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IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC  
RESINS PURCHASE LEVELS FROM 2007-2011

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# **IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

## **Impact of China's economic growth on Ecuadorian plastic resins purchase levels from 2007-2011**

**Rafael Cabello Galarza**

### **Abstract**

During the period from 2007 to 2011 China experienced a hasted economic growth which constituted an increment of import levels of plastic resin for the production of plastic goods. Such increment had an impact and affected the Ecuadorian plastic resins purchase levels. The plastic resins are petroleum based raw materials, thus the volatility of the oil barrel price afflicts the plastic resin import level of China and Ecuador. Unfortunately, Ecuador had to comply with both oil price volatility and China's plastic resin consumption will. The growth trend of plastic resin import between Ecuador and China seem to be opposite, periods in which China increased their plastic resin consumption Ecuador had to reduce their import levels. With China's high imports of plastic resin and volatility of oil prices, Ecuador experienced high peaks of plastic resin prices which in some years reached USD 2,000 per metric ton. Given the inflated prices along with a lower available supply for Ecuador, the country have seen a continuous downward trend of growth of plastic resin imports, which in 2010 and 2011 plummeted into negative growth rates. The following research paper will perform an annual statistical analysis in regards of prices and consumption levels of China and Ecuador, for the purpose of determining a behavior pattern between these two countries consumption levels.

**Keywords:** plastic resins, economic growth, China, price of oil barrels,

Ecuador, plastic resin import levels

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## **Resumen**

Durante el período del 2007 al 2011 China experimentó un rápido crecimiento económico, lo que constituyó un incremento de los niveles de importación de resinas plásticas útiles para la producción de artículos de plástico. Tal incremento tuvo un impacto que afectó los niveles de compras de resinas plásticas en el Ecuador. Las resinas plásticas son materias primas elaboradas a base de petróleo, por lo que la volatilidad del precio del barril de petróleo afecta el nivel de importaciones de resina de plástico de China y Ecuador. Desafortunadamente, Ecuador tuvo que lidiar con la volatilidad del precio del petróleo y el aumento de consumo de resina de plástico de China. La tendencia de crecimiento de las importaciones de resina de plástico entre Ecuador y China pretende ser opuesta, lo que implica que, en los períodos en que China aumenta su consumo de resina plástica Ecuador tiene que reducir sus niveles de importación. Con las altas importaciones de China de resina plástica y la volatilidad de los precios del petróleo, Ecuador experimentó altos picos de precios de la resina de plástico que en algunos años llegaron a USD 2,000 por tonelada. Los precios inflados junto con una menor oferta disponible para Ecuador, el país ha visto una tendencia continua a la baja en las importaciones de resina de plástica, que en 2010 y 2011 se desplomaron en las tasas de crecimiento negativas. La siguiente investigación contará con un análisis estadístico anual concerniente a niveles de precios y consumo de China y Ecuador, con el propósito de establecer un comportamiento entre los niveles de consumo de estos países.

**Palabras claves:** resinas plásticas, crecimiento económico, China, precio de barril de petróleo, Ecuador, niveles de importación de resinas plásticas.

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## **Introduction**

The Ecuadorian plastic industry, just like other South American plastic industries, is currently facing a set of problems in their productivity due to the struggle of stocking with basic raw material, plastic resins, necessary for the production of plastics. The problem starts due to constant fluctuations of oil prices which provoke variations in the resins prices which are imported.

As it is common knowledge India and China continue experiencing a hasted economic growth above 10%. Both China and India have a population above one billion, which creates a multiplier effect in consumption levels. These up growing economies, which account for almost 41% of the world population, generate disproportionate peaks on the demands.

The plastic resins, which are the base raw material for plastic goods, have seen these sharp increases. For 2010, out of 52 billion pound of plastic resin, 42% were directed to Asian countries, out of which 33.4% were directly destined to China. The unmeasured Chinese increase in consumption levels leaves a reduced supply of resin for the rest of buyers, and jeopardize plastic manufacturers in Ecuador (Plastics News, 2008).

Statistical data from Index Mundi reveals an upward growing trend which China is facing. In half a decade China has almost doubled its demand of plastic resins, rocketing their imports of plastic resins from United States Dollars (USD) 26.06 billion in 2005 to \$48.86 billion in 2010. In addition, China's annual growth

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rate reached its highest peak in 2010 at a rate of 27.05%. In average terms, the annual growth rate reaches 15.76%, which raises worldwide resin prices.

Ecuador's plastic resin scarcity is faced due to the fact that these raw materials are highly demanded by Chinese enterprises, thus decreasing the supply levels in Ecuador, ergo increasing prices as well. These factors hinders the production processes and more importantly reduce the profit margins, which in many cases result in an increase of prices in final products, causing inflation of prices and importation of inflation. Overvalued Ecuadorian plastic products diminish competitiveness in comparison with low-cost imported Chinese plastic products, reducing local profit margins (Diario El Comercio, 2009).

Besides from the macroeconomic factors that Chinese economic growth causes, the continuous fluctuation of oil prices in global market contributes to worsen the scenario for the plastic industry, decreasing revenues and forcing industries to go bankrupt. Instability in Middle East and warfare situation is one of the reasons for the rises and drops on oil prices.

The above stated creates an inconsistent structure for cost management, control on supply, and financial management for plastic industries in Ecuador.

The plastic industry generates many job positions, either directly or indirectly, being part of the supply chain in other productive sector like pharmaceuticals, cosmetics, food industry, and agro industrial industries, among others. Such industries require the use of plastic containers that require human resource with

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knowhow on the logistics of acquisition of products to complete the production process of their final products and services.

### **Theoretical Framework**

China's economic growth has had a hasted growth trend in the time frame that this research paper covers. The backlash of this economic growth can be translated into capital investments, growth in production levels, and higher levels of consumption. Since China has aimed to raise their production levels, it's likely that the tendency of acquiring inputs for that production is raised as well. This happens with the production of finished plastic goods, which requires a higher level of consumption of plastic resins. The increment of plastic resin consumption in China has an impact on the purchase levels of Ecuador, forcing the emerging country to have a downward trend of plastic resin import levels. China's growth has had an impact on the Ecuadorian plastic industry, studied from plastic resins purchase levels.

### *Definition of Terms*

**Economic Growth:** when a country is experiencing enhancement in capacity of an economy, thus increasing the production of good and services, compared to another period of time (Investopedia US, A Division of IAC, 2014).

**Imports:** comprehend the goods and services made at another country that are brought to the local country, indistinctly of how it was introduced to the local country (Amadeo, 2012).

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Plastic resins: the plastic resins are mostly common used, in a broad segmentation, in packaging, building sector and construction, and consumer sector. Resins can be divided into two categories: the thermoplastic resins and thermoset resins. Thermoplastics can be heated, melted and molded at the manufacturer's will repeatedly while thermosets bare only one melting and heating process thus can be molded only once (Blackwell Plastics, 2013).

High density polyethylene (HDPE): the high density polyethylene is a resin based on petroleum which withstands constant weathering and has a wide elongation capacity suitable for usage of food packaging since lacks of odor and allows food contact without compromising foods' condition (Blackwell Plastics, 2013).

Polypropylene (PP): PP is characterized by its low density, but mostly because of its transparency and crystallinity and its strength in its sidewalls when facing high temperatures. (Total Petrochemicals, 2007).

Post-consumption plastics: plastic articles that have been already used for any consumer article (Association of postconsumer Plastic Recyclers, 2011).

Post-industrialized plastics: plastic articles that have been already fabricated in a factory, gone through a transformation process (Plastic Recycling, 2013).

*The case of Ecuador: general overview of the problematic faced by the plastic industry*

During the period from 2007 to 2011 the plastic industry in Ecuador suffered severe increments in the prices of petroleum based raw materials mainly generated by the worldwide shortage, due to the strong growth of countries like India and China.



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The installed capacities for producing raw materials from petroleum are absolutely limited within the Ecuadorian industry against the sustained 10% annual growth of the Chinese and Indian economies (Back, 2011).

Given the fact that the raw material represents between 50% and 70% of the cost of production in this type of industry, it makes it impossible to absorb such increments, thus affecting the profitability of the industry facing severe losses. On the other hand, openness to international commerce with high levels of entry of finished goods coming from nearby countries contributed to a severe reduction on the demand of finished goods produced by the local industry.

According to Caterina Costa, 2011 president of the Asociacion Ecuatoriana de Plasticos (ASEPLAS), the high costs of the raw materials affected the industry. Increases of prices between 30% and 60% occurred during 2008 and 2010. These hikes in prices that affects the main input in plastics hinders operative and production processes, jeopardizing profit margins and making local plastic products more expensive against Chinese plastic products that easily enter our market (Buro de Analisis Informativo, 2011).

The plastic industry represents around 600 companies which are directly involved in the processing of plastics, out of which reuse the plastics produced. The industry creates 15,000 job positions, and additionally gives jobs to 30,000 people in an indirect form for the acquisition of plastics goods to fulfill the supply chain to complete the manufacturing process in order to get the final product that's going to be sold to final customers (Buro de Analisis Informativo, 2011).

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The plastic resins had faced a continuous price raising trend of 18 months since 2010, a trend that remains present leaving the sector in a difficult situation.

A metric ton (MT) of polypropylene (PP) for 2011 had raised its price as high as USD 2,100. The uncertainty creates a disadvantage for the industry because managers have to decide an optimal time for the purchase and how much to buy to mitigate losses. Determining the precise moment to stock is vital to avoid the necessity of buying at a higher cost. In what respects to financial opportunity costs, the surplus cash that is generated from annual profits are used in advanced purchases of raw materials instead of investing them in banks or projects that could yield interests. The opportunity cost of the situation foregoes money that could be earned through investments. The director of the development department of Pica, Mariuxi Zea, established that there's a delayed effect when oil prices drop, Most of the times, if the price of petroleum drops, it takes for 3 or 4 months for plastic resins to decrease as well.

The effect of price reductions are not immediate like what happens when prices rises. Many of the companies cannot afford to reduce their inventory of raw materials, and in these cases they have to continue with their normal stocking if the prices have recently risen. The plastic industry bears with the higher costs from the resins by diluting their margins. But there are moments in which marginal costs cannot be absorbed by the company and are directly passed on to the customers and clients (Buro de Análisis Informativo, 2011).

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### *China's Macro Environment*

#### *Political Aspect*

In January 2014 the New York Times released an article titled “For China, a Shift from Exports to Consumption”. The title explains the basic thought that converges the long-term plan of China, which is adapting their economic system to meet their local demand without decreasing their imports (Wassener, 2014). Is not an unknown fact that China's new approach for their economic growth is to enhance their production capacities to meet their local demand, leaving aside their stigma of being known as the maquila of the world.

The 12<sup>th</sup> Five Year Plan of China launched in 2011 aims to invest heavily in the development of their local industry. Even though the magnitude of supply of materials that China empowers is very high, the technological aspect is being left behind according to China's industry insiders (Xiaoji, 2011).

According to Plastics Today article “Global Plastics Issue: China moves from export driven to consumption focused” published in December 2013, the Chinese government is deriving their actions towards the production for local consumption, meaning that the political spectrum and law enforcement will be enacted to promote local production of key raw materials for further local consumption. The Chinese plan in 2012 called “Plan for New Materials” expects to rocket the value of new chemical materials to USD 42.4 billion by 2015, at a compound annual growth rate of 16%. One of these key raw materials is plastics. (PlasticsToday, 2013)

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### *Economical*

The statistics presented by the World Bank at Index Mundi reveals a tendency in which China is continuously increasing amazingly its level of production in terms of Gross Domestic Product (GDP), thus increasing the demand for commodities and raw materials. Unfortunately, this tendency is extremely related to the fact that the highest the increase in level of production, the higher the inflation for these commodities and raw materials.

The GDP in China has increased during the last decade. Just comparing 2007's GDP (USD 3.4 trillion) with 2012 GDP (USD 7.8 trillion) there's a sharp increase of almost 125%, with an increment higher than double in just half a decade (World Bank, 2013)

According to Table #1 from the World Bank statistics, the increase in percentage level of the GDP has a direct relation with the GDP per capita reaching an accumulative growth rate of 158% in the last decade. In the decade from 2001 to 2010 China surpassed and almost doubled the growth rate of GDP per capita compared to India's, which is the second country with largest increase in GDP per capita in the period 2001-2010 (World Bank, 2013).

With a higher level of GDP per capita, China's level of consumption has risen as well. They have achieved a considerable growth along with a consumerist trend, which results into the fast economic growth and increase in purchasing power and improvements in standard of living.

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The World Bank statistics show an upward fluctuation of consumption growth. Although the fluctuation has not been as sharp rocketing as the GDP growth or GDP per capita, it is very important to highlight the fact that China has raised from its lowest level of consumption growth rate at 5% to 7%, within the period from 2003 to 2007. Additionally, the fluctuations keep going upward, reaching almost a 9% growth in 2011 (World Bank, 2013).

Given the above stated, both factors contribute to increasing growth of wages in China, which leads to a growth of purchasing power, which is finally translated into higher level of consumption. Urban residents' net income rose by 7% in 2013, while on the other hand, rural residents' net income rose by 9.3% (Wassener, 2014). The National Bureau of Statistics of China calculated that the disposable income has risen from Chinese Yuan (CNY) 13,785 in 2008 to CNY 24,565 in 2013, accounting a growth of 78% (National Bureau of Statistics of China, 2014).

The last component in economic indexes for the analysis of the Chinese demand increase is a total consumption per capita. As stated before, and now confirmed with statistical data by the World Bank, China has doubled its consumption per capita in the last decade, having an accumulative increment of 103% during the period of 2000 to 2010 (World Bank, 2013).

There has been a combination of hasted growth in the GDP, thus the GDP per capita, consumption growth rate, and consumption per capita has grown as well, combination that propels the economic growth of this monstrous country upwards with highest level of consumption and demand.

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### *Social Aspect*

It is only logical that if China expects to enhance the value of their new materials up to \$42 billion, that wages will keep raising as well since the demand of labor hand will increase as well. Investment in industry can be easily translated into new working places. Millions of Chinese are migrating from their rural areas to urban areas seeking job opportunities. According to Trading Economics data, a trend is revealed in which rural population keep facing a negative growth. (Trading Economics, 2013)

Furthermore, China's population is quickly aging, leaving a labor force relatively old. In 2011, the population above 60 years old represented the 13.26%, while in 2000 the percentage was 10.33%. Contrary in 2011 the population below 16 years old represented the 16.60%, while in 2000 they represented the 22.89%. This phenomenon leaves a difficult scenario for employers since it is getting more difficult to hire new young employers and retain old ones. (Reinoso, 2011)

Following the statistical data from World Population Review, the population growth has dramatically decreased from 25.16% in 1960 to 4.98% in 2010. The extrapolation calculates that if measures are not taken, there will be a negative growth by 2030 (World Population Review, 2013)

### *Technological*

Following the Five Year Plan scheme, investment in technological facilities is one of the key elements for its implementation.

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One of the industries that will face important growth is the plastic packaging industries through the investments in pharmaceutical packaging. The pharmaceutical packaging complies 30% of usage in developed countries, while in China the participation is less than 10% (Research China Biportal, January).

The China Packaging Federation (CPF) is greatly persuading its industry to invest in new technologies in international trade fairs to reduce the labor costs. As previously explained in the social aspects, the labor hand wages has grown considerably.

The development that the plastic packaging industry is facing in China will fuel up the demand for it. Multinational enterprises such as Unilever are investing heavily, CNY 12 billion for the establishment of a new facility in Hefei. PepsiCo is set to disburse USD 2.5 billion in the construction of 12 plants in China. The overall investment of massive consumption enterprises of consumer goods is intrinsically bent to a higher demand of plastic packaging and plastic bottles. (Research China Biportal, January)

### *Environmental*

The Ministry of Environmental Protection of China (MEP) quoted that Chinese government measures have been practical so far, contrary to the Chinese citizen's dissatisfaction in regards of dangerous smog and unhealthy weather. During the first six months of 2013, the MEP rejected 14 construction projects that did not meet the environmental exigencies, which totalized USD 10.5 billion investment. The

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ministry also planned out to set action plans for quality standards in rural areas, especially on clean water and environmental protection. (English News, 2013)

In June 2008 the regulation of plastic bags became extremely rigid for Chinese shopkeepers and supermarkets. The battle against the nominated “white pollution”, in reference of the plastic bag colors, started due to the cheap and unsound conditions of the plastic bags given to clients. The State Council of China commented that the production of plastic bags were a sever misallocation of energy and resources, although they represented a convenience for consumers. All shopping centers and shopkeepers were prohibited to hand out plastic bags for free. In case that the clients prefer to pack their shopping in plastic bags, they must pay the price which is marked in the plastic bag. All retailers are prohibited to tear off the price of the plastic bags. (New York Times, 2008)

Five years later, the backlash of the plastic bag is nothing more than a very positive outcome. China has diminished the consumption by 67 million bags, retaining the usage of 6 million tons of oil, according to the National Development and Reform Commission (NDRC). (Upton, 2013)

The punishment for pollution standards became much harsher. China has now ratified the execution for careless culprits for breach of national environmental protection laws. Another countermeasure for a sloppy environmental law implementation are monetary penalties that firms must render based on their emissions. Additionally, legal actions will be taken against those enterprises that do not meet the pollution control (RT Question More, 2013).



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### *Legal*

One of China's main free trade agreements in regards of plastic resin and plastic goods imports without trade barriers is the Association of Southeast Asian Nations (ASEAN) – China Free Trade Area. Enacted and ratified in January 2012, the ASEAN- China free trade agreement diminishes the tariffs and trade barriers between China and the ASEAN countries, which are Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand and Vietnam. Around 8,000 of products enjoy the benefits of the trade. In the case of the plastics raw materials, the tariff trade agreement facilitates the exports of overall plastic resins with zero tariffs from the ASEAN countries to China (CHINA FTA NETWORK, 2009).

Imports of plastic solid waste have become more rigorous since on August 1<sup>st</sup> the Chinese Government enacted a new regulation for it. *Plastic News* reported a sharp instant plummeting of 80% of the imports of the plastic solid waste.

Regulations are also affecting the recycling process of post-consumer plastic. As mentioned before, Chinese Government is prohibiting the imports of unwashed plastics as well as the selling of it locally. The environmental protection agencies are in their duty to inspect meticulously the plastic recycling plants, to later on publish the directory of those enterprises that have fulfilled the requirements, and those who have not (Recycling International Editorial Staff, 2012).

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### *China's Economic Growth and Demand Increase*

The consumption level in China is almost at par with the Russian economy with an annual growth rate of 7.3%; surpassing its Asian neighbor India by 2.1%; according to the World Bank statistics (Back, 2011).

Wall Street journalist Aaron Back indicated in his article “Demand at Home Aids China Growth” published the following via online in 2011:

China's retail sales in September rose 17.7% from a year earlier, compared with a 17% rise in August. Industrial output growth accelerated unexpectedly in September, up 13.8% from a year earlier, exceeding both August's 13.5% and the 13.3% expected by economists (Back, 2011).

According to The Freedonia Group, a market research industry in Ohio, CL, they have forecasted a 7.5% annual increase of demand for packaging machinery, reaching a CNY 40 billion for 2016. Then largest segments of packaging machineries that are facing higher demand are filling, form, fill, and seal equipment. Plastic packaging industries are embracing the CPF's plan of action (PlasticsToday, 2013).

The worldwide rise of prices in petroleum propelled upwards the prices in plastic resins since it is the main component for its fabrication. But according to Plastico Panamericano Plapasa's president, Antonio Baduy, there's another key element that contributes to this tendency, which is the demand of Asian countries. Quoting Antonio Baduy's statement: “Two weeks ago, China stopped buying raw materials and the market has nowhere to sell it (Korea, Saudi Arabia), reason why prices went down in order to sell it to Latin America. But the moment that China reactivates its

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purchases, the prices in our region will rocket highly". The volatility of the petroleum prices and hike of demand by Asian countries pushed upwards the prices of resins. The price of the MT of most common of plastic resins (HDPE, LDPE, PP) rose by \$1,000 in the first semester of 2011 (El precio de las materias primas pone en aprietos al sector plástico, 2011).

### **Methodology**

For the purpose of this research paper, it will apply an exploratory investigation method which comprehends the revision of statistical data, reports, expedients, and other sources.

#### *Exploratory Analysis.*

Involves the recollection the information to determine key aspects of the plastic industry in Ecuador, such as increment in prices, reduction in plastic resin consumption, drop of productivity and profits contractions. Likewise, this information will aid to determine a linkage between China's plastic resin demand and Ecuador's plastic industry drops.

The PESTEL analysis will refer to cover six main topics: political, economical, social, technological, environmental and legal. These are key factor that do not necessarily work independently, but rather are linked to each other. The PESTEL will aid to determine which are the grounds in which China is operating, and will aid to clarify the directions of decisions that the government will take.

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*Annual Statistical Comparative Analysis.*

## *Tables and Figures*

The collection for the statistical analysis will be covered in the vast majority from websites like Banco Central del Ecuador, World Bank, Index Mundi, historic prices from Chinese enterprises, in order to determine imported quantities, prices, and other important aspects related to Ecuador and China's plastic resins. Additional information that affects the plastic resins consumption in Ecuador and China, such as changes in oil prices, will be taken into account as well for plastic resin import levels.

For the analysis of results, the research paper will cover annual comparative analysis of each year, starting from 2008. The figures along with the related information of plastic resin will contribute to identify the behavior of plastic resin import levels of Ecuador and China.

## **Results**

Figure 4 analyzes the fluctuations from 2005 to 2011 taken from Index Mundi database, we can see an increment of almost \$380 million in Ecuador's resins imports due to the price hikes that Ms. Caterina Costa spoke about (Index Mundi, 2011).

The hike of prices previously stated reveals the false impression that Ecuador is in growth of resin imports is in constant fluctuations, with a trend of growth of resin imports. However, given the reports measured in terms of containers from overall shipping lines taken from the data base of shipping line agency Grupo Remar, there is an imminent constant decrease in the number of containers imported to the

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country since the year 2009. Figure 5 from Grupo Remar import data base illustrates how the imports of plastic resin have been decreasing (Grupo Remar, 2013).

Contrary to what can be concluded at first glance from Figure 4, even though in USD the amount of imports is in growth, it is evidenced that the volume of containers and tons imported to Ecuador has a negative figure. But the scenario worsens in terms of percentual growth rate. Calculating the average growth rate there is a sharp plummeting in the import levels. Ecuador has had a constant downward trend in their plastic resin import in terms of percentage growth rate. This means that each year the country has been decreasing their marginal increments in imports reaching its most critical points in 2010 and 2011. In both years there were no marginal increases but rather negative marginal decreases, reaching its lowest point at a negative 3% in 2011, in which the numbers of tons were decreased.

Figure 9 based on Index Mundi statistical data shows there is an upward trend in terms of percentage growth rate of China's plastic resins imports. The economic growth of China in level of consumption along with GDP per capita has supported to maintain a regular demand and consumption of plastic resin. Contrary to Ecuador, China experienced a negative growth only in 2008. However, China's import growth behavior does not have sharp plummeting trend compared to Ecuador. They have rather manage to keep a sustained import level of plastic resins.

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## **Analysis of the Results**

### *Analysis of 2007-2008*

The political tension in the Middle East during 2008 had its impact on rocketing of the oil barrel due to the heavy war fare on going. The unceasing stoppage of supply due to geopolitical confrontations between oil producers like Iran and Iraq pushed the price of oil barrels to levels between USD 140 and USD 170 (Plastemart, 2013).

The peak prices on oil barrels contrived to raise the price of the plastic resins in China by 13%, reaching levels of USD 1510 per MT. However, the Chinese markets ought to wait for price drops and took precautionary measures since the costs were too elevated. China dropped their total volume of MT imports to 25 million tons, which represented a negative growth of 4.64% compared to 2007's total volume of 26.5 million tons (Plastemart, 2013).

Nevertheless, due to the high prices in resins, the total amount of resin imports in USD grew by 8%, reaching a grand total of USD 38.17 billion compared to the USD 35 billion imported last year.

Since China stopped buying 1.23 million tons, Ecuador had the opportunity to increase their imports of plastic resins, but a very high opportunity costs. The price of plastic resins grew by 22% and Ecuadorian plastic producers had to pay USD 2,076 per MT in contrast to a MT price of USD 1700 in 2007. The plastic resin import levels in MT rose by 7.64%, reaching 300,760 MTs. However, seizing the opportunity of China's demand drop meant for Ecuador to pay a grand total of USD

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576.85 million. The total plastic resin import levels in USD rose by 39%, the growth in volume only rose by 7.64% in MT. Ecuador increased their resin imports by 21,340 MTs, but the marginal total cost of those additional resins was USD 161.46 million. This means that each marginal MT cost USD 7,566.

### *Analysis of 2008-2009*

The effects of the 2008 financial crisis were evident during 2009. Worldwide investments plummeted, equity markets decline sharply, and so it happened with the earnings of the industrial sector. The price of the oil barrel sunk down to USD 45, which diminished the price of the plastic resins worldwide.

China intelligently dodged the plastic resins high prices in 2008. Since they refrained to stock their inventories in order to take advantage of the worldwide financial crash, they incremented their plastic resin import levels by 32% compared to 2008, . Their import levels in MT experienced a 30% growth reaching 32.91 million MTs compared to the 25 million MTs imported last year. Such increment in stock levels occurred since the price level of plastic resin per MT declined drastically to USD 1159. Considering such low price, the total amount of plastic resin imported in 2009 decreased by 0, 07%. On the other hand, as said before, the totality MTs rose by 30%.

The sudden raise of plastic resins from China overshadowed the possibilities of Ecuador to take advantage of the potential and beneficial situation of drops in oil prices, thus in plastic resins. During 2009 the MT of plastic resin crashed to USD 1380, being 34% cheaper than in 2008. However, since China hoard the plastic resin

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supply by increasing their inventories Ecuador was not able to avail the low cost of raw material, attaining to increase their volumes by a trivial 1.60%, spanning a grand total of 306 million MTs versus the 300 million in 2008. Even though the imported volumes rose, taking in consideration the low prices of plastic resins in 2009, the total amount of plastic resins in USD dropped in 27%, or to USD 421.43 million.

### *Analysis of 2009-2010*

The foreign exchange market had its presence in the recovery of the oil price per barrel, thus in the plastic resin prices. Worldwide investments were directed toward commodities, including crude oil futures due to USD depreciation in front of the Euro (EUR). In 2010 the EUR reached its highest peak at EUR 1.45 / USD. Given this fact, investors preferred to have their money in commodities like oil instead of having it in a currency that was constantly losing its value (Yahoo! - ABC News Network, 2013). Further, Iran was going through oil plants shutdowns. The price of oil barrel was quoted on \$79 approximated (Plastemart, 2013).

The effects of global depreciation of the USD reached the CNY / USD relationship forcing the USD to fall 327 basis points in front of the CNY (Yahoo! - ABC News Network, 2013). The CNY/USD situation benefitted the Chinese plastic producers and importers. Globalized commerce is almost entirely done in USD transactions, so an appreciation of CNY reduced the costs of imports. Additionally, China had increased their productive capacities, thus their inventories were set to be raised (Plastemart, 2013). The price of the plastic resin ton raised by 6% in comparison with the 2009 plummeted price, ending at USD 1,225 per plastic resin



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MT. Their plastic resin volumes imported were 40 million tons, growing by 20% compared to last year import levels. Keeping higher level of plastic resin consumption along with raised price of MT implied the total volume of plastic resins in USD raised by 27%.

However, the Ecuadorian environment for plastic producers was not favorable once again. The slight drop of world supply of plastic resin due to the closure of Iranian factories, and high price of oil barrel, impacted the price of MT of the plastic resin raising its price to USD 1,832 compared to USD 1,380 in 2008, growing by 33%. Once again, the raise of Chinese plastic resin consumption growth jeopardized the Ecuadorian industry import levels, pushing a negative growth of 0.69%, accounting for a grand total of 303 thousand MT. Since China raised their consumption, Ecuador had to struggle once again with the acquisition of plastic resins. Nonetheless, the plastic resin price increased so much that the total amount in USD grew by 37% in contrast to a negative growth of 0.69% for the total volume.

### *Analysis of 2010-2011*

The year 2011 contemplated another scenario that raised the price of the oil barrel. The war fare situation in Middle East became tenser as the no-fly zone over Libya was taken over, which backlashed in intensification of conflicts within Libya. The price of the oil barrel increased, and so did the plastic resins, up to \$106.

China's Central Bank announced an increment in the interest rates, complicating the credit situation for plastic producers (Trading Economics, 2014). The announcement of an expensive cost of money alarmed the plastic resin importers

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pushing their import level in MT to increase by a 16.23%. Even though the price of the plastic resin metric rose by 8.41%, the total amount in tons grew from 39.5 million tons in 2010 to 46 million in 2011 (Plastemart, 2013).

For Ecuador, the plastic resin MT price reached USD 2000, going hand by hand with China's plastic resin consumption growth once again. The prices rose by 9% compared to 2010, driving the total plastic resins import to increase by 26% artificially, estimating a grand total of USD 61 million in 2011. However, the high prices and low supply due to Chinese consumption growth and other factors explained continued to widen the gap between the growth in USD and MT. In 2011 Ecuador contracted their plastic resin import levels by 3%, reckoning a 295 million plastic resin ton in 2011 compared to the 303 million ton imported in 2010.

### **Conclusions and recommendations.**

There is a relationship between the purchase level of plastic resin in Ecuador and the consumption of plastic resin in China. As evidenced by the research, the general trend line of China and Ecuador's plastic resin consumption grow opposite, meaning that the year in which China increases their consumption, Ecuador is forced to reduce it.

The analysis shows that 2008 was a year of opportunity for Ecuador to stock their inventories since China had decreased their plastic resin consumption levels. Even though the plastic resin price in Ecuador had rocketed, it was a moment where buying additional stock was feasible since China reduced their import levels.

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But the opposite happened in 2009. The price of the plastic resin plummeted dramatically, being this year the perfect moment to increase import levels of plastic resin. But unfortunately, China enhanced their plastic resin import levels by 30%, having almost a marginal level of 8 million tons compared to last year. Since China raised its inventories, Ecuador was left with a minor available supply of plastic resin, being able to increase their inventories only by 1.6%.

Similar is the case in the next two years in which China boosted their plastic resin import levels, but at less degree due to oil prices fluctuations, decreasing the plastic resin supply for Ecuador and forced to reduced their plastic resin import levels each year.

Still there are strategies that plastic producers could apply in order to mitigate the rise of plastic resin prices. The core problematic lies in determining the right moment to increase inventory levels of plastic resins so that the company can be fully stocked during slack seasons.

An alternative is to develop a business unit that focuses directly in market research. This means to have a dedicated staff to investigate about different nations that can supply the raw material through a cost-benefit analysis. The business unit would have to be constantly investigating the price of oil, the consumption trend that China would be following, and the behavior of the plastic resins.

Plastic producers could ascend the supply chain by negotiation directly with international traders instead of buying plastic resins locally. In that manner, plastic

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producers would cut local intermediaries, thus cutting price inflation, and would avoid speculation of prices at some degree.

Also, strategic alliances with local competitors to form a guild can result advantageous for plastic producers. It would be possible to import plastic resins at much higher quantities to achieve lower cost per MT. Additionally, forming a guild increases the bargaining power of Ecuadorian buyers in front of international suppliers.

Plastic producers could avoid the turmoil of plastic resin imports if they adapt to be a part of the production chain of another enterprise. Joining the production chain of multinationals like Unilever or Coca Cola would result in dedicating the whole operation of the to a very specific productive phase while the multinationals would be in charge of the imports of overall inputs, including raw materials like plastic resin. That way the company can divert all their resources and tangible capitals in the production of the plastic product that the multinational requires.

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## IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011

### Appendixes

#### Tables

Increase in GDP Per Capita 2001-2011			
	\$ US at constant prices		
	Annual % Increase	Total % Increase	Total Increase as % of China's
China	9.90%	158.20%	-
India	6.10%	80.20%	50.70%
Russia	5.00%	63.20%	39.90%
South Korea	3.60%	43.00%	27.20%
Brazil	2.70%	30.10%	19.00%
Germany	1.20%	12.20%	7.70%
UK	0.80%	8.70%	5.50%
US	0.70%	7.30%	4.60%
Japan	0.60%	6.00%	3.80%
France	0.40%	4.60%	2.90%

Table # 1: Increase in GDP Per Capita 2001-2011

Source: (Wolrd Bank, 2013)

Elaborated by: the author

Increase in Total Consumption Per Capita 2001-2011			
	\$ US at constant prices		
	Annual % Increase	Total % Increase	China's Consumption Increase in Comparison
China	7.30%	103.20%	-
India	7.30%	101.90%	1.30%
Russia	5.20%	65.90%	56.60%
South Korea	2.90%	33.60%	207.10%
Brazil	2.40%	28.70%	259.60%
UK	1.30%	13.30%	657.90%
US	1.10%	11.10%	829.70%
France	1.00%	10.70%	864.50%
Germany	0.70%	6.70%	1440.30%

Table #2: Increase in Total Consumption Per Capita 2001-2011

Source: (Wolrd Bank, 2013)

Elaborated by: The author

**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

Sub-Chapter	TOTAL CHINA'S PLASTIC RESIN IMPORTS IN USD					
	2006	2007	2008	2009	2010	2011
Polyamides of ethylene forms.	\$6,391,724,249	\$6,873,272,314	\$7,817,750,551	\$9,323,385,785	\$11,064,881,832	\$14,724,510,163
Polymers of propylene or of other olefins,	\$3,986,058,825	\$4,716,801,579	\$4,838,502,286	\$5,870,199,737	\$6,875,664,978	\$8,011,397,455
Polymers of styrene, in primary forms.	\$4,807,559,683	\$5,909,747,061	\$5,899,463,544	\$5,409,695,926	\$6,678,883,256	\$7,773,291,791
Polymers of vinyl chloride or of other h	\$1,523,021,624	\$1,574,934,502	\$1,571,603,455	\$1,892,950,666	\$2,061,015,598	\$2,032,202,508
Polymers of vinyl acetate or of other vinyl	\$48,567,626	\$49,776,971	\$54,902,676	\$26,667,810	\$23,944,011	\$25,070,877
Acrylic polymers in primary forms.	\$942,590,672	\$1,083,256,351	\$1,206,140,618	\$1,166,635,693	\$1,707,865,763	\$1,865,414,958
Polyacetals, polyethers and epoxide resins	\$5,674,598,528	\$6,713,499,530	\$6,774,876,192	\$6,137,002,605	\$8,553,372,267	\$8,576,582,846
Polyamides in primary forms.	\$1,573,112,891	\$2,230,948,324	\$2,573,902,463	\$2,173,361,983	\$2,960,268,176	\$3,486,799,816
Amino-resins, phenolic resins and polyurethanes, in primary forms.	\$679,591,813	\$1,580,747,796	\$1,599,164,337	\$1,194,551,252	\$1,657,969,788	\$2,599,060,324
Silicones in primary forms.	\$617,374,089	\$701,437,272	\$787,340,210	\$735,190,997	\$859,065,990	\$779,387,650
Petroleum resins, coumarone-indene resins	\$253,878,898	\$330,531,329	\$375,006,952	\$336,467,356	\$478,390,678	\$581,681,823
Cellulose and its chemical derivatives	\$330,096,161	\$302,821,506	\$217,069,781	\$210,432,634	\$268,888,570	\$274,563,096
Natural polymers and modified natural polymers	\$17,665,252	\$22,349,690	\$37,319,101	\$32,639,484	\$47,609,435	\$58,277,459
Ion-exchangers based on polymers of headings	\$40,475,475	\$41,362,926	\$53,695,350	\$44,640,683	\$60,624,614	\$69,177,295
Polymers of ethylene, in primary forms.	\$2,406,796,782	\$3,202,866,313	\$4,316,537,186	\$3,546,267,012	\$5,087,619,436	\$10,109,315,386
Monofilament of which any cross-sectional	\$33,755,790	\$39,953,897	\$44,136,966	\$42,018,271	\$72,297,621	\$90,128,481
<b>Total Plastic Resin Imports</b>	<b>\$29,326,868,358</b>	<b>\$35,374,307,361</b>	<b>\$38,167,411,668</b>	<b>\$38,142,107,894</b>	<b>\$48,458,362,013</b>	<b>\$61,056,861,928</b>
<b>Total USD Import Change(%)</b>		<b>20.621%</b>	<b>7.896%</b>	<b>-0.066%</b>	<b>27.047%</b>	<b>25.999%</b>

Table #3: Total China's Plastic Resin Imports in USD

Source: (Index Mundi, 2011)

Elaborated by: The author

**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

Sub-Chapter	TOTAL ECUADOR'S PLASTIC RESIN IMPORTS IN USD					
	2006	2007	2008	2009	2010	2011
Polyamides of ethylene forms.	\$124,350,851	\$146,193,357	\$203,459,419	\$149,162,667	\$197,057,086	\$221,029,453
Polymers of propylene or of other olefins	\$65,396,090	\$63,779,568	\$100,239,336	\$61,053,942	\$95,327,895	\$135,761,426
Polymers of styrene, in primary forms.	\$15,691,846	\$17,163,120	\$21,514,372	\$15,745,767	\$26,448,605	\$31,691,743
Polymers of vinyl chloride or of other	\$58,810,702	\$59,129,293	\$82,658,254	\$55,212,740	\$71,205,378	\$100,453,391
Polymers of vinyl acetate or of other vinyl esters	\$788,594	\$1,017,400	\$1,566,233	\$1,918,693	\$3,756,974	\$5,248,157
Acrylic polymers in primary forms.	\$13,617,993	\$11,908,501	\$17,650,382	\$14,880,335	\$24,936,723	\$26,975,652
Polyacetals, other polyethers and epoxide resins	\$73,441,962	\$85,239,532	\$108,023,391	\$88,786,737	\$115,871,418	\$141,140,733
Polyamides in primary forms.	\$1,608,963	\$950,207	\$2,181,053	\$2,381,482	\$3,114,257	\$3,662,664
Amino-resins, phenolic resins and polyurethanes, in primary forms.	\$11,130,179	\$13,500,978	\$15,644,001	\$9,926,189	\$13,755,188	\$17,191,580
Silicones in primary forms.	\$3,492,954	\$3,922,601	\$6,117,429	\$5,433,362	\$5,900,753	\$6,868,514
Petroleum resins, coumarone-indene resins, polyterpenes	\$1,135,473	\$871,576	\$1,824,668	\$2,101,612	\$2,221,455	\$2,573,357
Cellulose and its chemical derivatives	\$5,894,201	\$7,034,944	\$8,523,695	\$8,394,837	\$11,477,564	\$13,124,091
Natural polymers and modified natural polymers	\$1,887,084	\$1,541,691	\$1,621,591	\$2,042,450	\$3,211,505	\$3,433,250
Ion-exchangers based on polymers	\$253,436	\$281,814	\$383,687	\$599,407	\$587,787	\$575,744
Polymers of ethylene, in primary forms.	\$636,923	\$787,669	\$1,868,825	\$765,173	\$605,973	\$681,022
Monofilament of which any cross-sectional	\$2,214,608	\$2,053,413	\$3,558,796	\$3,020,648	\$3,117,123	\$4,402,114
<b>Total Plastic Resin Imports</b>	<b>\$ 380,351,859.00</b>	<b>\$ 415,375,664.00</b>	<b>\$ 576,835,132.00</b>	<b>\$ 421,426,041.00</b>	<b>\$ 578,595,684.00</b>	<b>\$ 714,812,891.00</b>
<b>Total USD Import Change (%)</b>		<b>-7.28%</b>	<b>73.31%</b>	<b>-15.12%</b>	<b>3.19%</b>	<b>41.22%</b>

Table #4: Total Ecuador's Plastic Resin Imports in USD

Source: (Index Mundi, 2011)

Elaborated by: The author

## IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011

PLASTIC RESIN PRICE PER METRIC TON IN CHINA						
	2006	2007	2008	2009	2010	2011
USD / MT	\$ 1,310.00	\$ 1,335.00	\$ 1,510.44	\$ 1,159.00	\$ 1,225.00	\$ 1,328.00
Price Change (%) in USD		1.908%	13.142%	-23.267%	5.695%	8.408%

Table #5: Plastic Resin Price per Metric Ton in China

Source: (ChemOrbis Elektronik Pazaryeri A.S., 2013)

Elaborated by: The author

TOTAL CHINA'S PLASTIC RESIN IMPORTS IN METRIC TONS						
	2006	2007	2008	2009	2010	2011
Total MTs	22,386,922.41	26,497,608.51	25,269,068.40	32,909,497.75	39,557,846.54	45,976,552.66
Change (%) in MT		18.362%	-4.636%	30.236%	20.202%	16.226%

Table #6: Total China's Plastic Resin Imports in Metric Tons

Source: (ChemOrbis Elektronik Pazaryeri A.S., 2013), (Index Mundi, 2011)

Elaborated by: The author

PLASTIC RESIN PRICE PER METRIC TON IN ECUADOR						
	2006	2007	2008	2009	2010	2011
USD / MT	\$ 1,625.27	\$ 1,705.86	\$ 2,076.18	\$ 1,380.05	\$ 1,832.22	\$ 2,001.14
Price Change (%) in USD	4.469%	4.958%	21.709%	-33.529%	32.764%	9.220%

Table #7: Plastic Resin Price per Metric Ton in Ecuador

Source: (Banco Central del Ecuador, 2014)

Elaborated by: The author

TOTAL ECUADOR'S PLASTIC RESIN IMPORTS IN METRIC TONS						
	2006	2007	2008	2009	2010	2011
Total MTs	\$ 234,024.04	\$ 279,420.00	\$ 300,760.00	\$ 305,580.00	\$ 303,460.00	\$ 294,300.00
Change (%) in MT		19.398%	7.637%	1.603%	-0.694%	-3.019%

Table #8: Total Ecuador's Plastic Resin Imports in Metric Tons

Source: (Grupo Remar, 2013)

Elaborated by: The auth

**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

Figures

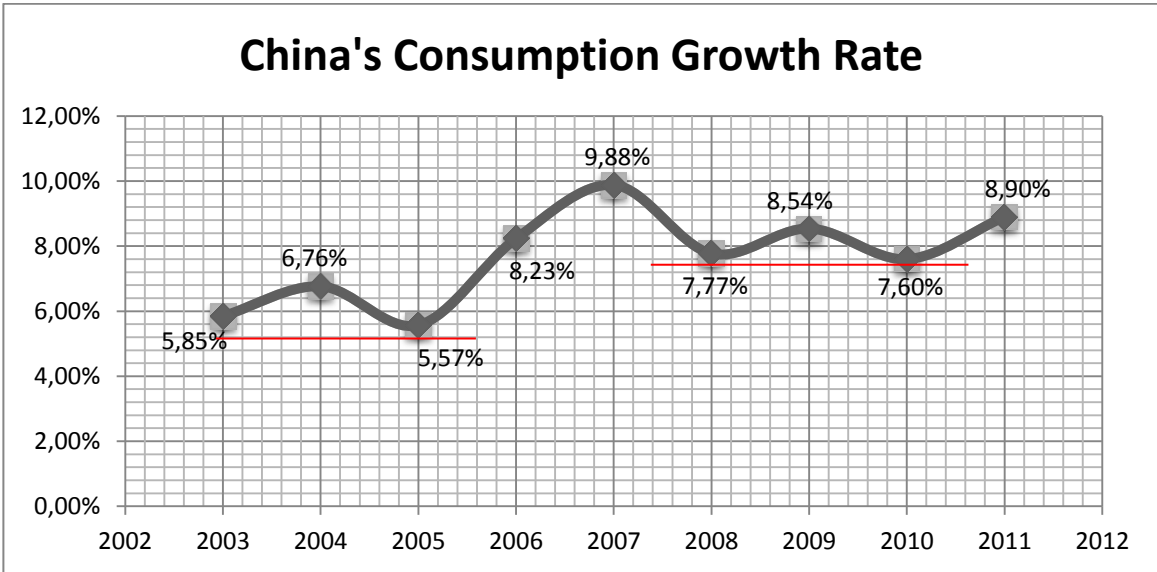


Figure 1  
 Source: (Wolrd Bank, 2013)  
 Elaborated by: the author

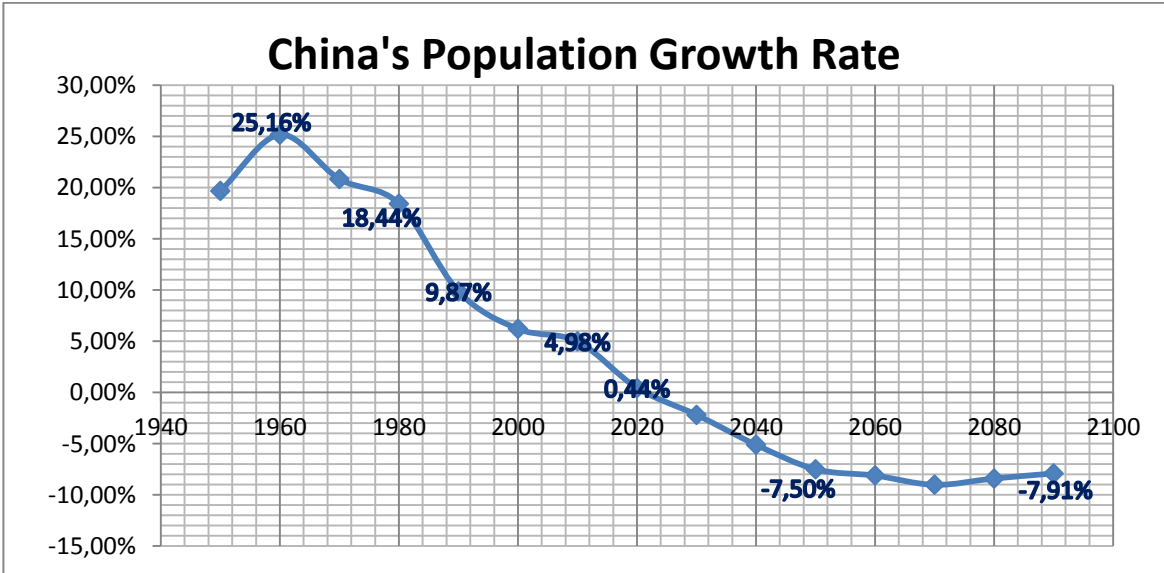


Figure 2  
 Source: (World Population Review, 2013)  
 Elaborated by: the author

**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

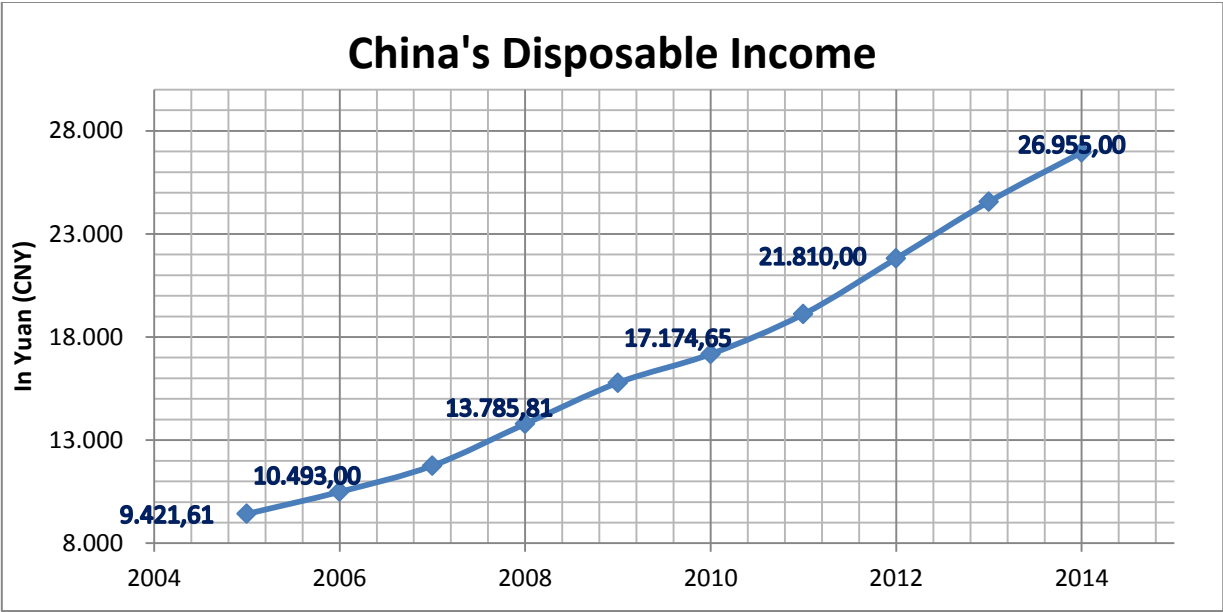


Figure 3  
 Source: (World Population Review, 2013)  
 Elaborated by: the author

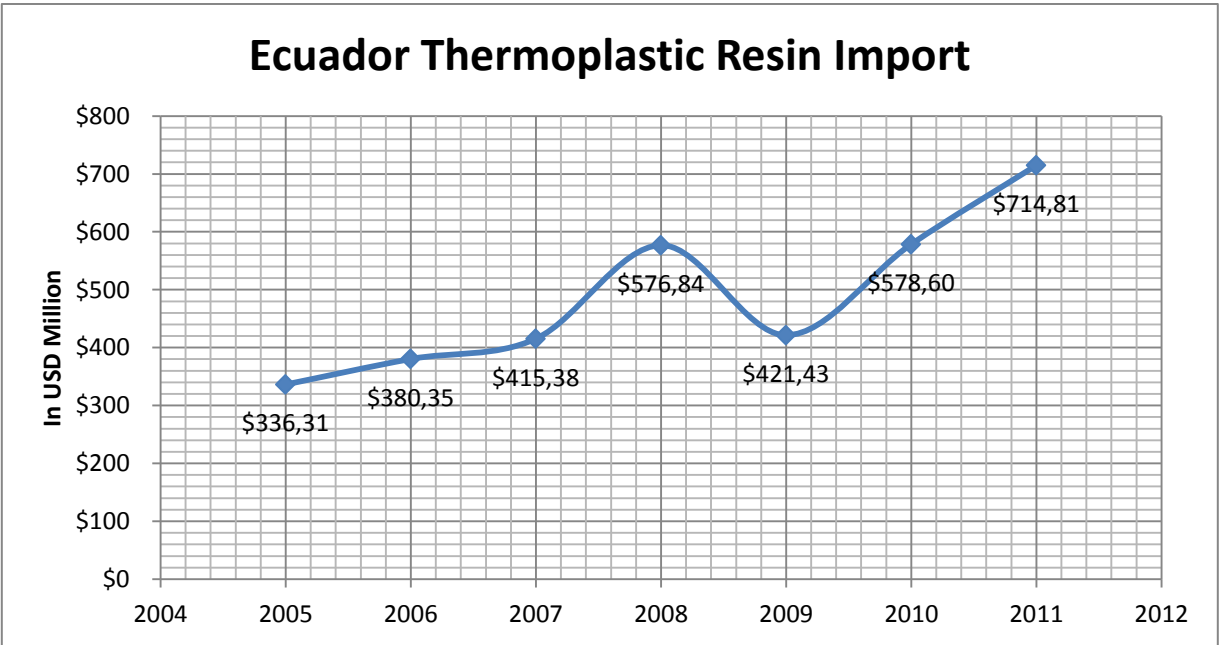


Figure 4  
 Source: (Index Mundi, 2011)  
 Elaborated by: the author

**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

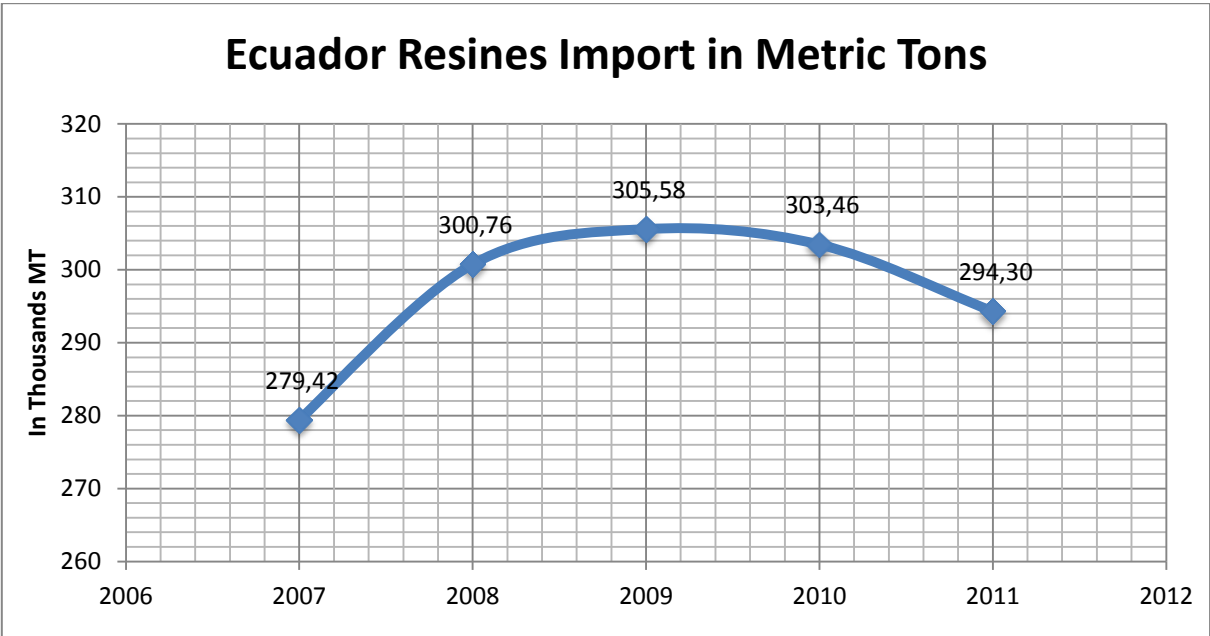


Figure 5  
 Source: (Grupo Remar, 2013)  
 Elaborated by: the author

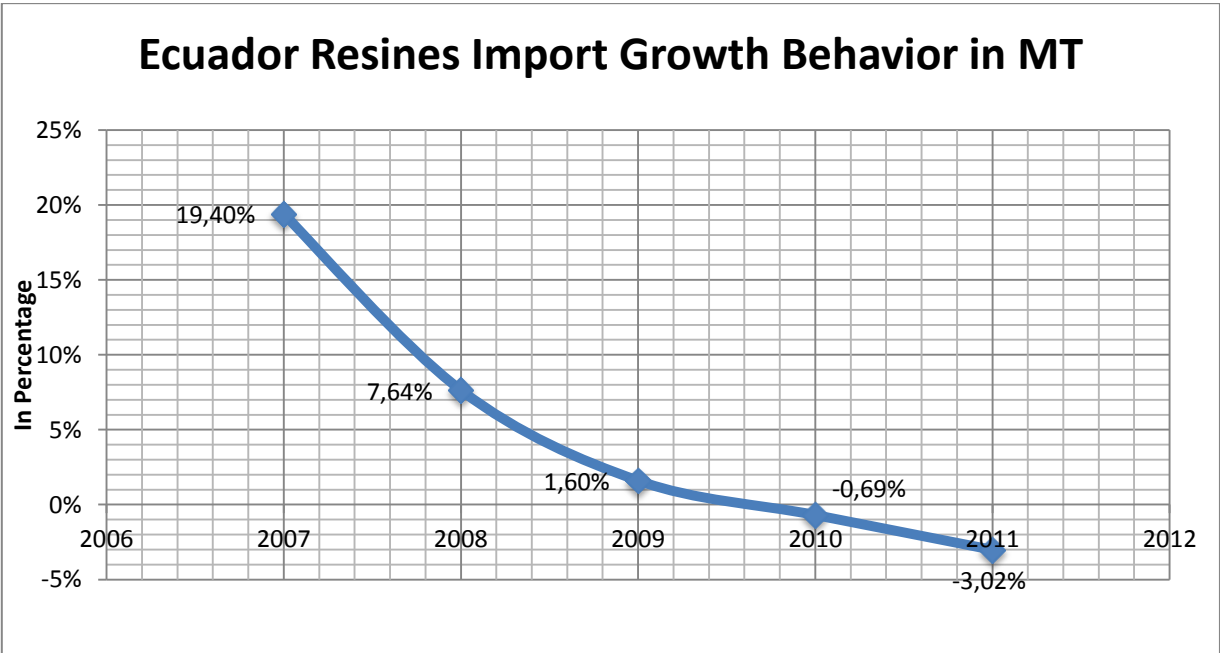


Figure 6  
 Source: (Grupo Remar, 2013)  
 Elaborated by: the author

**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

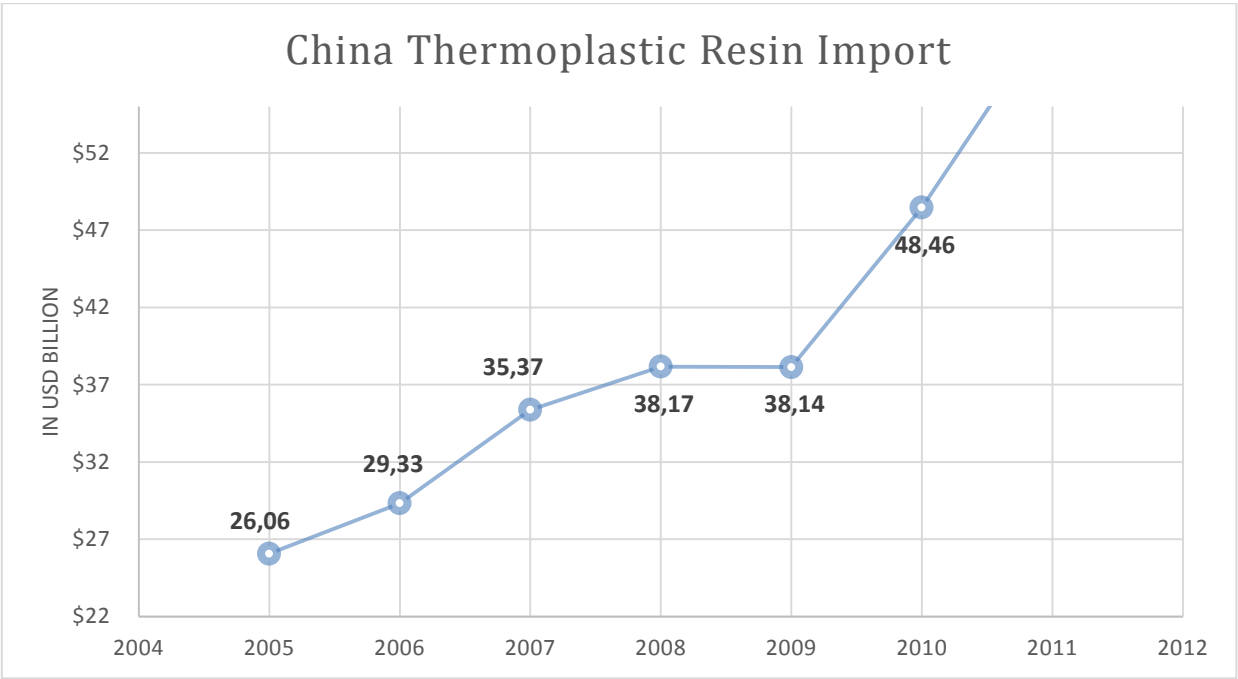


Figure 7  
 Source: (Index Mundi, 2011)  
 Elaborated by: the author

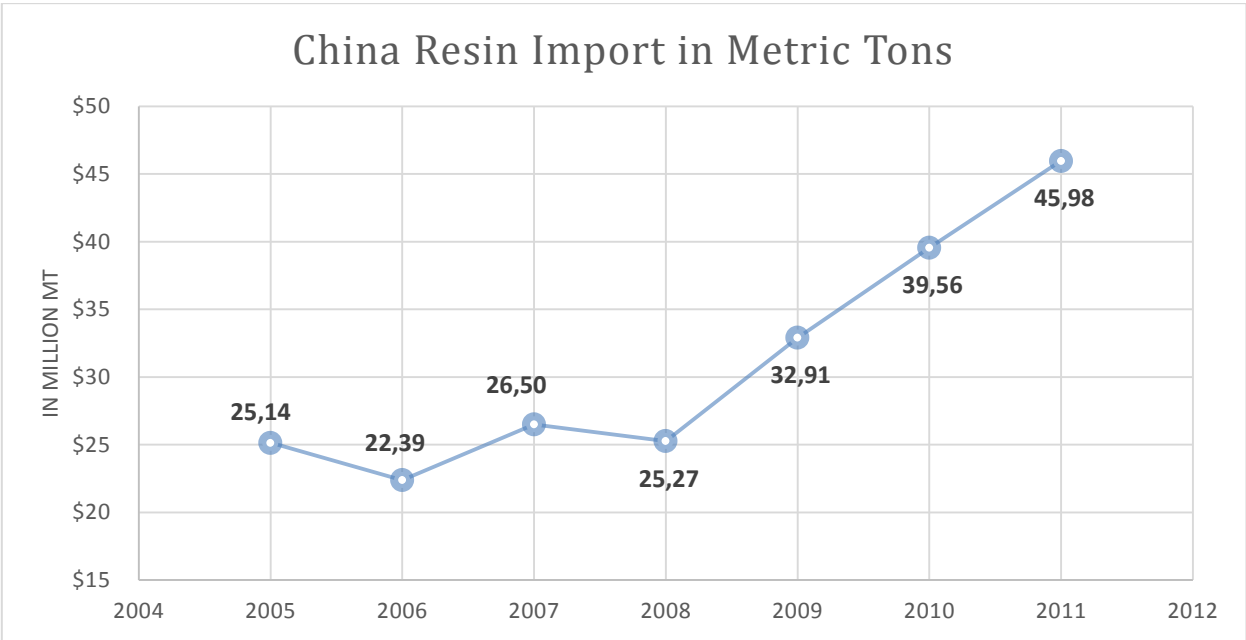


Figure 8  
 Source: (Index Mundi, 2011), (ChemOrbis Elektronik Pazaryeri A.S., 2013)  
 Elaborated by: the author



**IMPACT OF CHINA'S ECONOMIC GROWTH ON ECUADORIAN PLASTIC RESINS PURCHASE LEVELS FROM 2007-2011**

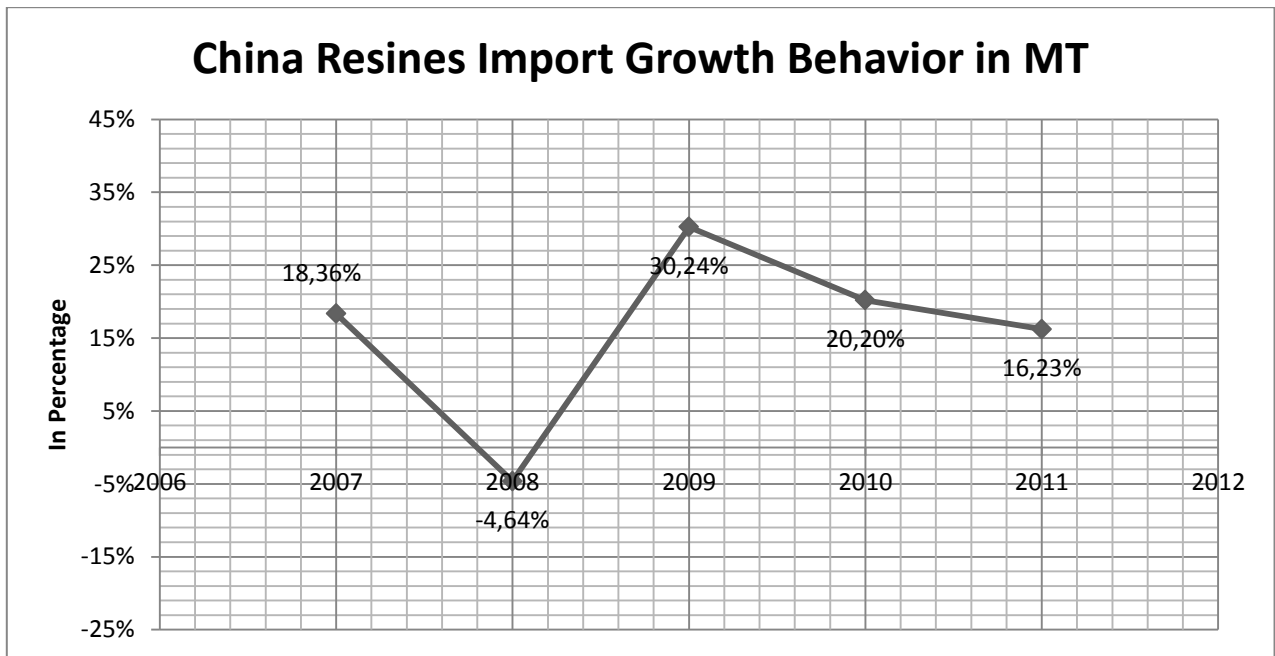


Figure 9

Source: (ChemOrbis Elektronik Pazaryeri A.S., 2013), (Index Mundi, 2011)

Elaborated by: the author

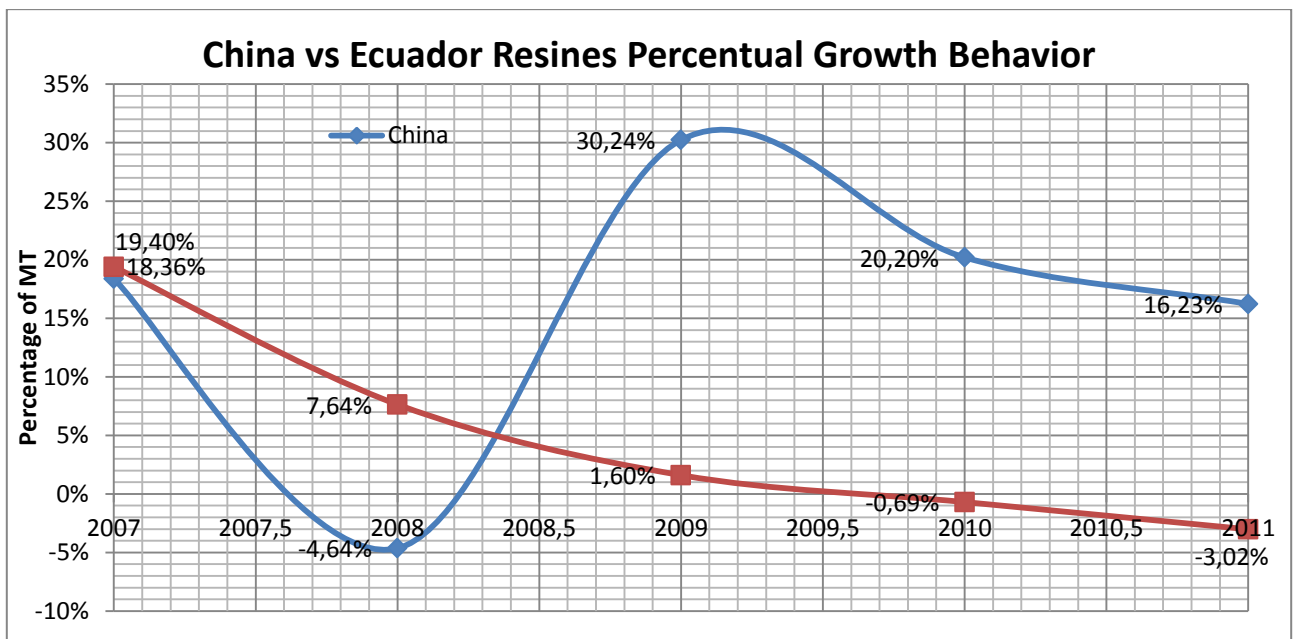


Figure 10

Source: (ChemOrbis Elektronik Pazaryeri A.S., 2013), (Index Mundi, 2011), (Grupo Remar, 2013)

Elaborated by: the author