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Korea's Participation in Global Value Chains and Policy Implications

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The expansion of global value chains during the past 20 years has widened the gap between export value and domestic value added, diminishing the per-unit contribution of exports to the country's economic growth. Thus, policies now need to target creating value added rather than increasing gross exports and focus on enhancing the competitiveness of input and production activities. In particular, regulatory reform must take place in the service sector to eliminate unnecessary obstacles to competitiveness. Moreover, to utilize global value chains more effectively, efforts should be made to enhance the efficiency of offshoring and attract production to the country's shores in order to create more domestic valued added and jobs.

I. Issue

Concerns have been raised over the structural problems in the Korean economy with gross exports recording consecutive year-on-year losses during the January-July period. However, such concerns are justified in Korea's case due to its heavy dependence on exports for economic growth. The landscape was significantly different even up until as late as the end of last year (2014); Korea broke records in trade, exports, and trade surplus for two successive years, winning the triple crown of trade. However, at the same time, the economy was in fact locked in a low-growth trough of about 3%.

The above reveals that although measures to counter shrinking exports are certainly needed, such measures alone are insufficient to accelerate economic growth to previous levels. Ergo, what is the reason behind the weakening effect of exports on the Korean economy? What are the alternatives for exports at present?

Against this backdrop, this study explains the widening gap between Korea's exports and domestic value added through the lens of global value chains (GVCs), and reveals the essential current conditions of the Korean economy which are undetectable from gross export statistics. This study also attempts to provide implications for policies to achieve sustained economic growth by conducting a comprehensive assessment of international production activities by Korean industries, including the trade and foreign direct investments (FDIs) for the past two decades.

II . Exports and Industrial Structures from a GVC Perspective

Gross exports are insufficient to accurately gauge the value of production activities conducted across different countries.

For every 100 won earned through the export of a product, Korea earned 75 won in value added in 1995. However, this fell to 59 won in 2011. The term global value chain refers to the global link of a product's value added resulting from the division of production on a global scale. Of course, international fragmentation of production has a long history. However, with the structure of global production becoming increasingly complex, many have begun to recognize that gross export (amount), a measure of the trade of a product (goods and services) between different countries, is insufficient to gauge the real value of the production activities conducted in each country.

For example, China's export of a US\$300 iPod creates a meager US\$5 in value added as it simply assembles and tests the products. Meanwhile, Japan earns US\$27 per iPod, although it is not directly involved in the export, it manufactures the major parts for the device (Linden et al.[2009]).

As such, from a GVC perspective, the focus is not on the products themselves but on the production activities and value added. Consequently, analyses and statistical indicators based on the GVC concept are better fitted for the real economy. In this sense, this section examines the vital conditions of the Korean economy using value added export indices based on data from the World Input-Output Database (WIOD).

Table 1 shows the VAX ratios, defined as the ratio of value added exports to gross exports, of Korea and other major countries. For Korea, the ratio slid at a faster pace than those of other countries, slipping from 0.75 in 1995 to 0.59 in 2011. Specifically, in 1995, Korea gained 75 won in value added for every 100 won earned through the export of a product. However, in 2011, the amount dropped to 59 won,¹⁾ illustrating how much the

(%)

<Table 1> Changes in the VAX Ratio by Country

	1995	2000	2005	2011	Change Rate (%)
Korea	0.75	0.70	0.67	0.59	-21.7
Japan	0.92	0.90	0.86	0.81	-11.3
China	0.84	0.82	0.72	0.75	-9.7
Taiwan	0.67	0.63	0.56	0.52	-21.6
Germany	0.79	0.74	0.72	0.69	-12.6
US	0.83	0.78	0.78	0.79	-4.3

Note: Change rate refers to the percentage changes in the VAX ratio between 1995 and 2011 Source: Figures were calculated by author using WIOD data.



[Figure 1] Share of Korea's Gross Exports and Value Added Exports by Industry

Note: As of 2011. Light industry includes food, textile, wood, pulp, and other manufacturing sectors and services includes electricity, gas, water, and construction. Source: Figures were calculated by author using WIOD data.

effect of a unit of export on the Korean economy has diminished.

The following section compares the gross exports and value added exports created by each industry. Figure 1 shows the share of each industry's exports against Korea's total exports in 2011. The combined share of gross exports of the country's three major industries, namely petrochemicals, electrical and electronics, and transport equipment, represented two thirds of Korea's gross exports. However, the combined share of value added exports was much lower at 43%. Contrarily, the services' share in value added exports posted 34.6% despite accounting for only 13.9% of gross exports.

The discrepancy between an industry's gross exports and value added exports is attributable to the international fragmentation of production through GVCs as well as the

¹⁾ VAX ratio is a similar concept to the ratio of value added inducement to total export that is typically used in input-output analysis. However, they can be different in their values depending on data sources and the composition of final demand, among others. VAX ratio, meanwhile, is also calculated and published in the OECD. According to the OECD, Korea's VAX ratio slid from 0.77 in 1995 to 0.58 in 2011, a steeper decline than was shown in this paper.



[Figure 2] Services' share in Gross Exports and Value Added Exports by Country

Considering the share of service value added embedded in a good, the role of services is critical even in exports.

Korea's share of services in value added export is on a continuous downward trajectory and is significantly lower than the global average. fact that a significant share of the value added comprising a product comes from other industries. In the case of the services industry, in particular, it is hard to accurately measure the export value of services because services are often embedded in a good which then is exported. On the other hand, the services' share of value added exports highlight that services, as a form of intermediate input, plays a critical role not only in the domestic economy, but also in exports.

Nevertheless, the services' share in value added exports is much lower in Korea than in other countries. Figure 2 shows that the share is roughly 45% in Japan, Germany, and Taiwan whose mainstay industry is manufacturing and that of other advanced countries exceeds 50%. The share falls short of the world's average in the case of Korea, along with China and Mexico.²⁾

Moreover, Korea's 2011 figure of 34.6% reveals that the services' share in value added exports has continued to fall below the 1995 figure of 39.1%.³⁾ Much like how the gross export of a product can be used as a barometer for the competitiveness of the product in overseas markets, the value added export can indicate the competitiveness of a certain production activity. Given this, observations made above imply that the competitiveness of Korea's services industry has become profoundly weak in overseas markets.s

²⁾ A significant number of Korean manufacturers provide internal services for production and thus the share of services value added is incorporated into the share of manufacturing. Even if this is considered, however, Korea's figure is still low.

³⁾ In most countries, the share of services in value added export rose or remained at the same level compared to the 1995 baseline. See Chung (2014) for further analysis of value added export in services and the weakening of competitiveness of Korea's manufacturing-related services.



With the intensification of offshoring, the share of foreign value added in domestic manufactured final goods has continuously increased.

Value added export is a useful indicator to precisely understand the reality of the Korean economy which may otherwise be hidden or distorted by gross exports. Of course, gross exports are meaningful in themselves. So, it is important to use both measures in a complementary manner to obtain an accurate understanding of the Korean economy.

III. Creation of Value added through GVC Participation

The sharp fall in the VAX ratio documented in the previous section calls for a closer examination. The fall is basically the result of Korea's active participation in GVCs which has increased the division of the production process between countries. This division of the production process has multiplied Korea's international trade, but at the same time it has driven down the share of the country's creation of value added.

A question then arises regarding the extent of the impact of Korean firms' active participation in GVCs on the creation of domestic value added and through what mechanism this is achieved. To answer this, GVCs are first classified into two categories based on the location of the final production stage of goods; domestic and foreign. Then, the amount and trend in value added created by the six participating industries (agriculture & mining, manufacturing, and services in domestic and foreign, respectively) in each GVC are analysed over the past 20 years (detailed information on the above GVC classification can be found in the Appendix).

Figure 3 shows, by year, the share of value added of both Korean and foreign industries



[Figure 4] Gross Output of Korean Manufactured Final Goods (1995=100)

participating in the production process of manufacturing goods finally produced in Korea, i.e. the GVC structure of Korean manufactured final goods. The figure shows that the value added share of three foreign industries increased from 24.5% in 1995 to 37.5% in 2011. As the intermediary production process of the goods were offshored, the proportion of foreign value added per unit of gross output increased.

The intensification of offshoring may raise concerns that Korea's value added and labor demand are being replaced by foreign countries. In fact, some are concerned that this could lead to the hollowing-out of Korean industries. However, the decreased value added would be offset by the gross amount once sufficient increase in gross output is guaranteed. In order to verify this, Figure 4 shows that manufactured final goods have increased since 1995. The index was then decomposed to show the ratio of domestic value added and foreign value added.

Another result of offshoring is the increase in gross output through which domestic value added can also increase. If the gross output is marked at 100 for 1995, it increased to 171 in 2011 from which Korea's share of the value added increased approximately 40% from 76 to 107 during the same period. Specifically, although the expansion in offshoring has increased the share of foreign value added per unit of final goods, domestic value added has also steadily risen during the last 20 years through the increase in the amount of gross output of final goods. Therefore, at least it could be said that the possibility of the hollowing-out of Korean industries due to offshoring is close to nil.

However, during the same period, the level of foreign value added increased a staggering 150% from 24 to 64. Considering the significantly steeper increase compared to that of Korea's value added, there is a high possibility that the offshoring in Korean manufacturing may have contributed much more to the country's economic growth.



[Figure 5] Share of Value Added Created by Korea's Manufacturing Via Domestic and Foreign GVCs

The above examined the GVC structure of Korean manufactured final goods. The following will examine through what kind of GVC activities the value added in Korean manufacturing is created. This paper classifies industries into three sectors; apart from the GVC in manufacturing final goods, there are also GVCs in agriculture & mining, and services, totalling six GVCs (three from Korea and three from overseas) in which domestic and foreign industries participate in to create value added. Therefore, the sum of the total value added created through participating in each GVC forms the industry's GDP.

Figure 5 examines how the share of value added created by the Korean manufacturing industry through the participation in domestic and foreign GVCs has changed during the period from 1995 to 2011 (for the purposes of discussion, the figure combined the three industries into the country's level). The share of value added created by the Korean manufacturing industry through the participation in foreign final goods GVCs increased from 25.7% in 1995 to 42.3% in 2011. This implies that the Korean manufacturing industry created relatively more value added by supplying intermediary goods to foreign final goods GVCs. Moreover, the increase in the actual total amount based on the 1995 constant won price accounts for almost 59% of the total increase in the Korean manufacturing industry GDP. Thus, participating in foreign GVCs has contributed significantly to the growth of Korea's manufacturing industry.

Returning to the main question of this section, through what mechanism GVC participation affects Korean industries' GDP; firstly, when domestic firms that produce final goods offshore their intermediary process, domestic value added can increase as long as the gross output is also sufficiently increased. However, one should note that, in reality, the increase falls significantly short of the increase in gross output. Secondly, as Korean firms take on the role of intermediary goods supplier through the participation of foreign

The increase in the value added created through the participation in foreign GVCs by Korean manufacturing has exceeded that created through participation in domestic GVCs.



GVCs, it provides Korea with opportunities to create value added. Based on this analysis, the following section will discuss policy implications to enhance the efficient utilization of GVCs.

IV. Policy Implications

Two major implications for policies can be drawn from the above analyses and observations. The first is the need to shift the focus of discussions from 'what products are sold at what price' to 'how much value (added) is created and through what production activities,' as was emphasized in section II. This is important because placing the focus on the former will only produce short-sighted policies such as export subsidies and a penchant for a weak currency while focusing on the latter will facilitate fundamental discussions on ways to improve the competitiveness of each individual input.

Procuring a significant portion of parts and materials, and capital goods, which determine the core value of major exports, from overseas and in particular from Japan, Korea's reality does not vastly differ from that of China and its export of iPods. This is reflected in the VAX ratios of the country's three major industries, which fall short of 0.4.⁴⁾ To overcome this problem, China has already declared its intention to procure intermediate goods from within its border. Similarly, the US designated the development of original technologies, including new materials and parts, as a key industrial strategy.

Further exacerbating matters for Korea is the falling competitiveness of Korea's alreadyweak services industry despite the steady increase in the share of services in the value added of manufactured goods. Given that the convergence of finance, distribution, knowledge-based business services, and manufacturing will only intensify in the future, Korea should accelerate its drive for deregulation and taking down the barriers to the services sector.

The other implication, as demonstrated in section III, is raising offshoring efficiency while simultaneously encouraging domestic production. Firms seeking to enter foreign markets or undertake outsourcing should be provided with higher quality support such as consulting or assistance establishing networks with foreign suppliers in order to improve the efficiency of their activities.

At the same time, however, more efforts should be made to improve the environment to increase production in Korea and boost value added and job creation.⁵⁾ Recently, major advanced countries have sought to attract production to their shores through incentives

Fundamental solutions must be considered by shifting the policy focus from export items to production activities and value added.

To utilize GVCs more effectively, efforts must be made to enhance the efficiency of offshoring and attract production to the country's shores.

⁴⁾ Specifically, the ratio was 0.36 for petrochemicals, 0.42 for electrical equipment, and 0.36 for transport equipment. The average VAX ratio of the overall manufacturing sector was 0.44 (See Chung [2014]).

⁵⁾ Of course, increasing production in Korea does not mean blocking domestic firms' entry into foreign markets. Rather, an improved production environment will increase the opportunity costs of firms entering overseas market which will improve efficiency, eventually leading to an increase in production in Korea while also enhancing the efficiency of offshoring.

such as corporate tax cuts as well as increased support for reshoring firms and inbound foreign investments. Korea, however, has not jumped on the bandwagon, but rather failed to resolve the critical issues in its production environment such as labor market rigidity and high entry-exit barriers. The result is evident as seen in the particularly low inbound foreign investments.⁶⁾ Not only that, support policies for U-turn firms have failed to bear fruit as of yet.

Robust plans to attract foreign investors are necessary since foreign investments can significantly contribute to technology transfer as well as to the facilitation of front- and back-end industries. It is also important to provide local firms who lack appropriate business networks with quality platforms to help them secure overseas sales channels and import quality intermediate goods at reasonable prices. Establishment of an online platform like China's Alibaba will be a good step to help them enter GVCs.

Last but not the least, it is crucial to coordinate the above mentioned policies to connect them with each other and create a synergy. For example, in order to raise the competitiveness of Korea's inputs, rather than establishing policies to foster a particular industry, the government must interlock the policies with that of industries in the same value chain and be mindful that there are no overlaps or trade-offs. Much like how companies organize GVCs and cooperate with each other, the relevant authorities must also bolster communication and cooperation to generate the effectiveness of their policies.

Communication and cooperation among relevant authorities are essential to make policies more connected with each other and create synergy.

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Appendix

In order to fully and more accurately understand the discussion in section three, Table 2 provides a formal definition for GVCs in the 'two-country three-industry' model (two country refers to domestic and foreign, three industry refers to agriculture & mining, manufacturing, and services).

Each of the columns in the 6x6 (shaded) matrix in Table 2 represents a GVC that shows how much value added is created by the six participating industries during the process of final goods production. For example, the second column represents the GVC for final goods in domestic manufacturing (e.g., automobiles, home appliances, etc.) and the value added created by each participant in this GVC can be seen in the figures in each cell. Futhermore, the total sum of the value added of all the industries equals the gross output of the final goods in domestic manufacturing industry.

The above matrix categorized the world's final goods into six types. The production and value added of each product is transferred between countries via offshoring thus creating a GVC.⁷⁾ The domestic and foreign industries that are the participants of the six GVCs create their value added through the particular production process they have undertaken. This is represented by each of the rows in Table 2 and the total sum of a row equals the total value added of that industry which equals the industry's GDP. Finally, the final products of each GVC are all consumed or invested.

		GVC Final goods (or final producer)							
		Domestic			Foreign			GDP by industry	
			AGR	MFC	SVC	AGR	MFC	SVC	
Value added of GVC participant country- industry	Domestic	AGR							
		MFC							
		SVC							
	Foreign	AGR							
		MFC							
		SVC							
Gross output (=final consumption & investment)									Global GDP

<Table 2> Two-Country, Three-Industry GVC Structure

Source: two countries: domestic and foreign, three industries: agriculture & mining (AGR), manufacturing (MFC), and services (SVC).

7) Here, final goods are classified as domestic if the final production process is conducted in Korea and vice versa for foreign countries. In cases where the final production process is offshored, it is regarded as an foreign GVC in which Korea is a participant. However, even in this case, the production process up until the point conducted in Korea will be regarded as a domestic value added and the industry GDP remains unchanged.