dynamic change of Korea's top 500 large firms and implications], Economic Reform Research Institute, 29 August 2018, accessed 2 November 2021, http://www.erri.or.kr/bbs/board.php?bo_table=B11&wr_id=326, 22.

[39] Alice Amsden, *Asia's Next Giant: South Korea and Late Industrialization* (Oxford: Oxford University Press, 1989); Stephan Haggard, *Pathways from the Periphery: The Politics of Growth in the Newly Industrializing Countries* (Ithaca: Cornell University Press, 1990).

[40] Karl Fields, "Not of a Piece: Developmental States, Industrial Policy, and Evolving Patterns of Capitalism in Japan, Korea, and Taiwan," in *East Asian Capitalism: Diversity, Continuity and Change*, eds. Andrew Walter and Xiaoke Zhang (Oxford: Oxford University Press. 2012), 46-67; Elizabeth Thurbon, *Developmental Mindset: The Revival of Financial Activism in South Korea* (Ithaca: Cornell University Press, 2016).

[41] Levy, "Case Studies," 3.

[42] In doing so, we claim generalizability, yet in a self-consciously tentative manner given the limitations and potentials of single-case studies. As Thomas Pepinsky notes, "all claims about the generalizability of findings from one country rely on assumptions about the comparability of the different national contexts." Here, we

show that Korea has the characteristics that are representative of HMEs, and thus establish what Paul Steinberg refers to as "system resonance"—that is, generalizability obtained by studying a representative case from a group that shares a distinct set of characteristics. In addition, as David Collier, Henry Brady, and Jason Seawright point out, the use of causal-process observations within a single-case study enables an in-depth test of the causal mechanisms, an important part of causal inference. Thomas Pepinsky, "The Return of the Single-Country Study," *Annual Review of Political Science* 22: 187-203, see 196; Paul F. Steinberg, "Can We Generalize from Case Studies?" *Global Environmental Politics* 15, no. 3: 152-175, see 166-168; David Collier, Henry E. Brady, and James Seawright, "Sources of Leverage in Causal Inference: Toward an Alternative View of Methodology" in *Rethinking Social Inquiry: Diverse Tools, Shared Standards*, eds. Henry E. Brady and David Collier (Lanham: Rowman and Littlefield, 2004), 229-266, see 252-255.

[43] Young-soo Ahn and Mi-jung Kim, "2020 nyeondaereul hyanghan bangwisaneop baljeon haeksim isyu" [Key issues on the development of the defence industry in the 2020s], Korea Institute for Industrial Economics and Trade, 31 October 2018, accessed 8 October 2021, https://bit.ly/3M725Wk, 80.

[44] International Trade Administration, "South Korea Country Commercial Guide: Defense Industry Equipment," accessed 17 October 2021, https://www.trade.gov/knowledge-product/korea-defense-industry-equipment; Novan Iman Santosa, "RI Orders 3 Submarines Worth $1B in Regional 'Catch-Up,'" *Jakarta Post*, 22 December 2011, https://bit.ly/3EjbRSJ.

[45] Bitzinger, *Arming Asia*, 94.

[46] Chung-in Moon, "Military Self-reliance, the Big Push, and the Growth of the Defense Industry," in *Korea and the World: Contemporary History and its Implications*, eds. M. Jae Moon et al. (Seoul: National Museum of Korean Contemporary History, 2015), 205-38; Jinki Kim, "A Study on Korea's Defense Industry Development Strategy," *Journal of Northeast Asian Studies* 58 (2011): 119-138, see 122.

[47] The Special Law would be amended 14 times until it was finally abrogated during Roh Moo-hyun's tenure.

[48] Jong Chul Choi, "South Korea," in *Arms Procurement Decision Making, Volume I: China, India, Israel, Japan, South Korea and Thailand*, ed. Ravinder Singh (New York: Oxford University Press, 1998), 177-210, see 182-183; Choonjoo Lee, Jeong-dong Lee, and Tai-yoo Kim, "Innovation Policy for Defense Acquisition and Dynamics of Productive Efficiency: A DEA Application to the Korean Defense Industry," *Asian Journal of Technology Innovation* 17, no. 2 (2009): 151-171, see 153-154.

[49] Richard Weitz, "South Korea's Defense Industry: Increasing Domestic Capabilities and Global Opportunities," *Korea Economic Institute of America Academic Paper Series*, 7 November 2013, accessed 8

December 2021, http://www.keia.org/sites/default/files/publications/kei_aps_richard-weitz_final.pdf, 2; Richard Bitzinger and Mikyoung Kim, "Why Do Small States Produce Arms? The Case of South Korea," *Korean Journal of Defense Analysis* 17, no. 2 (2005): 183-205, see 187-188.

[50] Kwang-Yeol Kim, "The Defense Industrial Policy of the Roh Moo-Hyun's Administration," *Journal of Korean Political and Diplomatic History* 27, no. 1 (2005): 223-262, see 233-235.

[51] Dean Cheng and Michael Chinworth, "The Teeth of the Little Tigers: Offsets, Defense Production and Economic Development in South Korea and Taiwan," in *The Economics of Offsets: Defense Procurement and Countertrade*, ed. Stephen Martin (London: Routledge, 1996), 245-298, see 250; Dong Joon Hwang, "South Korea's Defense Industry: An Asset for the U.S.," *Heritage Foundation Asian Studies Center*, 10 December 1985, accessed 27 September 2021, https://www.heritage.org/report/south-koreas-defense-industry-asset-the-us, 4.

[52] Cheng and Chinworth, "The Teeth of the Little Tigers," 250.

[53] Ik-Seong Na and Jun-Geun Jang, "A Study on the Export Competitiveness of Korean and Israeli Arms: Focusing on Arms Export Diversification," *Journal of the Korea Association of Defense Industry Studies* 28, no. 1 (2021): 15-30.

[54] Suk-Hyun Kim, "An Empirical Study on the Direction of Growth in Korean Defense Industry Exports," *Journal of the Korea Association of Defense Industry Studies* 27, no. 2 (2020), 15-29; Ik-Seong Na and Jun-Geun Jang, "An Empirical Study on the Factors Affecting Arms Imports: Focused on the Korean Arms Importing Countries," *Journal of the Korea Association of Defense Industry Studies* 27, no. 1 (2020): 53-66.

[55] Subin Kim, "Changjogyeongje haeksim donglyeok sidong kkeeojinda" [The main driver of creative economy turning off], *DongA Weekly*, 15 December 2015, https://weekly.donga.com/List/3/all/11/152509/1.

[56] Sam Mayper, "The Evolution of South Korean Defense Industry: An Emerging Global Player," *Second Line of Defense*, 16 November 2013, https://sldinfo.com/2013/11/the-evolution-of-south-korean-defense-industry-an-emerging-global-player/.

[57] Nak-gyu Yang, "Bangsacheong mun yeolmyeonseo jeonmunhwagyeyeolhwa pyejidwaetta" [Specialization and systematization abolished with the opening of DAPA], *Asia Business Daily*, 4 October 2020, https://www.asiae.co.kr/article/2020092910370577696.

[58] Do-hee Kim, "Bangwisaneop suchul jiwonchegye hyeonhwang mit gaeseonbangan" [The current state of the defence industry export support system and areas of improvement], National Assembly Research Service, 16

October 2020, accessed 7 November 2021, https://www.nars.go.kr/report/view.do?cmsCode=CM0155&brdSeq=31798, 3-4.

[59] Defense Acquisition Program Administration (DAPA), "Bangwisaeopcheong, bangsansuchul wonseutopjiwonchegye guchuk chaksu" [DAPA creating a one-stop assistance system for weapons export], ROK Policy Briefing, 24 November 2018, accessed 30 October 2021, https://www.korea.kr/news/pressReleaseView.do?newsId=156305374.

[60] Choi, "South Korea," 185-186.

[61] Weitz, "South Korea's Defense Industry," 4.

[62] Soon-Ho Jung, "Bangsansuchuljiwonjedo hyeonhwang mit baljeonbanghyang," [The state of defence industrial export support system and directions for improvement], Korea Institute for Industrial Economics and Trade, 9 August 2012, accessed 18 November 2021, https://www.kiet.re.kr/research/economyDetailView?detail_no=1076.

[63] Jung, "Bangsansuchuljiwonjedo."

[64] Ministry of Defense, "Jeongbubucheoga himeul moa bangwisaneopui hwallyeokeul buleoneotta!" [Government branches blow life into the defence industry!] ROK Policy Briefing, 11 August 2021, accessed 20 November 2021, https://www.korea.kr/news/pressReleaseView.do?newsId=156465821.

[65] Ministry of Defense, "Bangwisaneop, 'chugyeokhyeong' beoseona 'seondohyeong'euro" [Defence industry, from "chaser" to "first mover"], ROK Policy Briefing, 9 July 2020, accessed 30 October 2021, https://www.korea.kr/news/pressReleaseView.do?newsId=156400202.

[66] Yonhap News, "S. Korea Launches Arms Export Promotion Center," 19 November 2018, https://en.yna.co.kr/view/AEN20181119005751315.

[67] DAPA, "Bangwisaeopcheong"; Kim, "Bangwisaneop," 5-7.

[68] DAPA, "Bangwisaeopcheong."

[69] Young-soo Ahn, Won-joon Jang, and Hyun-gi Min, "2014 KIET Bangwisaneop tongye mit gyeongjaengryeok baekseo" [2014 KIET defence industry statistics and competitiveness white paper], Korea Institute for Industrial Economics and Trade, 29 December 2014, accessed 10 November 2021, https://bit.ly/3EiVJk5, 10.

[70] Defense News, "2020 Top 100," accessed 3 January 2022, http://people.defensenews.com/top-100/.

[71] "Bangsaneopche gyeongyeongsiltae" [Business condition of defence firms], E-nara jipyo, accessed 15 January 2022, https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1703. Figure converted into

US dollars using the average exchange rate in 2020. Woori Bank Foreign Exchange Center, "Giganbyeolpyeonggyunhwanyuljohoe" [Periodic average exchange rate search], accessed 15 January 2022, https://spot.wooribank.com/pot/Dream?withyou=FXXRT0016.

[72] Jeff Jeong, "Hanwha Emerges as South Korea's Defense Giant," *Defense News*. 26 July 2015, https://www.defensenews.com/top-100/2015/07/26/hanwha-emerges-as-south-korea-s-defense-giant/.

[73] Defense News, "2014 Top 100," accessed 7 January 2022, http://people.defensenews.com/top-100/.

[74] Soo-hwan Chae and Jin-myung Lee, "Hanhwae palin samseong 4saneun eotteon got" [What the four Samsung firms sold to Hanwha do], *Maeil Business*, 27 November 2014, https://www.mk.co.kr/news/special-edition/view/2014/11/1467661/.

[75] Maeil Business, "Samseong-hanhwa bikdil, gyeyeolsa 4 got maegak" [Big deal between Samsung and Hanwha, four subsidiaries sold], 26 November 2014, https://www.mk.co.kr/news/business/view/2014/11/1466794/.

[76] Wook Chung, "Hanwha Techwin Selected as Preferred Bidder for Doosan DST," *Pulse*, 30 March 2016, https://pulsenews.co.kr/view.php?year=2016&no=236170.

[77] Chung, "Hanwha Techwin." As a Hanwha manager noted, the "centre of gravity is moving to exports" in the defence sector and the takeovers were a response to the challenges posed by this shift in emphasis to exports. Eunna Bae, "Hanhwageurup hamjeongyong enjin reideo deung bansanjeonja saeopeuro yeongyeok hwakdae" [Hanwha Group expands into the defence electronics sector, including marine engines and radars], *JoongAng Daily*, 4 May 2016, https://www.joongang.co.kr/article/19978842#home.

[78] Jeong, "Hanwha."

[79] Min-hee Jung, "Hanwha Aims to Become One of Top 10 Global Defense Firms, Taking Over Doosan DST," *Business Korea*, 31 March 2016, http://www.businesskorea.co.kr/news/articleView.html?idxno=14255.

[80] Hee-hoon Yoon, "Hanhwageurup bangsan saeop yeongyeok jojeong chaksu … gyeyeolsagan sineoji chugu" [Hanwha Group embarks on realignment of defence business sector… pursues synergies between subsidiaries], *Chosun Biz*, 17 October 2016, https://biz.chosun.com/site/data/html_dir/2016/10/17/2016101702502.html.

[81] Se-jin Lee, "Hanhwa geodeuphanen bangsan jaepyeon … 'gyumoeui gyeongje'kkaji norinda" [Hanwha's repeated restructuring of defence sector … aiming at "economy of scale"], *Herald Business*, 23 October 2018, https://biz.heraldcorp.com/view.php?ud=20181023000426.

[82] Gang-wook Cho, "Gimseungyeon hoejang 'hangukui rokhidmatin' kiunda" [Chairman Kim Seung-yeon to develop Korea's Lockheed Martin], *Asia Business Daily*, 23 January 2015, https://www.asiae.co.kr/article/2015012310412492391.

[83] Defense News, "2021 Top 100," accessed 7 May 2022, http://people.defensenews.com/top-100/.

[84] Yong-won Yoo, "Segye suchulsijang jeolban, hangukui jajupo K9i jibaehanda" [Korea's K-9 self-propelled howitzers rule 50% of the global export market], *Chosun Ilbo*, 6 September 2020, https://bit.ly/3EARRex.

[85] Hanwha Defense, "Geulobeol rideoro doyakhaneun hanhwadipenseu" [Hanwha Defense becoming a global leader], accessed 2 February 2022, https://www.hanwha-defense.co.kr/kor/company/record.do.

[86] Defense News, "2021 Top 100."

[87] Min-seok Kim, "Hanhwabangsan 'hapbyeongsineoji'e mugisuchul sunwi 4dangye" [Hanwha's defence subsidiaries jump four steps in the weapons export rankings thanks to synergies resulting from M&A], *News1*, 18 Mar. 2020, https://www.news1.kr/articles/?3875205.

[88] Yoo, "Segye suchulsijang jeolban."

[89] Gyeong-eop Ho, "Gimseungyeon(Hanhwageurup hoejang)ui 5beonjjae seungbusu" [Fifth bet by Kim Seung-yeon (Hanwha Group Chairman)], *Premium Chosun*, 27 November 2014, https://bit.ly/3L3wK6E.

[90] Jung-joon Ahn, "5nyeonjeon samseongtekwin sadeulin gimseungyeonui hanhwa, maechul 1.8jo 5jo" [Kim Seung-yeon's Hanwha, which purchased Samsung Techwin 5 years ago, increases revenue from 1.8 billion to 5 billion won], *Money Today*, 22 January 2020, https://news.mt.co.kr/mtview.php?no=2020012110545743431.

[91] Jonathan Caverley and Ethan Kapstein, "Who's Arming Asia?" *Survival* 58, no. 2 (2016): 167-184.

[92] For example, see ET Bureau, "India, Philippines ink $375 million BrahMos missiles," *The Economic Times*, 29 January 2022, https://bit.ly/3EjXrBE.