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DOES THE KOREAN ECONOMY DEPEND TOO MUCH ON SAMSUNG?

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Abstract

Korea's traditional growth model has reached an apparent limit. The main reason is because of the ineffectiveness in at least one of the three growth drivers: (1) trade surplus from exporting goods (macro-economy level), (2) manufacturing industry (industry level) and (3) large conglomerates (corporate level). The three drivers intersect into a single factor—Samsung Electronics (Samsung). This paper first answers the question as to whether the Korean economy depends too much on Samsung by setting forth a new classification and characterizing Samsung as a “systemically important corporation (SICO).” This paper shows that Samsung is a “systemically important corporation (SICO)” in terms of size, interconnectedness, and business complexity. If Samsung qualifies as a SICO, to reduce the systemic risk of Korean economy, Samsung should be viewed, treated and regulated accordingly. Two policy issues are emphasized: (1) anti-monopoly and fair trade, and (2) separation of financial business from manufacturing business. This paper also shows that Samsung's success is closely associated with the unique nature of semiconductor technology: constant but gradual changes. In other words, in the semiconductor industry, a similar innovative pattern repeats itself without an unexpected jump. Because of the resonance of this technology with the Korean people, culture and corporate structure, this paper suggests that Korea should search for industries which have a pattern of technology resembling the semiconductor industry (e.g. biosimilar industry) as sectors for future growth.

Key words: *Korea's economy, chaebols, Samsung, systemically important financial institution, systemically important corporation*

Introduction

In order to effectively answer whether the Korean economy depends too much on Samsung Electronics (Samsung),¹ this paper first sets forth a new classification and characterizes Samsung as a “systemically important corporation (SICO).” SICO requires objective and unbiased criteria and should be distinguished from the rather subjective, biased, and even misleading term of “too much.” The “systemically important” concept was coined by the Financial Stability Board (FSB) after the subprime crisis to regulate globally influential financial institutions.² FSB classifies a financial institution as a “systemically important financial institution (SIFI)” if it satisfies one or more of the following conditions: size, interconnectedness, complexity in business model, global activity, and substitutability. Applying these conditions to Samsung can provide new insight on how to identify and characterize the company. As a result, this paper demonstrates that Samsung is a SICO, and is therefore both a main driver of economic growth (upside) and a source of systemic risk (downside). Therefore, this paper argues that Samsung as a SICO should be viewed, treated and regulated accordingly. This paper focuses on two issues: (1) anti-monopoly and fair trade, and (2) separation of financial business from manufacturing business.

In addition, Samsung's success has primarily derived from the nature of the semiconductor industry and technology—namely continuous but gradual change. This paper underscores that the nature of technology fits well with Korean people, education, culture and corporate structure. Therefore, in order to boost its economy, Korea needs to search other sectors which have the pattern of technology resembling the semiconductor industry.

Mr. Hyoung Tae Kim is a Visiting Scholar at the School of Business, The George Washington University. His paper is the seventy-seventh in KEI's Academic Paper Series. As part of this program, KEI commissions and distributes approximately ten papers per year on original subjects of current interest to over 5,000 Korea watchers, government officials, think tank experts, and scholars around the United States and the world. At the end of the year, these papers are compiled and published in KEI's *On Korea* volume.

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Samsung as a Systemically Important Corporation (SICO) in Korea

This paper characterizes Samsung as a “systemically important corporation (SICO),” a concept defined by reference to “systemically important financial institutions (SIFI).”³ SIFI was originally coined by the Financial Stability Board (FSB) to regulate bulge-bracket financial institutions (especially banks) after the subprime crisis. The FSB concluded that the huge and complex financial institutions were responsible for the crisis. Their problems are not limited to themselves but can spread into the financial system and even into the economic system as a whole. In other words, they incur systemic risk. Therefore, FSB designates those financial institutions as SIFIs and imposes stricter regulations on them.

The regulation for SIFI starts with banks because their activities are closely related to systemic risk. However, FSB and regulators have continued to extend the scope of SIFI regulation to include nonbank financial companies such as insurance companies, securities broker dealers, and financial market infrastructure institutions. The argument for extending the coverage of SIFI regulation is that systemic risk stems not only from banks but from other financial institutions.

The same logic can be applied to nonfinancial companies. Systemic risk is not only limited to the financial institutions, but can be brought about by nonfinancial companies (e.g. Nokia, Daewoo). Therefore, we can naturally extend the “systemically important” concept to nonfinancial manufacturing companies. This is the reason why we need to define and identify a “systemically important corporation (SICO).”

If a company—financial or nonfinancial—is systemically important, the government is likely to inject tax payer money to bail it out if faced with financial distress. Because of the likelihood of government aid, the government can be justified to increase its ex-ante regulation for SIFI or SICO. When it comes to incurring systemic risk, a systemically important nonfinancial company is not that different from a financial company. Thus, to determine whether a nonfinancial company is systemically important, one can apply the same criteria⁴ used for financial institutions. This paper focuses on size, interconnectedness, and complexity of business model.

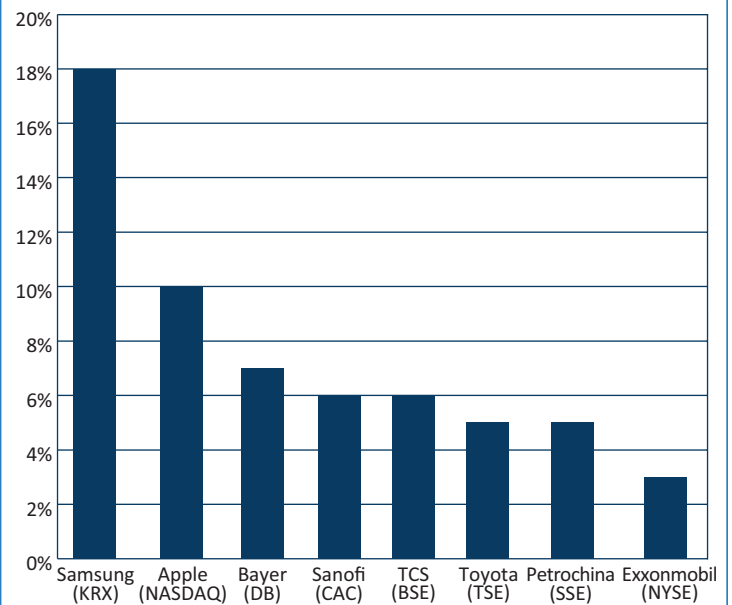
Size

Size is the most important indicator for determining SICO. Among many measures for size, market capitalization is the most widely used and accepted. Samsung Electronics (Samsung) accounts for

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18 percent of the total market capitalization of the Korea Exchange (KRX).⁵ Samsung conglomerate as a whole takes up 28 percent. The comparison of this number with those of the other global top 20 Exchanges shows that the proportion is exceptionally high. For example, the biggest company in the New York Stock Exchange (NYSE), ExxonMobil, accounts for 3 percent of the total market capitalization. Apple is the largest company in NASDAQ, with 10 percent of total market capitalization. Toyota, the largest company in the Tokyo Stock Exchange (TSE), takes up 5 percent. Petrochina also accounts for 5 percent of total market capitalization for the Shanghai Stock Exchange. The proportion of Bayer in Germany and Sanofi in France is 7 percent and 6 percent, respectively.⁶ In terms of relative proportion of market capitalization, Samsung in KRX is conspicuous compared with the other largest market capitalization companies in the top 20 Exchanges (see Figure 1).

Figure 1: Comparison of the Largest Market Cap Companies in Major Exchanges



DB: Deutch Borse, CAC: French Exchange, BSE: Bombay Stock Exchange, SSE: Shanghai Stock Exchange



From the perspective of a percentage of market capitalization, Nokia of Finland stands out. The Helsinki Exchange, where Nokia has been listed, is not one of the top 20 Exchanges. However, Nokia shows how a failed SICO can be a detriment to the national economy, and provides a useful policy case for Korea. At its height in 2002, Nokia accounted for 74 percent of the total market capitalization of the Finnish Helsinki Exchange, and was definitively considered a SICO in the Finnish economy. The number, however, plummeted to 7 percent in 2013. It has now bounced back to around 10 percent. Nokia is famous for “successful failure.” Even though Nokia’s technologies and human capital have been transferred to other start-up companies such as Rovio and Supercell, the Finnish economy has been stagnating.⁷ The Finnish economy has exhibited a negative growth rate for the past four years and is expected to decline again this year. The Nokia case underscores the significant role of SICO in terms of economic growth and systemic risk. Start-ups and SMEs can complement or partly replace SICO (e.g. Nokia, Samsung), but they cannot fully replace it. That is the reason why SICO is not easily substitutable.

In an export-driven economy like Korea, the size of export is a useful indicator of determining whether a company is SICO. In terms of a proportion of total export, Samsung is a SICO. Samsung Electronics is responsible for 26 percent of Korea’s total exports; Samsung group as a whole amounts to 36 percent.⁸ Korea’s GDP is comprised of consumption (54 percent), investment (26 percent), government expenditure (16 percent), export (58 percent) and import (54 percent). While the net export is only 4 percent, total exports (58 percent) account for the bigger portion of GDP than consumption (54 percent).⁹ The global ranking also exhibits the Korean economy’s heavy reliance on exports. While Korea’s GDP is 14th in the world, the volume of trade ranks 7th. Consequently, Samsung is a SICO because it takes up the substantial portion of the exports, which is a systemically important macroeconomic variable in Korea.

Although it is not included in SIFI criteria defined by FSB, employment-generating capacity should be considered as a vital measure in classifying a company as a SICO. If company failure leads to significant job loss, the government has sufficient incentive to step in and bail it out. Samsung employs a significant number of workers in the domestic market. However, there is a huge gap between Samsung’s revenue-generating performance and employment-generating performance in the domestic market. As of 2014, Samsung employed 310,000 people: 210,000 overseas and 100,000 in the domestic market. In the 50,000 positions created

in 2014, the domestic market accounts for only 10 percent. Samsung is not as much “systemically important” in creating employment as in generating market values, sales and exporting goods. In terms of employment, Small and Medium-sized Enterprises (SMEs) play a dominant role.¹⁰

Interconnectedness

Interconnectedness is another criterion for determining SICO. This paper reviews the interconnectedness of Samsung in three different dimensions: technology characteristics, trickle-down effect, and supply chain. First, the semiconductor technology, Samsung’s main technology, is a General Purpose Technology (GPT) and, by definition, is interconnected to a wide variety of industries. GPT exercises widespread influences on the other industries.¹¹ According to the U.S. National Research Council, semiconductor technology is a basic enabling technology for virtually any device that moves on or that shares, accumulates, transmits and manipulates information. As a result, it relates to every industry requiring memory or calculation capacity: ICT, automotive, aerospace, shipbuilding, etc. Second, through the trickle-down effect, Samsung is closely related to domestic SMEs and subcontractors. Samsung is responsible for a dominant proportion of sales by domestic subcontractors. As a result, Samsung’s performance is directly associated with that of the related subcontractor companies. This is a channel through which Samsung has contributed to the domestic economy. Third, in terms of the supply chain, Samsung has business relationships with more than 400 customer companies including Walmart, Best Buy, HP, and Apple and related to over 1,200 suppliers including Qualcomm, SAP, AUO, and Nikon etc. In terms of supply chain, Samsung is more heavily interconnected to the overseas market than to the domestic one.¹² Samsung earns 85 percent of operating income from the overseas market. It has more than 300 overseas subsidiaries and corporations. Foreign stockholders account for 70 percent of the ownership. Therefore, from the interconnectedness perspective, Samsung can be considered a SICO through the mechanism of General Purpose Technology (GPT) and trickle-down effect.

Complexity of Business Model

Samsung is classified as a SICO when measured by “the complexity of business model,” the third standard for SICO. Samsung has a complicated and unique business model: it runs both “set business” and “component business.” This contrasts sharply with other major electronic companies who focus on only one of these businesses. For example, Apple produces only set products such as smartphones, tablets, and PCs. Intel specializes in



component businesses including CPU, AP, and NAND. Table 1 compares Samsung’s business model to those of other major electronic companies. In addition, Samsung is unique because it even competes with its client: Apple. While Apple is a client for Samsung’s component division, it is Samsung’s biggest competitor in the set division. This uniqueness takes place because Samsung has a wide variety of product lines. From Samsung’s perspective, the diversified products may contribute to reducing business risk. However, because investors can diversify away risks by constructing portfolio companies, the complex business does not add value to investors but incurs “conglomerate discount.” The “conglomerate discount” means the value of a conglomerate company is smaller than the summation of the value of each affiliate or division.¹³ Because of the opaqueness of the economy, the complicated business model has more chance to bring about systemic risk. That is the reason why “the complexity of business model” is included as a criterion for SIFI or SICO.

Through “circular shareholdings,”¹⁴ Samsung is even interconnected with financial businesses including insurance, securities, credit card, and asset management business. Even though Samsung Electronics does not operate a financial business, it is vulnerable to the risk caused by its financial affiliates because of this

indirect connection. The complexity of this business model combined with complicated governance structure exposes Samsung to uncertainty and makes it a SICO.

The Resonance of Semiconductor Industry with Samsung

The properties of the semiconductor industry and key success factors

Semiconductor manufacturing, Samsung’s primary business, is the biggest contributing factor for Samsung’s success and thereby qualifies Samsung as a SICO. This paper identifies the properties of the semiconductor industry and the key success factors that are derived from the semiconductor industry. In addition, understanding the sources of Samsung’s success can further lead to the identification of other industries that can generate successful and systemically important companies.

The first contributing characteristic of the semiconductor business lies in its nature of technology. Semiconductor technology changes constantly but without the unexpected jump in technological innovation. This characteristic makes the technology reasonably predictable.¹⁵

Table 1. Comparison of Business Scope: Samsung vs Competitors

| | | Samsung | Apple | Intel | Hynix | LG | Toshiba | Sony |
|-----------|----------------|---------|-------|-------|-------|----|---------|------|
| Component | DRAM | O | | | O | | | |
| | NAND | O | | Δ | O | | O | |
| | AP | O | O | O | | | | |
| | CPU | Δ | | O | | | | Δ |
| | LCD | O | | | | | O | |
| | Image Sensor | O | | | Δ | | | O |
| Set | TV | O | | | | O | O | O |
| | Smartphone | O | O | | | O | | O |
| | Tablet | O | O | | | Δ | O | |
| | PC | Δ | O | | | Δ | Δ | Δ |
| | Camera | O | | | | | | O |
| | Game mach | | | | | | | O |
| | Home appliance | O | | | | O | Δ | |
| | Medical device | Δ | | | | | Δ | |

O: strong engagement

Δ: medium engagement



Second, the semiconductor business is also characterized by its innovation pattern: successive replacement of an outdated technology with a similar, but slightly enhanced technology. As a result of the slight enhancement of the technology in each succession, each generation cannot reach full market dominance (e.g. 100 percent market share) before it is replaced by the next generation (see Figure 2). The maximum market share for one version is usually limited to around 70 percent because several overlapping generations exist together in the same market at the same time. In addition to the overlapping lifecycle of several generations, each semiconductor product is short-lived.¹⁶ This figure also illustrates that the specific semiconductor DRAM’s market share changes from 10 percent to 90 percent in only about 4-5 years. Figure 3 shows a changing pattern of an accumulated market share. The evolution of semiconductor DRAM measured by memory capacity is represented by a concatenation of logistic functions. For example, the estimated function for 512M DRAM’s accumulated market share that fits well with data is a logistic function: $f(t) = 250 / (1 + 276.78e^{-1.2t})$.

Third, innovations in the semiconductor industry are frequently made in the manufacturing process, as compared to other industries where it originates in R&D (e.g., pharmaceutical industry). The semiconductor industry is also characterized by the fact

Figure 2: Market Share of Semi-conductor DRAM

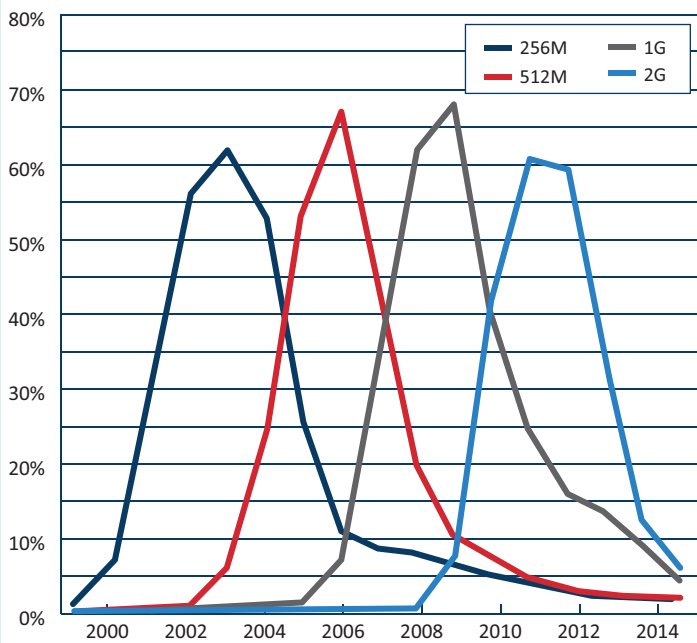
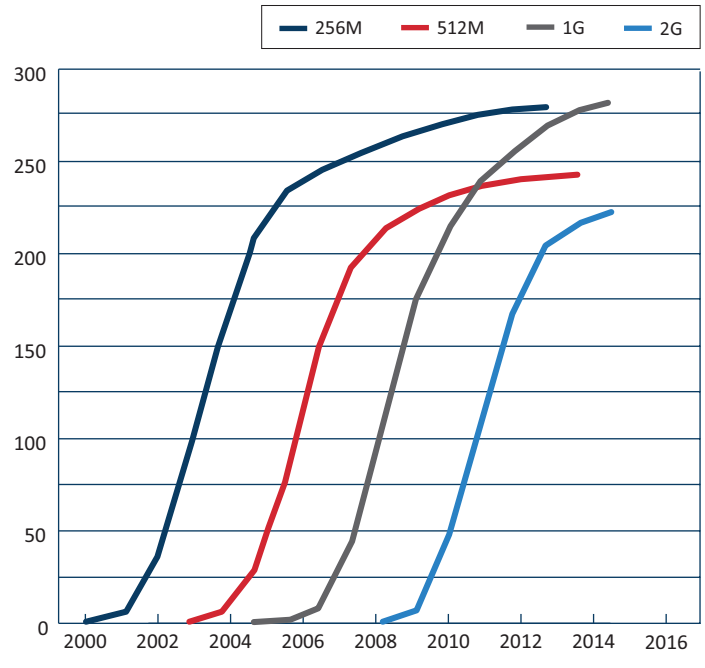


Figure 3: Accumulated Market Share of Semi-conductor DRAM



that innovation and productivity go hand in hand. In contrast, in the pharmaceutical industry, the increase in productivity is not translated directly into innovation. As a result, innovation in the pharmaceutical industry is harder to achieve and the industry builds up an invincible entry barrier. Tables 2 and 3 show the resultant difference in incumbency of the two industries. While most incumbent companies in the pharmaceutical industry have remained in the global top 10 over time, those in the semiconductor industry have failed to do so.

Taking all these characteristics into account, the first key success factor for the constantly changing semiconductor technology is “speed.” The constant, but gradually changing technology requires speedy investment and production for the next generation product in response to the technological change. Second, due to the simple and clear direction for innovation (e.g., expanding memory capacity combined with reducing size), management must move in perfect order to achieve a clearly defined business goal. Third, the company developing a semiconductor needs to have sufficient capital investment capability to invest in production facilities. Thus, to be successful, such a company should expedite the production process to cut down the depreciation costs. The faster semiconductors get produced, the cheaper the price. The breakdown of operating costs of semiconductors shows that depreciation amounts to 30 percent. The high proportion of depreciation



costs contrasts to that of other industries: ICT (8 percent), petrochemical (5 percent), automotive (3 percent), and electric appliances (3 percent). Thus, “speedy” production has a competitive edge in the semiconductor industry.

The reasons for the resonance of semiconductor industry with Korea

The semiconductor industry fits especially well with Korea,¹⁷ and is another important reason why Samsung has been so successful.

This success is owed in part to Korea’s unique education, military, and corporate culture.

Korea is well known for its heavy focus on education. Korea’s educational system comprises long (even extreme) hours of homework, tests, and discipline. Private lessons after school are normal and popular. Students aged 14 to 24 years old devote 50 hours per week to studying, the longest among OECD (Organisation for Economic Cooperation and Development) countries

Table 2. Change in Global Rankings: Pharmaceutical Industry

| 1990 | 2000 | 2014 |
|-----------------------|----------------|----------------|
| 1. Merck | 1. Pfizer | 1. Pfizer |
| 2. BMS | 2. GSK | 2. Novartis |
| 3. Glaxo | 3. Merck | 3. Sanofi |
| 4. Smithkline Beecham | 4. Astrazeneca | 4. Roche |
| 5. Ciba Geigey | 5. BMS | 5. Merck |
| 6. AHP | 6. Novartis | 6. GSK |
| 7. J&J | 7. J&J | 7. Amgen |
| 8. Eli Lilly | 8. Aventis | 8. Astrazeneca |
| 9. Bayer | 9. Eli Lilly | 9. Eli Lilly |
| 10. Roche | 10. Roche | 10. BMS |

Red: companies which have stayed in the global top 10 league table over time

Table 3. Change in Global Rankings: Semiconductor Industry

| 1990 | 2000 | 2014 |
|----------------------|----------------------|----------------------|
| 1. NEC | 1. Intel | 1. Intel |
| 2. Texas Instruments | 2. Toshiba | 2. Samsung |
| 3. Motorola | 3. Texas Instruments | 3. Qualcomm |
| 4. Hitachi | 4. Samsung | 4. Micron |
| 5. Toshiba | 5. NEC | 5. SK Hynix |
| 6. Fujitsu | 6. STMicro | 6. Texas Instruments |
| 7. Philips | 7. Motorola | 7. Toshiba |
| 8. Intel | 8. Infineon | 8. Broadcom |
| 9. National | 9. Philips Semicon | 9. STMicro |
| 10. Matsushita | 10. Micron | 10. Renesas |

Red: companies which have stayed in the global top 10 league table over time



and substantially above the OECD average of 34. Per day study hours for Korean students is also the longest, followed by Finland and Japan.¹⁸ The extreme focus on education trains the Korean students to work under pressure and to be accustomed to the similarly repeated pattern of work, which is a characteristic of the semiconductor industry. The target of high school education is simple and clear: getting into college. This is the reason why the proportion of high school graduates who get into college is around 80 percent, the highest rate in the world. The simple and clear business target is another characteristic of the semiconductor industry.

Korean military service is another big contributor. The obligatory military service allows most of the Korean male population to be exposed to simple, repeated tasks: in military training, the soldiers move in perfect order and are under strict discipline with repeated training. The moving in perfect order and upgrading similar technology patterns are also success factors of the semiconductor industry.

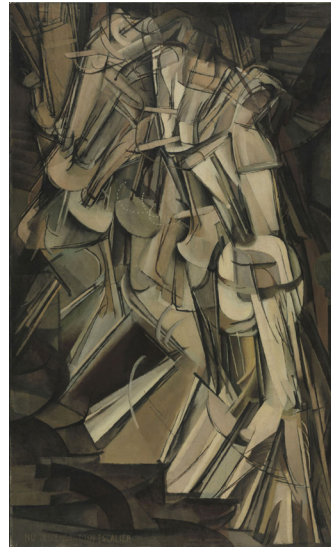
The educational and military experiences for Koreans translate similarly into their work culture. Korean corporate culture is characterized by pursuit of a single objective, being disciplined, working well in a hierarchical corporate structure, and making quick decisions and implementation. In addition, long working hours are associated with another success factor of the semiconductor industry: continuous operation of business for expedited production.¹⁹ This cultural rhythm of repetition throughout the life time of the Korean people happens to coincide well with that of the semiconductor industry.

All these experiences are translated into Samsung's performance in the semiconductor industry. Indeed, Samsung's corporate culture is disciplined, well-managed, strict, decisive and moving in perfect order. Samsung focuses on the management and operation system, allowing the company to speed up investment and production. In a nutshell, the natural frequency of Samsung is almost identical to that of the semiconductor industry, and why it resonates with it so well in Korea.

Samsung vs Apple: An Analogy with Futurism vs Cubism

As a metaphor, the constantly but gradually changing technology of semiconductor industry is akin to the artistic pattern of Futurism in fine art. The arts in Futurism represent continuously but incrementally moving motions with a fixed single perspective (Figure 4). We can compare Samsung and Apple by analogy with two different "-isms" in fine arts: Futurism and Cubism. In contrast

Figure 4. Nude Descending a Staircase (Duchamp)



to Futurism, Cubism first decomposes an object and then reconstructs it with multiple perspectives (Figure 5). While the creativity of Futurism lies in a gradually moving multiple timeframe, the originality of Cubism comes from multiple perspectives with a single timeframe. Samsung fixes on a single goal, such as increasing memory capacity, and achieves it through an incrementally improving technology. Apple, just like Cubistic art, destroys the old products and reconstructs them with multiple perspectives. For example, the smartphone creatively reconstructs the computer, phone and Internet.

Figure 5. Crying Woman (Picasso)





*Industries Resembling the Semiconductor Industry*²⁰

Based on the analysis of the properties of the semiconductor industry and the key success factors in Samsung, to overcome its sluggish economy, this paper suggests that Korea should search for industries similar to the semiconductor industry. This paper identifies the biosimilar industry and the rechargeable battery industry as promising candidates for technologies, and the private equity fund (PEF) industry as a promising candidate for the financial sector.

A biosimilar drug is a biologic medical product that is similar to an original drug product,²¹ but can be approved without the full clinical trial after certain patents covering the original drug expire. While biosimilar companies try to make their product as close as possible to the original, they do not have access to the originator's manufacturing process. The manufacturing or production process can be critically important for biosimilars because unlike the more common small-molecule drugs, biologics generally exhibit high molecular complexity, and may be quite sensitive to changes in the manufacturing processes.

Certain characteristics of the biosimilar industry are comparable to those of the semiconductor industry. As mentioned, much like the semiconductor industry, the manufacturing process of the biosimilar company is one of the most important processes in developing a biosimilar product. This is because the drug structure, its efficacy, and toxicity are already known and the technological challenge remains in the manufacturing of the specific drug as similar to the original biologics as possible. Analogous to the semiconductor industry, a biosimilar company requires several essential infrastructures such as commercial-scale production facilities and sterile rooms. In addition, the production target is clear in a biosimilar company in the sense that it aims at copying a specific original biologic product. The uncertainty a biosimilar company faces is therefore significantly reduced because it copies an already proven product.

Another industry resembling the semiconductor industry is the rechargeable battery industry. Maximizing recharge capacity, instead of memory capacity, is a simple goal. Rechargeable batteries resemble semiconductors in many respects: a single and clear goal, the nature of technology, and the pattern and source of innovation. However, the innovation cycle of the rechargeable battery is longer than that of semiconductors, which is where the industries differ.

In the financial industry, private equity funds (PEF) resemble the semiconductor industry. First, the similar corporate restructur-

ing pattern repeats itself. A typical restructuring process of PEFs begins with buyout or at least acquiring significant portion of target shares. If a PEF comes to control the target company, the next thing is to change the incumbent management and create a new board representation. By designing an appropriate compensation scheme for a new management, PEFs focus only on financing and big restructuring issues. New management takes care of the general business operation. If restructuring is almost done and an exit is expected, a PEF returns to the first stage of the business cycle and searches for another target company. The new target company search process is akin to new product development in the semiconductor industry. For example, if the lifecycle of a 1G semiconductor DRAM reaches a matured stage, a newly-developed 2G DRAM gets introduced to the market. Second, compared with venture capital, PEFs are exposed to less uncertainty. Unlike venture capital's target firms—which, by definition, have new business models—PEFs target distressed firms with established track records. A new PEF target firm is predictable and not exposed to high uncertainty. Third, as in the semiconductor business, rapid and perfectly in order restructuring is crucial in PEF business because the value of distressed firms decays exponentially. As in the semiconductor industry, “speed” is a vital consideration and a key success factor for the PEF industry.

Proposed Regulation of a SICO

Being classified as “systemically important” is both positive and negative. The positive aspect is that a SICO makes a pivotal contribution to economic growth; the negative aspect is that a SICO may become a source of systemic risk. There are two channels that Samsung may bring about systemic risk. First, because of Samsung's dominant position in the market, Samsung may cause a systemic risk by preventing innovative start-ups or SMEs from maturing. Samsung may also incur a systemic risk through the simultaneous operation of manufacturing and financial businesses.

To avoid the systemic risk of dwarfing growth of innovative start-ups or SMEs, the Korean government should focus on anti-monopoly and fair trade policies. A lesson can be learned from U.S. history: controlling the dominant power of IBM in the 1980s-1990s led to a growth of Microsoft, which was a start-up company during the period. Similarly, without the U.S. anti-monopoly laws in the 2000s, the world would not have seen the splendid growth of Apple, Google and Amazon because of the Microsoft monopoly. Similarly, the Korean government needs to regulate



Samsung such that it does not exercise excessive power in the market. The regulation will allow the birth and/or growth of other globally competitive companies like Samsung.

Second, to avert a systemic risk, the Samsung conglomerate needs to separate its financial business from the manufacturing (e.g. semiconductor) business. It is an effective way not only to minimize a systemic risk of Korean economy, but also to preserve a systemically important corporation, i.e., Samsung Electronics. While Samsung Electronics itself does not run a financial business, it is connected to financial businesses through the circular holdings of the Samsung conglomerate, which operates financial businesses such as insurance, securities, and credit cards through affiliates.

General Electric (GE) recognized this problem and the necessity for separating the manufacturing division from its financial component. GE was first designated as SIFI in 2013 by the U.S. Financial Stability Oversight Council (FSOC) because of GE capital.²² GE reshaped itself by spinning off its financial arms so that GE can focus on manufacturing. In June 2015, GE announced that it would sell its financial assets to Wells Fargo and Blackstone to avoid additional stronger regulations.²³ A similar path should be followed by Samsung to prevent systemic risk.

Regulation is not everything. There is an important issue that should be addressed by Samsung itself. While Samsung has substantially contributed to the Korean economy, it faces a new challenge: domestic employment. Unlike in the past, the most widely accepted and important economic contribution at the moment is generating employment. Samsung should address a gap between its economic power as a SICO and its employment generating performance in the domestic market. Samsung obtains less than 30 percent of its total employment from the Korean market. While Samsung has been expanding production in foreign countries and earning most of its operating income from the overseas markets,

Samsung should address a gap between its economic power as a SICO and its employment generating performance in the domestic market.

the percentage of the domestic employment has been decreasing. Thus, the increase in export does not translate into domestic production, demand and economic growth. Accordingly, this leads to an argument that Samsung no longer makes as big of a contribution to Korea, even though Samsung accounts for a significant proportion of market capitalization, sales and exports.

Conclusion

Applying SIFI conditions, this paper shows that Samsung is a “systemically important corporation (SICO)” in terms of size, interconnectedness, and business complexity. If Samsung qualifies as a SICO, to reduce the systemic risk of Korean economy, Samsung should be viewed, treated, and regulated accordingly. Two policy issues are emphasized: (1) anti-monopoly and fair trade, (2) separation of financial business from manufacturing business.

This paper also shows that Samsung’s success is closely associated with the nature of semiconductor technology: constant but gradual changes. In other words, in the semiconductor industry, a similar innovative pattern repeats itself without the unexpected jump. Because of the resonance of this technology with the Korean people, culture, and corporate structure, this paper suggests that Korea should search for the industries similar to the semiconductor industry as sectors for future growth.



Endnotes

- ¹ In this paper, Samsung means Samsung Electronics. When this paper refers to Samsung group as a whole, it uses the word, Samsung Conglomerate.
- ² The Financial Stability Board (FSB) is a forum consisting of G20 country's ministers of finance and central bank governors. The FSB has assumed a key role in promoting the reform of international finance regulation.
- ³ Besides SIFI or SICO, we can define "systemically important asset" if the asset has systemic influence to an economy. For example, real estate is a systemically important asset in Korea.
- ⁴ There is a measure like "employment" which is considered better suited to manufacturing companies than to financial companies. However, SIFI conditions alone can give us a new insight in characterizing SICO like Samsung.
- ⁵ All of market cap percentages in this section are average percentages calculated from the two years daily stock price data from July 2013 to June 2015.
- ⁶ One exceptional case is Teva Pharmaceutical Industries ("Teva"), the biggest company in Israel. Teva's market capitalization amounts to 30 percent. But the Tel Aviv Stock Exchange is not one of the top 20 Exchanges.
- ⁷ Historically, Nokia has succeeded in transforming itself to an entirely different entity. At first, it changed from a timber company to an Information and Communications Technology (ICT) company. Now, after selling its major businesses, Nokia transformed into a non-performing entity (NPE), widely known as a "patent troll." Nokia has more than 30,000 patent rights.
- ⁸ The number is a 5-year average from 2010 to 2014.
- ⁹ The number is a 5-year average from 2010 to 2014.
- ¹⁰ In Korea, SMEs account for 90 percent of total employment. Large corporations including Samsung account for only 10 percent. This phenomenon is not limited to Korea.
- ¹¹ The distinguishing features of General Purpose Technology (GPT) include pervasiveness, improvement and innovation spawning. Pervasiveness, the defining property of GPT, means it has an impact on technical change and productivity of a large number of industries. In addition, GPT should experience continuous improvement in its own industry and induce innovation in other sectors.
- ¹² "Global activity" is another but secondary important criterion for SIFI. Because we focus on Samsung's SICO position in the domestic market, we do not review it more in detail.
- ¹³ We can witness the conglomerate discount not just in manufacturing companies but in financial conglomerates like financial holding companies. This is frequently verified in empirical studies.
- ¹⁴ Circular shareholding refers to cross shareholding by three or more companies. In other words, Company A invests in Company B, which invests in C Company, and then C Company invests in Company A, which results in a circular shape of investment.
- ¹⁵ Clayton Christensen defines such technology as an "enhancing" technology in *The Innovator's Dilemma* (1997).
- ¹⁶ By analogy with biology, semiconductor DRAM is regarded as a "Drosophila Melanogaster (fruit fly)" in technology evolution.
- ¹⁷ "Resonance" is a phenomenon in physics which takes places when a wave meets another wave with identical natural frequency and, as a result, brings about greater amplitude.
- ¹⁸ OECD Report (2013).
- ¹⁹ The per year working hour of Korean labor is about 2,200 hours, second only to Mexico among OECD countries. OECD average is 1,700 hours.
- ²⁰ "Resembling" here means that the estimated function for an industry's property (e.g. accumulated market share) has similar shape as in the semiconductor industry (e.g. logistic function). But, due to data availability, this paper cannot estimate and identify the functions. Because the rechargeable industry has a short history and private equity firms are, by definition, private firms, it is difficult to get data. The rigorous estimation will be a future research agenda.
- ²¹ Blanchard, A., H. D'Iorio and R. Ford, "What You Need to Know to Succeed: Key Trends in Canada's Biotech Industry," *Insights* (Spring 2010).
- ²² FSOC was established based on the "Dodd-Frank Wall Street Reform and Consumer Protection Act." It has the right to designate SIFI in the United States.
- ²³ Additional regulation includes larger capital, higher liquidity, lower leverage, etc.



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