

Master Thesis

Analysis of the Economic Impact  
of Korean Steel Industry  
on Economic Growth of Korea

2021

The Graduate School of Hansung University

Major in International Trade and Economic

Dept. of International Trade and Economic

Dilmurod Abdulkhamidov



Master Thesis  
Advisor Professor DongWhan Lee

# Analysis of the Economic Impact of Korean Steel Industry on Economic Growth of Korea

– 철강 산업이 한국 경제 성장에 미치는 경제적  
영향 분석 –

JUNE 2021

The Graduate School of Hansung University

Major in International Trade and Economic

Dept. of International Trade and Economic

Dilmurod Abdulkhamidov

Master Thesis  
Advisor Professor DongWhan Lee

# Analysis of the Economic Impact of Korean Steel Industry on Economic Growth of Korea

– 철강 산업이 한국 경제 성장에 미치는 경제적  
영향 분석 –

Submit the above thesis as a master's thesis

JUNE 2021

The Graduate School of Hansung University

Major in International Trade and Economic

Dept. of International Trade and Economic

Dilmurod Abdulkhamidov

Approved Dilmurod Abdukhamidov Master Thesis  
in International Trade and Economics

June 2021

Judge Chair \_\_\_\_\_(Sign)

J u d g e \_\_\_\_\_(Sign)

J u d g e \_\_\_\_\_(Sign)

# Abstract

## Analysis of the Economic Impact of Korean Steel Industry on Economic Growth of Korea

Dilmurod Abdulkhamidov

Major in International Trade and Economics

Dept. of International Trade and Economics

The Graduate School

Hansung University

This paper analysis the effect of steel industry on the GDP of Korean Republic. The data from 1980 to 2019 is explained for running regression and realizing the real effect of steel industry to Korean GDP. Because the data is a time series OLS model of regression is run through STATA. On the basis of this search, it is clarified that the steel industry output has a negative effect on the GDP of Korean Republic. Because of the large amount of pollutants emission, steel industry causes the other industries to decrease. In this paper, two hypotheses are used: a) steel industry output has a positive relationship with Korean GDP; b) unemployment rate has a negative relationship with the GDP of country. As a result of regression, hypothesis (a) is rejected and hypothesis(b) is

accepted.

Even though, the steel industry has a negative relationship with GDP as a production, it plays a crucial role as a raw material in Korean economy. It is impossible to develop the shipbuilding industry, vehicle industry, building construction industry and some other fields of economy without steel material. I hope that, on the basis of new advanced technologies, The Republic of Korea will be able to find new ways on using steel without polluting of environment very soon.

Besides steel industry, there are some other variables which can effect on the GDP growth of Korean Republic. In this thesis, apart from steel industry, unemployment rate, inflation rate, trade openness, foreign direct invest (FDI) and tax revenue are used as variables. Unemployment rate and inflation rate are acceptable from them. Both of them have a negative relationship with the GDP growth of Korea. it means that, if unemployment rate or inflation rate increases the GDP of the country decreases. The other variables such as trade openness, foreign direct invest and tax revenue has no relationship with the GDP growth of Korea.

It can be concluded that, for increasing the GDP of country, the Republic of Korea must decrease unemployment rate and inflation rate as much as possible. Moreover, the government of Korea should find innovative ways of decreasing pollutions of environment which is the result of manufacturing steel products.

Keywords : Economy impact, steel industry, Economic growth, GDP

## Table of Contents

CHAPTER I: INTRODUCTION .....	1
1.1. Background .....	1
1.2. Purpose of study .....	3
1.3. Hypothesis of the study .....	4
1.4. Significance of study .....	4
1.5. Steel Production Worldwide .....	5
1.6. Steel as a main part of Korean industry and export .....	8
1.7. Economic growth in South Korea .....	12
 CHAPTER II: THEORETICAL ANALYSIS AND STUDIES ON PREVIOUS RESEARCHES .....	 21
2.1. Theoretical background .....	21
2.2. Literature review .....	29
2.3. Determinants of Korean Economic Growth .....	32
 CHAPTER III: METHODOLOGY .....	 35
3.1. Type of research .....	35
3.2. Data source .....	36
3.3. Research design .....	43
 CHAPTER IV: ANALYSIS AND DISCUSSION .....	 47
4.1. Analysis .....	47
4.2. Discussions .....	52
 CHAPTER V: CONCLUSIONS .....	 54
 REFERENCES .....	 56



## Index of Figure

Figure 1 Crude steel production .....	5
---------------------------------------	---

## Index of Tables

Table 1 Descriptive statistics .....	48
Table 2 Correlation matrix .....	49
Table 3 Regression Results .....	50

## CHAPTER I: INTRODUCTION

### 1.1. Background

How did South Korea advance from being one of the world's least fortunate nations entangled in one of the Cold War's bloodiest contentions to a quickly rising semi-fringe country competing for center status today with world-driving examination, improvement, and creation in shipbuilding, gadgets, and different ventures? Numerous aspects of Korea's rapid economic growth have been examined, including the significance of Japan's "flying geese," the role of Cold War geopolitical support for Korean development, the role of authoritarian developmentalism, the effects of crony capitalism, and the role of state-driven export-led industrialization for key analyses of Korea's rapid economic growth. We argue that a world-systems analysis focused on key generating sectors provides a more complete picture of Korea's meteoric economic rise. The neoliberal economists' interpretation of South Korea's and the other Asian Tigers' rapid rise as a result of market-friendly policies, as exemplified by the World Bank's (1993) report, was debunked both by the events of the Asian financial crisis and by a diverse array of analysts (e.g. Burkett and Hart-Landsberg 2000; Amsden 1989, 1994; Wade 1990b, 1996; Kohli 2004; Ozawa 2001). Alternative explanations for South Korea's rapid rise offered by these and other analysts focused on the institutional patterns of the South Korean state and chaebol (large industrial groups) (Amsden 1989; Woo 1991; Kohli 2004), the broader rise of Asia (Arrighi 1996; Arrighi, Hamashita,

and Selden 2003; Frank 1998; Peng 2002), and participation in the flying geese model of development (Arrighi, Hamashita, and Selden 2003; Frank 1998; Ozawa 2001, 2003, 2005; Hayter and Edgington 2004; Korhonen 1994; Romm 1992; Cutler and Ozawa 2007). Each of these lines of analysis sheds light on a critical aspect of South Korea's meteoric economic rise. These institutional patterns are unquestionably critical for South Korea's economic ascent, as is the relationship with Japanese firms and the Japanese state, which is emphasized most prominently in the flying geese model but also in the rise of Asia model. We will compare this case of rapid economic ascension to those examined by Bunker and Ciccantell (2005, 2007) in terms of the central role of generative sectors in the raw materials and transportation industries, as well as the ways in which the establishment and growth of these two industrial sectors shaped institutional patterns and the broader economic ascension of South Korea and East Asia. Generative sectors serve as test beds for institutional patterns in economies capable of long-term economic growth (Bunker and Ciccantell 2005, 2007). Even though South Korea has never challenged global hegemony and may never do so, its meteoric rise has reshaped East Asia and the capitalist world economy of the late twentieth and early twenty-first centuries. We analyze the critical industrial sectors that underpinned and shaped South Korea's ascent, steel and shipbuilding, from a low-wage, light industry base to a world leader in electronics, automobiles, and other advanced industries, using the model of generative sectors within the evolving capitalist world-economy. As we will demonstrate below, the institutional patterns, relationships with Japan,

and Korea's place in Asia's broader rise were all critically shaped by the development of these two industrial sectors.

The steel industry is the nation's primary industry, with a significant impact on inter-industries, and has been critical to Korea's economic growth by providing materials to high-demand industries such as automobiles, shipbuilding, and construction.

The steel industry's GDP accounts for 1.5 percent of total industry output and 4.9 percent of manufacturing output.

The steel industry has been attempting to increase steel self-sufficiency and balance the trade by increasing exports. As a result, exports increased to USD\$27.7 billion in 2016, up from USD\$7.6 billion in 2000, representing a 5.8% increase in total exports in Korea. Similarly, imports have tripled from USD\$6.8 billion in 2000 to USD\$19.4 billion in 2016. Infrastructure investment has also increased significantly, from 1.7 trillion won in 2000 to 3 trillion won in 2016.

## 1.2. Purpose of study

To establish the impact of Steel industry on economic growth in Korea. At present Production volume of crude steel in South Korea is increasing, however the share of steel industry in GDP is decreasing. The purpose of the study is to estimate the statistical significance of steel industry on economic growth in Korea. Below the tasks of the research will be given:

- to conduct literature review on the impact of steel industry on economic growth in Korea;

- to study the theories related to the interrelations between steel industry and economic growth;

- to determine the variables for regression using literature review;

- to estimate the impact of steel industry on economic growth in Korea;

- to develop conclusions based on the results of regression;

- to develop the recommendations for increasing the impact of steel industry on economic growth.

### 1.3. Hypothesis of the study

H1: The steel industry output has a positive relationship with an economic growth in Korea

H2: Unemployment rate has a negative relationship with an economic growth

### 1.4. Significance of study

The research intends to estimate the determinants of economic growth in Korea with a variable of interest steel industry input. The data from 1980 to 2019 will be collected from World bank database. The

results of the research are expected to determine the relationship between Steel industry output and economic growth in Korea, according to the results, further recommendations can be made.

## 1.5. Steel Production Worldwide

In March 2021, global crude steel production for the 64 countries that report to the World Steel Association (world steel) was 169.2 million tons (Mt), up 15.2 percent from March 2020.

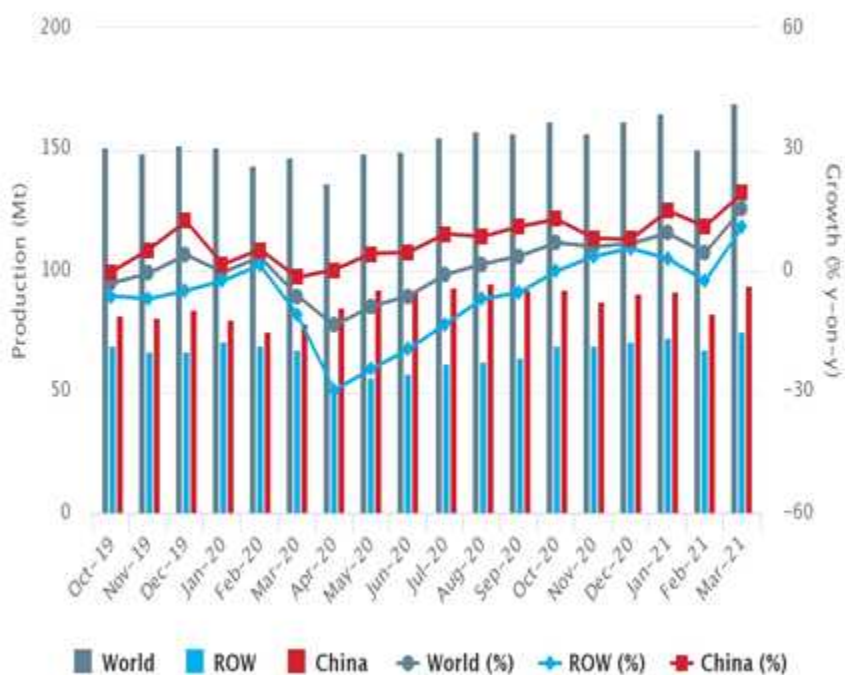


Figure 1. Crude steel production

Source: World Steel Association

## Production of crude steel by region

In the first three months of 2021, global crude steel production totaled 486.9 Mt, up 10.0 percent from the same period in 2020. Asia and Oceania produced 356.9 million tons of crude steel in the first quarter of 2021, up 13.2 percent from the same period in 2020. In the first quarter of 2021, the EU (27) produced 37.8 Mt of crude steel, up 3.1 percent from the same quarter in 2020. North America's crude steel production was 28.1 Mt in the first three months of 2021, down 5.2 percent from the first quarter of 2020. In the first quarter of 2021, the CIS produced 26.2 Mt of crude steel, a 3.1 percent increase over the first quarter of 2020.

The significance of the metallurgical area in industry is obvious. The essential situation of the steel business overall gives it a benefit contrasted with different enterprises. The items acquired, and, specifically steel, are broadly utilized in different areas, adding to the general economy. In this unique circumstance, the thought drawn from an investigation of the European Commission, as indicated by which metallurgy "is the center action supporting essential metals creation, alloying and handling, creation and material stream (e.g.: reuse and reusing); these exercises represent 46 % of the all out assembling worth and 11 % of the all out of total national output (GDP) in the European Union", obviously shows the job and needs of this industry. Presently, steel creation involves a significant spot in the whole society, yet its support is subject to the distinguishing proof of new methods of creation and alloying, to guarantee the decrease of creation costs in the midst of improved useful, innovative and financial properties and utility of steel. In such manner, lately it has been noticed



the undeniably enormous scope use of the extraordinary systems of elaboration and treatment of prepares (the exchange of certain metallurgical cycles outside the heater, either in the scoop or in specific gear), creating a progression of advantages (expanded efficiency, lessening energy utilization, improving nature of prepares and so forth) Besides, a perpetual worry of administrators in the steel business is to apply the most recent creation advancements, energy effective, conservative and less contaminating. Expenses of crude materials and energy assets stay genuine difficulties requiring supported endeavors as far as item advancement and expanding work usefulness. Also, a significant test is the retraining of the representatives, as per the new age of steelmaking advances outfitted to lessening CO<sub>2</sub> discharges.

Internationally, the steel business positions second, after oil and gas, with an expected turnover of about \$ 900 billion. The inescapable utilization of steel in different areas and its attributes contrasted with different materials have driven countless financial administrators, in which more than 2,000,000 individuals work (in the event that it is considered the connections with different ventures, the quantity of occupations in the steel business overall is assessed at 50 million). Sadly, a longing to acquire a higher benefit in any movement can be found in the steel business. The two financial backers and public specialists intuited the area's capacity to create high benefits, which prompted the formation of new creation limits or the improvement of existing ones. China is described by creation overcapacity (brought about by sponsorship strategy rehearsed by the specialists), which causes an overabundance that can't be consumed by the homegrown market. It ought to likewise be noticed that

this nation is confronting financial challenges brought about by the way that monetary improvement was mostly founded on trades as opposed to homegrown utilization.

## 1.6. Steel as a main part of Korean industry and export

South Korea was the fourth largest steel exporter in the world in 2018. South Korea exported 14.9 million metric tons of steel year to date (through June), also referred to as YTD 2019. This is a 3% decrease from 15.3 million metric tons in YTD 2018. South Korea's steel exports accounted for approximately 7% of all steel exported globally in 2017. South Korea's steel exports in 2018 were less than half the volume exported by the world's largest exporter, China, and just behind the second largest exporter, Japan. Steel accounted for just 4.3 percent of South Korea's total exports in value terms in 2018. South Korean steel is exported to over 150 countries and territories. The top ten partner countries account for 72 percent of South Korea's steel exports in 2018. Each of the top ten countries received over 900,000 metric tons of South Korea's steel exports.

South Korea had a trade deficit in steel products prior to 2009. The deficit reached an all-time high of 8.2 million metric tons in 2008. Since 2009, imports have been declining while exports have been steadily increasing. Since mid 2010, South Korea has consistently had an annual steel trade surplus, with annual exports increasing by 49% and imports declining by 27% between 2009 and 2018. South Korea's steel trade surplus was 6.1 million metric tons in the first quarter of 2019, down 21% from 7.7 million metric tons in the same period last year.

South Korea's steel exports increased to a record 31.6 million metric tons in 2014. Exports have fluctuated between 29.8 and 31.6 million metric tons per year since that time. South Korea exported 14.9 million metric tons of steel in the first quarter of 2019, down 3% from 13.3 million metric tons in the same period last year. South Korea's YTD 2019 exports fell 7% to \$12.4 billion, down from \$13.3 billion in YTD 2018. South Korea's steel exports are dominated by flat products. In the first quarter of 2019, 76%, or 11.2 million metric tons, of South Korea's steel exports were flat products. Long products accounted for 13%, or 1.8 million metric tons, followed by pipe and tube products, which accounted for 6% (884 thousand metric tons), stainless products, which accounted for 5% (778 thousand metric tons), and semi-finished steel, which accounted for 1%. (201 thousand metric tons).

Exports to South Korea's top ten steel markets accounted for 75% of the country's total steel export volume of 11.1 million metric tons in YTD 2019. (mmt). Japan was South Korea's largest export market, accounting for 13% (1.9 mmt) of total exports, followed by China at 13% (1.8 mmt), India at 11% (1.7 mmt), the United States at 8% (1.2 mmt), Mexico at 7% (1.1 mmt), Thailand at 7% (1.0 mmt), and Vietnam at 6% (932 thousand metric tons) in YTD 2019.

South Korea's steel exports increased to seven of its top ten markets in the first quarter of 2019. South Korea's exports to Thailand (14 percent), Mexico (12 percent), India and Malaysia (both 7% ), Vietnam (6 percent ), Japan (5 percent ), and Indonesia increased the most by volume (4 percent ). South Korea's exports to the United States (-14%), China (-6%) and Italy decreased the most in volume terms (-5

percent). Between YTD 2018 and YTD 2019, the value of South Korea's steel exports increased in all but four of the country's top ten export markets. They increased the most in Mexico (9%), India, Vietnam, and Indonesia (all 4%), Thailand (3%), and Japan (3%). (2 percent). South Korea's exports to Italy and China (both -12 percent) and the United States decreased in value (-10 percent). Korea's exports to Malaysia remained virtually unchanged (down less than 1 percent). Apart from the top 10, other significant changes in South Korea's YTD 2019 export volume included exports to 11th-ranked Turkey (-26%), 20th-ranked Bangladesh (42%), 22nd-ranked Philippines (-45%), 26th-ranked Sweden (74%), and 31st-ranked Iraq (2,082 percent). The top export markets for South Korea's steel products vary in terms of volume. China accounted for the lion's share of South Korea's flat product exports, accounting for 14% (1.6 million metric tons), closely followed by India and Japan, both accounting for 13%. (1.5 million metric tons each). Japan accounted for 12 percent (212 thousand metric tons) of South Korea's exports of long products, followed by Vietnam at 11 percent (185 thousand metric tons). Japan also received the majority of South Korea's semi-finished products, accounting for 50% of total exports (100 thousand metric tons). Vietnam received the lion's share of South Korea's stainless exports, accounting for 15% (117 thousand metric tons), closely followed by Turkey at 13% (98 thousand metric tons) and Thailand at 12%. (92 thousand metric tons). The United States accounted for 49 percent (429 thousand metric tons) of South Korea's pipe and tube exports, while Canada accounted for 8%. (67 thousand metric tons).

In 2018, South Korea's steel products' import market share decreased in six of the country's top export destinations. South Korea's share of China's imports decreased the most (3.3 percentage points), followed by Indonesia (2.7 percentage points), Japan (2.4 percentage points), and the United States (2.4 percentage points) (down 1.7 percentage points). Thailand and Malaysia's import share decreased by less than 1%. India (up 3.7 percentage points from 2016), Mexico (up 0.5 percentage points), and Italy all saw significant increases in their share of steel imports from South Korea (up 0.2 percentage points). Japan, China, and India accounted for more than 25% of South Korea's total steel imports. In 2018, flat products accounted for the lion's share of South Korean steel imports into each country. Flat products from South Korea accounted for 73% (2.7 mmt) of steel mill products imported to Japan, 86 percent (3.3 mmt) of imports to China, and 89 percent (2.7 mmt) of imports to India.

South Korea's crude steel production increased by 42% between 2009 and 2012. Production has fluctuated since then, but has averaged approximately 68.4 million metric tons per year through 2018. Production totaled 36.5 million metric tons in the first quarter of 2019, up 1% from 36.1 million metric tons in the same period last year. Apparent consumption (a proxy for steel demand) fell behind production in 2011 after being in balance with production in 2009 and 2010. In the first three months of 2019, apparent consumption increased to 30.4 million metric tons, up from 28.4 million metric tons in the same period last year. The gap between apparent consumption and production reached a record high of 15.0 million metric tons in 2018. The demand–supply gap

decreased to 6.1 million metric tons in YTD 2019, down from 7.7 million metric tons in YTD 2018. Exports as a percentage of output increased gradually from 41.2 percent in 2009 to 44.3 percent in 2015, before declining for three consecutive years. Exports as a percentage of production fell to 40.7 percent in YTD 2019, down from 42.4 percent in YTD 2018.

## 1.7. Economic growth in South Korea

Korea has achieved remarkable success in balancing rapid economic growth and significant poverty reduction. Between 1960 and 2019, the Korean government's policies resulted in annual real gross domestic product (GDP) growth of an average of 7.3 percent. Annual export growth of 16.0 percent on average between 1961 and 2019 fueled this strong performance, while savings and investment increased to 34.7 percent and 29.8 percent of GDP, respectively. As the first former recipient to join the Organization for Economic Cooperation and Development's (OECD) Development Assistance Committee (DAC) in 2009, Korea's gross national income (GNI) per capita increased rapidly from US\$67 in the early 1950s to over US\$30,000 in 2018.

Korea is a critical development partner of the World Bank Group and has contributed significantly to the International Development Association (IDA), the World Bank's fund for the world's poorest countries, since 1977. Today, Korea provides development experience that inspires many developing countries in areas such as sustainable development, infrastructure development, and service improvement to

improve people's lives, as well as the transition to a dynamic knowledge economy. Korea set a goal in 2015 to increase its official development assistance (ODA) to 0.2 percent of gross national income (GNI) by 2020 and 0.3 percent by 2030, and has been steadily increasing its ODA volume since then.

To prepare for a more prominent international role, the Korean government increased its IDA contributions, signed a co-financing framework agreement with the Bank, and established multiple trust funds. The World Bank Group's Korea Office is transforming itself into a global innovation and technology hub for sustainable development. As a global innovation and technology hub, the Korea office will assist developing countries in adopting innovative and technology-enabled development strategies and in advancing green growth innovations for sustainable development. Two flagship events on innovation and technology – the Global Innovative Growth Forum, co-organized with the Ministry of Economy and Finance in 2019, and the Korea Innovation Week, co-organized with the Ministry of Economy and Finance in 2020 – showcased the Korea office's progress in partnerships and programs.

While countries worldwide work to contain the spread and impact of COVID-19 (coronavirus), the World Bank Group Korea Office is collaborating with the Korean government to share the country's expertise and experience, particularly in the use of innovative and technology-enabled solutions to address the pandemic (World Bank).

The Korean government set up Pohang Iron and Steel Company (POSCO) in 1968, and the organization got broad government

support all along, while the little steel small factories worked during the Japanese pioneer time frame didn't get government support.

Due to its gigantic capital necessities, most Koreans at first went against the development of the plant, yet POSCO constantly extended its ability and end up being fruitful by the mid-1980s.

As a result, the Korean steel industry turned into the impetus and key part for various businesses, like vehicles, shipbuilding, holders, rail lines, development, and machines, which supplemented each other in a righteous pattern of financial development throughout the most recent thirty years. The markers of the commitment by the steel business as a generative area are striking. Korean steel creation extended from 2.55 million tons in 1975 to 36.8 million tons in 1995, to 43.1 million tons in 2000, and to 48.5 million tons in 2006, making it the world's fifth biggest steel maker. The commitment of the steel business to the Korean economy is obvious from the association among POSCO and the principle enterprises of autos, apparatuses, development, and shipbuilding (Hogan 2001; Shin and Yoo 2004). As a result of POSCO's gigantic increment of the stockpile of homegrown steel from 20% of utilization during the 1970s to in excess of 90% in 2000, the whole Korean economy could support constant development. Korean automakers, for example, created 1.322 million vehicles (347,000 were traded) in 1990, and POSCO made 1.426 million tons of steel to the business (Hogan 2001:42-43).

The Korean apparatus industry produces coolers, clothes washers, microwaves, forced air systems, VCRs, and shading TVs, and



burned-through critical measures of steel to create 32.9 million units in 1990, ascending to 47.5 million units in 1999 (Hogan 2001: 48–51). Ventures in the development business, including building foundation like expressways and scaffolds, business building development and private development, additionally utilize enormous measures of steel. In the last part of the 1990s, POSCO's shipments of steel to the development business surpassed one million tons each year (Hogan 2001:59–60). Rail lines in Korea have as of late centered around a high velocity railroad undertaking to interface the urban areas of Seoul and Pusan, a distance of 412 kilometers, with culmination anticipated 2010 at an expense of US\$16.3 billion. A more aspiring arrangement of future undertakings center around building railroad linkages between Korea, Japan, and China, directing across the Korea–China line and to the Siberian railroad, in the end arriving at Europe (Kim, Hong and Nam 2001). It is normal that these undertakings will create an appeal for steel, including for rails and underlying steel for the development of railroad stations and offices. POSCO plans to build its creation of boat steel from its present 3.6 million tons to 4.7 million tons by 2010, because of the blast of the shipbuilding business as of late. This will soothe the lack of topnotch transport steel for ships, seaward oil stages, and plants (Asia Pulse News 2006).

POSCO, with the complete help of the Korean state, created five key techniques in the course of the most recent forty years to decrease steel production expenses and backing the more extensive cycle of Hogan (2001) anticipated a persistent development of interest for erosion safe stirred steel throughout the following 20 years and the factories of

POSCO and Kwangyang can convey top notch cold-moved sheets. By building the second plant at Kwangyang in 1985, POSCO could react expeditiously to the market's different requirements: "an arrangement of one organization two works, which empowers us to seek after less amount yet more noteworthy item assortment " (Hogan 2001:39). For a nitty gritty conversation about the advantages of building Kwangyang plants as far as size and new innovation.

Korean financial development (Park 2003). In the first place, POSCO received new advances and offices from numerous different regions, including Japan and Europe (Enos and Park 1988), e.g., robotization innovation, bigger scope impact heaters, ceaseless projecting gear, scaled down plant innovation, and an assortment of different developments (Hogan 2001). D'Costa (1994:49–50) laid out the purposes behind embracing imported innovation. To start with, the upgrade of fare expected required a better nature of steel than fulfill global guidelines. Second, in light of the fact that the size of creation is conversely related with unit cost, bringing in bigger scope innovation decreases costs. Third, present day innovation joined with trained and low compensation work make an underlying intensity. Fourth, the exchange of innovation from Japan became conceivable in light of the fact that Japanese firms and the Japanese state didn't see South Korea as a danger during the 1970s. Moreover, two Japanese steel makers, Nippon Steel and Mitsubishi Heavy Industries, confronted with worldwide overcapacity and a political environment empowering moving vigorously dirtying enterprises out of Japan, imagined that South Korea was an appealing other option (D'Costa 1994:59). Changes in the worldwide economy, driven in huge

part by Japan's fast financial climb, set out significant open doors that POSCO, with colossal assistance from the Korean state, seized to get one of the world's biggest steel firms and a basic segment of the worldwide economy.

Second, POSCO submitted huge capital and HR to innovative advancements and innovative work by building up two of the world's driving exploration associations, Pohang University of Science and Technology (POSTECH) in 1986 and the Research Institute of Industrial Science and Technology (RIST) in 1987. While POSTECH conducts fundamental logical exploration, RIST seeks after the improvement of applied innovations from which POSCO benefits through pilot plants and later business creation. POSCO's innovative advances incorporate the FINEX plant (Steel News 2003) and Smelting Reduction and Near-Net-Strip Casting (Strip Casting). This innovative work development procedure will be a vital component in Korea's push to keep up and further upgrade its situation on the planet economy despite China's fast financial development.

Third, POSCO's staff arrangements assisted it with accomplishing and keep up its undeniable degree of worldwide seriousness. POSCO is a model of the 'ascent of the fragmented work market,' which uses a progressive multi-level compensation construction of administrators, standard specialists, and contracted out laborers. It is like the Japanese partitioned construction of "perpetual and momentary workers."

Ordinary specialists in POSCO are generously compensated. Then again, there are "contracted-out (brief)" regular laborers who take the

humble errands of "relining, cleaning, pressing, planning ingot shape, scarfing, and treating pieces" (Park 1991). During the 1980s, they made up around 24% of absolute representatives at POSCO. It is assessed that POSCO saved around 15% of aggregate work costs by recruiting brief laborers (Amsden 1989). POSCO has a military-style activity to cultivate solid inspiration among laborers, a broad preparing program that works with exceptionally low paces of turnover and non-appearance (e.g., just 0.07% of work days in 1984 were lost to non-appearance) (Amsden 1989:212), a feeble worker's guild (POSCO Fact Book 2001, 2006) and huge quantities of unpredictable specialists at its Oejoo Opchae (subcontracted organizations).

Fourth, POSCO, assembled deep-water ports in Young Il Bay and Kwangyang Bay, recreating the Japanese system of utilizing maritime enormous mass transporters combined with global speculations and dealing abilities to get long haul admittance to press metal by means of long haul contracts as opposed to the unfamiliar direct venture model of the steel firms in the U.S. what's more, Europe. This Japanese procedure had totally changed the conditions in worldwide crude materials businesses, and POSCO utilized this Japanese-set out freedom. The development of steel creation by POSCO required a consistent increment of imported crude materials. POSCO's imports of iron mineral developed from 11.6 million tons in 1981 to 27.7 million of every 1991, to 39.5 million out of 2001, and to 42.2 million tons in 2005 (POSCO Fact Book 2000-2006), a yearly development pace of more than 6%. POSCO imported 20.8 million tons from geologically close Australia, 57% of the aggregate, 10.5 million tons from Brazil, 29% of the aggregate, and 2.6

million tons from India, 7% of the aggregate, in 2000. The significant hotspots for coal are Australia, Canada, the United States, and China.

Fifth, to grow this crude materials technique for getting steady causes of supply, POSCO made joint endeavor interests in different nations. Two global joint endeavors in coal were shaped: Miller Pohang Company (with the Mount Thorley Coal Mine Project in Australia) in 1981 and POSCAN (Greenhills Coal Mine Project in Canada) in 1993. KOBRASCO, a Brazilian joint dare to create iron metal pellets, was framed in 1996. The declaration of another unfamiliar speculation plan by POSCO to fabricate a coordinated 12 million-ton steel plant in Orissa, India in 2006 is an illustration of its endeavors, in view of these procedures to get crude materials. It would be POSCO's first unfamiliar interest in building an incorporated steel plant. Orissa has 5 billion tons of iron metal stores, of which POSCO can use mining rights to 600 million tons, sufficient for provisions for the following 30 years (Ohmynews 2006).

Every one of these procedures was unequivocally displayed on Japan's amazingly fruitful advancement technique and, from numerous points of view, was upheld by Japanese firms and the Japanese state by means of financing, joint endeavors, and innovation deals. The Japan-driven rebuilding of the world economy set out essential open doors that POSCO and the Korean state used to advance financial development. As we will find in the shipbuilding business, Japan, South Korea, and all the more as of late China are occupied with monetary and political connections of collaboration and contest. Japanese firms and the Japanese state give funding to, offer innovation and items to, and

structure joint endeavors with South Korean and Chinese firms, while at the same time contending in worldwide business sectors with these exact same firms. This mind-boggling reliance reflects prior connections between the U.S. furthermore, Japan (Bunker and Ciccantell 2007) and between the U.S. also, Great Britain (Bunker and Ciccantell 2005) and features the requirement for world-frameworks investigation to look at the ascent of East Asia and the potential for rebuilding the entrepreneur world-economy as a multidimensional and regularly conflicting interaction.

## CHAPTER II: THEORETICAL ANALYSIS AND STUDIES ON PREVIOUS RESEARCHES

### 2.1. Theoretical background

#### Economic growth theory

There have been numerous theories about what causes economic growth over time. Classical economics is widely believed to be the first modern school of economic thought. Many of the fundamental concepts of classical economics were proposed by Scottish economist Adam Smith in 1776. The book, titled 'The Wealth of Nations,' was first published during the British Agricultural Revolution and was widely regarded as a seminal work promoting the benefits of free market economies and the concept of laissez-faire and free competition. Smith asserted in his book that a nation's wealth is maximized when its citizens act in their own self-interest. David Ricardo (1817) extended these ideas by introducing the labor theory of value. This theory is predicated on the premise that in a competitive environment, the prices of goods sold tend to be proportional to the labor costs associated with their production. Mill (1848) developed this theory further by situating it within contemporary social environments. Classical economics is concerned with the interaction of the law of diminishing returns and population growth (Jackson, 2001). According to the law of diminishing returns, "as successive equal increments of one resource (e.g. labor) are added to a fixed resource (e.g. land), the resulting increases in total output (marginal outputs) will diminish in size beyond a certain point" (Jackson, 2001). This concept is then weighed against what is referred to as a society's 'optimal population.' This is the point at which, given an economy's limited

resources, a nation's population grows to the point where the highest income per person is generated. Another characteristic of classical economics was the assumption that an economy's output was distributed among various social groups in proportion to the costs incurred by those groups in producing the output (Liberty, 2010). However, because market prices are not always reflective of the product's 'value' (i.e. the cost of production), this suggested that 'value' equates to how the person acquiring the product perceives it, resulting in the concept of supply and demand. This was dubbed the Marginal Revolution in economics, and it resulted in the development of what became known as neoclassical economics. Neoclassical economics is predicated on the following principles: individuals make rational choices among possible outcomes; firms maximize profits; and individuals act independently on the basis of complete and relevant information.

To distinguish what made the Korean steel industry fruitful, it is sensible to analyze the historical backdrop of its turn of events. The relevant examples contrast when the monetary emergency of 1998. The Korean economy and steel industry entered a time of out and out blast times in the last part of the 1980s and Korea's Gross domestic product and steel creation kept on developing until 1997. Nonetheless, everything changed after the monetary emergency: Korea's extent inside worldwide Gross domestic product topped first in 1996 and afterward peaked again in 2007. Interestingly, Korea's worldwide portion of steel utilization topped in 1996, however declined a short time later in spite of certain times of worldwide Gross domestic product topped first in 1996 and afterward peaked again in 2007. Conversely, Korea's worldwide portion of steel utilization topped in 1996, yet declined a short time later in spite of certain times of recuperation. This confuse is credited to the way that the Korean economy, vigorously subject to IT-driven development after the monetary emergency, had kept up a lot of Gross domestic product reliable, yet Korea's offer in worldwide utilization has been falling quicker



than that of Gross domestic product due to declining steel power of Gross domestic product. The development paces of clear rough steel use and unrefined steel creation from 1970 to 1997 expanded at compound yearly development rates (CAGR) of 12.5% and 17.9%, separately, yet a simple 2.1% and 2.5% from 1997 to 2016. Specifically, rough steel use has deteriorated since the monetary emergency of 2008, and even by 2016 it had neglected to recuperate the levels in 2008. In the interim, unrefined steel creation has flooded since the activity of Hyundai Steel's shoot heater in 2011, and the hole among organic market has broadened. Looking at the progressions that occurred around the emergency of 1998 dependent on factors identified with steel use, there are two particular things. The first is a huge easing back in the urbanization rate after 1996. Second, net capital arrangement as level of Gross domestic product declined subsequent to topping in 1996. Alongside industrialization, urbanization is a significant driver of both financial development and steel interest. Net capital arrangement, included interests in development and offices, is likewise firmly identified with steel interest. Specifically, deteriorating urbanization around the monetary emergency of 1998 and a dive in speculation brought about by bothered oversupply in the Korean economy prompted stagnation in steel interest. Strangely, the Korean economy moved from government-headed to advertise driven in 1998. The Korean government had carried out seven Five-Year Monetary Improvement Plans, with the last portion finishing in 1997. Perceiving the restrictions of government-drove activities in extending the economy, Korea endeavored to move to a more market-drove economy, yet was hit by the Asian monetary emergency of 1997-98. Korea acknowledged crisis advances from the Worldwide Money related Asset (IMF) and likewise took measures to liberate markets, for example, presenting a completely drifting conversion standard framework and opening the stock

and security markets. Subsequently, the year 1998 turned into a defining moment for the Korean economy as it moved from government-headed to advertise driven.

Lots of articles were written to inspect the advancement of the Korean steel industry from a hypothetical viewpoint and draws strategy suggestions for mavericks. It is no simple assignment to apply just a solitary point of view and sum up progress factors for what has been named Korea's "Marvel on the Han River." In this way, it is imperative to consider changing financial speculations to personality such factors. In light of existing exploration on the achievement of the steel business by the scholarly world, research foundations, and the media, the creator embraced different hypotheses to reconsider the achievement factors and offer ramifications for agricultural countries—get up to speed hypothesis, newborn child industry contention, fourth factor of creation, Lewis defining moment, and endogenous development hypothesis.

The get up to speed hypothesis was addressed by Seoul Public College Teacher Keun Lee. This part mostly inclines upon his clarification and examination. As per the get up to speed hypothesis among nations, ventures, and organizations, there are openings, in which tenderfoots can find first movers. Four agent windows are the development of new innovative and monetary ideal models, downturn in business cycles, changes sought after conditions, and mechanical approaches and government limitations. In any event, whenever a window for a promising circumstance opens, few out of every odd maverick can take advantage of the lucky break and beat first movers. The outcome changes relying upon how the main movers respond and how well mavericks beat their

weaknesses and capitalize on their benefits. As first movers wish to hold their own benefits on the lookout, they frequently disregard new advances and fall into the main mover trap. Then again, newbies are burdened by their necessity of gigantic assets and government support in the underlying stage, yet they can skip arranges by embracing first movers' trend setting innovations for minimal price, and surprisingly become first movers themselves. In the event that willing to face challenges, they are offered a chance for jumping. This get up to speed hypothesis clarifies how the Korean economy had the option to accept a window for open door and prevail with regards to making up for lost time to cutting edge economies. This is additionally obvious for the steel business, yet for different areas also, including hardware, cars, and petrochemicals. The get up to speed cycle for the Korean steel industry is partitioned into three phases. The first is the section stage (1968 – 1972) when its improvement was energized generally by government activism. The Korean government joined POSCO as a state–possessed organization in 1968, and ordered the Steel Business Advancement Law to effectively uphold the foundation of the Pohang Steelworks. Moreover, POSCO was given an assortment of advantages: long haul advances at low financing costs, foundation of framework, decrease or nullification of duties and levies, and decreases in utility rates. The subsequent stage is the continuous make up for lost time stage (1973 – 1986) in which worldwide monetary downturns started by the first and second oil stuns offered a kind of freedom to Korea. Pohang Steelworks started delivering steel in 1973 and extended creation limit through 1983. Under the worldwide downturn that followed the main oil stun in 1973, POSCO had the

option to buy old hardware at costs lower than typical. The public authority additionally carried out strategies to sustain substantial and compound ventures (1973–1979), zeroing in on six areas—steel, petrochemicals, apparatus, shipbuilding, gadgets, and non-ferrous metal. This altogether drove up steel interest. Third is the continuing onward stage—a time of taking off extension after 1987. POSCO began building its Gwangyang Steelworks in 1981. The subsequent oil stun of 1979 and resulting monetary downturn had given an opportunity to POSCO to find first-movers. POSCO exploited this downturn to advance rivalry among hardware providers and figured out how to purchase gear at discounted costs. Besides, the downturn additionally offered a further chance for POSCO to present state of the art innovations at sensible expense. During this stage—skipping get up to speed stage, POSCO had the option to get more noteworthy expense advantage than at any other time. To sum up, the Korean government set up the state-possessed steel organization POSCO with an end goal to enter the steel business, and downturns in the worldwide steel industry and homegrown mechanical arrangements furnished Korean organizations with promising circumstances. Because of stagnation in the worldwide steel industry during the 1970s and 1980s, POSCO could save money on expenses of new venture. In particular, the achievement of POSCO is described by way following at the beginning phase and afterward by stage-skipping. As proposed by the get up to speed hypothesis, the Korean government has assumed a vital part in the development of the steel business. Inspecting government arrangements of the time, it essentially carried out advancement procedures dependent on the newborn child industry

contention. The center of this contention is that early businesses frequently come up short on the seriousness of their better-settled rivals in different nations and consequently require insurance until they can achieve comparable intensity and add to public turn of events. This contention was first completely expressed during the 1790s by the US legislator Alexander Hamilton and later efficiently created by the German financial analyst Friedrich Rundown. Korea is a genuine illustration of transforming an impeded industry into one with a similar benefit. The Korean government's part around then can be ordered into five examples. In the first place, it set up a state-claimed organization and gave centered government support. This is a "determination and focus" system. Truth be told, this methodology is apparently the solitary decision for a nation coming up short on the assets, advancements, or capital for supporting key ventures. The second is a mechanical technique fixated on substantial and synthetic ventures. Industrialization is key in that it has a high modern linkage impact and can without much of a stretch make high added esteem dependent on improved viability. A prudent cycle was successfully made in that the improvement of substantial and synthetic enterprises expanded steel interest and filled the steel business, while the ascent of the steel business tied down economies of scale to supply cost serious items to steel-devouring ventures. At last, the steel-burning-through ventures had the option to become further. Third, the public authority was effectively engaged with building foundation, like streets, rail routes, and ports, even in the beginning phases of monetary turn of events. At the point when the Korean government started developing the Gyeongbu Interstate associating the southern and northern

compasses of South Korea, it was met with negativity and the assessment that pouring a particularly colossal measure of cash into foundation was unseemly while individuals were battling to earn enough to pay the bills. Be that as it may, the development of foundation expanded coordination effectiveness and improved modern seriousness. Also, steel request was made while the foundation was being raised. The fourth example is import limitations and fare driven development methodologies. The public authority postponed market openings for as far as might be feasible with an end goal to help the business acquire seriousness and looked for send out driven procedures with the end goal of defeating the little homegrown market. The fare driven technique is profitable for a country with a low sovereign credit score looking to acquire unfamiliar assets for buying offices, just as to guarantee worldwide seriousness in the opposition for trades. Fifth, the public authority has ventured forward to ingrain work cognizance, and was effectively engaged with sourcing specialists for the business. Under the trademark "We should live well," the public authority enlivened energy and supported work awareness. Because of Koreans' enthusiasm for instruction, the public authority extended instructive frameworks and gave ability to organizations in a convenient way.

Perhaps the main speculations to clarify the wonderful development of the Korean steel industry is the fourth factor of creation—business and authority. There are three fundamental components of creation: land, work, and capital. Moreover, business venture is frequently attached as an extra factor. At the point when the Korean government started sustaining the steel business, not many anticipated achievement. The

Korean government looked for worldwide financing to fabricate a steel factory during the 1960s, yet the Global Bank for Reconstruction and Advancement (IBRD, presently the World Bank) gave a report distrustful of Korea's steel industry possibilities in 1969. The report demanded that it was too soon for Korea to enter a particularly capital and innovation concentrated industry as steel, and encouraged it to initially foster more work escalated enterprises. In particular, it guaranteed that a system of delivering middle items to supplant imports would build steel creation costs in Korea just as fare costs and at last dissolve the country's w o r l d w i d e i n t e n s i t y .

## 2.2. Literature review

Steel's ability to be shaped and moulded, as well as its elasticity, ductility, proven resistance to a variety of uses, and corrosion resistance, have established it as a dominant material in a variety of sectors. Steel is practically indispensable in the modern world, being used in construction, infrastructure, automotive, and a variety of other industries, as well as being a significant determinant of economic development. Numerous studies have examined the steel industry's role in the economy and discovered a positive correlation between steel production and economic growth (Ozkan, 2011). Clearly, because this is not the only determinant, a set of qualitative and quantitative factors must be analyzed. One of the most contentious issues in the literature continues to be air pollution, with industry in general and the steel industry in particular representing extremely vulnerable sectors when viewed through this lens (Amza &

Dobrotă, 2012). As a result, producing steel with efficient structures while minimizing adverse environmental effects can contribute to sustainable development. Additionally, the steel industry's need to adopt sustainable development principles has been the subject of numerous studies, given the imperative of ensuring that performance is consistent with these principles. Due to the importance placed on resource efficiency, it is necessary to adhere to basic production management principles (Nicolae, 2012). As such, in terms of resource optimization, facility management encompasses economic, managerial, and engineering activities. As it is critical to maximize machine capacity utilization, numerous specialists have emphasized the importance of developing new methodologies in this field (Radojicic, Nesic, Vesic Vasovic, Spasojevic-Brkic, & Klarin, 2011). Within the steel Businesses operate in an economic environment that has a significant impact on the results they achieve. Thus, an economic boom propagates its beneficial effects at the microeconomic level by fostering the growth of businesses. Similarly, any economic or financial crisis has a multiplicity of effects on production, consumption, and development. It is self-evident that the steel industry cannot be an exception in this context. Steel production is directly related to a country's economic growth rate and market demand. Steel is one of the most widely used materials in critical sectors such as construction, transportation, energy, and domestic appliance manufacturing, as previously explained. Obviously, the construction sector consumes the most steel (around 50%), followed by mechanical machinery (16%), the automotive industry (13%), and metal products (11%). (in accordance with the World Steel Association for 2014). Given the upward trend in global car production and the fact that steel accounts for more than 50% of the weight of an average car, the current study examines the relationship between steel production, car production, and economic growth. Additionally, despite increased



discussion about alternative materials and current regulations enacted in various countries to promote carbon emission reduction and fuel efficiency (achieved by reducing the weight of automobiles, which is made possible by reducing the amount of steel used in their manufacture), it is clear that steel remains an undisputed material in terms of its qualities (Bălan, Ungureanu, & Dobrotă, 2016).

### 2.3. Determinants of Korean Economic Growth

In reality, determining whether steady-state growth has been achieved is quite difficult. Economic, social, cultural, demographic, and political structures all influence the steady-state level of output. It is dependent on a variety of factors, including savings and consumption patterns. When a society has a proclivity for consumption and an aversion to saving, its steady level of output is lower than when it saves and invests heavily. Along with economic and demographic factors, steady-state output is also determined by political and social institutions, such as tax rates, the extent of market and business decision-making distortions, the maintenance of the rule of law and property rights, and the degree of political freedom (Barro, 1991). Numerous economic variables, including investment, human capital, international trade, and inflation, are considered critical for economic growth. Trade and investment are identified as major inputs for growth in Levine (1992) systematic examination of numerous economic factors that may account for long-run aggregate economic growth, although the effect of trade on growth is diminished when investment is controlled. Additionally, they discover that the initial stage of development has a detrimental effect on growth, depending on the level of human capital. Human capital has always been shown to have a positive effect on growth, although this effect did not hold true between 1974 and 1989. Barro (1997) demonstrates that a variety of variables, including initial GDP levels, initial human capital levels, fertility rates, government consumption, the rule of law index, and trade, all have an effect on growth. According to Chirinko (1994), there is a long-run positive relationship between capital formation and per capita growth. Capital formation is quantified as the share of domestic real gross investment in real GDP. Economic growth is

quantified as the percentage change in real GDP per capita. Their proposals stem from growing concerns that the US economy has been growing at a slower pace than its long-run potential, and from the conclusion that this slower growth is partly due to scarce capital formation. For the United States, (Silva, 2004) report that while increased trade appears to be associated with an increase in inter- and intrastate inequality, this result is far from straightforward. While poorer rural areas and states benefit from cheaper exports in general, they are disproportionately harmed by cheaper imports. By contrast, wealthier urban areas and states benefit from lower exports and imports, which are associated with an increase in employment but not earnings (Silva, 2004). Empirical studies of the Mexican economy's opening to trade have produced similar findings. For instance, Hanson (1996) study demonstrated how a shift away from import substitution in Mexico resulted in the dispersion of manufacturing industry away from Mexico City, creating conditions conducive to the reduction of regional disparities. Goldsmith, (1969) cross-country study, which establishes a graphically positive relationship between finance and growth, has been followed by several subsequent cross-country studies. These include additional countries and variables relating to financial development and economic growth that can be tracked over longer time periods. Additionally, studies using disaggregated data across industries and firm levels are conducted. While all of those studies find a positive correlation between finance and growth, they do not conclude that finance causes growth. King (1993) demonstrate a strong and positive relationship between financial development and growth in their influential cross-country study, using data for 77 countries from 1960 to 1989. While they demonstrate that finance predicts growth, they do not address the issue of causality in detail. Levine and Zervos (1998) establish a

positive relationship between stock market development and growth, capital accumulation, and productivity growth, using data from 42 countries between 1976 and 1993. More recently, Khan and Senhadji (2000) discovered that while financial development has a positive effect on growth, the magnitude of the effect varies depending on the indicator of financial development, the estimation method, the data frequency, and the functional form of the relationship. They make no formal reference to the causality issue. Credit to the private sector, stock market capitalization, and bond market capitalization as a percentage of GDP are all indicators of financial development. It is widely believed that inflation and long-term economic growth have a negative relationship. However, observers' willingness to express this hypothesis appears to be much stronger than the empirical evidence supporting it. Early empirical studies produce extremely mixed results by utilizing a variety of data sets and approaches in an attempt to substantiate the hypothesis empirically (Haslag, 1997). It is difficult to establish a negative long-term relationship because a Philips curve phenomenon can result in a positive relationship between growth and inflation in the short run. In the early 1990s, several influential studies (Fischer, 1993; Barro, 1996) established the empirical basis for the widely accepted negative relationship. More recently, Bruno and Easterly (1998) conducted a thorough examination that sheds some light on the subject. They conclude that the negative correlation between inflation and growth is a result of periods of high inflation. Inflation has a long-run negative effect on growth, owing to high inflation episodes; the inflation effect on growth can be as high as 40% per year.

## CHAPTER III: METHODOLOGY

### 3.1. Type of research

This research studies the impact of Korean steel industry on economic growth in Korea from 1980 to 2019. Apart from steel industry impact, there will be other control variables, but the variable of interest will be the Korean steel industry output. As an economic growth, GDP growth will be used, and it will be dependent variable in the research. The independent variables are as follows:

- 1) Steel industry output (ln will be used – SI);
- 2) Trade openness (TO);
- 3) Inflation rate (INFL);
- 4) Foreign direct invest (FDI);
- 5) Unemployment rate (UnR);
- 6) Tax revenue (TR).

## 3.2. Data source

### GDP growth

Data on GDP growth in South Korea are taken from World Bank database, it is the secondary data which is measured in percentage. The years range from 1980 to 2019.

### Steel Industry output (SI)

Steel is used in nearly every aspect of our lives, from automobiles to refrigerators to washing machines to roads, bridges, ships, and airplanes, and is widely used in engineering and construction work. As a result, steel production and consumption are inextricably linked to the socioeconomic development of numerous large economies.

Steel consumption is highly dependent on the economy's overall performance (GDP) and, more specifically, on infrastructure investments such as railways, ports, roads, airports, and housing.

The source of the data is World Steel Association and it is the secondary data.

### Trade openness (TO)

Since Grossman and Helpman (1990), Romer (1990), and Young (1991), a growing body of economic research has focused on the

role of trade in promoting economic growth. The issue is whether trade serves as a catalyst for economic growth, as the trade-led growth hypothesis asserts. Trade openness has been shown to potentially boost economic growth in the long run by increasing access to goods and services, increasing resource allocation efficiency, and increasing total factor productivity through technology diffusion and knowledge dissemination (Barro & Sala-i-Martin, 1997; Rivera-Batiz & Romer, 1991). As a result, it is expected that countries with greater trade openness will perform better than those with less openness. From this vantage point, developing countries stand to benefit significantly from trade with advanced economies. Worldwide establishments and contributor governments regularly prescribe exchange advancement approaches to non-industrial nations in the desire for opening up and coordinating them into the worldwide market dependent on these expected advantages. These policies were prompted by the failure of the import substitution industrialization strategy, as well as by empirical evidence that more outward-oriented economies experience faster economic growth. However, another line of research argues that increasing trade openness may harm economic growth by increasing inflation and depressing exchange rates (Cooke, 2010; Jafari Samimi, Ghaderi, Hosseinzadeh, & Nademi, 2012). Trade liberalization may have a detrimental effect on economic growth in countries that specialize in the production of

low-quality products (Hausmann, Hwang, & Rodrik, 2007). For example, countries that export primary products are particularly vulnerable to trade shocks. Despite these divergent views, the general consensus is that economic development, particularly in developing countries, is facilitated by openness to international trade. The data source is World Bank and it is estimated by the  $(\text{Imports} + \text{exports})/\text{GDP}$

## **Inflation rate (INFL)**

The first contentious issue regarding economic growth and inflation is their relationship. Theoretical and empirical evidence regarding the relationship between inflation and economic growth indicate that there may be no relationship (Sidrauski, 1967), a negative relationship (Fisher, 1993), or a positive relationship (Mallik and Chowdhury, 2001) between these two variables. Today, the issue isn't just the basic relationship, yet in addition the degree of expansion, which can affect monetary development. While structuralists believe that inflation is beneficial to economic growth, monetarists believe that inflation is detrimental to economic growth. Both perspectives have their own explanations for why inflation has a beneficial or detrimental effect on economic growth. For example, according to neoclassical views, inflation promotes economic growth by redistributing income in favor of higher saving capitalists. This



results in an increase in savings and, consequently, economic growth. Additionally, Keynesians asserted that inflation can boost growth by increasing the rate of profit, thereby stimulating private investment. On the other hand, theories or empirical evidence demonstrate why inflation is detrimental to economic growth. For instance, Barro (1995) stated that high inflation reduces investment, which has a detrimental effect on economic growth. Gultekin (1983) also explained why inflation and economic growth have a negative relationship, stating that growth is dependent on the rate of return, which is decreased by inflation, and thus economic growth is inversely related to inflation. The data source is World Bank and it is the secondary data

OLS is the most well-known regression analysis method. It is also a good starting point for all spatial regression analysis techniques. The method provides the construction of a global model of the variable or process that you want to study or predict; he creates a regression equation that reflects the process in progress.

### **Public sector loans to GDP (FinDev)**

A healthy financial system is regarded as one of the critical pillars upon which sustained economic growth can be built (Demirguc-Kunt, 2006). The correlation with public sector loans and economic growth, in other words, is not well understood. The finance-growth nexus is a hotly debated topic in the literature of financial economics. There were initially two major schools of

thought. The first school of thought maintained that financial development is necessary to economic increasing (Goldsmith, 1969; Levine, 1997; McKinnon, 1973; and Schumpeter, 1911). Indeed, finance has an effect on growth through its influence on saving, investment, and technological innovation (Demirguc-Kunt, 2006). However, proponents of the second school of thought, the Neoclassical theorists, contended that finance is not the primary driver of growth (Lucas, 1988). According to Lucas (1988), the literature has long exaggerated the relationship between financial development and economic growth (Christopoulos & Tsionas, 2004). Accordingly, Singh (1997), Andersen and Tarp (2003), Ayadi, Arbak, Naceur, and De Groen (2015), and Ductor and Grechyna (2015) advanced arguments and evidence in support of an inverse relationship between financial sector development and economic growth. In my point of view financial development doesn't have an effective relationship with GDP growth of South Korea, that's why it is not used in the model of this thesis.

### **Unemployment rate (UnR)**

In the short term, the relationship between economic growth and unemployment may be tenuous. It's anything but phenomenal for the joblessness rate to keep declining for quite a while after other wide proportions of financial movement start to improve. Subsequently, it is oftentimes alluded to as a slacking financial marker. One explanation joblessness may not fall fundamentally

when financial development resumes following the finish of a downturn is that a few firms may have underutilized representatives on their payrolls because of the expenses related with laying off specialists when item request decreases and rehiring them when item request improves. That's why, employers ought to initially be able to rise output to meet increasing demand without hiring additional workers at the start of a recovery by increasing the productivity of existing employees. This boosts labor productivity growth temporarily above its long-run trend rate. Once available labor is fully utilized, output growth can only exceed the rate of productivity growth until firms begin hiring additional workers. As an economic expansion continues, output growth is determined by the combined rates of labor supply and productivity growth. Employment will increase as long as real gross domestic product (GDP) growth exceeds labor productivity growth. When employment growth outpaces labor force growth, the unemployment rate declines.

### **FDI (net inflow % of GDP)**

Foreign Direct Investment (FDI) is a term that refers to a country's long-term involvement in management, joint ventures, and the transfer of technology and expertise from country A to country B. According to the economics literature, based on endogenous growth theory, the level of financial sector development may affect foreign direct investment and its impact on technology diffusion in the host

country, thereby increasing the rate of economic growth. There are two types of FDI: inward and outward foreign direct investment, which result in a net FDI inflow (positive or negative) and a "stock of foreign direct investment," which is the cumulative amount of FDI over a given period. Direct investment does not include stock purchases. Numerous policymakers and academics argue that FDI can have a significant positive impact on the development efforts of a host country. Along with providing direct capital financing, FDI can provide valuable technology and know-how while also fostering relationships with domestic firms, which can help jumpstart an economy. Industrialized and developing countries have offered incentives to encourage foreign direct investment in their economies based on these arguments.

### **Tax Revenue (% of GDP)**

Economic growth can be broadly defined as an increase in a country's productive capacity, as measured on an annual basis. Meanwhile, taxes are a percentage of a country's population's income collected by the government in exchange for no explicit benefit to the tax payer. Numerous empirical studies examine the long run relationship between economic growth and taxation. The studies conducted in response to this motivation varied in terms of data usage, country of origin, methodology used, and time period covered by the studies conducted in developed or developing countries (Egbunike, Emudainohwo, & Gunardi, 2018). In the real

world, taxes can increase the cost of capital and reduce people's incentives to invest, to the point where high tax rates deter domestic and foreign direct investment, adversely affecting the economy's long-term growth. Taxes frequently have an effect on household decisions to spend less and save more, supply less labor and invest in human capital, due to their effect on disposable income. Individual households typically substitute high-taxed activities for lower-taxed activities. A high tax rate causes individuals to reduce working hours and prioritize leisure over work, engage in less productive economic activity, or eventually exit the labor market entirely, resulting in a lower growth rate (Ferede and Dahlby, 2012). Taxation is critical for promoting sustainable growth and poverty reduction in developing countries. It will provide those countries with the necessary fiscal stability and predictability to faster growth and finance the social and physical infrastructure necessary for sustainable development.

### 3.3. Research design

Time-series analysis is a set of statistical methods for identifying the components of a time series and forecasting it.

A time series or a series of dynamics is a sequence of statistical data collected at different points in time about the value of any parameters of the process under study. Each time series value is called a time series level. In the time series, each level should be indicated with the measurement time or measurement number in order. Time series analysis methods differ significantly from simple sample data analysis methods. When analyzing a time series, the researcher is interested not only in the statistical characteristics of the time series, but also takes into account the relationship of measurements with time.

Time series, as a rule, arise from the measurement of some indicator. These can be both characteristics of technical systems and indicators of natural, socio-economic phenomena and processes. For example, the dynamics of the exchange rate or the stock rate, in the analysis of which they try to determine the main direction of development, i.e. trend. Or, for example, analyzing the dynamics of a company's sales in order to plan the stock balance.

The main purpose of time series analysis is to build a forecast of its values for future periods. And the main tasks of time series analysis are to understand under the influence of which components the value of the time series is formed, and to build a mathematical model for each component or their combination. Any time series can be decomposed into the following components:

trend, seasonal component, cyclical component and random component. The first three components form the non-random component of the time series. The random component is present in any time series. But the presence in the structure of the time series of components of a non-random component is not necessary.

### **OLS model for econometric estimation**

Regression analysis is perhaps the most commonly used statistical method in the social sciences. Regression is used to evaluate the relationship between two or more attributes of objects. Defining and measuring attitudes allows you to better understand what is happening on the ground, predict where something will happen, or start testing the reasons why events happen in the places where it happens.

Regression model:

$$GDPgr = \beta_0 + \ln\beta_1 SI + \beta_2 TO + \beta_3 INFL + \beta_4 UnR \\ + \beta_5 FDI + \beta_6 TR + u_t^{\omega}$$

This model is expected to determine the relationships between dependent and independent variables. The outcome variable or a dependent variable is GDP growth, the variable of interest is steel industry output.



## CHAPTER IV: ANALYSIS AND DISCUSSION

### 4.1. Analysis

This chapter includes the analysis results of the regression, i.e., the relationship between dependent and independent variables in Korea, the model for estimation is OLS and the data ranges from 1980 to 2019. The data is secondary data.

According to the results the statistical significance of steel industry output to economic growth in Korea.

Apart from the variable of interest other variables will be used as control variables, these are trade openness, inflation rate, FDI, tax revenue and unemployment rate.

Table 1: Descriptive statistics

<i>Variable</i>	Obs	Mean	Std. Dev.	Min	Max
<i>GDP growth</i>	40	6.102856	3.99836	-5.12944 8	13.37617
<i>Steel industry output</i>	40	40.5625	20.89719	8,5	72.5
<i>Trade openness</i>	40	68.01426	15.93962	46.91868	105.5663
<i>Unemployment rate</i>	40	3.59425	.9817336	2,05	6,96
<i>FDI (%of GDP)</i>	40	.7404681	.4947634	.0720198	2.155985
<i>Tax revenue (% of GDP)</i>	40	13.76646	1.249429	12.49979	20
<i>Inflation rate</i>	40	4.74425	5.263337	.38	28.7

Source: Author's calculation using Stata

Table 2: Correlation matrix

	<i>GDP growth</i>	<i>Steel industry output</i>	<i>Trade openness</i>	<i>Unemp. rate</i>	<i>FDI (%of GDP)</i>	<i>Tax revenue (% of GDP)</i>	<i>Inflation rate</i>
<i>GDP growth</i>	1.0000						
<i>Steel industry output</i>	-0.5541	1.0000					
<i>Trade openness</i>	-0.5444	0.7445	1.0000				
<i>Unemployment rate</i>	-0.4031	-0.0148	0.1214	1.0000			
<i>FDI (%of GDP)</i>	-0.2020	0.4193	0.2648	0.2266	1.0000		
<i>Tax revenue (% of GDP)</i>	-0.2188	0.2727	0.3011	0.1695	-0.0800	1.0000	
<i>Inflation rate</i>	-0.1224	-0.5438	-0.2255	0.1958	-0.3668	-0.0139	1.0000

Source: Author's calculation using Stata

Table 3: Regression Results

VARIABLES	Model 1	Model 2	Model 3
SteelIndustryoutput	-0.1701292** *	-0.1618802** *	-0.1648186***
p> t	(0.000)	(0.000)	(0.000)
Tradeopenness	0.0005547	0.0016449	
p> t	(0.989)	(0.967)	
Unemploymentrate	-1.404754***	-1.281884***	
p> t	(0.004)	(0.004)	
FDIofGDP	0.5404001		-0.5354146
p> t	(0.54)		(0.606)
TaxrevenueofGDP	0.2551006		0.0071993
p> t	(0.71)		(0.985)
Inflation rate	-0.3891558** *	-0.3945653** *	-0.4672824***
p> t	(0.001)	(0.000)	(0.000)
Constant	15.9493	19.03657	15.30256
p> t	(0.002)	(0.000)	(0.006)
Observations	40	40	40
R-squared	0.6623 (0.6009)	0.6557 (0.6163)	0.5655 (0.5158)
*** p<0.01, ** p<0.05, * p<0.1			

```
. reg GDPgrowth SteelIndustryoutput Tradeopenness Unemploymentrate FDIofGDP TaxrevenueofGDP Inflationrate
```

Source	SS	df	MS	Number of obs	=	40
				F(6, 33)	=	10.79
Model	412.925593	6	68.8209322	Prob > F	=	0.0000
Residual	210.562902	33	6.380694	R-squared	=	0.6623
				Adj R-squared	=	0.6009
Total	623.488495	39	15.9868845	Root MSE	=	2.526

GDPgrowth	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
SteelIndustryoutput	-.1701292	.037196	-4.57	0.000	-.245805	-.0944535
Tradeopenness	.0005547	.0407084	0.01	0.989	-.0822671	.0833766
Unemploymentrate	-1.404754	.4605104	-3.05	0.004	-2.34167	-.4678388
FDIofGDP	.5404001	.998743	0.54	0.592	-1.491558	2.572358
TaxrevenueofGDP	.2551006	.3583419	0.71	0.482	-.4739514	.9841526
Inflationrate	-.3891558	.100847	-3.86	0.001	-.5943306	-.1839811
_cons	15.9493	4.817261	3.31	0.002	6.148513	25.7501

## 4.2. Discussions

Table shows the findings of the research on the impact of steel industry on economic growth in Korea from 1980 to 2019.

According to the results, steel industry output, unemployment rate, and inflation rate are statistically significant to GDP growth in Korea. Other variables such as trade openness, FDI to GDP and Tax revenue to GDP are not statistically significant to economic growth in Korea.

Steel industry output has a negative impact statistically on economic growth in South Korea according to the results. That means an increase in the production of steel will decrease the economic growth. It can be explained that steel industry production will cause the emission and pollutes the environment, consequently it will impact on other industries of the economics, which may cause the economic growth to decline. The ozone harming substance of most importance to the world steel industry is carbon dioxide (CO<sub>2</sub>). All things are considered, 1.9 huge loads of CO<sub>2</sub> are transmitted for each huge load of steel created. As per the International Energy Agency, the iron and steel industry represent roughly 4–5% of absolute world CO<sub>2</sub> outflows. Unemployment rate has a negative relationship with economic growth in South Korea statistically, that means an increase in the percent of unemployment rate may decrease the economic growth in Korea. Without productivity growth, as long as each new addition to the labor force is employed, output growth will equal labor supply growth. If GDP growth slows to a pace slower than labor force growth, there will be insufficient new jobs created to accommodate all new job seekers. As a result, the employed share of the

labor force will decline. In other words, the unemployment rate will increase. If output growth exceeds labor force growth, employers will fill some of the new jobs created to meet rising demand for their goods and services by drawing from the pool of unemployed workers. In other words, unemployment will decline.

Inflation rate also has a negative relationship with an economic growth of Korea according to the results, that can be explained with a growth of inflation rate, or higher inflation rate may cause the GDP of country to decrease, or vice versa, that is the decreasing of country may cause inflation rate to increase. Therefore, there is a negative relationship between them.

## CHAPTER V: CONCLUSIONS

Steel is critical to the modern world, and its use is critical to man's transition to a more sustainable future. Steel is critical to a greener world, whether it is used in lighter, more efficient vehicles, renewable energy generation, the construction of new, highly efficient power plants and smart electrical grids, or the development of transportation infrastructure and high-energy-efficient residential and commercial buildings.

Steel production will continue to grow at a rapid pace, particularly in developing regions such as Latin America, Asia, Africa, and the Indian subcontinent, where steel will be critical in boosting developing societies' material and social welfare. Over 60% of steel consumption in these regions will be used to build new infrastructure.

Master's thesis aims to estimate the relationship/impact of steel industry on economic growth in Korea from 1980 to 2019. The regression results can show the following findings:

According to the correlation matrix it can be seen that all variables have moderate negative correlations with an economic growth in Korea, that is an essential finding of the research.

In all regression models' results, steel industry production output level has a negative correlation.

Hypothesis 1 will be rejected, because there is a negative relationship between steel industry output and economic growth in Korea. An increase



in steel industry output by 1 mt may decrease an economic growth by about 0.17 percent.

Hypothesis 2 will be supported/accepted. The regression shows the negative significant relationship between unemployment rate and an economic growth. An increase in the unemployment rate by 1 percent will decrease the economic growth by 1.4 percent

To sustain these efforts and to identify all potential opportunities to reduce carbon emissions associated with steel's life cycle, a full life cycle approach is critical. This approach takes into account not only the emissions associated with steel manufacturing, but also the energy savings associated with the use of new generation steels in lighter, stronger products. Additionally, the inherent recyclability of steel must be a primary consideration in the search for future sustainable materials. This will help the industry to have a positive contribution to the economic growth of the country.

## REFERENCES

- Amsden, Alice. 1989. *Asia's Next Giant: South Korea and Late Industrialization*. New York: Oxford University Press.
- Amsden, Alice. 1994. "Why Isn't the Whole World Experimenting with the East Asian Model to Develop?" *World Development* 22:627–633.
- Amza, G., & Dobrotă, D. (2012). Risk estimation of air pollution produced by a welded construction company. *Metalurgija*, 494–496.
- Andersen, T. B., & Tarp, F. (2003). Financial liberalization, financial development and economic growth in LDCs. *Journal of International Development*, 15(2), 189–209. <https://doi.org/10.1002/jid.971>
- Arrighi, Giovanni, Takeshi Hamashita, and Mark Selden. (eds.) 2003. *The Resurgence of East Asia: 500, 150 and 50 Year Perspective*. London: Routledge.
- Arrighi, Giovanni. 1996. "The Rise of East Asia: World Systemic and Regional Aspects." *International Journal of Sociology and Social Policy* 16(8):6–44.
- Ayadi, R., Arbak, E., Naceur, S. B., & De Groen, W. P. (2015). Financial development, bank efficiency, and economic growth across the Mediterranean. In R. Ayadi, M. Dabrowski, & L. De Wulf (eds.), *Economic and social development of the Southern and Eastern Mediterranean countries* (pp. 219–233). Cham: Springer. doi:10.1007/978-3-319-11122-3\_14

- Bălan, G., Ungureanu, M., & Dobrotă, G. (2016). Characteristics and tendencies in the steel industry, globally and regionally. *Metalurgija*, 511–514.
- Barro, R. J. (1991). Economic growth in a cross-section of countries. *Quarterly Journal of Economics*.
- Barro, R. J. (1997). *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge: MIT Press.
- Barro, R. J., & Sala-i-Martin, X. (1997). Technological diffusion, convergence, and growth. *Journal of Economic Growth*, 2(1), 1–26.
- Barro, R., 1996. “Inflation and growth”, *Federal Reserve Bank of St. Louis Review*, vol. 78, pp. 153–169
- Barro, R.J. (1995), “Inflation and Economic Growth”, *Bank of England Quarterly Bulletin* 35: 166–176.
- Bruno, M. and W. Easterly, 1998. “Inflation crises and long-run growth”, *Journal of Monetary Economics*, vol. 41, pp. 3–26
- Bunker, Stephen and Paul S. Ciccantell. 2005. *Globalization and the Race for Resources*. Baltimore: Johns Hopkins University Press.
- Bunker, Stephen and Paul S. Ciccantell. 2007. *East Asia and the Global Economy: Japan’s Ascent, with Implications for China’s Future*. Baltimore, MD: Johns Hopkins University Press
- Burkett, Paul and Martin Hart-Landsberg. 2000. “Alternative Perspectives on Late Industrialization in East Asia: A Critical Survey.” *Review of Radical Political Economics*. 32:2:222–264.

- Chirinko, R. M. (1994). Fiscal Policies Aimed at Spurring Capital Formation: A Framework for Analysis. Federal Reserve Bank of Kansas City. Economic Review.
- Christopoulos, D. K., & Tsionas, E. G. (2004). Financial development and economic growth: Evidence from panel unit root and cointegration tests. *Journal of Development Economics*, 73(1), 55–74. <https://doi.org/10.1016/j.jdeveco.2003.03.002>
- Cooke, D. (2010). Openness and inflation. *Journal of Money, Credit and Banking*, 42, 267–287.
- David Ricardo 1817, *On the Principles of Political Economy and Taxation*.
- Demirguc-Kunt, A. (2006). Finance and economic development: Policy choices for developing countries (World Bank Policy Research Working Paper No. 3955).
- Ductor, L., & Grechyna, D. (2015). Financial development, real sector, and economic growth. *International Review of Economics & Finance*, 37, 393–405. <https://doi.org/10.1016/j.iref.2015.01.001>
- Egbunike, F. C., Emudainohwo, O. B., & Gunardi, A. (2018). Tax Revenue and Economic Growth: A Study of Nigeria and Ghana. *Signifikan: Jurnal Ilmu Ekonomi*. 7(2), 213–220. <https://doi.org/10.15408/sjie.v7i2.7341>
- Fischer, S., 1993. “The role of macroeconomic factors in economic growth”, *Journal of Monetary Economics*, vol. 32, pp. 485–512

- Fisher, M. and Seater, J. (1993), "Long-Run Neutrality and Superneutrality in an ARIMA Framework", *American Economic Review* 83: 402–15.
- Frank, A. Gunder. 1998. *ReOrient: Global Economy in the Asian Age*. Berkeley, CA: University of California Press.
- Goldsmith, R. (1969). *Financial Structure and Development*, New Haven, CT. Yale: YaleUniversity Press.
- Goldsmith, Raymond W. (1969). *Financial Structure and Development*. New Haven, CT: Yale University Press.
- Grossman, G. M., & Helpman, E. (1990). Comparative advantage and long-run growth. *American Economic Review*, 80, 796–815.
- Hanson, G. (1996). Economic integration, intraindustry trade and frontier regions. *European Economic Review*.
- Haslag, J. (1997). Output, Growth, Welfare and Inflation: A Survey. *Economic Review*, Federal Reserve Bank of Dallas, Second Quarter.
- Hausmann, R., Hwang, J., & Rodrik, D. (2007). What you export matters. *Journal of Economic Growth*, 12, 1–25. <https://doi.org/10.1007/s10887-006-9009-4>
- Jackson, J. &. (2001). *Macroeconomics*. New South Wales. : Irwin/McGraw Hill Australia Pty Limited.
- Jafari Samimi, A., Ghaderi, S., Hosseinzadeh, R., & Nademi, Y. (2012). Openness and inflation: New empirical panel data evidence.

- Economics Letters, 117, 573–577. <https://doi.org/10.1016/j.econlet.2012.07.028>
- King, R. G. (1993). Finance and Growth: Schumpeter Might Be Right. *Quarterly Journal of Economics*.
- Kohli, Atul. 2004. *State-Directed Development*. Cambridge: Cambridge University Press
- Korhonen, Pekka. 1994. “The Theory of the Flying Geese Pattern of Development and its Interpretations.” *Journal of Peace Research* 31(1):93–108.
- Levine, R. R. (1992). A sensitivity analysis of cross-country growth regressions. *The American Economic Review*.
- Levine, Ross (1997). “ Financial Development and Economic Growth: Views and Agenda”. *Journal of Economic Literature*; V. 35, pp. 688–726.
- Liberty, L. o. (2010). *Neoclassical Economics*.
- Lucas, R. E., Jr. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3–42. [https://doi.org/10.1016/0304-3932\(88\)90168-7](https://doi.org/10.1016/0304-3932(88)90168-7)
- McKinnon, Ronald I. (1973). *Money and Capital in Economic Development*. Washington D.C.: Brookings Institution.
- Mill, J. (1848). *Principles of Political Economy with some of their Applications to Social Philosophy*, . London: Longmans, Green and Co.

- Nicolae, A. (2012). Contributions Regarding the Development and Operationalization of Metallurgical Ecosociology Knowledge. *Metal. Int.*, 98–101.
- Ozawa 2003. “Pax Americana-led Macro-clustering and Flying-Geese -Style Catch-up in East Asia: Mechanisms of Regionalized Endogenous Growth.” *Journal of Asian Economics* 13:699– 713.
- Ozawa 2005. *Institutions, Industrial Upgrading and Economic Performance in Japan: The FlyingGeese Paradigm of Catch-up Growth*. Northampton, MA: Edward Elgar.
- Ozawa, Terutomo. 2001. “The ‘Hidden’ Side of the ‘Flying-geese’ Catch-up Model: Japan’s Dirigiste Institutional Setup and a Deepening Financial Morass.” *Journal of Asian Economics* 12:471–491.
- Ozkan, F. (2011). Steel industry and the sector ’s impact on economical growth in Turkey. *Reg. Sect. Econ. Stud.*, 47–58.
- Peng, Dajin. 2002. “Invisible Linkages: A Regional Perspective of East Asian Political Economy.” *International Studies Quarterly* 46(3):423–447.
- Radojicic, M., Nesic, Z., Vesic Vasovic, J., Spasojevic-Brkic, V., & Klarin. (2011). M. One approach to the design of an optimization model for selection of the development strategy. *TTEM Tech. Technol. Educ. Manag.*, 99–109.

- Rivera-Batiz, L. A., & Romer, P. M. (1991). International trade with endogenous technological change. *European Economic Review*, 35, 971–1001.
- Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy*, 98, S71–S102. <https://doi.org/10.1086/261725>
- Romm, Joseph. 1992. “Japan’s Flying Geese.” *Forbes*. 150(12):108–112
- Schumpeter, Joseph A. (1911), *The Theory of Economic Development*. Cambridge, MA: Harvard University Press.
- Sidrauski, M. (1967), “Rational Choice and Patterns of Growth in a Monetary Economy”, *American Economic Review* 57: 534–544.
- Silva, J. L. (2004). Regional income inequality and international trade. *Economic Geography*.
- Singh, A. (1997). Financial liberalization, stock markets and economic development. *The Economic Journal*, 107(442), 771–782. <https://doi.org/10.1111/eoj.1997.107.issue-442>
- Wade, Robert 1990b. *Governing the Market*. Princeton: Princeton University Press.
- Wade, Robert. 1990a. “Industrial Policy in East Asia: Does it Lead or Follow the Market?” Pp.231–266 in *Manufacturing Miracles*, edited by G. Gereffi and D. L. Wyman. Princeton: Princeton University Press.



Young, A. (1991). Learning by doing and the dynamic effects of international trade. *The Quarterly Journal of Economics*, 106, 369–406.

# 국 문 초 록

## 철강 산업이 한국 경제 성장에 미치는 경제적 영향 분석

달 리 무 로 드 압 둘 카 미 도 브

국 제 무 역 경 제 전 공

국 제 무 역 경 제 학 과

한 성 대 학 교 대 학 원

이 논문은 철강 산업이 한국 GDP에 미치는 영향을 분석합니다. 1980년부터 2019년까지의 데이터는 회귀를 실행하고 철강 산업이 한국 GDP에 미치는 실제 효과를 실현하기 위한 것입니다. 데이터는 역귀의 타임 시리즈 OLS 모델이기 때문에 STATA를 통해 실행됩니다. 이에 따라 철강산업 생산량은 한국 GDP에 부정적인 영향을 미친다는 것이 명확히 되고 있다. 많은 양의 오염 물질 배출으로 인해 철강 산업은 다른 산업이 감소하게 합니다. 이 논문에서는 철강 산업 생산량이 한국 GDP와 긍정적인 관계를 맺고 있다는 두 가지 가설이 사용됩니다. b) 실업률은 국가의 GDP와 부정적인 관계를 가지고 있습니다. 회귀의 결과로 가설(a)이 거부되고 가설(b)이 받아들여진다.

철강산업은 생산으로 GDP와 부정적인 관계를 맺고 있지만 한국 경제의 원자재로서 중요한 역할을 하고 있다. 조선산업, 자동차산업, 건설산업, 철강 소재 없는 경제분야 등은 개발이 불가능하다. 새로운 첨단 기술을 바탕으로 한국은 조만간 환경을 오염하지 않고 철강을 사용할 수 있는 새로운 방법을 찾을 수 있기를 바랍니다. 철강 산업 외에도 한국의 GDP 성장에 영향을 미칠 수 있는 다른 변수가 있습니다. 이 문헌에서는 철강 산업, 실업률, 인플레이션을, 무역 개방성, 해외 직접 투자(FDI) 및 세수(SDI)를 제외한 다양한 변

수로 사용됩니다. 실업률과 인플레이션율은 그들로부터 받아들일 수 있습니다. 둘 다 Korea.it GDP 성장률과 부정적인 관계를 맺고 있으며, 실업률이나 인플레이션율이 상승하면 국가의 GDP가 감소한다는 것을 의미합니다. 무역 개방성, 해외 직접 투자, 세수 등 다른 변수는 한국의 GDP 성장과 아무런 관계가 없다. 한국의 GDP를 높이기 위해서는 한국이 실업률과 인플레이션율을 최대한 낮기 위해서는 가능한 한 낮아야 한다는 결론을 내릴 수 있습니다. 또한, 한국 정부는 철강 제품 제조의 결과인 환경 오염을 줄이는 혁신적인 방법을 찾아야 한다.