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Growth and Ecology. The Case of South Korea.

Sosa, María Adriana[1]

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Abstract

In agreement with UN, the intention of the sustainable development is to keep the balance among the economic advantage, the social improvement and the environment protection. However, several critical voices have questioned the possibility of a sustainable development under the actual mood of production – consumption. In this sense, this article has the goal to confront these theorical positions through the analysis of South Korea's case. The methodology was based on the econometrical analysis of the correlation between economic growth and the contamination level. The result showed, through a quadratic model, the verification of the Kuznets Curve, that in developed countries the level of pollution decreases. However, the contribution of this work lies in demonstrating that the effects of growth on the reduction of pollutants are infinitely small, so the ecological damage caused to the planet while achieving the optimum level of growth could be irreversible.

Key Words

Sustainable Development; Ecological Economics; Kuznets; Production-Consumption Mode

Introduction

According to the report "Our Common Future", also called the "Brundtland Report" written in 1987 (UN, n.d.a.), sustainable development is defined as meeting the needs of the present generation without compromising the ability of future generations to meet their own needs. For the UN (UN, n.d.a.), sustainable development is constituted as the fundamental axis for the world progress in the long term and aims: to maintain the balance between the economic development, the social development and the protection of the environment.

[1] PhD student in Administration, La Salle University Mexico. Email: mariaadriana_sosaheredia@hotmail.com

With the intention of materializing the objectives of the Brundtland report, several meetings have been held at a global level, among which we can mention the Earth Summits (1972, 1992, 2012); Environment and Development Summits (1992); Sustainable Development Summits (2002, 2012, 2015); Oceans Conference (2017), among others (UN, n.d.). One of the main difficulties is that not all countries have complied and of those that have, the results have been meager.

Efforts are continuing to make further progress in this area. According to Gallopin (2003), sustainability and sustainable development are issues of global importance. In this regard, the World Bank (s.f.b, s.p.), argues that "sustainable development recognizes that growth must be both inclusive and environmentally sound in order to reduce poverty and generate prosperity for both present and future generations. While noting the urgency of collaboration by all countries, it recognizes that today "more countries are addressing the relationships between land, forests, water, and food security in a more holistic and sustainable way.

Under these circumstances and in recognition of the seriousness of the situation at the global level in the economic, social and environmental fields, to comply with the agreements established (UN, 1992; UN, 2015; ECLAC, 2018) by the world instances, in this case, the United Nations Organization through one of its main organs which is the World Bank, to be sustainable nations; it is perceived that the indicators that contribute to the sustainable development of the countries are not sufficiently clarified, which has made it difficult for the nations to comply with the established agreements. Some of these countries have made significant efforts to become sustainable countries, one of which is South Korea. The extent of the issue is recognized, so this paper will address only the environmental dimension.

Diverse are the positions that have been given to the task of suggesting ways for a sustainable development under the scheme of production - consumption, which have been questioned. In that sense, this article aims to confront these theoretical positions from the analysis of the case of South Korea.

The methodology was based on instruments of descriptive statistics and an econometric model that identifies the significant variables to define if the development in the Asian country has been sustainable or not, at least in the environmental dimension.

The results generated from the interpretation of the indicators will provide elements to describe how they influence the performance of South Korea to promote its sustainable development. And suggest alternatives to continue towards sustainability, improve its strategies and be an example for other countries, especially Mexico.

It is desirable that South Korea, through a series of strategies, continues to advance in its efforts to improve and become, in the medium term, a sustainable country in all areas. And this performance will turn it into an example country in terms of the strategies to be followed, tropicalizing them according to the context and circumstances of each nation; a situation that, if achieved, will promote compliance with the UN agreements on sustainable development.

This study is justified because it promotes sustainable development by creating awareness, in all human beings, of what we are all obliged to care for, protect and grow: Planet Earth, for the good of current and future generations. Taking up the definitions given above, sustainable development will be understood as: all the activities that human beings must carry out together, with justice, and equity, to promote social, economic, and environmental well-being for themselves, their community, their country, and the world. These activities have to do with ethics in the care of natural resources, in order to satisfy human needs in their three areas: economic, socio-cultural, and environmental.

Sustainable development can be explained by three dimensions previously mentioned, which are economic, socio-cultural and environmental. For the purposes of this document, emphasis is placed on the environmental dimension. Among the indicators that explain this dimension are: reforestation, water efficiency, energy efficiency, greenhouse gas emissions, and natural resource income.

To explain this dimension, the following relationships are established between its indicators under the production-consumption mode: 1. Each one of the interpretations made to these relations are supported by the necessary theoretical positions.

Literature Review/Theoretical Background

The economic theory of non-renewable resources refers to the problem of depletion as a matter of uncertainty, since it depends on the speed with which technology advances in order to conserve natural resources, through the production of adequate substitutes and the recycling of other usable products, and with this, find an optimal distribution relationship of scarce goods for the satisfaction of human needs (Solow, 1994).

From the perspective of strong sustainability, it is recognized that there are components of natural capital that are physically irreplaceable so they must be preserved in their integrity in contrast to weak sustainability, which, from the theory of the price system, expects that when

the natural resource becomes scarce, the price will rise, to make alternative technologies such as recycling profitable, among others (Azqueta, 2007).

Economy and ecology are directly related to sustainability, so the optimal allocation of resources must be efficient, both financially and in terms of time, to bring social benefit, avoiding irreversible damage, through substitutability (Perman et. al. 2003). There must be a tendency towards a new long-term vision of the economy, a transition from environmental economics (studies pollution as a consequence of the emission of waste into nature; implies the monetary valuation of environmental benefits and costs) to ecological economics (is the physical description of the economy. Raw materials and waste materials are linked to the principle of conservation of material - energy; recognizing that not everything can be recycled; the scale of the economy is subject to the ecosystems; the use of biophysical indicators for measuring sustainability is promoted) in which ethics are taken into account for the management of costs and benefits of the whole community (Naredo, 1994; Van Hauwermeiren, 1999).

The growth of the Gross Domestic Product (GDP), the main objective of the economic policy of the governments, is an indicator of the well-being of the population. A high rate is interpreted as a sign of successful economic policy. Indicators of weak sustainability with depleting resources do not allow one to distinguish the difficult connection between the economy and the environment.

Situation that leads to the construction and application of wrong policies. It is especially important to implement monetary and non-monetary signals that allow for a deepening of strong sustainability. Multi-criteria analysis is fundamental. Economic and natural capital complement each other. Therefore, it must be considered as a global process. To this end, it has been suggested that a tax on the depletion of natural capital be applied (Falconí, 2002).

Climate change is a constraint on growth (Galindo et al., 2014a) and has radical effects on economic actions, ecosystems and the comfort of inhabitants (Galindo et al., 2015a). Various studies argue that economic growth reduces poverty, in contrast, the poor distribution of income accentuates it (Galindo et al., 2014a). Understanding the correspondence between climate change and poverty is essential for designing and implementing strategies that promote sustainable development (Galindo and Samaniego, 2010).

Along the same lines, the current economic development model used by Latin America presents weaknesses with very marked risks that are destroying the bases of support for renewable and non-renewable natural resources (Galindo et. al., 2014a); especially in terms of energy consumption, an essential element in today's economies (Galindo et. al., 2015b;

Jiménez-Bandala, 2017) and gasoline (Galindo et. al., 2015c). This reflects the urgency of implementing optimal risk management strategies that will allow for a gradual and efficient shift towards sustainable development with defined objectives in the social, environmental (Galindo et. al., 2014b), cultural, economic and political spheres. All subsidies must be eliminated since they represent negative incentives (Galindo et. al., 2015c).

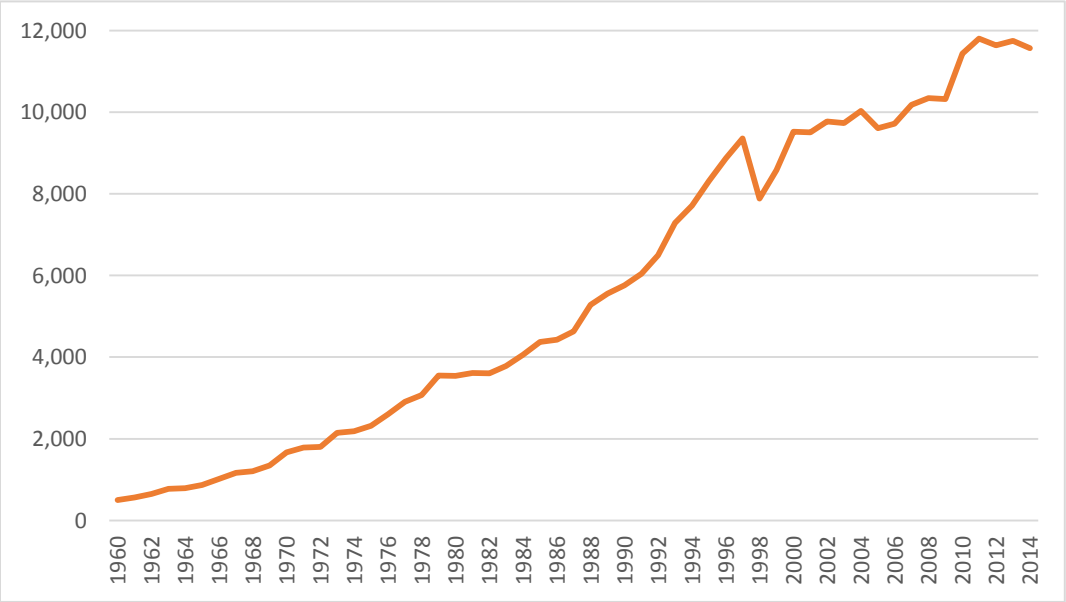
Another problem that economic growth brings with it is overpopulation, and in that sense, common resources are only justified when population density is low, otherwise, they need to be regulated under a scheme of laws (Hardin, 1968). Likewise, the problem of environmental pollution is also a consequence of the excessive increase in the number of inhabitants. One solution proposed is to restrict the freedom of reproduction (Hardin, 1968).

The economy, more than orienting itself towards the conventional and more than thinking about the monetary utility of non-renewable resources, should focus on the use of ecosystems, understanding their functioning, to get the most out of the resources, without exhausting them, maintaining a constant natural flow of them for present and future generations, as is the use of solar energy (Aguilera and Alcantara, 1994).

The Case of South Korea

According to the World Bank (s.f.a), records on greenhouse gas effects, are given from 1970 onwards, and on energy efficiency, that is, on the consumption of renewable energy, from 1989, almost 20 years after the record on environmental pollutants was started. Looking at Graph 1, it is in the period from 1991 to 1994, that a decrease in the consumption of renewable energies is registered, going from -41.43% to -21.23% in 1992; then from -3.58%, in 1993 to -39.18% in 1994. A very brief conservative improvement occurred later, when consumption increased by .46% in 1995, and in 1998 it reached an increase of 40.28% in efficiency.

Graph 1. Carbon Dioxide Emissions South Korea 1960-2014 (metric tons per capita)



Own preparation with data from the World Bank

In 1999, this consumption dropped considerably to -17.05%, with levels falling in the following years. From 2002 onwards, an increase in the consumption of renewable energies began to be seen again, with a consumption of .65%. In 2003, the consumption increased by 21.38%, to fall again in 2004 with a decrease of -8.91%. It is from 2005 onwards that the consumption of renewable energies begins to increase substantially, being 13.34% in that year, with a constant upward trend, reaching 2014 with an increase in the consumption of renewable energies of 47.65%. However, in 2015 it presented a slight decrease in consumption of -4.60%.

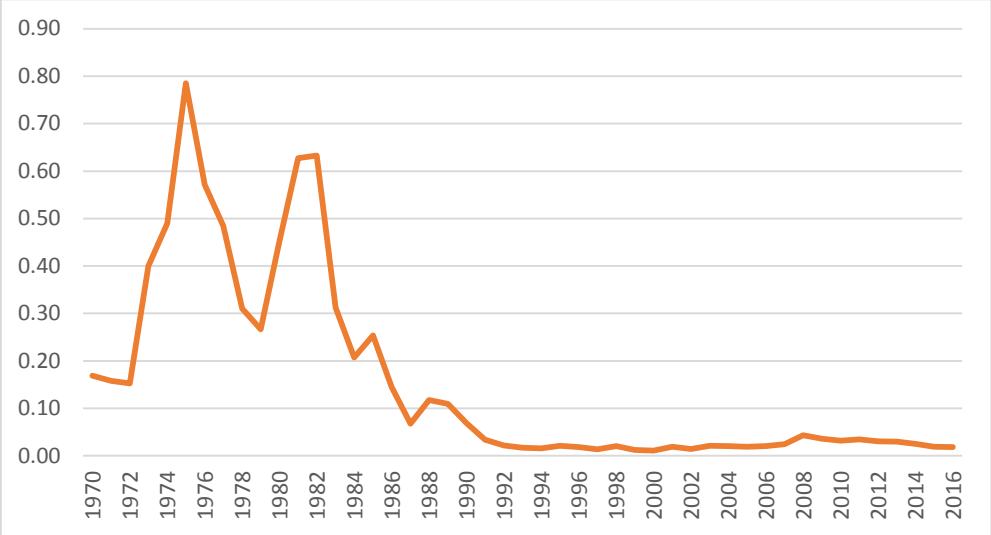
In contrast, the effects of greenhouse gases have been on the rise over time since they were first recorded in 1970, with the highest peak being recorded in 2012, with an increase of 2.91%. Likewise, it presents slight decreases in the periods of 1986, 1998, 2005 and 2009, being these of -.45%, -12.34%, -.19% and -.08% respectively.

It is assumed that a greater use of energy efficiency contributes to a decrease in the effect of greenhouse gases. Graph 1 shows this possibility as of 2012, due to the lack of more data, but it is feasible that after 2012, the energy efficiency indicator will begin to exceed the greenhouse gas effect indicator for this country. In this regard, few studies have been carried out to corroborate this relationship.

In Michigan, United States, a study was carried out between 2010 and 2014 by researchers Fowlie, Greenstone and Wolfram (2015), who have written in various documents on the progress of this research to corroborate that the reduction of energy consumption and emission of greenhouse gases can be achieved through energy efficient modifications. The

researchers present evidence of this in low-income housing. However, it is noted that even though the issue of air conditioning has contributed to lower heating bills, it is recognized that much research remains to be done in order to substantiate the conclusions generated.

Figure 2. Total natural resource income as a percentage of GDP (South Korea, 1970-2017)



Own preparation with data from the World Bank

Graph 2 shows that since the 70's and 80's as well as the first years of the 90's, the indicator of total income of the Republic of Korea's natural resources has behaved irregularly, alternating between increases and decreases. These movements were very marked in the years 1973 to 1977 and 1980 to 1983, during which the increases and decreases were: 162%, 22%, 60%, -27%, -15%, 69%, 39%, 1% and - 51% respectively. After 1983, the downward trend was substantial, to increase again in the periods of 2001, 2003, 2006, 2007, 2008 and 2011 in the following proportions: 72%, 46%, 6%, 20%, 79% and 9%. By 2016, the indicator was at -5%.

This situation can be explained by the fact that South Korea has a territory that is not very favorable for agriculture and livestock, since a large part of the surface is dominated by mountains and forest areas. On the other hand, due to the increase of population in the cities, the spaces susceptible to be sown have been reducing, due to the demand of urbanization and creation of new companies. It is worth mentioning that, the country implements strong phytosanitary and sanitary barriers. Likewise, there are strict protectionist measures, among which are the prohibition of the importation of rice, beef, and some types of fruits and vegetables. Beef production has also decreased due to epidemics. As well as fishing due to overexploitation (OECE, 2019).

However, in recent years South Korea has sought to become more self-sufficient in this area, trying to reduce its imports. Some of the main Korean conglomerates or chaebols as they are: Lotte and SPC, besides having strategic business units such as distribution, supermarkets, department stores, convenience stores, franchises, hotels and financial services, are diversifying into the food industry (OECE, 2019).

The country's situation suggests that its economic growth is not substantially due to the income from its natural resources, but rather to its exports derived from the technology it develops in the area of telecommunications and microelectronic components, in addition to a solid automotive industry, among other industrial branches. The position taken in this regard is that there is no direct relationship between income from natural resources and economic growth as reflected in GDP, at least for South Korea.

In this regard, the so-called "abundance paradox" theory proposes that countries with abundant natural resources tend to have a lower GDP, in contrast to those economies that have scarce natural resources. (Autry, 1993 in Gonzalez, Erraes, and Cruz, 2017). While this proposal applies well to South Korea, it is important to note that it is not always true, because there may be other factors that influence the management of natural resources to favor economic growth, such as adequate resource management.

In line with this reflection, Banegas (2015) refers that there are few studies that address the relationship between natural resources and economic growth. He refers to a study carried out in Latin America, which highlights the significant increase in natural resources in four countries: Bolivia, Ecuador, Mexico, and Venezuela. Only in Ecuador was there a positive relationship between natural resources and economic growth, that is, natural resource exports contributed to an increase in per capita GDP (Sachs and Warner, 1998, in Banegas, 2015).

For their part, Falconi, Burbano and Cango (2016) report that Kuznets' environmental curve hypothesis suggests a possible relationship between economic development and environmental pollution, in the sense that with more development there is more pollution, but as time goes by, the latter tends to be less, as the level of economic development improves, reflecting this behavior graphically with a curve that resembles an inverted U. Then, a proposal for an econometric model was made taking as a reference the Kuznets environmental curve.

Methodology used

To carry out the analysis, two econometric models of quadratic regression were proposed to correlate pollution and economic growth, with two purposes, the first to verify the effect of the Kuznets Curve and second to measure the effects of the variables and their level of significance.

The first model will verify the global effects for the available data from 185 countries, considering as a cross section the year 2017 and is expressed in (1).

$$Y = B_o + B_1 X_1 - B_2 X_1^2 + u \quad (1)$$

The second model will verify the effects for the case of South Korea, considering a longitudinal period from 1961 to 2017 to locate the behavior of both variables over time, as expressed in (2).

$$W = B_o + B_1 Z_1 - B_2 Z_1^2 + u \quad (2)$$

Of both models, the variables expressed are explained in Table 1.

Table 1. Variables and data of the proposed models

Literal	Variable
Y	Pollution level; measured by the ratio of the total GDP of 185 countries to the volume of CO2 by 2017. That is, it shows a proportional relationship between pollution and the size of the economy (World Bank, n.d.).
W	South Korea's pollution level from 1961 to 2017; measured by the ratio of total GDP to CO2 volume for each year. That is, it shows a proportional relationship between pollution and the size of the economy (World Bank, n.d.).
X1	Level of economic growth; measured by the volume of the 2017 Gross Domestic Product of 185 countries at constant prices (World Bank, n.d.)
Z1	Level of economic growth in South Korea from 1961 to 2017; measured by volume of Gross Domestic Product at constant prices (World Bank, n.d.).

A quadratic regression model expresses the correlation of a Y variable as a function of an X from a different shape than a line, although the adjustment is made in the same way as for a line, i.e. using the least-squares method (Gujarati, 2010). In this case, representing a polynomial function of order 2 minimizes the distance to the graph that governs the model and the adjustment is made better than in a linear regression.

The regressions were performed using STATA software and the results are presented in the following section.

Results and discussion

The econometric models

For the first model (world comparative), the results obtained were

$$Y = (3 * 10^{-10}) + (4 * 10^{-12})X_1 - (6 * 10^{-24})X_2^2 + u$$
$$p = \quad 0.03 \quad\quad 0.06$$
$$R^2 = \quad 0.72$$

For the second model (Korean historical), the results obtained were:

$$Y = (4 * 10^{-10}) + (2 * 10^{-12})X_1 - (2 * 10^{-24})Z_2^2 + u$$
$$p = \quad 0.06 \quad\quad 0.01$$
$$R^2 = \quad 0.67$$

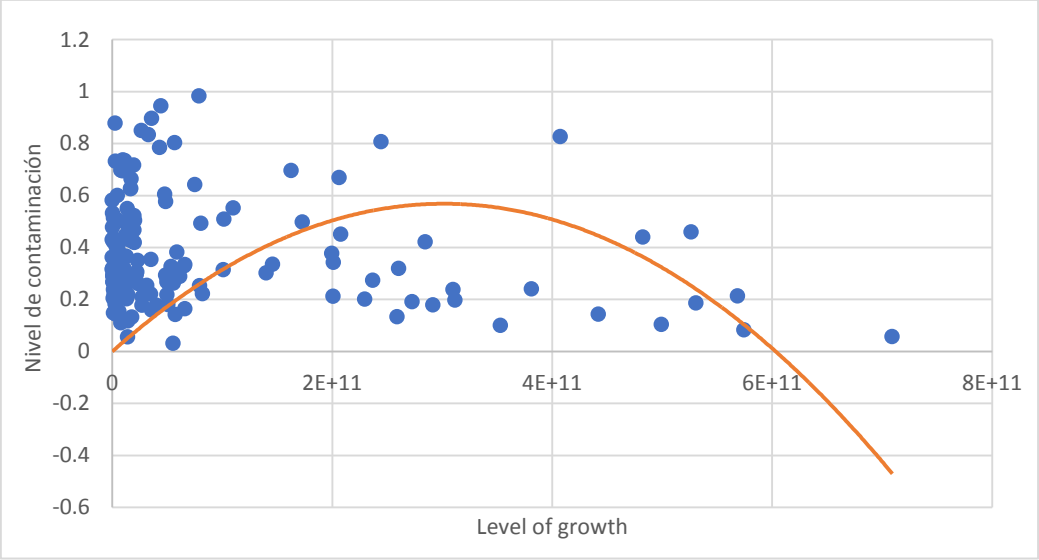
As can be seen, both models are acceptable in terms of data adjustment if we consider the determination coefficient (R2 value), for the first case it is 72% and for the second case it is 67%. Both equations show the expected signs, positive for the first degree term and negative for the second degree term, so they correctly draw the Kuznets curve which is verified in all cases.

Regarding the significance of the variables, both the linear and quadratic relationships were significant at 95% reliability, demonstrated with an error probability value (p) close to 0.05.

Therefore, we can say that the relationship between economic growth and pollution is proven. At first, the greater the growth, the greater the contamination, but at a certain point, the slope changes and the greater the growth, the contamination decreases. However, it is worth noting the very low values that the coefficients have, which indicates that the incidence of economic growth on the reduction of pollutants is infinitely small. The economic growth must be quite high and the effects on the reduction of pollutants are quite small. It can be seen that the positive effects of pollution (X*10-12) are greater than the negative effects (X*10-24).

This has been a constant concern because while the Kusnetz curve shows that more growth must be encouraged so that in the future the levels of contaminants begin to decrease, in the short term the level of contaminants will increase until the appropriate level of growth is reached. In figure 3 we show the model for the 185 countries of the world.

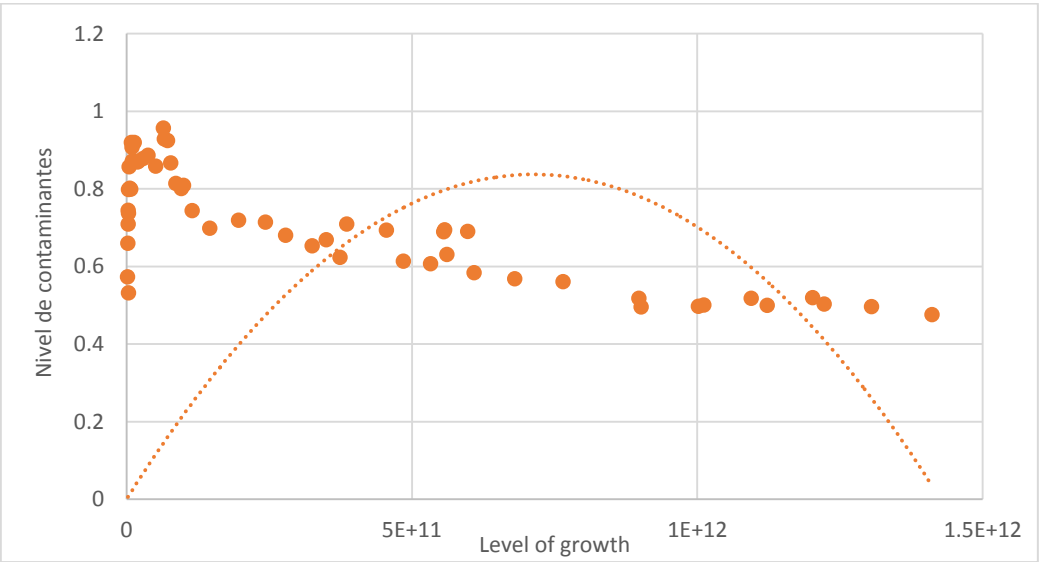
Graph 3. 2017 Global Kuznets Curve



Own preparation with data from the World Bank

As can be seen, most countries are still in the upward phase of the curve, that is, they are at a low growth level and high levels of pollutants; some others are in the phase of greater pollution with respect to the size of their economy, this is the particular case of China. Very few countries are in the downswing, including the United States, which has the lowest proportion of pollutant emissions relative to the size of its economy.

Figure 4. Kuznets Curve South Korea 1960-2017



Own preparation with data from the World Bank

Figure 4 shows the behavior of the data for South Korea, it is clear that the Asian country is already in the downward phase; however, its level of pollutants remains high in proportion to the average level of pollutants in other countries of the world. The model equation also reveals that growth rates will have to be higher each day for pollution to be reduced further, as low coefficients indicate very low impacts.

A prospective analysis

A prospective analysis was considered based on the equation resulting from the model (1) in order to calculate the periods in which at least 70% of the countries are located in the downward phase of the Kusnetz curve. It follows that, with the current behavior of the coefficients of the variables, ceteris paribus, we should be growing at rates above 4% per year to move in 125 years to the downward phase of the Kuznets curve, in that period will have emitted as many pollutants as possible. It is clear that the planet would not support such levels and the only thing that would be achieved would be to accelerate global warming.

The above data show us the limits of the current production-consumption mode and the serious disadvantage between rich and poor countries that shows a singular paradox: poor countries will have to reduce their pollutants for the planetary good, even if this means condemning them to backwardness (Van Hauwermeiren, 1999). The conditions of sustainability should also include an issue that has been little discussed: the debt of the rich countries in environmental matters that they have with the rest of the world, since the current mode of production-consumption allowed their growth at the cost of the lagging of the peripheral countries, even more, meaning that it was at the cost of the world's environmental resources (Jiménez-Bandala, 2018).

Conclusions

In the environmental dimension, efficiency in the use of energy resources is the basis for reducing the effects of greenhouse gases. Finally, not only to have natural resources, there is going to be a satisfactory economic development. Adequate public policies and their correct implementation will allow it, otherwise, even if one has natural resources, if adequate public policies are not implemented, a country's development may be very deficient.

South Korea's situation in this regard is different. It does not have sufficient natural resources, which has led it to take advantage of other inputs to achieve favorable economic development, allowing it to achieve high growth rates and a higher standard of living, even surpassing countries such as Mexico, which in the 1970s had a higher standard. It has implemented public

policies to achieve satisfactory economic growth and has been mentioned as an example of harmonious sustainable development.

While in the environmental dimension, in recent years a better use of energy efficiency has been observed in contrast to the continued increase in greenhouse gas emissions and it is expected that this efficiency will increase in the coming years, the data resulting from the econometric model indicate that the effects are extremely small, which shows us the limits of this production-consumption mode and the impossibility of continuing at the same pace for all countries in the world.

With the evidence presented we could be in a position to affirm that the possibilities of ecological growth are almost nil and that the requirement we have is to transform the current mode of production-consumption which implies not only moving the economy towards heterodox approaches such as zero growth or degrowth, but also completely revolutionizing the westernized paradigms of life that survive today.

Today it is urgent to change the way of doing things, to transform the individual interest into a collective interest. The traditional economy urgently needs to evolve into a social economy. That is, the interest in the benefit of humanity must take precedence over individual benefit. The economy has faced very strong challenges throughout the history of mankind, to solve problems of different kinds, being its traditional approach to address the interests of industrialists, seeking to maximize their profits in the shortest possible time, through the optimization of resources to obtain high margins of productivity.

It is a weak sustainability posture, and selfish in the sense that by taking prices as a reference, and in that eagerness to achieve maximum yields in the short term, it has led to the exhaustion of non-renewable natural resources, reaching the point that, once their scarcity is detected, the search for substitutes that fulfill the same function of the natural resource already scarce or on the verge of extinction is strongly promoted. It is imperative to seek a balance between cash flows and stocks (Solow, 1994). Technology is an important element in achieving this balance.

It is necessary to think not only about satisfying the needs of current generations, but also to allow future generations to enjoy the fruits of natural resources. Waiting for the depletion of natural resources to create substitutes for them is not the ideal or ethical strategy. It is of vital importance the regeneration or renewal and recovery of ecosystems. The exploitation of natural resources must go hand in hand with the creation of substitutes that are

commensurate with the services provided by natural resources and that, at the same time, are biodegradable.

In short, the world must act as a community. Countries that are close to that balance must put aside their particular interests to work for the common good. They must help other nations in the pursuit of human well-being today and in the future. It is to act without selfishness, it is to act with principles, with values, with honesty, with responsibility, with commitment, with ethics, with will, and with education. It is to work as a team. Our planet Earth demands it from us.

References

Aguilera, F. y Alcántara, V. (1994). De la economía ambiental a la economía ecológica. En F. Aguilera, V. Alcántara (Comp.), De la economía ambiental a la economía ecológica (pp. 9-21). Barcelona: Fuhem e Icaria.

Azqueta, D. (2007). Introducción a la economía ambiental. México: McGraw Hill Profesional.

Banco Mundial. (s.f.a). Indicadores mundiales, disponible en << https://datos.bancomundial.org/>>

Banco Mundial. (s.f.b). Banco Mundial: Un enfoque integral sobre la sostenibilidad medioambiental, disponible en <<http://www5.bancomundial.org/odm/medio-ambiente.html>>

Banegas, R. (2015). Recursos naturales y crecimiento económico: el efecto moderador de la inversión en América Latina, Centro de Desarrollo Económico y Social (CEDES), Investigaciones económicas, Economía, Documento de trabajo CEDES Nº 03/2015, pp. 1 – 26. Santa Cruz, Bolivia: Universidad Autónoma Gabriel René Moreno.

Cepal, (2018). La agenda 2030 y los objetivos de desarrollo sostenible. Una oportunidad para América Latina y el Caribe. Recuperado de https://www.cepal.org/es/publicaciones/40155-la-agenda-2030-objetivos-desarrollo-sostenible-oportunidad-america-latina-caribe

Falconí, F. (2002). Acercamiento a la sostenibilidad débil. Indicadores de sostenibilidad débil. Economía y desarrollo sostenible: matrimonio feliz o divorcio anunciado (35-93). Quito, Ecuador: Autor.

Falconi, F., Burbano, R. y Cango, P. (2016). La discutible curva de Kuznets. Documento de trabajo. Ecuador: FLACSO.

Fowlie, M, Greenstone, M. and Wolfram, C. (2015). Do Energy Efficiency Investments Deliver? Evidence from the Weatherization Assistance Program. Quarterly Journal of Economics, 133 (3), 1597 – 1644; y American Economic Review, 105 (5), pp. 201 – 204. doi: 10.1257

Galindo, L. M., y Samaniego, J. L. (abril, 2010). La economía del cambio climático en América Latina y el Caribe: algunos hechos estilizados. Revista Cepal, (100), 69 – 96.

Galindo, L.M. et. al. (septiembre, 2014a). Cambio climático, agricultura y pobreza en América Latina. Una aproximación empírica. En CEPAL (Ed.), Estudios del Cambio Climático en América Latina. Santiago de Chile: Naciones Unidas.

Galindo, L.M. et. al. (2014b). Paradojas y riesgos del crecimiento económico en América Latina y el Caribe. Una visión ambiental de largo plazo. En UN. CEPAL (Ed. de la serie), Series de la CEPAL. Medio Ambiente y Desarrollo: No. 156. Santiago de Chile: Naciones Unidas.

Galindo, L. M. et. al. (2015a). Adaptación al cambio climático a través de la elección de cultivos en Perú. El Trimestre Económico, LXXXII (3), núm. 327, 489-519.

Galindo, L. M. et. al. (enero – junio, 2015b). Metaanálisis de las elasticidades ingreso y precio de la demanda de energía: algunas implicaciones de política pública para América Latina. Economía, XXXVIII (75), 9 – 40.

Galindo, L.M. et. al. (Diciembre, 2015c). Meta-análisis de las elasticidades ingreso y precio de la demanda de gasolina: implicaciones de política pública para América Latina. Revista Cepal, (117), 8-25.

Gallopin, G. (mayo, 2003). Sostenibilidad y desarrollo sostenible: un enfoque sistémico. En UN.CEPAL (Ed. de la serie), Series de la CEPAL. Medio Ambiente y Desarrollo: No. 64. Santiago de Chile: Naciones Unidas.

González, C., Erraes, J. y Cruz, J. (2017). ¿Importan los recursos naturales en la determinación del crecimiento económico? Evidencia empírica para países por su nivel de desarrollo: Ecuador, Chile y Canadá, Revista Económica, 2, 77- 85.

Gujarati, D.N.(2010). Econometría. México: McGraw Hill Interamericana.

Hardin, G. (1968). The tragedy of commons. Science, v. 162 (1968), pp. 1243-1248. Traducción de Horacio Bonfil Sánchez. La tragedia de los comunes. Gaceta Ecológica, (37), [1995]: 1 – 13.

Jiménez-Bandala, C. (2017). Industrialización y neoliberalismo: las políticas fallidas de desarrollo en el México del Sur, el caso de la Cuenca del Papaloapan, Oikos Polis, Revista latinoamericana de Ciencias Económicas y Sociales, 2(1), 65 - 101.

Jiménez-Bandala, C. (2018). Development in Southern Mexico: Empirical Verification of the "Seven Erroneous Theses about Latin America, Latin American Perspectives, 45(4), 129-141.

Naredo, J. M. (1994). Fundamentos de la economía ecológica. En F. Aguilera Klink, V. Alcántara (Comp.), De la Economía Ambiental a la Economía Ecológica (pp. 231-252). Barcelona: Fuhem e Icaria.

Oficina Económica y Comercial de España (OECE). (2019). Informe Económico y Comercial de Corea del Sur, Seúl, Madrid, OECE. Disponible en: https://www.icex.es/

United Nations. (UN). (s.f.a). Desarrollo sostenible. Antecedentes. Recuperado de

https://www.un.org/es/ga/president/65/issues/sustdev.shtml

United Nations. (UN). (s.f.b). Principales cumbres y conferencias. Recuperado de https://www.un.org/development/desa/es/about/conferences.html

United Nations. (UN). (1992). Programa 21. Recuperado de https://www.un.org/spanish/esa/sustdev/agenda21/agenda21sptoc.htm

United Nations. (UN). (2015). El acuerdo de París. Recuperado de https://www.un.org/sustainabledevelopment/es/combatir-el-cambio-climatico/

Perman, R., Ma, Y., McGilvray, J., & Common, M. (2003). Natural Resource and Environmental Economics. Pearson Addison Wesley.

Solow, R. (1994). La economía de los recursos o los recursos de la economía. En F. Aguilera, V. Alcántara (Comp.), De la Economía Ambiental a la Economía Ecológica (pp.83-97). Barcelona: Fuhem e Icaria.

Van Hauwermeiren, S. (1999). Hacia una nueva visión de la economía. Manual de economía ecológica (pp. 69-92). Quito, Ecuador: Ediciones Abya – Yala.