

Green Growth as an Alternative Development Strategy: Case of South Korea

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Abstract:

The aim of this paper is to shed light on the controversial green growth paradigm as a way to achieve growth while preserving the environment, by studying the case of South Korea and its national Green Growth strategy. For this purpose we used the descriptive and analytical method to explore the concept of green growth and analyze the Green Growth experience of South Korea, our findings show that South Korea's strategy contributed to develop green technologies and the growth of exports but had a poor performance regarding green energy goals, reflected by an increase in CO2 emissions.

Keywords : Green-growth, sustainable-development, South-Korea, Green-economy.

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I- Introduction:

Economic growth is what allows humanity to develop and improve its quality of life. However, rapid growth and development also creates externalities that impacts negatively this quality of life. Indeed, rapid growth can cause severe natural resource depletion, environmental pollutions, noise pollution and lower air quality arising from air pollution and road congestion.

Today, there is an increasing global concern about the consequences of this unsustainable growth model which has led to numerous debates going from how to reduce these negative externalities of economic growth to even questioning its necessity. In this context Green Growth has appeared as the new growth model to achieve sustainable development worldwide, especially considering the fact that the cause of most of the previously mentioned negative externalities the world is facing today is mostly due to the underlying patterns of unsustainable production and consumption that characterize the current economic growth models. Thus, in order to address resource shortage and climate changes, an increasing number of countries start seeking out new growth models to realize sustainable development.

Since the concept of a green economy and green growth first came into widespread use at the Rio+20 Conference in 2012, there has been a growing interest in the relationship between economics, the environment and our common future. However, in spite of its attractiveness, empirical evidence for green growth remains limited.

The republic of South-Korea was one of the first countries to engage in a green growth strategy right after the 2008 financial crisis, therefore, in our study we will try to explore the concept of green growth and analyze the experience of south Korea by addressing the following problematic :

-To what extent did the Green Growth strategy of South-Korea reach its goals ?

We try to answer this problematic through the two following axes:

-Theoretical framework of Green Growth

-Case study of South-Korea's Green Growth strategy

1. Theoretical framework of green growth

The growth-oriented economic system has been accompanied by serious environmental damage including various sorts of pollution and biodiversity loss due to ever-increasing use of natural resources and generation of waste (Sevil & Erinc, 2019, piii).

GDP affects the environment through three effects; "The scale effect", that refers to the observation that more pollutants are produced as more goods are produced. "The composition effect" refers to the fact that some sectors (such as services) are cleaner than some other sectors (such as manufacturing), and that a shift in the structure of the economy will lead to a change in the environmental indicator. "The technology effect" refers to the fact that better technology produces less pollutants per unit of product (Ho & Wang, 2014, p17). Correspondingly, growth of production in manufacturing sector that is not accompanied by a technological change towards more efficient use of resources and less polluting, inevitably leads to environmental degradation. On the other side, studies have proven also, that environmental degradation has a significantly negative impact on economic growth (Azam, 2016, p175-182). Indirect contributions of environmental protection to economic growth are also possible because world economies are far from their

“optimum.” Indeed, there are many market failures that are not directly due to environmental issues, but that have negative consequences on the environment and the economy. (Hallegatte et al., 2012, p5).

The environmental crisis the world is facing today is the outcome of the conflict between economic development and environmental policies, indeed, economic growth and development have always appeared as in contradiction with environmental policies, under this context, the concept of green economy has emerged as a promising alternative approach to economic development at the expense of long term environmental effects.

Many international organizations have proposed a definition for green growth, the OECD for instance defined green growth as the following: “*Green growth means fostering economic growth and development while ensuring that natural assets continue to provide the resources and environmental services on which our well-being relies.*” (OECD, 2012) It also had been defined by the United Nations Environment Program (UNEP) “*as the one that results in improved well-being and social equity while significantly reducing environmental risks and ecological scarcities.*” (Green Economy. (n.d.). UNEP - UN Environment Programme. Retrieved October 1, 2020, from <https://www.unenvironment.org/regions/asia-and-pacific/regional-initiatives/supporting-resource-efficiency/green-economy>.) In essence, green growth is about making the growth resource efficient, cleaner and more resilient without slowing it.

Green growth is in fact, green economy’s idea of growth, which is the growth of GDP that is subject to green conditions and that focuses on the green sectors as new growth engines, correspondingly, green economy does not exclude the idea of growth as a fundamental part of traditional economy, which differentiates it significantly from the concept of de-growth and a-growth. (Sevil & Erinc, 2019, piii)

1.1. History of the concept :

The concept of green growth has made its first appearance in 1989 in the study of Pierce et Al, titled “blueprint for a green economy; submission to the shadow cabinet” (Ge & Zhi, 2016, p257-264) but the revival use of the concept coincided with the financial crisis of 2008 as many countries that have experienced a recession started looking for alternative ways to achieve economic development. Soon after the crisis the international community, the scientific community and environmental groups provided an important support to turn the concept of green economy into a new opportunity or pathway that overcome the crisis, the UNEP the OECD and World bank called for a radical transformation of the current development practices toward a greener economy The 40th World Economic Forum 2010 and the UN Conference on Sustainable Development 2012 (also known as the Rio20) in Rio have been held around the theme of the green economy. The international debate after the 2008 global crisis focused on proposing the green economy as an alternative model that would increase human well-being while reducing environmental challenges and risks (Balaban, 2019, p69-92).

At first, the term green growth’s focus was entirely on the mitigation of climate change, but it now covers a wider range of environmental resources (soil, water, fish stocks, habitats and so on) (Jacobs, 2012, p1-24)

One controversial issue with regard to the definition of green economy arises from the relationship between the concepts of green economy and sustainable development. Indeed, Sustainable development, defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs, is very in line with the definition of green growth, mainly because it contains within it two key concepts: (Lorek & Spangenberg, 2014, p33-44); the concept of needs, in particular the essential needs of the world’s poor, to which overriding priority should be given; and the

idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

Consequently, the green economy concept has been criticized for overlapping with sustainable development or attempting to replace it. Other critics argue that green economy is not a new issue or concept but just another way of phrasing sustainable development. However, there are bold statements emphasizing that green economy should not be considered as a substitute for sustainable development (Balaban, 2019, p69-92).

In regards to sustainable development The OECD (2011), for instance, states that green growth is “a subset of sustainable development but does not replace it,” underlining that sustainable development is an overarching goal and green economy is a tool to achieve that goal. It claims that green growth concept provides a practical and flexible approach for achieving concrete measurable progress across its economic and environmental pillars. (What is green growth and how can it help deliver sustainable development? - OECD. (n.d.). Oecd.Org. Retrieved October 1, 2020, from <http://www.oecd.org/greengrowth/whatisgreengrowthandhowcanithelpdeliverustainabledevelopment.htm>)

Many reasons explain the shift from sustainable development to green growth discourse. While sustainable development had a significant upsurge among policymakers and business sector during the 1990's, its traction started notably decreasing after it became clear that countries' commitment to sustainable development had not been sufficient to slow and inverse the degradation of the environment (global indicators have continued to worsen), so a concept already universally supported could not achieve the goal, furthermore a political discourse focused on environmental costs and the need to constrain the growth to address them would be unlikely to attract voters. Thus the purpose of green growths' concept was to shift from this negative and politically unattractive framing to a more positive one. (Jacobs, 2012, p1-24)

Green growth aims to unleash economic development and growth by enhancing productivity through creating incentives for greater efficiency in the use of natural resources, reducing waste and energy consumption, unlocking opportunities for innovation and value creation, and allocating resources to the highest value use, opening up new markets by stimulating demand for green goods, services and technologies. And lastly by contributing to fiscal consolidation by mobilizing revenues through green taxes and through the elimination of environmentally harmful subsidies. (What is green growth and how can it help deliver sustainable development? - OECD. (n.d.). Oecd.Org. Retrieved October 1, 2020, from <http://www.oecd.org/greengrowth/whatisgreengrowthandhowcanithelpdeliverustainabledevelopment.htm>)

Greening the growth path of an economy depends on policy and institutional settings, level of development, social structures, resource endowments and particular environmental pressure points. For these reasons, advanced, emerging, and developing countries will face different challenges and opportunities.

The promise is that technological change and substitution will improve the ecological efficiency of the economy, and that governments can speed this process with the right regulations and incentives. (Hickel & Kallis, 2019, p8)

Greening the growth requires reconciling economic competitiveness with the need to protect the environment. Governments and politicians can encourage green development through many ways and policies, implementing the method of “green GDP” is one of them, it is a way to measure the growth of an economy compared to the harm production does to the environment. The process is by subtracting the costs of environmental damage done in a specific period of time from the gross domestic product from that same time. In this way,

the consumers can have a tendency for consuming the products which are less harmful to the nature (Sertyesilisik & Sertyesilisik, 2017, p49-65).

1.2. Theories and arguments supporting green growth.

The earliest theoretical basis for green growth was provided in 1974 by Holdren & Ehrlich as the explanatory identity $I=PCT$ which shows that the environmental impact (I) would increase if the population (P) grows and consumption C rises by growth, unless the technological change (T) was sufficient to overcome it. Since then other theories have emerged such as the cost/benefit analysis of the Stern Review that showed that the impact of not acting on global warming would be much more damageable to growth (5 to 20% of GDP) than the costs of acting on it (4 to 2% of GDP) (Jacobs, 2012, p12)

More recently – after the financial crisis of 2008- many other arguments and theories came up, stronger than the previous, the most notorious ones are the green Keynesian stimulus, correcting market failures, and technological innovation policies and comparative advantages, and are briefly explained in the following (Jacobs, 2012, p1-18).

The first is a short term one, it argues governments should sustain aggregate demand in the economy by replacing lost private sector demand with public expenditure. This in turn creates a multiplier effect which generates further income and employment growth, proponents of environmental spending go further, arguing that green measures in a recession are better for short-term growth. They point out in particular that many environmental measures are labour-intensive, and so give greater employment growth per dollar spent than non-green measures. And here monetary policy is not always enough for two reasons; the liquidity trap and the inability of the monetary policy to create jobs directly or to target environmental investment, for these reasons the fiscal policy is essential (Harris, 2015, p4)

Correcting the market failures theory of green growth starts from the observation that natural environment, just like labour, physical capital, and technology and human capital, is also a factor of production, “the environment is viewed mostly as a limiting factor—either because of its finite ability to produce resources or its finite ability to absorb waste” (Hallegatte et al., 2012, p30) the market failure occurs when the environmental resources are over-exploited and thus are not valued properly, if these systematic market failures were corrected, growth might be higher.

The third theory relates to the claim that environmental policies create numbers of jobs in environmental industries, and it argues that countries that introduce environmental policy give their industry a head start over other countries, which stimulates growth by the comparative advantages they get, and China is a good example, on the other hand, low carbon energy systems will unleash a wave of innovations in production methods and thus create a new industrial revolution, this is the most radical argument towards green growth and has faced many critics.

Green growth theories nevertheless face many critics, and due to the lack of empirical evidence (Hickel & Kallis, 2020, p469–486) it remains difficult to assert its effectiveness, some critics claim that the changes in structure of economic activity in developed countries –that caused a positive improvement in environmental indicators, is due to the increasing imports of manufactured goods from developing countries (Ho & Wang, 2014, p18) this in addition to offshoring industries results in offsetting the reduced pollution in rich countries by an increased pollution in developing ones.

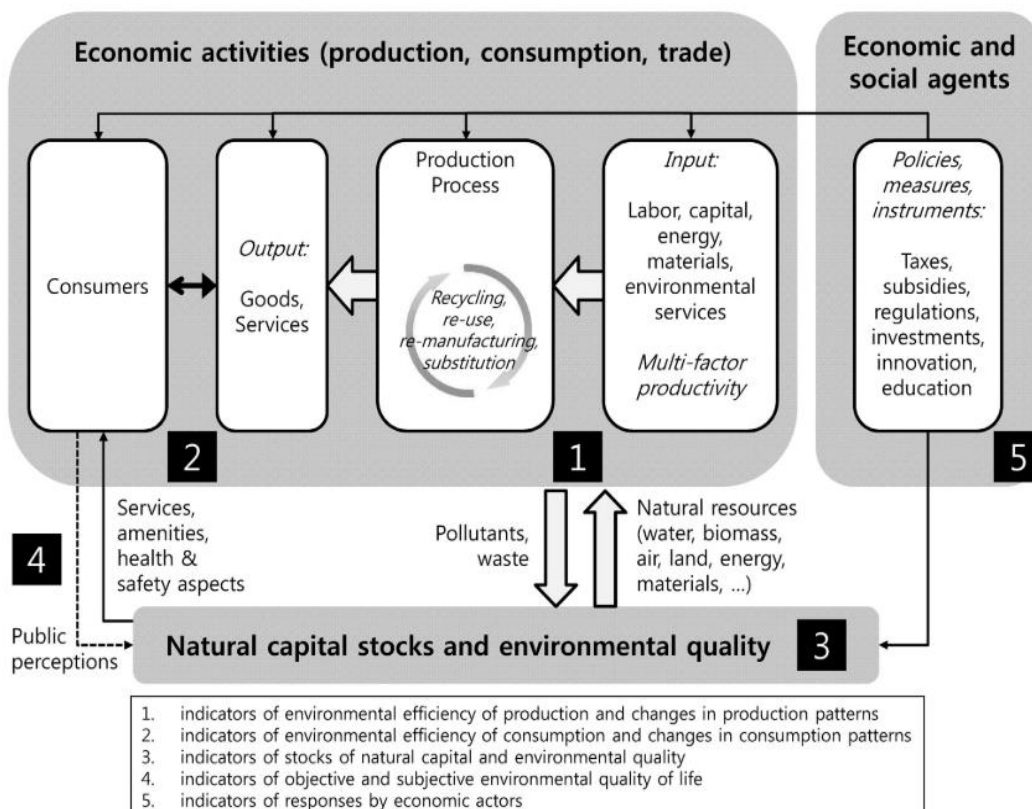
Moreover, some of the critics of green growth argue that it is impossible to grow the economy while simultaneously using less resources, therefore their attention is focused on how to achieve a better welfare without growth (Shao, 2020, p1) hence, they proposed concepts like “de-growth” and “A-growth”.

1.3. Measuring Green Growth:

Due to the different definitions of green growth of different international institutions, each focusing on a different aspect of the concept, many sets of indicators have been proposed, also finding a standardized way to measure green growth is not a trivial initiative for another reason; there are important structural levels and income differences between countries that must be taken into consideration in order to build a measurement system that allows relevant comparison of progress in green growth between countries (Katharina & Jana, 2014, p2), in addition the system must be able to differentiate between cyclical and structural changes in an economy

Each of the above-mentioned international organizations has developed a set of indicators to measure green growth; the OECD for instance has outlined a framework that includes three categories; production, consumption and environment, organized in five interrelated categories; (1) indicators of environmental efficiency of production and changes in production patterns, (2) indicators of environmental efficiency of consumption and changes in consumption patterns, (3) indicators of stocks of natural capital and environmental quality, (4) indicators of objective and subjective environmental quality of life, and (5) indicators of economic actors' responses (Estella et al., 2014, p38). The UNEP meanwhile, divided its indicators into three categories: a) environment (indicators for issues and targets to be addressed by green growth policy), b) policy (indicators for policy interventions), and c) well-being and equity (indicators for ex ante assessment and ex post analysis of the impact of policy interventions). These three categories cover up to five topics each and have been assigned a total of 40 indicators. And the World bank proposes a set of indicators for measuring the potential benefits of green growth policies. It measures the benefits within each of the three pillars of sustainability and identifies the channels through which these benefits are generated (Katharina & Jana, 2014, p2)

Figure 1 : The OECD framework comprising five measurement categories for selecting green growth indicators.



Source : (Estella et al., 2014)

2. Case study of South Korea's green growth strategy

South Korea has known a strong economic growth (9% to 7%) until 90s crisis that led to faltering growth, which has prompted the country to opt for a knowledge based model, this has led to a growth of 4.1% until 2007. On the other side, climate change was another factor driving south Korea to green growth, as it has recorded a rise of temperature of about 1.8°C from 1911 to 2010 South Korea has registered a strong economic growth since its rapid industrialization in the 1970s, recording a growth rate of 7.1% from 1971 to 1980 and 9% from 1981 to 1990, the 90s Asian financial crisis led to a faltering growth, prompting the country to reorganize its growth strategy and subsequently opt for a knowledge based model, this approach led to a modest 4.1% growth during the period 2001-2007 (Estella et al., 2014, p44) The impact of climate change was another factor driving South Korea to reevaluate its economic growth model. Recently, South Korea has suffered from more frequent and intense heavy snows, torrential rains, droughts, and extreme heat waves. 2127 people died between 1994 and 2005 due to heat wave, and annual average economic losses from extreme weather events have tripled since the 1990s (Estella et al., 2014, p44)

South Korea's industrialization and growth was based on carbon intensive industries such as steel, petrochemical and automobile industries, which has considerably increased energy consumption. Therefore energy security was also one of the concerns that have driven South Korea to rethink its economic model, as it is highly dependent on fossil fuels and imports 97% of its energy, and therefore susceptible to price variations in the global market (Estella et al., 2014, p44) These diverse concerns have ushered in a paradigm of green growth in South Korea. On August 15, 2008, President Lee Myung-Bak announced "Green Growth" as a new national development strategy to guide the South Korean economy over the next 60 years (Mathews, 2012, p761).

South Korea's green growth strategy proposed by the Lee Myung-Bak administration was an attempt at a fundamental paradigm change from the fossil fuels dependent growth to a more sustainable one with energy independence through low-carbon and renewable energy resources (Lee, 2015, p343)

Since the 2008 crisis South Korea has been making huge efforts to green its economy, by launching its low carbon growth strategy as a new national policy vision and by linking stimulus packages to reduce GHG emissions by 30%, and provided support by means of a complete formal legislative framework (Castellacci & Lie, 2017, p3).

2.1. South Korea's strategies in fostering green growth

Korea's policy to pursue the Green Growth strategy was characterized by comprehensiveness, structure, systematism, and a vigorous way by establishment of the Presidential Committee for the Green Growth that includes the Prime Minister and 13 Ministers in addition to the 36 prominent private experts (Seyithan, 2015, p347-348)

The green growth national strategy and the first five year plan had three principal objectives : The first objective was climate change adaptation and energy independence by reducing GHG emissions and attaining energy independence by increasing the share of renewable energy. The second objective was the creation of new engines for economic growth and emphasized nurturing green technologies and green industries. The third objective was improvement of quality of life and enhancement of South Korea's international standing,

involved green practices in land use, transport infrastructure, and general lifestyle (Lee, 2015, p345).

These ambitious goals are to be met by implementing a variety of policy instruments. Apart from public and educational campaigns, the main instruments designed to drive the transition to Green Growth include:(Mathews, 2012, p763)

- Public investment in infrastructure through : improving water quality, seed funding a pilot project for the smart grid on Jeju Island, or seed funding the creation of urban charging grids for electric vehicles.
- Public procurement : mandatory eco-friendly public procurement program for public institutions.
- Public R&D in energy and low-carbon technology: where a new agency have been formed (KETEP) to administer new and renewable energy technology R&D expenditure (covering solar PV, wind, bio, etc.).
- Regulation and incentives : through both Feed-in Tariffs and Renewable Portfolio Standards; sector-specific carbon emission reduction targets; more stringent vehicle GHG emission standards; stronger pollution controls, and eco-friendly tax reform.
- Market correction measures in order to internalize externalities : such as environmental taxes and pollution charges, and a proposed emissions trading scheme.

Figure 2 : South Korean key strategies, policy directions.



source : (Seyithan, 2015)

The illustration in figure 2 summarizes the strategies set by the South Korean government to achieve the green growth goals. Climate change mitigation and energy independence is aimed to be achieved through effective mitigation of greenhouse gas emissions, reduction of fossil fuels use and strengthening the capacity to adapt to climate change. The second goal's strategy was to develop green technologies, greening industries and engineering of a structure basis for green industry growth. And the last goal's strategy was to develop green cities, bring green revolution in daily life, become a role model for international community as a green growth leader.

2.2. Evaluation of South Korea's green growth strategy

In order to analyze and evaluate the outcomes of the south Korean green growth strategy, we consider energy, resource circulation, and finance as the determinants of green growth as follows ; (Mathews, 2012, 764)

- Energy : the shift from finite and polluting sources of energy to renewable energy and energy efficiency.
- Resource circulation :the existing industrial order is based on a linear model where resources enter at one end(from an infinite source called 'nature'), are

processed, and wastes are dumped at the other end (into an infinite sink called 'nature'). A transition to a sustainable system requires making resources circulate, through eco-industrial initiatives that link outputs of one plant to inputs at another, in other words by recycling, as well as through reducing resource intensity.

- Finance : the actual industrial order is based on finance that creates credit for investment based only on the criterion of credit-worthiness, it has no regard to ecological impact. A transition to a sustainable system will have to involve a reorientation of finance so that it is targeted at green projects, through utilization of eco-criteria such as sociotechnical standards covering carbon emissions, resource use and energy and resource-efficiency.

1. After 5 years of launching Korea's Green Growth strategy, some outcomes became evident. Firstly, Korea's strategy towards the Green Growth has given a significant impulse to the endeavor to develop green technologies and green industries. Secondly, with the help of different means such as greening the industry, putting emphasis on rail roads, the Green Growth helped the government to fight against climate change at the local and international level. In addition to that, statistics show the Green Growth strategy contributed to the growth of export and created new job opportunities thus strengthened the Korea's competitiveness. Thirdly, Korea's Green Growth strategy has realized a better life quality for citizens according to the study of Seyithan (Seyithan, 2015, p352).

2. Nevertheless, if we consider one of the key macro-economic indicator of green growth, namely CO₂ emissions from energy, it reveals a low performance, i.e. CO₂ emissions increased significantly. Some possible explanations for the estimated figures arise from the policy review. In fact, the specific allocated amount for low-carbon technologies was in fact very modest and measures devoted to short-term effects, such as energy efficiency in buildings and transportation, did not deliver as expected. In addition, some key policy instruments have been implemented lately, such as a renewable portfolio standard that was introduced in 2012 and the emissions trading scheme was launched in January 2015. And, the stimulus package was not supported by complementary pricing reforms (transport and electricity) that are also needed to drive a green economy (Sonnenschein, 2019, p20-21).

3. Besides, the new strategy for green growth as embodied by the five year plan has not met its own goal to reduce environmental pressure. In fact, while environmental pressure has increased since the plan's implementation, energy efficiency has improved. Indeed, Gunderson and Yun used the Jevons Paradox to explain this situation, which is the commonly found association between increased production and consumption of resources despite improved efficiency. A "rebound effect" is often used as a synonym for the Jevons paradox. A rebound effect is when the benefits of efficiency gains are partially "consumed" by increases in resource use due to improvements in efficiency (Gunderson & Yun, 2017, p21-22)

4. Korea's Green Growth experience nevertheless, provided numerous lessons including: (Seyithan, 2015, p352)

- It has shown that environmental awareness and economic development are not mutually exclusive and can be balanced.
- Participation in a global drive to mitigate climate change can prove beneficial to a country's domestic interests.
- It is essential and critical to set effective institutional arrangements to the success of a national green growth vision.
- The likelihood of success is greater when the central finance and planning agency plays an active role.

5. However, for developing countries, pollution control and environmental monitoring is a challenging task due to lack of know-how, poor funding, old technology and high levels of corruption.

6. As ecological footprint researches and assessments shown, although less developed and developing countries seem to better maintain their environmental conditions stable and proper use their resources. Yet this is a false impression. The principle reason behind which this happens is the absence of innovative potential to exploit the assets and to get economic advancement by they own. This is because the growth potential is based on low cost labor, poor technological endowment and lack of environmental and social regulation.

For the case of Algeria, it appears that the green growth indicators are still distant where renewable energy investment represents only 0.4 billion dollars, which is, compared to African and Arab countries, is a very small number. (بن زيدان, 2016, p468). Despite the considerable potential that Algeria possesses from renewable energy, their exploitation are still faltering and substandard (بوعكريف et al., 2021, p367) Therefore Algeria needs to overcome the obstacles that are constraining its green development by establishing a legislative framework to support renewable energies implementation (موساوي & موساوي, 2015, p409), promoting green innovation and developing a green industry that covers the goods and services market as well as the labour market (p137, 2017, محمد عيسى, 2017) as developing green energy industry creates many jobs opportunities (دين & زرواط, 2018) and subsequently green economic growth.

Conclusion

Vital challenges, for example, environmental change, and global economic turmoil, have prompted nations around the globe seeking after new techniques to give a fitting reaction to those of unpredictable impediments. The Green Growth showed up as a new age reaction to previously mentioned difficulties.

The 2008 - 2009 global financial crisis triggered fiscal stimulus packages around the world. While the primary reason for the improvement and stimulus was to get economies back on the economic growth path, several environmental organizations, environmental economists, and policy makers saw this crisis as an opportunity to achieve economic recovery with low environmental impact.

By installing the numerous components of the Green Growth into a single, coherent strategy structure, South Korea has been one of the main leading examples on the planet.

Results :

Green growth is the reconciliation between the economic growth and the environment's protection, from climate change, resource depletion and pollution. Whether it is a utopian concept or a realistic purpose, that cannot be confirmed due to lack of empirical studies, green growth nevertheless relies strongly on technological development, as a more efficient resource use, pollution management and energy efficiency requires innovative technological solutions.

South Korea's green growth strategy was characterized by comprehensiveness, structure, systematism, and a vigorous which allowed to realize some positive outcomes such as giving a significant impulse to the endeavor to develop green technologies and green industries, in addition , statistics show that the Green Growth strategy contributed to the growth of export and created new job opportunities thus strengthened the Korea's competitiveness.

Regarding energy, South Korea had a poor performance, as CO2 emissions increased significantly, Some possible explanations for the estimated figures arise from the policy review. In fact, the specifically allocated amount for low-carbon technologies was in fact very modest and measures devoted to short- term effects, such as energy efficiency in buildings and transportation, did not deliver as expected.

Energy efficiency has improved but environmental pressure has also increased, and that can be explained by the Jevon's Paradox where the benefits of efficiency gains are partially "consumed" by increases in resource use due to improvements in efficiency.

Recommendations :

The strategy towards Green Growth, in order to be efficient, should be comprehensive, systematic and vigorous, and coordinate all economic, financial and political actors and structures towards its clearly set goals.

We also recommend governments to encourage the use and the development of new technology through financial and fiscal incentives towards its use as well as research and innovation in its field.

For developing countries, we emphasize the necessity of pollution control and environmental monitoring first by acknowledging the state of their environment; and that by developing their databases to keep track of environmental conditions and have a clear assessment of its situation in order to take the right decisions towards its protection.

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