

**THE STUDY OF THE EXPORT ACTIVITY IN PUERTO RICO AND
FINDING NEW EXPORT OPPORTUNITIES WITH A DECISION
SUPPORT MODEL ANALYSIS**

by

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Abstract

International trade of goods and services as a percentage of world gross domestic products (GDP) increased from approximately 12.1 percent in 1960 to 30 percent in 2010 (World Bank, 2011). As of 2009, Puerto Rico net exports started a positive trend when exports surpassed imports. This reality contrasts with decades of misrepresented governmental data that included trade with the United States of America (U.S.A.) as international trade. Operations managers of companies located in Puerto Rico interested in increasing production, sales, and income, should consider exporting. Although Puerto Rico has vast experience trading with the USA and territories, its experience in other markets is more limited. This research presents an export market selection method to help managers and export promotion agencies determine which countries they should focus on for their export activities. The Decision Support Model (DSM) used was previously tested in other countries, such as Belgium and South Africa. Two single regression models were performed with Puerto Rico's exports (PRX) as the dependent variable and other countries GPD (OGDP) and country risk (OCR) as independent variables. PRX significant linear relationship with OGDP was not supported but was supported with OCR. Forty five countries passed the DSM first filter. Of these, Puerto Rico exported to 38 of them. Puerto Rico's managers and export promotion public officials should focus its limited resources in the selection of countries with more income and stability.

Resumen

El comercio internacional de bienes y servicios como porcentaje del producto interior bruto mundial (PIB) aumentó aproximadamente de 12.1 por ciento en 1960 a 30 por ciento en 2010 (World Bank, 2011). A partir de 2009, las exportaciones netas en Puerto Rico comenzaron a presentar una tendencia positiva, ya que las exportaciones superaron las importaciones. Esta realidad contrasta con décadas de datos gubernamentales donde la inclusión del comercio con los Estados Unidos de América (EE.UU.) como el comercio internacional daba un panorama diferente. Los gerentes de operaciones de las empresas ubicadas en Puerto Rico interesados en aumentar la producción, ventas e ingresos deben considerar exportar. Aunque Puerto Rico tiene una vasta experiencia comercial con los EE.UU. y sus otros territorios, la experiencia en otros países es más limitada. Esta investigación presenta un método de selección de mercado de exportación para ayudar a los gerentes y empleados de agencias de promoción de comercio internacional a que determinen en qué países deben enfocar sus actividades de exportación. El modelo de Apoyo de Decisiones (mejor conocido en inglés como el “DecisionSupportModel – DSM”) se utilizó con éxito en otros países, como Bélgica y Sudáfrica. Dos modelos de regresión simple se realizaron con las exportaciones de Puerto Rico (PRX) como la variable dependiente y como variables independientes: el PIB de otros países (OGDP) y el riesgo del país (OCR). No se validó la relación lineal entre PRX con OGDP, pero se validó la relación entre PRX y OCR. Cuarenta y cinco países pasaron el primer filtro DSM. Puerto Rico exporta a 38 de esos países. Gerentes y funcionarios públicos de promoción interesados en exportación sostenible deben enfocar sus recursos limitados en la selección de los países con mayores ingresos y estabilidad.

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To my mom Hilda and my dad Freddy: Thank you for all the sacrifices. Without you, I would not have come so far.

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List of Abbreviations

BIS:	Department of Commerce's Bureau of Industry and Security
DSM:	Decisional Support Model
ECCN:	Export Control Classification Number
EAR:	Export Administration Regulations
EU:	European Union
GDP:	Gross Domestic Product
NAFTA:	North America Free Trade Agreement
OCR:	Other Country Risk (non PR)
OGDP:	Other GDP (non PR)
P.R.:	Puerto Rico
PRX:	Puerto Rico Exports
U.S.A:	United States of America
USD:	United States Dollar
WTO:	World Trade Organization

Chapter 1: Introduction

Whether to export or not is not the question. The question should be what and where to export. Exporting occurs when a country sells domestically made goods and services to someone or some firm in another country (Flynn, 2005). Companies benefit from exporting by adding additional sources of revenue besides their local market, improving usage of production facilities, diversifying their market, extending product life cycle, and improving products and services to international market standards (Suranovic, 2010). Increased demand of products and services from abroad translates into more opportunities for the labor force. The export country also benefits from increased production, employment, tax revenues, and gross domestic product (GDP).

The gross domestic product (GDP) is the total market value of all final goods and services produced annually within the boundaries of a country, whether by the country or with foreign-supplied resources (McConnell, Brue, & Flynn, 2009). As new export opportunities arise, more goods and services are produced within the boundaries of that country. An increase in net exports should positively affect the GDP of the country. As Ahmad (2001) stated: “Export-oriented economies tend to be relatively free of price distortions and allocate resources more efficiently”. Exporting-led nations are also increasingly economically independent, as in the case of China. Figure 1 is a graph that illustrates World Exports of Goods and Services as a Percentage of World GDP from 1960 to 2010. It shows that world exports as a percentage of world GDP have increased from approximately 12.1 percent in 1960 to 30 percent in 2010 (World Bank, 2011). Although this figure shows a considerably steady growth, there have evidently been some periods of decline with the most drastic in 2009. Nonetheless, an R-Squared

of 0.9371 indicates that world exports of goods and services have been in line with world GDP. Therefore highlighting the growing importance of exports to a country's GDP.



Figure 1.1 World Exports of Goods and Services as a Percentage of World GDP from 1960 to 2010
Source: World Bank, 2011

Since exporting is beneficial to so many stakeholders, particularly to the exporting country, the questions companies and public policy officials should focus on are what goods and services to export and where to export them. This research focuses on the second question. Individual, organizational, and country variables help determine export market destination. At an individual level, managers' experience in exporting is an important variable to determine where to export. At an organizational level, firm's strategy and structure are important variables

(Grøgaard Birgitte, 2011). At a country-level, main variables are mostly divided in foreign market demand such as: GDP, consumption patterns, and barriers such as: country risk, tariff barriers, exchange rate (Green & Allaway, 1985; Malhotra & Papadopoulos, 2007; Papadopoulos, Chen, & Thomas, 2002; Pearson, Viviers, Cuyvers, & Naudé, 2010; Russow & Okoroafo, 1996)

Operations managers and export promotion public officials face international competition and limited resources. Also in common, they have a key question: Are we exporting to the right countries? This question is not limited to currently exporting firms. For firms contemplating its first international venture, the right international market selection is a key decision. Operations manager and export promotion public officials in Puerto Rico (P.R.) face the same questions but in a limited and decreasing domestic market (US Census, 2011) and with economic recession (Calero, 2011). Doing business with other countries and expanding P.R.'s production in order to export could be the answer to reconstructing an ailing economy that has suffered much in these last few years.

Background problem

For many years, the economy of Puerto Rico was one of the most dynamic in the Caribbean. Since 2006 Puerto Rico has been in a recession (Negrón Díaz, 2006). The government is searching for options to improve the situation, but as of December 2010, the Economist Intelligent Unit forecasted a contraction of 4.2 percent. In a shrinking depressed economy a viable solution is to increase exports. Although the economy has contracted, the analysis of the industry composition of the GPD could help determine areas where to focus internal production efforts.

Until the year 1950, Puerto Rico’s main economic sectors were commerce with 19.9 percent of GDP and agriculture with 18.5 percent of GDP (Irizarry-Mora, 2001). Nonetheless, agriculture has gradually disappeared as industrialization has taken hold of our economy. Yields of agricultural products have decreased over the years. Figure 2 presents the industry sectors as a percentage of Puerto Rico GDP in 2010 (Diaz Marrero, 2011). The main sectors were manufacturing (46.8%), and total services (35.8%). Total services include utilities, information, finance, insurance, real estate, transportation and other services. Agriculture and commerce represent 0.57 percent and 8.01 percent, respectively. Export efforts should focus on manufactured products and services.

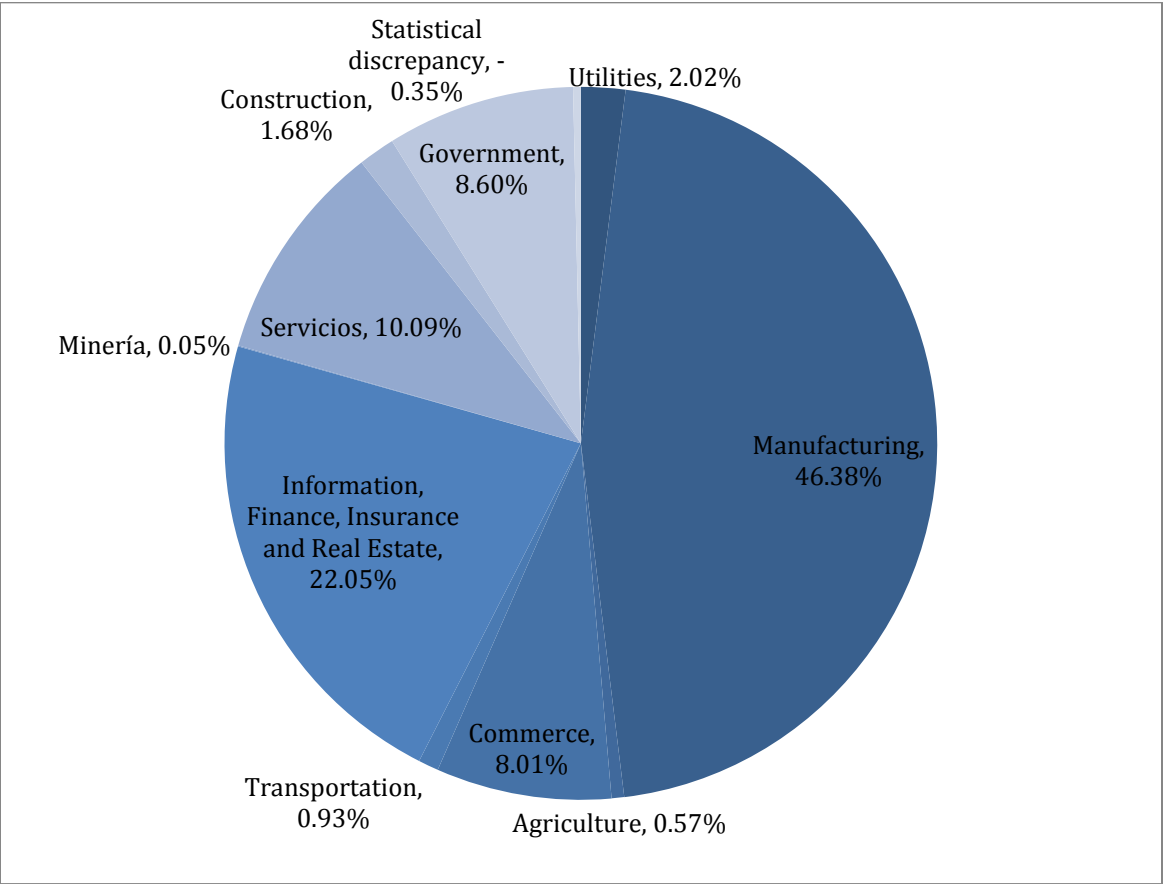


Figure 1.2 Industry sectors as a percentage of Puerto Rico GDP in 2010
 Source: Apéndice Estadístico, Junta de Planificación, 2011 (Diaz Marrero, 2011)

If Puerto Rico implements a system that promotes the increase exports, it could make remarkable improvements in its economy. It could have similar results to those countries that have overcome their economic challenges through increasing and well-coordinated exports. For example, Japan rose to economic prominence primarily because of its export growth. Similarly, U.S. exports helped to mitigate the effects of domestic recession in the early 1990s and the Asian countries of Singapore, Hong Kong, Taiwan and South Korea became known as the “Asian Tigers” due their emphasis on export promotion, as opposed to import substitution, as means of economic development (Shankarmahesh, Olsen, and Honeycutt Jr. 2005).

Operations managers and export promotion public officials have to start with a determination of where it is better to focus its resources and activities. Countries with buying power will result in continuous investment, and their low country risk should increase the possibility that the buyer will be able to pay.

Objectives and Research Questions

This research first objective is to determine the trend of Puerto Rico exports from 2000 to 2009. Besides determining the trend, we are interested in knowing Puerto Rico’s main trading partners. Since the majority of P.R.’s products go to the United States, this study will focus on those products that are exported internationally and on those countries that, over the time, have become more relevant to our trade. The first objective research questions are:

1. What were the trends of Puerto Rico exports from the year 2000 to 2009?
2. To which countries Puerto Rico exports the most?

The second objective is to determine whether there is a correlation between Puerto Rico's exports and the trading partner's GDP and country risk. The second and third objective research question is:

3. Are exporting companies in Puerto Rico exporting to the countries with highest GDP and least country risk?

The final objective is to determine which countries would be the potential partners and the best choices to export. The study research questions are the following:

4. Are current trade partners the best choices?
5. Where should exporting companies be exporting?
6. Where should exporting companies not be exporting?

Theoretical framework

While it is a fact that most of Puerto Rico's products have been exported to the United States, it is important to find other feasible international destinations to our products. Export-led economies have excelled among others because of their economic growth and independence. Finding new international export opportunities will contribute to the economic growth of Puerto Rico. But the decision of the destination of P.R exports should be driven by a method estimation model that supports the feasibility of the opportunities. The decision support model (DSM) created by Cuyvers was used on 1995 in Belgium to find realistic export opportunities (L. Cuyvers, De Pelsmacker, Rayp, & Roozen, 1995). This is why the Decision Support Model (DSM) approach will be used to determine viable options.

Limitations

All research has its limitations, and this one is not an exception. The DSM is a complicated model created by LudoCuyvers that has previously been used to study countries such as Thailand, Belgium and South Africa (L. Cuyvers et al., 1995; L. Cuyvers, Viviers, & Steenkamp, 2011; Ludo Cuyvers, 2004; Pearson et al., 2010; Steenkamp, Rossouw, Viviers, & Cuyvers, 2009). Its main complication is the amount of data required for each filter. Although at the beginning of the research process the author wanted to use all filters, lack of available data limited the research scope. Even with this scope limitation, the study provides an important contribution to operation managers and export promotion public officials that are in charge of determining which countries to start evaluating and on which countries they should focus their organizations' limited resources.

Although export of services is an important sector in international trade and industry in Puerto Rico's GDP, information is not easily available. For this study, services exported were not used because export of service statistics are not standardized (Suranovic, 2010). Every model used is substantially different thus providing different results.

The exports data is presented on non-adjusted, U.S. dollar (USD) this means that it could be influenced by currency fluctuation and inflation. Future Studies could compare non-adjusted and real adjusted currency.

The DSM approach has to be updated every year, since it is very important to have the current GDP and country risk so the results are accurate. For example, Greece turned out to be one of the countries that were successful on the filter, but currently Greece has some political

and financial struggles, which means that it is not a feasible opportunity. This study used data from 2009, which was the most recent data available at the time.

Thesis Outline

The research has five chapters. This chapter introduced the topic, justified the research, and presented the objectives and model. Chapter two contains the literature review that focuses on the benefits of exporting, the history of P.R.'s exports, the importance of exports to GDP, and the models of international selection market. Chapter three discusses the research process in the selected population. It also presents the two methods used to analyze the data: simple regression analysis and the DSM approach. Chapter four contains the analysis of results of the simple regression analysis and the DSM approach. Finally, chapter five finishes the research with conclusions, recommendations, and future studies.

Chapter 2: Literature Review

This chapter will review the literature found during previous research performed in order to seek arguments that will validate the main theory stated here, which is summarized in the following statement: “A growth in exports will result in an improvement to the economic situation for countries”(Ahmad, 2001). A series of researches performed on other countries that found export opportunities using similar approaches with also be explained. The countries presented took advantage of these opportunities and found positive correlations between growth in exports and an improvement in their economy.

The questions to be answered are: How many products does Puerto Rico export? To how many countries does it currently export? How does this affect our current situation? These questions shall be answered through the data collected by an intensive research. To support the arguments, researches supporting the export-led countries will be used.

International Trade Theory

The Theory of Comparative Advantage, Smith’s Pure Exchange Model of Trade, the Factor Mobility and Income Distribution, and the Heckscher-Ohlin’s Factor Proportion Model all agree that a country benefits from its export activities (Suranovic, 2010).

Benefits and Importance of Exporting

There are several factors that motivate a country to export its goods, one of them being the increase of the GDP of the country (Ahmad, 2001). This is why there are trade agreements, such as the North America Free Trade Agreement (NAFTA), international organizations, such as the World Trade Organization (WTO), and economic unions, such as the European Union (EU),

that offer benefits to exporting among member countries. Since Puerto Rico is a territory of the United States of America, the agreement that applies is NAFTA.

Some studies have demonstrated why exporting is good for an economy. Most of them have substantial proof of how the increase of exports has been beneficial for the country's economic status. This is demonstrated by several cases that will be discussed later in the supporting studies section. As a preface of this section, we will provide the Cambodia and Chile examples. Both countries are great examples of how countries find opportunities through exports, exploit them, and improve their economic situations. In Cambodia's case, the time frame between 1998 through 2008 was important because many improvements were observed during this timeframe (Agosin, 2009; Guimbert, 2010).

Countries invest in export promotion agencies at a state, national and supranational level. For example, all US States have export promotion agencies. The US federal government has several agencies that promote exports, such as the International Trade Agency (Department of Commerce) and the Department of Agriculture. At the supranational level, the US is a member of the World Trade Organization and other trade related United Nations agencies that help promote trade between different countries.

Since trade between countries is greatly beneficial, there are several organizations, such as the World Trade Organization (WTO), economic unions like the European Union (EU), and trade agreements, such as the North American free Trade Agreement (NAFTA), which have worked arrangements to lower the tariffs to be paid as a result of the import of products and services. Exporters of goods and services, importers of foreign components used in "domestic"

products and domestic sellers of imported products all strongly support lower tariffs (Ahmad, 2001).

Relationship between Exporting and Economic Growth

It is a fact at this point that the world is a globalized one. It has allowed a great improvement in terms of how countries perform business between each other and even more how the trade between countries is taking place.

Although increased imports are the purpose of trade (Krugman, 1993), it is necessary to pay for imports through increased exports (Shankarmahesh, Olsen, & Honeycutt Jr., 2005). Ideally, a country would have a balance between import and exports. Nevertheless, that is not our case. Most of the products that Puerto Rico exports come from foreign industries that have manufacturing operations in P.R. Oftentimes, it is not a product; most of the time it is a component of a product. This is not negative, but it would be of great impact to seize opportunities and expand the exports of coffee and other products produced wholly locally. People from the other half of the world would have access to our products.

The focus does not have to be only on export of products opportunities. It is also important to consider other countries to export our products or services. It may be found that Puerto Rico does not have a lot of options when it comes to products, but it may have multiple opportunities country-wise.

Exports contribute not only to the improvement of the trade deficit figures, but also to development and enhancement of unique domestic economic competencies (Albaum, Strandkov, & Duerr, 2002). It is a fact that because of the globalization, trade has become easier and it has broken many trade barriers around the world. This is why this opportunity has to be

taken advantage of. It will help develop a stronger country economic- and status-wise. The perspective of the country will be a self-sufficient and independent one that does not survive because of the support of other countries.

Public policy makers regard export development as an economic tool that enables a nation to employ citizens, build overseas exchange reserves, and ultimately create a higher standard of living (Leonidou & Katsikeas, 1996). The connection between exports and economic growth is indeed quite close for a variety of reasons; at its most obvious level, growing exports raise the level of GDP, since they are part of it (Ahmad, 2001). Countries that have presented a growth on exports have had the possibility to present economic stability. For example, a family where the parents have jobs will present more economic stability than a family where the parents do not have jobs. As their income increases, their economic stability will proportionally increase. In still more subtle ways, export-oriented economies that tend to be relatively free of price distortions and allocate resources more efficiently (Ahmad, 2001) will have the opportunity to become more independent. Most developing countries vie with each other in promoting their exports, or are urged to do so with the expectation that such policy would lead to economic growth (Ahmad, 2001).

Throughout the years, there have been several researches conducted in different countries that are related to the exports of goods and their relationship with the economy of that country. Some of these researches have come up with several options to identify opportunities and develop strategies to promote the production of new products or to expand the production of a good that already exists with the purpose of exporting it. Other researches show how the practice of identifying opportunities to export has significantly improved their economy.

One of the researches conducted by Professor Manuel R. Agosin from the University of Chile studied the growth and diversification of exports on emerging economies (Agosin, 2009). Professor Agosin focused his research on determining whether the expansion of exports is related with the growth of the economies of certain countries. He believed that there had to be a relationship between the increase of exports and the growth of the economy, since exports are part of the GDP. He also stated that countries that have a diversified export trade will show a greater growth than those countries in which such diversification is limited.

To diversify or not to diversify the product and service export mix is the question that needs to be answered because achieving diversification is essential to increase the productivity of a country. There are two factors that suggest the diversification of exports has a positive effect on the growth of production. The first one is the portfolio effect. This means that the diversification of exports leads to lower volatility on the exports. Countries that are unstable are less likely to grow than the ones that are stable. The second factor is the dynamic effect that the diversification of exports has on the production of the country.

Creating a diversified export trade could be to lead to the production of a new good or, by taking advantage of a good that that country already produces, producing to satisfy the increasing demand of other countries for that product. It is all about having options and taking advantage of the best opportunities. An example of this is the wine in Chile. In this country, they had produced this good since the seventeenth century, but they started to increase the production in order to export it in the mid-1980 and meet the demand of other countries. The key point was to identify opportunities and to diversify the options for the exporting country because a greater diversification provided a great incentive on investment.

In another study, Joseph Pearson, Wilma Viviers, LudoCuyvers and WimNaude identified the export opportunities for South Africa in Brazil, China and India. These last countries are called “southern engines of growth”. In this study, the authors concluded that Brazil, China and India are going to be part of the top five economies of the world due to their substantial growth. “Studies have already determined that the growth of China and India have had substantial benefits for Latin America through, for instance, higher commodity prices, cheaper inputs and growing capital inflows” (Pearson et al., 2010). These benefits could also have a positive impact on South Africa.

The main concept of the research mentioned above was to search for new export opportunities for South Africa, which consisted on finding the best country/product combinations. A decision support model was used to identify these opportunities for products and for countries. With the DSM, the authors obtained combinations of products and countries that would be successful export opportunities. The DSM has four filters. The first filter takes into consideration political and commercial risks. The second filter takes into consideration the currents trade flows between countries and the exporting country’s revealed comparative advantage. The third filter takes into consideration the product and the market. It specifically examines the market concentration of countries and the potential trade barriers. The final filter analyzed the degree of market importance and cluster opportunities. After making these filters, the countries with more opportunities represented the countries with greater relevance for South Africa to further their exports. China was the country with the most opportunities, followed by India and Brazil. According to this research, if South Africa wanted to pursue these opportunities, their focus should be on all the factors affecting competitiveness, such as labor skills and productivity.

This analysis opened doors for the South African economy. Since these countries (Brazil, India, and China) are emerging economies, it would be a great opportunity to pursue or expand business with them. One of the positive outcomes by furthering business with them through exports would be more economic stability to South Africa.

A research performed by StephaneGuimbert (2010), a senior economist from Cambodia, titled “Cambodia 1998-2008: An Episode of Rapid growth” showed the rapid growth that Cambodia experienced during the years 1998 to 2008. Cambodia’s growth performance ranks 6 across all countries in the world. Out of 194 countries with data between 1960 and the present, Cambodia is one of only 46 that have achieved 7 percent annual growth on average for 14 consecutive years (Guimbert, 2010). Agriculture had a crucial role on Cambodia’s economy. According to the study, since 2004 Cambodia has been a great rice exporter. In Cambodia, the agriculture sector was not the only one that had expanded; the industry sector had also developed and expanded. Garments and footwear were the country’s leading export sector and had been growing at an average of 28 percent per annum (Guimbert, 2010). The main concept of this research was to highlight how Cambodia’s economy improved in a short period of time and how part of the great improvements was a consequence of the increase in exports. In fact, the improvement in the economy was directly proportional to the increase in exports.

Puerto Rico’s Export History

In the beginning, Puerto Rico had very productive land and natural resources, which included coffee, sugar and others. As a result of the industrialization era, the focus went from the agricultural products to bringing more industries to the country so that Puerto Rico could achieve great economic development. From the 1960s to the 1990s, Puerto Rico’s economy experienced growth, with some periods of high dynamism (Irizarry-Mora, 2001). Since 2005, the trend seems

to have improved, despite recessions and increased unemployment. As figure 2.1 shows, the exports have increased over the period of ten years ranging from 2000 to 2010. The international exports of Puerto Rico, excluding those exports to the United States, were plotted in order to show the behavior of Puerto Rican trade. As shown in the graph, Puerto Rico had a decrease in export activity from the years 2000 to 2001. Then it had a short improvement from 2003 to 2004, had a setback in 2005, and later showed a reestablishment until the 2009. Evidently, one has to take into consideration the effect on the inflation and currency fluctuation.

Puerto Rico's Economic Background

In this section, we will discuss a brief history of Puerto Rico, which will allow us to understand where Puerto Rico stood many years ago and to try to compare it to the current situation. Many years ago, several explorers from different countries (mainly Spain) had interest in finding new lands rich in minerals to extract and sell. That was how Puerto Rico was discovered. By that time, the name was “*Borikén*” and it was populated by “*taínos*”. It turned out that the land had minimal amounts of gold and Spain used “*Borikén*” for military purposes because of its strategic location. At the time, the economy depended of agricultural products (Irizarry-Mora, 2001). These were exported in a large scale. Puerto Rico surpassed wars, slavery and other situations and by the nineteen-century there as a large amount of production of agricultural products to export (Perez-Berg, 2010). The products imperative to export were sugar cane, coffee and tobacco.

Once the regimen changed from the Spaniards to the United States, P.R. became more dependent of the United States. By the 1940's, 98% of P.R. exports were headed to this country (Irizarry-Mora, 2001). By 1976, the 936 section of the Federal Tax Code was approved by the Congress of the United States.

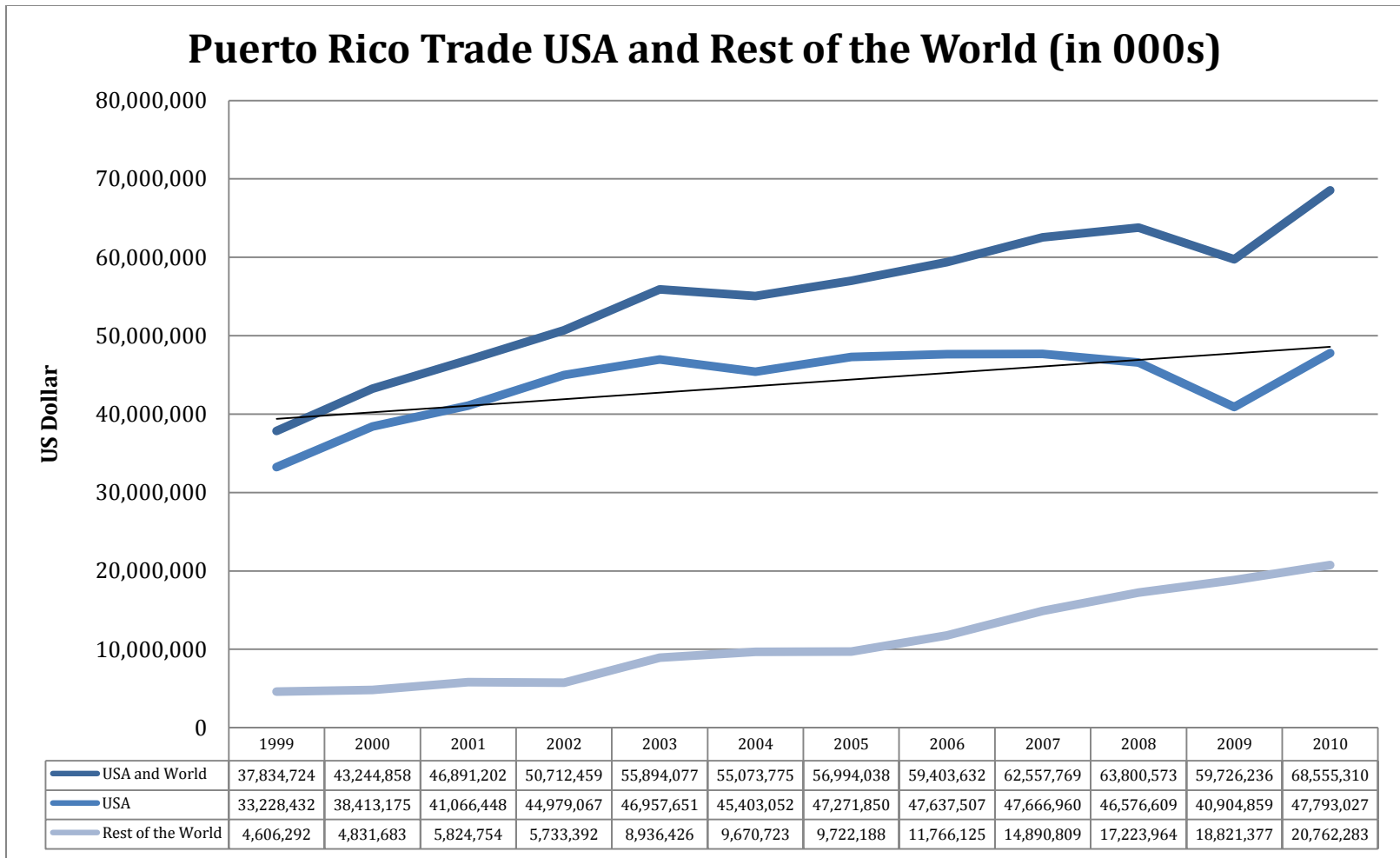


Figure 2.1: Puerto Rican Trade with the USA and the Rest of the World in USD (in thousands)
 Source: Economic Indicators, PR Planning Board, 2011.

Puerto Rico International Trade (in 000s)

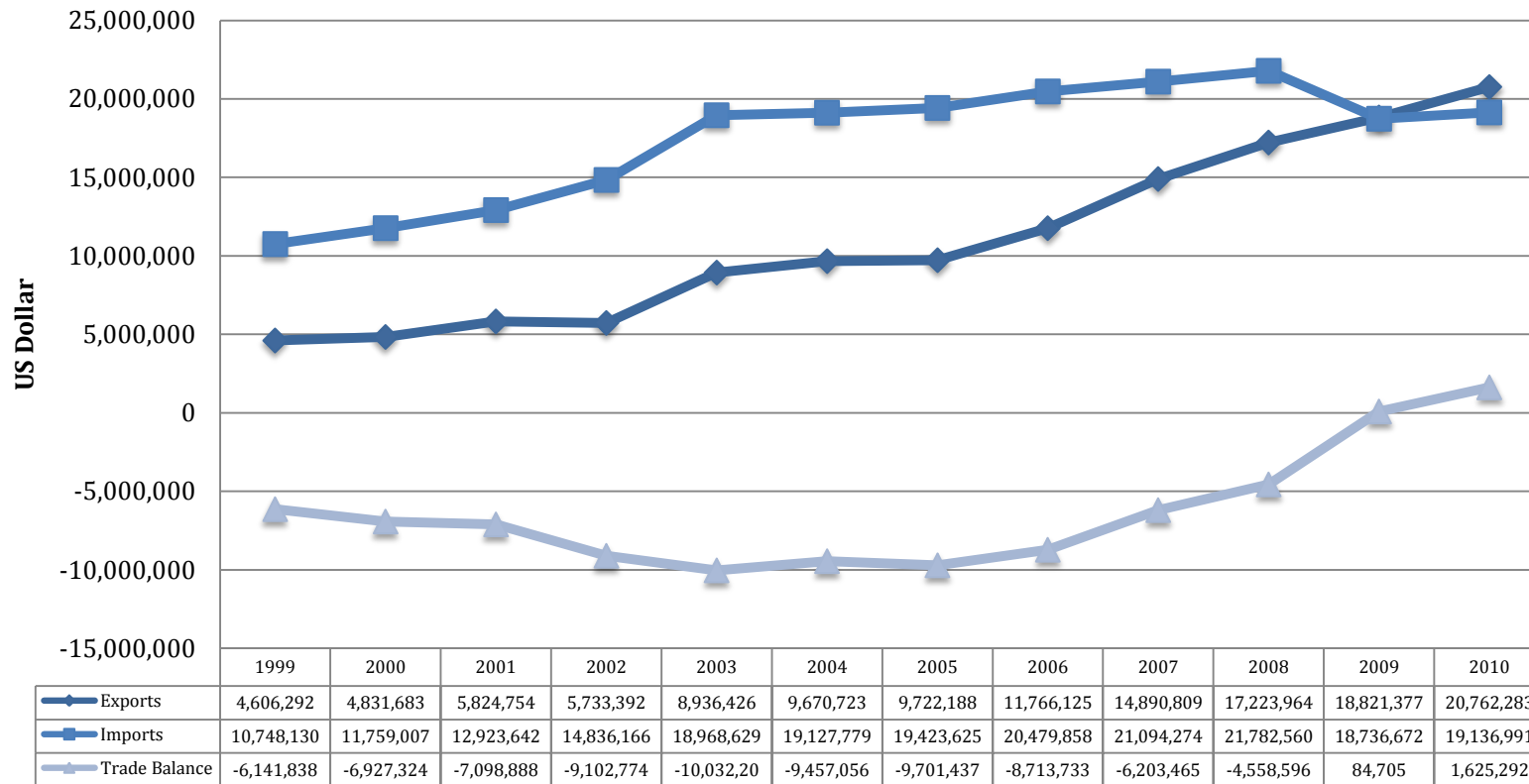


Figure 2.2: Puerto Rican Trade Balance, Exports and Imports in USD (in thousands)
 Source: Economic Indicators, PR Planning Board, 2011.

This law was of great benefit, since United States companies under this section had tax relief from their incomes, not only for production on the island, but for other activities as well. The companies that entered during this period to P.R. were known as “936 companies”. This section was of great development to the island. By 1987, there were 2,328 manufacturers in Puerto Rico. Of these, 521 (or 22%) were “936 companies”. At the time, that 22% of the manufacturers, who were mostly pharmaceutical companies, “*petroleras*” and others, produced 81.1% of the goods in Puerto Rico (Irizarry-Mora, 2001). By 1993, these companies had managed to create 109,297 direct jobs and 197,828 indirect jobs. This section was eliminated on November 1996 and was replaced by section 30 A, which gave these “936 companies” the opportunity to claim 60% of the amount they paid out in payroll as a deduction in their income tax returns. Companies that entered Puerto Rico after November 1996 could not take advantage of this opportunity. Because of this, between the period of November 1996 and summer of 2001, 24,000 jobs were lost, companies started exiting Puerto Rico and started evaluating other countries in which to operate. The business attractiveness that Puerto Rico had offered was gone.

The imports increased as well to a 91.5%. Most of these were basic need products. At this time, most of the goods produced in Puerto Rico were exported to the United States, while the products that satisfied basic necessities were imported from the United States.

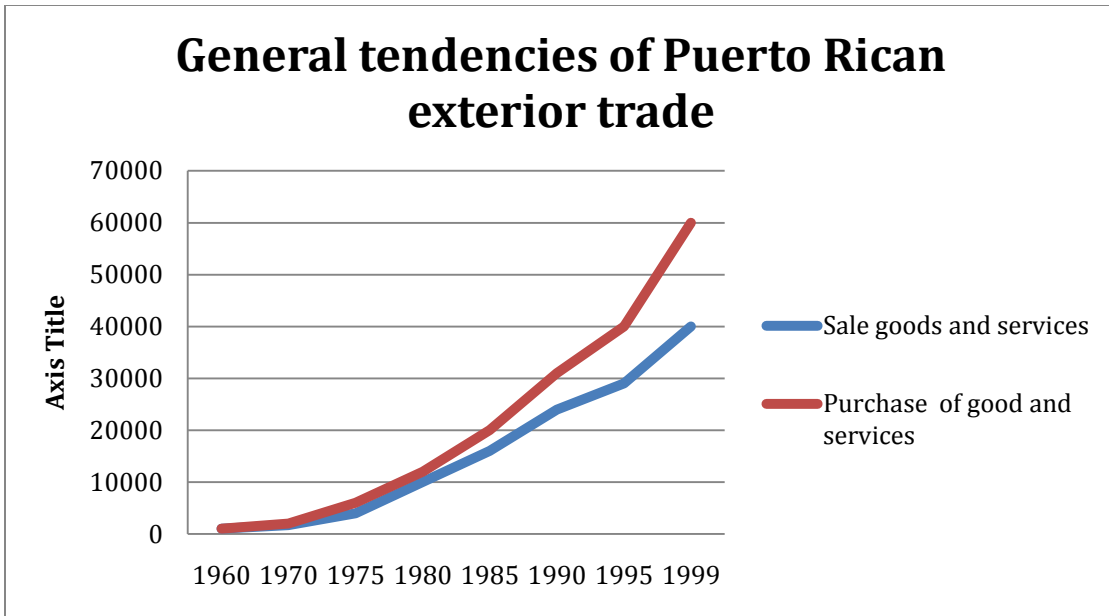


Figure 2.3 General tendencies of Puerto Rican exterior trade(Irizarry-Mora, 2001)

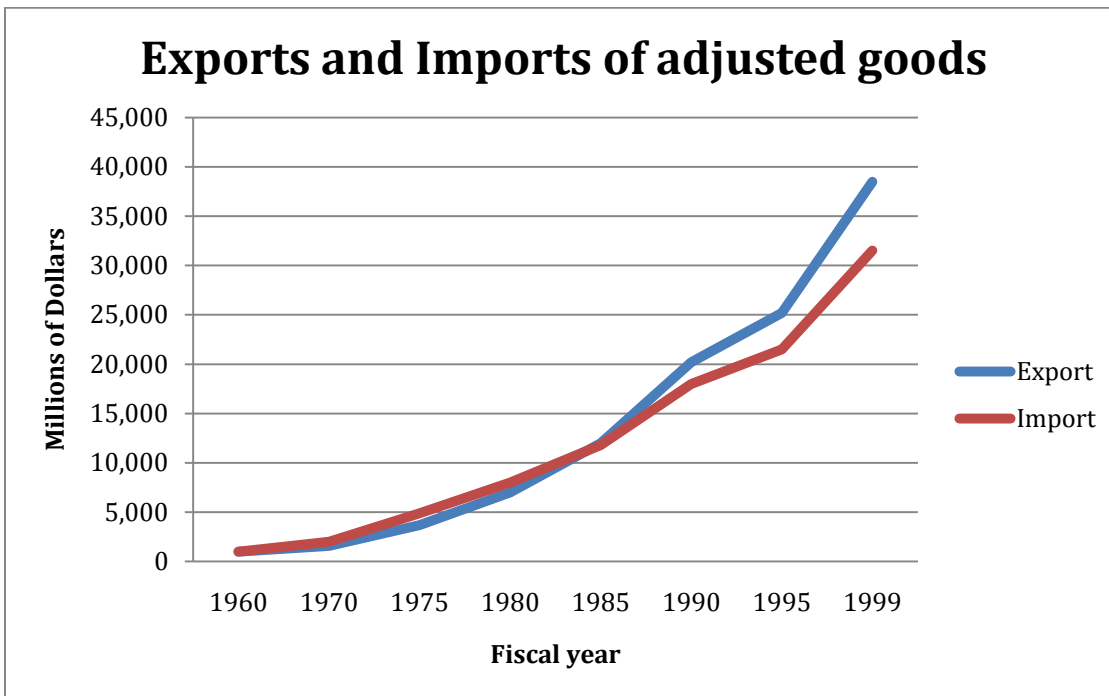


Figure 2.4 Exports and Imports of adjusted goods (Irizarry-Mora, 2001)

Figure 2.2 shows the general tendencies between exterior commerce and Puerto Rico commerce. It shows data from 1960 through 1999 and focuses, specifically, on the tendencies in the purchase of products and services and sales of products and services. Both increased over the years, but it is important to notice the lack of balance between the sales and purchases (Irizarry-Mora, 2001).

There are many variables that influence the decision why countries promote exporting. These variables include the decision to increase gross domestic product, the need to diversify country risks, which involves political risk and commercial risk, and the decision to improve labor participation. Although in theory exporting seems positive for a country, in some occasions government has to restrict the goods and services being exported. Some of the exports need export licenses from the Department of Commerce's Bureau of Industry and Security (BIS) because of the sensitivity of the product. This entity enforces the Export Administration Regulations (EAR) for most of the commercial export items. If a product requires an export license, the product will have an Export Control Classification Number (ECCN). These products are part of a list called the Commerce Control List, which can be found in the Government Printing office website("Export control basics (Exporting 101)," n.d.).

Export Markets Selection Methods

The next question is where to export. International trade literature indicates that the market entry decision of exporting countries is based on importing country characteristics, proximity, national cultural distance, trade agreement between countries, and past trade experience. Among the key country variables are gross domestic product (GDP) and country risk.

The international market selection method can be classified into two categories: the qualitative approaches which are based on perceptions and the quantitative approaches that are based on concrete data. The quantitative methods can be divided into market grouping and market estimation. The market grouping approach divides and groups the countries based on similarities on social, economic and political indicators. Demand levels are usually not taken into account (Sakarya, Eckman, & Hyllegard, 2007, p. 212). The market estimation method evaluates foreign markets on the basis of several criteria that measures aggregate market potential and attractiveness (Papadopoulos et al., 2002, p. 41; Sakarya et al., 2007, p. 212). The criteria used on these methods are wealth, size, growth, competition, and access indicators (Sakarya et al., 2007, p. 212). The limitation of these models included lack of product specificity, assuming that the environment was constant and that data was available. Examples of the market estimation models at a country level are: Green and Allaway's shift-share model, Russow and Okoroafo's global screening model, Papadopoulos et al.'s trade-off model, the ITC multiple criteria method, assessment of export opportunities in emerging markets model, and Cuyvers' decision support model. These models are categorized as country level models which observed the markets in a macro- level perspective (L. Cuyvers et al., 1995; Freudenberg & Paulmier, 2005; Green & Allaway, 1985; Papadopoulos et al., 2002; Russow & Okoroafo, 1996). These models can identify country/product opportunities in order to concentrate their resources on the outcomes of these models.

The Green and Allaway's shift-share model identifies and compares the growth on the market share for a period of time (Green & Allaway, 1985). This model compares the current growth with the expected growth, which is called net shift. The data used for this analysis are the imports of the countries that are taken under consideration for the products that will be analyzed.

The product and country combination is obtained for each country. This product and country combination is then analyzed to consider the opportunities. Among the limitations found for this model, one that stands out is the fact that it identifies relative opportunities, but not realistic opportunities.

The Russow and Okoroafo's global screening model used the international business theory and market screening to classify their variables into three criteria. These were: measure of size and growth, factors of production and economic development (Russow & Okoroafo, 1996). This model used the criteria mentioned above to evaluate the product. It also divided the countries on clusters of similar markets. These clusters would have potential demand for the product and would be categorized into high, medium and low potential market. The limitation of this model is that it is a very extensive process and the data may not be available.

The purpose of the trade-off model presented by Papadopoulos *et al* is to identify the potential demand and the trade barriers of the countries in order to make effective decisions. Among the variables identified for the demand potential were: apparent consumption, import penetration, origin advantages and market similarity. Variables for the trade barriers were tariff barriers, non-tariff barriers, geographic distance and exchange rate. The limitations identified for this model were lack of direct conversion schemes between the trade coding systems, as well as unavailability, unreliability and aging of data for some countries (Papadopoulos et al., 2002, p. 184).

The ITC multiple criteria method measures the current export performance of the exporting country, domestic supply capacity and the characteristics of the international environment for developing countries whose goal is to diversify their exports (Freudenberg &

Paulmier, 2005). One of the limitations of this model is that it concentrates on the product demand for the world, not for countries in particular.

The assessment of export opportunities in emerging markets is the model used to identify opportunities in future emerging markets. This model took under consideration long-term market potential, identifying business prospects and predicting potential profits. By the 2007, Sakarya introduced other variables such as cultural distance, competitiveness of the industry and customer receptiveness to the model (Sakarya et al., 2007). Having a very specific model could be a positive thing, but in this case being too specific could be a limitation, since the data required to perform this analysis may not be available for each of the countries.

The decision support model (DSM) created by Cuyvers was used on 1995 in Belgium to find realistic export opportunities (L. Cuyvers et al., 1995). This model used 4 filters to identify realistic export opportunities. The first filter used as criteria the Country risk and the GDP of all the countries. The objective of this filter was to eliminate all the countries that had high country risk and low GDP, and obtain the most feasible markets to export. The second filter consisted of identifying market potential of the country and a products combination. The purpose of this filter was to obtain countries with demand potential. The third filter used trade restrictions and market concentration to screen the options that were successful on the second filter. The fourth filter used as variables the market importance and the market size and growth. The results from the DSM approach affect the export promotion in a positive aspect, since its outcomes are realistic opportunities, not only on the destinations of the exports, but also on the products that a certain country should export. The decision on where to export should not be supported by the outcomes of that model alone. For the purpose of this research, the first filter of the DSM approach was used.

Key Variable: Gross domestic product (GDP)

Gross domestic product is the parameter that measures the value of services and goods produced in a country for a period of time. It takes under consideration the transactions that are involved with money (Ahmad, 2001). GDP analysis is calculated in real and percentage of growth terms.

GDP is important for the exporting country in two ways. First, exporting affects the export country's internal economy. Secondly, it is an important variable while evaluating the export potential of another country. The main question is: how do exports affect the economic status of a country? Exports are part of the GDP equation (McConnell et al., 2009). Since there is a proportional relationship, an increase in exports means an increase in the GDP.

$$GDP = C + I + G + NX \quad \text{Eq (1)}$$

Where:

C = is the consumption of expenditures

I = the investment of expenditures

G = government purchases of goods and services

NX = Net exports (Exports- Imports)

In "net exports", we consider all the exports of the country. The imports are subtracted from this equation, which means that "net exports" equals the exports minus the imports of a country. In international institutions, such as the World Bank and the International Monetary Fund, the calculation is made in US dollars.

In order to analyze how exports and imports contribute to the GDP of a country, we will compare the imports, exports and GDP of the top ten countries with the highest exports in the world. The imports variable was added because in the GDP equation the net exports subtract the imports from the exports, so it influences the GDP. If a country has high exports, but has high imports, then its effects on the GDP will be insignificant. On the contrary, if the exports of a country are higher than the imports, then it will have a positive effect and will increase the GDP. China, for example, is the top exporter country in the world but has high volume of imports. For this reason, this country's GDP is not as high as that of other countries, such as the United States, which is third in the list and has a relatively low volume of imports compared to China. This causes the United States' GDP to be higher. One has to remember that the GDP is not only influenced by these two factors. There are other factors mentioned above, but by analyzing “net exports”, we can more effectively observe the impact of exports on the GDP formula.

Table 2.1: Top ten exporter countries and the GDP relation (2010)

Country	Exports (US millions)	Imports (US millions)	GDP (US millions)
China	1,506,000.00	30,824.02	5,878,629.25
Germany	1,337,000.00	10,318.18	3,309,668.87
United States	1,270,000.00	16,973.68	14,582,400.00
Japan	765,200.00	6,734.18	5,497,812.57
France	508,700.00	4,192.17	2,560,002.00
Korea, South	466,300.00	8,576.07	1,014,483.16
Italy	458,400.00	3,862.06	2,051,412.15
Netherlands	451,300.00	2,130.00	783,413.25
Canada	406,800.00	2,097.35	1,574,052.20
United Kingdom	405,600.00	4,461.67	2,246,079.10

Key Variable: Country Risk

Another of the parameters that measures the viability of investment or exports to another country is the country risk. This risk includes political risk, exchange rate risk, economic risk, sovereign risk, and transfer risk, which is the risk of capital being locked up or frozen by government action. Political risk is often measured in a scale from 1 to 7, 1 being the lowest political risk and 7 being the highest political risk. It represents the risk that investment return could suffer as a result of political changes or instability in a country. Instability affecting investment returns could stem from a change in government, legislative bodies, other foreign policy makers, or military control.

Another parameter used to measure the viability of a country is the commercial risk. This variable is important because it defines the current health of a country and the capability to maintain a positive relationship with other countries. This one is measured following the scale of A, B and C. A represents low commercial risk, B moderate, and C high commercial risk.

Chapter 3: Methodology

If the increase of exports has a positive influence in the economic growth of a country, then finding opportunities to export products to different countries may help rebuild the economy. First, it is important to identify the trends and the behavior of the exports from Puerto Rico. Then, it is crucial to study the relationship between the GDP and the exports and see the type of relationship between country risk and exports.

For this study, it was first considered the current behavior of P.R.'s exports for a period of ten years. Then, it was studied the current situation regarding where Puerto Rico was exporting its goods, without taking into consideration P.R.'s exports to the United States because currently the majority of the goods are headed to that country. For this, a simple regression analysis was first used and then the first filter of the decisional support model was used to obtain new international opportunities. The results from the decisional support model were compared to the countries that Puerto Rico was exporting to, in order to analyze the existing approach when it came to exporting products.

Hypothesis

Export-led countries that have interactive relationship with several countries have better probabilities to develop stable economies by increasing the GDP of their countries.

H₁: There is a linear relationship between the countries to which Puerto Rico exports and GDP.

H₂: There is a linear relationship between the countries to which Puerto Rico exports and country risk.

H₃: Puerto Rico is currently exporting its products to countries with low country risk and high GDP.

H₄: Puerto Rico exports products to countries with high country risks.

Data Description

On the first stage of this study, we perform a descriptive analysis to study the trends of the exports of products from Puerto Rico for a period of time of nine years. The study covers export transactions from 2000 to 2009. The main reason for using the period is that nine years is enough time to determine a trend.

The first stage used the international export transactions from P.R. for the period of 2000 to 2009 in US dollars to all the countries, except the United States. The data was obtained at the United States of America (U.S.A.) Census Bureau. The U.S. Trade Online, a paid service of the U.S.A. Census Bureau, provides nation, state and territory information of products exported, industries that export, and export recipient countries (“USA Trade Online,” 2011).

After analyzing the behavior of exports, it was used the first filter of the DSM approach to figure out to which countries it would be more viable to export Puerto Rico’s products. For this filter, it was considered commercial risk and political risks for all the countries of which data could be found. The data was obtained from the Office Du Ducreire(“Country risks | Office du Ducreire,” n.d.). The political and commercial risk had to be transformed in order to apply the first part of the filter. The political risk was obtained in a scale from 1 to 7. In order to use a uniform variable for both commercial and political risk, the data was transformed to a scale from 1 to 10. The political risk was multiplied by the 1.43 value to obtain values for the desired scale. The commercial risk was in a scale from A to C. In this case, we assigned a value of 3.33 for A,

6.67 for B and 10 for C. The commercial and political risks used were from 2009, the year with most recent data found at the time of this research. The other variables used were the GDP per capita and the GDP growth for the countries analyzed (“GDP ranking | Data,” n.d.).

Sample Size

Two different approaches were used utilizing different sample sizes. For the first simple regression analysis, 163 countries were used, whether P.R. exported to them or not. For the second simple regression, the only countries considered were those to which P.R. exported their goods in 2009. The sample size in this case was of 105 countries. It is important to note that 21 countries were classified as outliers and were not used on these models. For the DSM approach, the sample size used was of 240 countries.

Operationalization of variables

There were several variables used in this study. In the following table, we illustrate each of the variables and from where they were obtained.

Table 3.1: Variables studied in the DSM model approach

Variable	Description	Source
Puerto Rican Export (x_{nij})	Number of transactions between PR and the rest of world	Planning Board
Country risk	These risks include political risk, exchange rate risk, economic risk, sovereign risk and transfer risk, which is the risk of capital being locked up or frozen by government action (def. came from Office Du craire) Average of Commercial risk and political risk	Office Du Ducroire, Belgium
Commercial Risk	Financial risk assumed by a seller when extending credit without any collateral o recourse	Office Du Ducroire, Belgium
Political Risk	Risk that investments return could suffer as a result of political changes or instability in a country	Office Du Ducroire, Belgium
GDP	Is the total market value of all final goods and services produced in a country in a given year, equal to total consumer, investment and government spending, plus the value of exports, minus the value of imports	World Bank
GDP per capita	GDP per capita is gross domestic product divided by midyear population.	World Bank
GDP growth	Annual percentage growth rate of GDP at market prices based on constant local currency .	World Bank
X_{pt}	Is the average value for the indicator in the research	$\sum X / n$
CV	Critical value	$CV = X_{pt} - \alpha\sigma_{x,t}$
α	This value would be chosen between 0 to 1 by increments 0.001	
$\sigma_{x,t}$	Is the standard deviation value for the indicator in the research	

Simple Regression Model Analysis

The Regression analysis is often used to identify the correlation between a dependent variable with an independent variable. In this case the variables under consideration are export as the dependent variable (Y) and the Country risks and GDP as the independent variables (X). In this case the formula will be:

$$Y = B_0 + B_1X_{1i} + E_i \quad \text{Eq(2)}$$

Where:

Y = dependent variable

B_0 = Y intercept for population

B_1 = slope for population

X_{1i} = independent variable

E_{1i} = random error

The t test for the slope will identify if there is a significant relationship between the dependent variable and the independent variables. The Hypotheses were:

$H_0: B_1=0$: This means that there is no linear relationship between the dependent variable (in this case the exports) and the independent variable, which is the country risk or GDP.

$H_1: B_1 \neq 0$: This means that there is a linear relationship between the dependent variable exports and at least one of the independent variables country risk or GDP.

To reject or not reject the H_0 , t calculated t_c and t from the table t_t are compared. If t_c is greater than or equal to t_t or if the p-value is less than alpha, then H_0 is rejected and it could be concluded that there is a significant linear relationship between the dependent variable and the independent variable.

Decisional Support Model

After analyzing the actual situation of Puerto Rico's exports, a Decisional support model (DSM) was performed. A DSM is a tool or model for the selection of countries or products where opportunities for successful exports could exist. This framework consists of four filters in which every country or product available is exposed in order to obtain a realistic and successful opportunity to export. The benefit of the DSM tool is that this country/product combination will pass through four filters, which will eliminate all the combinations that are not viable opportunities for the country. For the purpose of this study it was used the first filter of the model.

Filter One

This filter consists of examining the country risk ratings. Country risk contains the political and commercial risk of the country. The country risk was the average of the commercial and political risk. As mentioned above, commercial risk and political risk values had to be transformed in order to get the average to calculate the country risk.

The political risk was rated on a scale from 1 to 7, 1 being the lowest and 7 being the highest rating. Therefore, if a country had a rating of 1 it would have low political risk. If a country had a rating of 7, it would have high political risk. The commercial risk scale is different from the political risk. This scale is from A to C. If a country has a commercial risk of A it will

be considered a low commercial risk. B is medium risk and C is high commercial risk. Since these scales are different they were converted in order to obtain the country risk.

The political risks data for short term and medium/long term ratings needed to be transformed in order to be used. For this reason, this rating was multiplied by 1.43 to get a homogeneous scale. The new scale would vary from 1.43 to 10.00.

In order to calculate the country risk, the commercial risk needed to be a numeric value. For this reason, this variable needed to be transformed as well, it was assigned a numeric value for A, in this case 3.33, for B, which is 6.67, and for C, which is now 9.9. After the transformation, the outcome was that both of the variables had similar scales thus the country risk was needed to be determined. Therefore the country risk is the average between the short term, medium long-term political risk and the commercial risk. After this risk is obtained for each country, the formula for the critical value is as follows:

$$CV = X_{pt} - \alpha \sigma_{x,t} \text{Eq}(3)$$

Where:

X_{pt} - is the average value for the indicator in the research

α - this value would be chosen between 0 to 1 by increments 0.001

$\sigma_{x,t}$ - is the standard deviation value for the indicator in the research

Alpha would be a value between 0.001 and 1 in increments of 0.01. The value of alpha applied for each equation was different, since each part of the filter was different. For the first part of the filter was calculated the critical value and was compared with the country risk of each

country. After obtaining the list of the countries, then comes phase two of the filter, where it was used the GDP per capita and the GDP of the countries obtained on the first filter for a period of three years. The critical value was calculated again with the GDP data. After obtaining the critical value, it was compared with the GDP for each country for the period stated. The country will pass the filter if the GDP is greater than the critical value. From the first filter, it was obtained the countries that were the most viable options to export. Then, were compared to the countries that Puerto Rico was exporting its goods in order to analyze if Puerto Rico was exporting to those viable options.

The DSM approach was previously used in countries such as Belgium, Thailand and, more recently, in South Africa. These countries found great export opportunities using this model. In the case of South Africa, the researchers found that Brazil, China and India would be the top three countries where South Africa would have successful export opportunities. Using this approach Puerto Rico can also find successful export opportunities.

Chapter 4: Result Analysis

In the first stage of the research, the current situation of Puerto Rico's export was analyzed in order to determine how it has changed across the years and what factors may have had an effect on the increase and decrease in exports. After analyzing the situation and studying the relationship that the variables had using a multiple regression analysis, the results from the first filter of the DSM approach were analyzed in the search of feasible opportunities for P.R. exports. The objective of this was to analyze the approach that Puerto Rico was using export its products. In the search for solutions, it is imperative to perform a comparative analysis between the countries that P.R. currently exports to and the countries suggested by the first filter of the DSM approach. Since the purpose of this study is to find international opportunities, we have excluded the United States from our results.

Descriptive Statistics

For the country risk data set, the mean was calculated, which was 6.07 for the 240 countries. This parameter represents the central tendency of the data set. The mean is commonly used when all values have equivalent roles. Taking under consideration that the mean could be affected by extremes values, in this case, the country risk of Afghanistan, which was the only country with a country risk of 10.0, the median was calculated. The median was of 5.99, which was almost 6.00 and very close to the mean value. With this measure, it could be determined that half of the values are smaller or equal to 5.99 and that the other half of the country risk values were larger or equal to 5.99. Another parameter considered to describe the data was the mode, which is the value that repeats most frequently. For the country risk, the mode was 3.17, which meant that the country risk rank repeated the most was 3.17.

Another aspect was the variation and the shape of data, which was obtained with the range, variance and standard deviation. The range was of 7.95, which falls into the category of high country risks. The standard deviation for the country risk is 2.41, which means that the risks are clustering within 2.41 around the mean of 6.07.

Table 4.1: Descriptive Statistics for Country risk

Descriptive Statistics Country Risk	
Central Tendency	
Median	5.99
Mean	6.07
Mode	3.17
Variation and shape of the Data	
Range	7.95
Variance	5.80
Standard Deviation	2.41

Simple Regression Model Analysis

Simple regression model for all the countries

First, the results from the simple regression analysis are being discussed. For this analysis all countries were taken into consideration.

Table 4.2: Simple regression analysis for all countries

Variables	R²	P-value	Decision
Exports vs. Country Risk	5.91%	0.0017	H ₀ is rejected
Exports vs. GDP	0.088%	0.707	H ₀ is not rejected

$$\text{Estimated exports} = 9848711.6 - 929792.51 \text{country risk} \quad \text{Eq (4)}$$

In the first case, the relationship between the exports and country risk was analyzed. The determination coefficient (R^2) measures that 5.91% of the variation of exports is explained by the country risk. The p-value obtained was of 0.001754. Since it was less than the alpha of 0.05, H_0 is rejected at a 5% level of confidence. It could be concluded that there is a significant linear relationship between the exports and the country risk.

$$\text{Estimated exports} = 3471707 + 11.11 \text{ GDP} \quad \text{Eq (5)}$$

In the second case, the relationship between the exports and GDP was analyzed. The determination coefficient (R^2) measures that 0.088% of the variation in exports is explained by the GDP. Since the p-value is 0.707, which is greater than the alpha of 0.05, then H_0 is not rejected at a 5% level of confidence. It could be concluded that there is not sufficient evidence to determine that there is a linear relationship between exports and GDP.

Simple regression for countries that P.R. exports to

Table 4.3: Simple regression analysis for countries P.R. exports to

Variables	R²	P-value	Decision
Exports vs. Country Risk	4.70%	0.026	H_0 is rejected
Exports vs. GDP	0.34%	0.55	H_0 is not rejected

In the second stage of this analysis, the relationship between the exports and GDP for countries that P.R exports was analyzed.

$$\text{Estimated exports} = 11651624 - 961773 \text{ Country risk} \quad \text{Eq (6)}$$

In the first case, the relationship between the exports and country risk was analyzed. The determination coefficient (R^2) measures that 4.70% of the variation of exports is explained by the country risk. The p-value obtained was of 0.026. Since it was less than the alpha of 0.05, H_0 is rejected at a 5% level of confidence. It could be concluded that there is a significant linear relationship between the exports and the country risk.

$$\text{Estimated exports} = 5167891 + 37.67GDP \quad \text{Eq (7)}$$

In the second case, the relationship between the exports and GDP was analyzed. The determination coefficient (R^2) measures that 0.34% of the variation in exports is explained by the GDP. Since the p-value is 0.55, which is greater than the alpha of 0.05, then H_0 is not rejected at a 5% level of confidence. It could be concluded that there is not sufficient evidence to determine that there is a linear relationship between exports and GDP.

Results of filter 1.1: Country risk

Filter 1.1 of the DSM approach takes under consideration the country risk. The approach was applied to 240 countries, since for these countries we found the data on political risk and commercial risk in the Office Du Ducroire. The Office Du Ducroire provided enough information for the computation of country risk. As mentioned above, these values were transformed in order to calculate the country risk, which in this case represented the average of the political risk and commercial risk. After the country risk was obtained, in order to get the cut-off value or critical value, the average of the countries' risk, the standard deviation and the alpha value of 0.001 were calculated.

The average of the transformed data was 6.07, the standard deviation was 2.41, and the alpha was of 0.001. This alpha value was used since, after the probe process, the result was not

significant for the country risk portion of this part of the filter. The critical value obtained was 6.07. This value was compared to the country risk of the 240 countries. The 6.07 represents a low political risk of approximately 3.5 of the scale of 1 to 7 and commercial risk of B which is a medium parameter of the scale of A to C.

Table 4.4: Critical Value for Country risk

Calculation Critical value	
Average	6.07
Std dev.	2.41
Alpha	0.001
Critical value	6.07

Out of the countries that Puerto Rico currently exports to, the lowest country risk found was 2.05¹. This low country risk shows that these countries are politically and commercially stable, and also have the capability of maintaining good relationships among other countries. These factors are very attractive to potential investors and are good opportunities to export P.R.'s products. When a country has a favorable country risk, it is considered an attractive prospect of investment and favorable to the country that is considering export because these countries do not have political and commercial negative factors that could significantly affect the export country. Countries such as Sweden, Japan, China, Germany, and others² have a country risk of 2.05, which is favorable. A strong government structure and financial status provide a confident argument that supports the will to have relationships with those parties. This parameter should

¹Reference to table 4.5 to see the countries that ranked 2.05

² Reference to table 4.5 to see the countries that ranked 2.05

not be the only ones considered before exporting. A country also needs to evaluate the options available and the country risk is only one of the valuable parameters to do so.

Table 4.5: Countries with the lowest risk

Countries with the Lowest Risk			
Country	Country Risk	Country	Country Risk
Austria	2.05	Liechtenstein	2.05
Cyprus (Greek) (South)	2.05	Luxembourg	2.05
Czech Republic	2.05	Malta	2.05
Finland	2.05	New Zealand	2.05
Germany	2.05	Singapore	2.05
Hong Kong (China)	2.05	Sweden	2.05
Japan	2.05	Switzerland	2.05
Korea (South)	2.05	Taiwan	2.05
Total of Countries: 16			

Countries such as Cuba, Venezuela and Haiti had the highest country risk with 9.46 rating. We would not want those countries owing to P.R., nor would we want to invest resources and efforts trying to get them countries to invest in Puerto Rico. For example, Afghanistan has a country risk of 10.01, which means that the country is not political or economically stable. P.R.’s decision to invest resources to build a relationship with this country would be of great risk, so it should to be analyzed whether the investment is feasible.

Appendix 3 provides a list of the countries that Puerto Rico has exported to and is currently exporting to. From the analysis performed in this study, a total of 38 were found to be successful on the first part of the filter and 27 were not successful. Currently, P.R. is exporting to

countries with high risk. Appendix 3 also shows the countries to which P.R. is currently exporting with their respective country risk. Is Puerto Rico directing its efforts to export to the correct places? The results of the first phase of the filter are not enough to determine the answer to this question because there is another very important variable to consider, the GDP.

From the 27 countries that were eliminated, P.R. made export transaction with 13 of them in 2009. Examples of these countries were Argentina, Dominican Republic, Nicaragua, Syria and Venezuela. After this analysis, these countries were no longer considered on the next filter, since they failed the country risk filter. One of the limitations of this study is countries that were not successful on the first portion of the study were not considered on the second portion of this analysis. If a country failed, it was eliminated because of their high risk, which did not give the opportunity to be considered in the second portion, even though it could have had an opportunity of being successful in the GDP per capita and GDP filter.

Results of Filter 1.2: GDP and GDP per Capita

For the second phase, the filter used the GDP per capita and the GDP of the countries. The GDP per capita indicates the standard living of the countries. The GDP also measures the national accounts and economic shape of a country. For this phase, the data of 81 countries out of the 121 that passed the first part of the filter was used. We specifically used the GDP per capita for 2007, 2008 and 2009. As stated before, the average of the GDP for the countries, the standard deviation and an alpha value for each of the years was calculated in order to obtain the critical value. The value used as alpha was 0.296. This value was selected because a greater value would have resulted in a constant behavior once critical value calculated.

Table 4.6: Critical Values GDP per Capita

Critical Values GDP per Capita (\$)			
Parameters	2007	2008	2009
Average	29674	32495	28491
Standard deviation	30786	33564	31076
Alpha	0.296	0.296	0.296
CV	20561	22560	19293

Table 4.7: Critical Values GDP (in millions \$)

Critical Values GDP (in millions \$)			
Parameters	2007	2008	2009
Average	6.3186E+11	7.1465E+11	7.6083E+11
Standard deviation	1.7383E+12	1.8485E+12	1.9251E+12
Alpha	0.1	0.1	0.1
CV	4.5803E+11	5.298E+11	5.6832E+11

A critical value was calculated for 2007, 2008 and 2009 years and then it was compared with the GDP per capita for the corresponding years. If this critical value was greater than the GDP per capita, then the country was eliminated. Of the 81 countries considered, 40 countries were successful on this filter for two years or more. Six additional countries were also added to this list mainly because they were successful on the GDP filter but had not been selected with the GDP per capita analysis. Countries such as Canada, France, and Germany, among other that were successful on the final stage of the filter, are great prospects to build relationship and to make further analysis on the feasibility of exporting P.R. products. This analysis helps us determine that is feasible to invest more to expand the trade with those countries.

After obtaining the results of the filter, the countries were compared to the current export situation. Countries such as Mexico and Canada were successful on the DSM filter and P.R. is currently exporting to them, which is a great result, since P.R. is a territory of the United States and the NAFTA agreement is applicable to this scenario. Emerging markets such as Brazil, China, and India were also successful on the filter and P.R. currently exports there (Pearson, Viviers, Cuyvers, & Naudé, 2010).

Table 4.8: Countries that Puerto Rico export currently and that were successful on Filter 1 of the DSM approach

Countries that P.R. currently export and passed filter 1	
Australia	Italy
Austria	Japan
Bahrain	Korea
Belgium	Mexico
Bermuda	Netherlands
Brazil	New Zealand
Canada	Norway
Cyprus	Portugal
Denmark	Qatar
Finland	Russian Federation
France	Singapore
Germany	Slovenia
Greece	Spain
Hong Kong SAR, China	Sweden
India	Switzerland
Ireland	United Arab Emirates
Israel	United Kingdom

Out of the 45 countries obtained from the first filter of the DSM approach, P.R. was exporting to 34 of them. The other 11 countries were opportunities obtained by this model that

have not been taken into consideration by P.R. The government should perform more in depth analysis of Puerto Rico exports to see which option is more feasible taking under consideration country risk and GDP. They must determine whether export to countries such as Australia, Austria, Finland and the markets of the other countries shown in table 4.8 or if to concentrate the efforts on the countries that P.R. is currently exporting to.

Chapter 5: Conclusion and Recommendation

Conclusion

After reviewing several studies, literature supports the fact that there is a positive relationship between the exports and the economic growth of a country (Almad 2001). Since this field has not been studied in depth in P.R, it is greatly recommended to start focusing in it. Puerto Rico has increased its exports over the last ten years, but it was in 2009 that was observed how the international exports surpassed the international imports, which resulted in a positive trade balance for P.R. This trend continued in 2010. Besides the United States, Puerto Rico has been exporting most of its goods to Germany and Netherlands.

Observing the results obtained from the regression model, it seems that for now it has taken into consideration the country risk of the countries when the export decision in Puerto Rico has been made. Nonetheless, there are other factors that should be taken into consideration, since in the regression analysis for country risk there was a coefficient of determination around 5%, which meant that there were other factors that affect the exports. A relationship between GDP and exports was not supported with the simple regression analysis model, but several researchers and authors concluded in theory that the exports influenced the GDP, since exports is one of the variables used to calculate the GDP.

Puerto Rico should look into markets where country risk is low and GDP is high. After performing the first filter of the DSM approach, it could be observed that out of the 200 countries that P.R was currently exporting their products to, 34 countries were successful on the DSM approach. Among the successful countries on the first filter from the DSM were destinations such as: Brazil, India and China. These were identified as the upcoming power countries in the

world in the *Identifying export opportunities for South Africa in the southern engines: A DSM approach* article (Pearson et al., 2010). On the other hand, it also exports to the countries that have greater country risk and lower GDP, such as Afghanistan, Cambodia and Iraq. New opportunities were identified with the DSM. These included countries such as: Andorra, Faeroe Island, Greenland, Iceland, Kuwait, Liechtenstein, Luxemburg, Macao SAR, China, San Marino and Monaco. With this, it could be determined that there is no direction on the destination of P.R.'s exports or the exporters were willing to take on the risk and export to these countries that were not feasible markets.

Since the field on Puerto Rico exports has not been studied in depth it is advisable to acquire an export promotion policy that helps structure this field. This is needed in order to build a structure program in which the decisions are made with a sense of direction. An example of this is how the DSM approach was used by the Belgian government export promotion institution to obtain realistic opportunities. They deployed resources to those opportunities and were successful. The results from a model such as the DSM approach help managers determine where it is more feasible and optimal to export their products. This will also help the operation managers from the companies take the correct decisions when it comes to the production and specification of the product. It is important to note, though, that even though models like these are useful, the decisions should not be based on models like this alone. "Other considerations, such as feedback from foreign trade offices (on the demand side of exports) and export councils (on the supply side), should also be taken into consideration" (Steenkamp, E., Rossouw, R., Viviers, W., & Cuyvers, L., 2009).

Recommendations

In the course of this research, there were found some areas of opportunities on this field. First of all, research should be performed by government entities, such as Puerto Rico Trade, *Junta de Planificación de Puerto Rico* or private firms, to study the trade field in Puerto Rico. This would be beneficial because there would be concrete data supporting the exporting decisions without these being arbitrary. Similarly, educational programs should be established to help and direct exporters so these businesses can make correct decisions when it comes to exporting their products to other countries. Also, P.R. trade data should be more readily available and easy to access so that more studies can be made on this field. Finally, create a system that promotes export in an intelligent and coherent way that is supported by studies and findings of the feasibility of trade with the countries. These initiatives would help improve the quality in the export process which eventually will lead to optimize the economic growth.

Future Studies

While performing this research, it was found that there had not been many studies that investigated Puerto Rican trade. This may be primarily due to the complexity of the topic.

Further studies may include:

- Completing the 3 filters of the DSM approach
- Analyzing countries that P.R. exports to and distances to different countries
- Studying the correlation between exports and distances to different countries
- Comparing the exports of Puerto Rico's authentic products and exports of products of foreign companies established in P.R.

- Studying exports produced by P.R. companies and research the programs that the government has to guide businesses to make the correct decisions when it comes to exporting internationally
- The effect on the 936 section on the production of goods and their effect on exports

Studies in this field will help improve the export activity in Puerto Rico by providing additional insight on other factors that could have an effect on the decisions made by Puerto Rico exporters. Since this field has not been fully studied this research was a starting point to better comprehend the export activity in Puerto Rico and open doors to other related studies.

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Appendices

Appendix 1: Raw data of all countries country risk, GDP per capita and P.R exports³

Country	Risk	GDP per capita	Export
Zimbabwe	9.94	449	2,577
Mali	7.56	691	2,987
Cambodia	8.99	706	3,500
Bhutan	6.45	1831	3,676
Ukraine	8.98	2468	3,950
Kiribati	8.04	1306	4,709
Ghana	8.04	1098	5,869
Uzbekistan	8.52	1156	6,900
Azerbaijan	7.10	4899	8,780
Papua New Guinea	5.51	1172	9,076
Malta	2.05	19248	11,456
Afghanistan	10.01	486	11,718
Cyprus	2.05	31280	12,653
Gabon	6.62	7502	13,186
Niger	8.51	352	14,130
Seychelles	9.94	8688	14,240
Russian Federation	5.69	8684	15,909
Nepal	8.03	427	23,947
Cote d'Ivoire	9.94	1106	27,389
Iraq	9.46	2090	27,546
Senegal	7.09	1023	32,193
Libya	9.94	9714	33,264
Oman	2.52	16207	39,684
Liberia	9.46	222	43,430
Lithuania	4.57	11141	48,432
Armenia	8.52	2826	50,000
Sri Lanka	6.45	2068	65,786
Cameroon	7.56	1136	73,000
Latvia	5.03	11616	90,746
Croatia	7.10	14222	94,297
Bahrain	5.04	26021	94,341
Sao Tome and Principe	9.94	1171	106,408
Iran, Islamic Rep.	9.94	4540	122,850
Slovenia	4.28	23726	129,652
Macao SAR, China	2.52	40404	156,080
Nigeria	7.10	1118	197,931

³ GDP data obtained from World Bank . Commercial and political risk (used to calculate Country risk) obtained from Office Du Ducreaire.

Swaziland	7.56	2533	206,255
Estonia	4.10	14238	234,816
Comoros	8.51	812	255,194
Guinea-Bissau	8.03	519	280,000
Serbia	7.56	5872	298,131
Bolivia	7.09	1758	336,309
Slovak Republic	4.28	16176	338,598
Qatar	2.52	69754	343,621
Bulgaria	5.68	6423	502,230
Angola	7.56	4081	512,683
Namibia	4.10	4267	654,731
Jordan	5.51	4216	715,348
Norway	3.17	79089	773,241
Czech Republic	2.05	18139	833,014
Hungary	3.63	12868	905,735
Montenegro	8.52	6635	923,118
Paraguay	7.10	2242	928,324
Morocco	4.58	2811	942,735
Belize	6.45	4062	965,779
Lebanon	8.98	8175	965,956
Tunisia	5.05	3792	982,786
Bosnia and Herzegovina	8.51	4525	984,085
Romania	5.68	7500	1,016,703
Nicaragua	8.51	1069	1,039,402
Georgia	7.56	2449	1,172,476
Finland	2.05	44581	1,501,643
Portugal	3.17	21903	1,620,180
Poland	3.63	11273	1,639,894
Uruguay	3.93	9420	1,675,425
New Zealand	2.05	29352	1,725,980
Bermuda	4.58	88747	1,993,154
Albania	8.04	3808	2,007,476
Grenada	8.04	6029	2,260,468
Peru	4.10	4469	2,706,853
Denmark	3.17	55992	3,160,085
Dominica	8.04	5132	3,515,536
Bangladesh	7.09	551	3,573,441
Ecuador	8.98	4202	3,700,256
St. Vincent and the Grenadines	8.05	5335	3,892,561
United Arab Emirates	5.69	50070	4,202,278
St. Lucia	8.51	5496	4,421,413
Honduras	8.04	1918	4,716,777
Indonesia	6.15	2349	4,760,691
Philippines	4.57	1752	4,835,561

El Salvador	6.15	3424	4,874,960
Malaysia	2.52	7030	5,859,158
Turkey	6.63	8215	7,502,628
Pakistan	8.51	955	8,269,435
South Africa	5.05	5786	8,385,523
Haiti	9.46	646	8,669,428
Guyana	7.56	2656	9,154,122
Egypt, Arab Rep.	7.11	2270	9,208,998
Antigua and Barbuda	8.52	12920	9,218,092
St. Kitts and Nevis	8.04	10988	10,222,660
Chile	2.52	9644	12,156,027
Vietnam	8.98	1113	13,510,168
Greece	4.28	29240	18,760,383
Venezuela, RB	4.28	11490	18,875,605
Guatemala	6.62	2661	20,803,312
Barbados	5.04	14050	23,000,276
Thailand	4.58	3893	27,080,710
Saudi Arabia	3.63	14799	27,539,696
Argentina	8.51	7626	34,189,521
Israel	3.94	26256	35,340,829
Jamaica	7.56	4471	37,160,235
India	4.58	1192	38,100,635
Trinidad and Tobago	3.63	15841	38,222,378
Costa Rica	4.58	6386	41,305,474
Sweden	2.05	43654	41,776,617
Algeria	6.64	4029	0
Belarus	9.94	5075	0
Benin	7.56	745	0
Botswana	4.58	6064	0
Burkina Faso	8.03	517	0
Burundi	9.46	160	0
Cape Verde	7.41	3064	0
Central African Republic	8.51	454	0
Chad	8.51	610	0
Congo, Dem. Rep.	9.46	160	0
Congo, Rep.	8.03	2601	0
Djibouti	9.46	1214	0
Equatorial Guinea	8.03	15397	0
Eritrea	9.94	369	0
Ethiopia	8.51	344	0
Faeroe Islands	3.63	45188	0
Fiji	7.11	3326	0
Gambia, The	8.98	430	0
Greenland	3.63	22613	0

Guinea	9.46	407	0
Iceland	3.63	38029	0
Kazakhstan	6.62	7257	0
Kenya	8.04	738	0
Kosovo	8.51	2985	0
Kyrgyz Republic	8.98	860	0
Lao PDR	8.51	940	0
Lesotho	5.51	764	0
Liechtenstein	2.05	134392	0
Luxembourg	2.05	105044	0
Macedonia, FYR	7.10	4515	0
Madagascar	8.99	438	0
Malawi	8.98	310	0
Maldives	7.87	4760	0
Marshall Islands	9.46	2504	0
Mauritania	8.98	919	0
Mauritius	5.53	6735	0
Micronesia, Fed. Sts.	8.52	2476	0
Moldova	8.51	1516	0
Monaco	3.17	186175	0
Mongolia	6.62	1573	0
Mozambique	7.56	428	0
Palau	6.47	8074	0
Rwanda	8.98	522	0
Samoa	4.11	2776	0
Sierra Leone	8.51	341	0
Solomon Islands	7.10	1256	0
Sudan	9.94	1294	0
Syrian Arab Republic	8.98	2474	0
Tajikistan	9.46	716	0
Tanzania	7.56	503	0
Timor-Leste	8.99	492	0
Togo	8.03	431	0
Tonga	8.05	2991	0
Turkmenistan	8.04	3904	0
Uganda	7.56	490	0
Vanuatu	5.04	2702	0
Yemen, Rep.	7.10	1118	0
Zambia	7.56	990	0

Appendix 1.1 Regression for country Risk

SUMMARY
OUTPUT

Regression Statistics

Multiple R	0.243267745
R Square	0.059179196
Adjusted R Square	0.053335588
Standard Error	8530714.823
Observations	163

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	7.36985E+14	7.36985E+14	10.12716816	0.001753568
Residual	161	1.17165E+16	7.27731E+13		
Total	162	1.24535E+16			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	9848711.622	2075949.743	4.744195592	4.58724E-06	5749109.346	13948313.9	5749109.346	13948313.9
Risk	929792.5154	292174.3155	-3.18232119	0.001753568	1506780.707	352804.3236	1506780.707	352804.3236

RESIDUAL
OUTPUT

PROBABILITY OUTPUT

<i>Observation</i>	<i>Predicted Export</i>	<i>Residuals</i>	<i>Percentile</i>	<i>Export</i>
1	609673.3272	607096.3272	0.306748466	0
2	2816380.897	2813393.897	0.920245399	0
3	1486777.6	-1483277.6	1.533742331	0
4	3848450.589	3844774.589	2.147239264	0
5	1496075.525	1492125.525	2.760736196	0
6	2373179.798	2368470.798	3.374233129	0
7	2373179.798	2367310.798	3.987730061	0
8	1929978.699	1923078.699	4.601226994	0
9	3250284.071	3241504.071	5.214723926	0
10	4725554.862	4716478.862	5.828220859	0
11	7939537.657	7928081.657	6.441717791	0
12	544587.8511	532869.8511	7.055214724	0
13	7939537.657	7926884.657	7.668711656	0
14	3693485.17	-3680299.17	8.282208589	0
15	1939276.624	1925146.624	8.895705521	0
16	609673.3272	595433.3272	9.509202454	0
17	4561291.518	4545382.518	10.12269939	0
18	2382477.723	2358530.723	10.73619632	0
19	609673.3272	582284.3272	11.34969325	0
20	1052874.426	1025328.426	11.96319018	0
21	3259581.996	-	12.57668712	0

		3227388.996		
		-		
22	609673.3272	576409.3272	13.19018405	0
		-		
23	7505634.483	7465950.483	13.80368098	0
		-		
24	1052874.426	1009444.426	14.41717791	0
		-		
25	5602659.135	5554227.135	15.03067485	0
		-		
26	1929978.699	1879978.699	15.64417178	0
		-		
27	3848450.589	3782664.589	16.25766871	0
		-		
28	2816380.897	2743380.897	16.87116564	0
		-		
29	5168755.961	5078009.961	17.48466258	0
		-		
30	3250284.071	3155987.071	18.09815951	0
		-		
31	5159458.036	5065117.036	18.71165644	0
		-		
32	609673.3272	503265.3272	19.32515337	0
		-		
33	609673.3272	486823.3272	19.93865031	0
		-		
34	5872298.964	5742646.964	20.55214724	0
		-		
35	7505634.483	7349554.483	21.16564417	0
		-		
36	3250284.071	3052353.071	21.7791411	0
		-		
37	2816380.897	2610125.897	22.39263804	0
		-		
38	6036562.309	5801746.309	23.00613497	0
		-		
39	1939276.624	1684082.624	23.6196319	0
		-		
40	2382477.723	2102477.723	24.23312883	0
		-		
41	2816380.897	2518249.897	24.84662577	0
		-		
42	3259581.996	2923272.996	25.4601227	0
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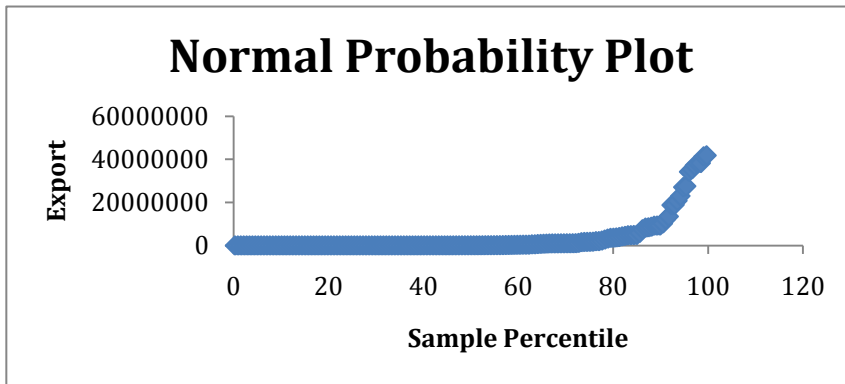
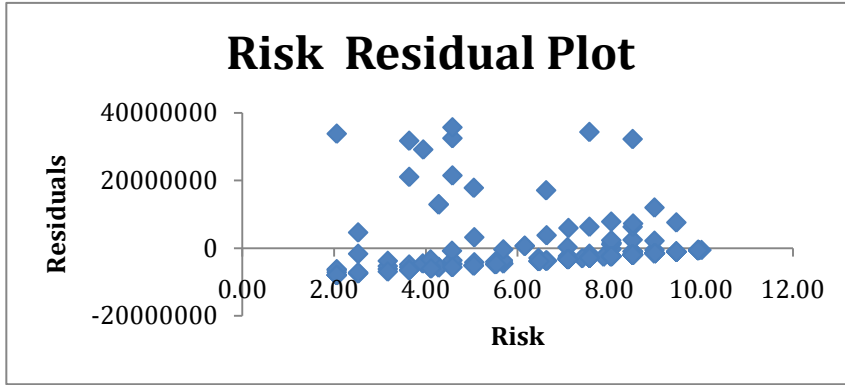
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51	6470465.483	5564730.483	30.98159509	0
52	1929978.699	1006860.699	31.59509202	0
53	3250284.071	2321960.071	32.20858896	0
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59	4570589.443	3553886.443	35.88957055	2577
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61	2816380.897	1643904.897	37.11656442	3500
62	7939537.657	6437894.657	37.73006135	3676
63	6904368.656	5284188.656	38.34355828	3950
64	6470465.483	4830571.483	38.95705521	4709
65	6194627.036	4519202.036	39.57055215	5869
66	7939537.657	6213557.657	40.18404908	6900
67	5593361.21	-3600207.21	40.79754601	8780
68	2373179.798	365703.7981	41.41104294	9076

69	2373179.798	112711.7981	42.02453988	11456
70	6036562.309	3329709.309	42.63803681	11718
71	6904368.656	3744283.656	43.25153374	12653
72	2373179.798	1142356.202	43.86503067	13186
73	3259581.996	313859.0039	44.47852761	14130
74	1496075.525	2204180.475	45.09202454	14240
75	2363881.873	1528679.127	45.70552147	15909
76	4561291.518	359013.5177	46.3190184	23947
77	1939276.624	2482136.376	46.93251534	27389
78	2373179.798	2343597.202	47.54601227	27546
79	4127388.344	633302.6562	48.1595092	32193
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81	4127388.344	747571.6562	49.38650307	39684
82	7505634.483	1646476.483	50	43430
83	3684187.245	3818440.755	50.61349693	48432
84	1939276.624	6330158.376	51.22699387	50000
85	5150160.111	3235362.889	51.8404908	65786
86	1052874.426	7616553.574	52.45398773	73000
87	2816380.897	6337741.103	53.06748466	90746
88	3240986.146	5968011.854	53.6809816	94297
89	1929978.699	7288113.301	54.29447853	94341
90	2373179.798	7849480.202	54.90797546	106408
91	7505634.483	4650392.517	55.52147239	122850

92	1496075.525	12014092.47	56.13496933	129652
93	5872298.964	12888084.04	56.74846626	156080
94	5872298.964	13003306.04	57.36196319	197931
95	3693485.17	17109826.83	57.97546012	206255
96	5159458.036	17840817.96	58.58895706	234816
97	5593361.21	21487348.79	59.20245399	255194
98	6470465.483	21069230.52	59.81595092	280000
99	1939276.624	32250244.38	60.42944785	298131
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101	2816380.897	34343854.1	61.65644172	338598
102	5593361.21	32507273.79	62.26993865	343621
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105	7939537.657	33837079.34	64.11042945	654731
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107	609673.3272	609673.3272	65.33742331	773241
108	2816380.897	2816380.897	65.95092025	833014
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111	1052874.426	1052874.426	67.79141104	928324
112	2962048.391	2962048.391	68.40490798	942735
113	1939276.624	1939276.624	69.01840491	965779
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115	1052874.426	-	70.24539877	982786

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127	3693485.17	-3693485.17	77.60736196	2260468
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137	1496075.525	1496075.525	83.74233129	4760691
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138	2528145.217	2528145.217	84.35582822	4835561

139	1052874.426	1052874.426	84.96932515	4874960
140	1496075.525	1496075.525	85.58282209	5859158
141	4706959.012	4706959.012	86.19631902	7502628
142	1929978.699	1929978.699	86.80981595	8269435
143	1939276.624	1939276.624	87.42331288	8385523
144	6904368.656	6904368.656	88.03680982	8669428
145	3693485.17	-3693485.17	88.65030675	9154122
146	2816380.897	2816380.897	89.26380368	9208998
147	3829854.739	3829854.739	89.87730061	9218092
148	1496075.525	1496075.525	90.49079755	10222660
149	6027264.384	6027264.384	91.10429448	12156027
150	1939276.624	1939276.624	91.71779141	13510168
151	3250284.071	3250284.071	92.33128834	18760383
152	609673.3272	609673.3272	92.94478528	18875605
153	1496075.525	1496075.525	93.55828221	20803312
154	1052874.426	1052874.426	94.17177914	23000276
155	2816380.897	2816380.897	94.78527607	27080710
156	1486777.6	-1486777.6	95.39877301	27539696
157	2382477.723	2382477.723	96.01226994	34189521
158	2363881.873	2363881.873	96.62576687	35340829
159	2373179.798	2373179.798	97.2392638	37160235
160	2816380.897	2816380.897	97.85276074	38100635
161	5159458.036	5159458.036	98.46625767	38222378
162	3250284.071	3250284.071	99.0797546	41305474



Appendix 1.2: Regression Analysis GDP

SUMMARY OUTPUT

<i>Regression Statistics</i>			
Multiple R	0.029633577		
R Square	0.000878149	0.087814886	-
Adjusted R Square	-0.005327577	0.532757693	
Standard Error	8791059.033		
Observations	163		

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1.0936E+13	1.0936E+13	0.14150623	0.70728342
Residual	161	1.24425E+16	7.72827E+13		
Total	162	1.24535E+16			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	3471707.05	761373.3592	4.559795806	1.00884E-05	1968140.807	4975273.294	1968140.807	4975273.294
GDP per capita	11.1072946	29.5270807	0.376173138	0.70728342	47.20302222	69.41761142	47.20302222	69.41761142

RESIDUAL OUTPUT

<i>Observation</i>	<i>Predicted Export</i>	<i>Residuals</i>
		-
1	3476694.226	3474117.226
		-
2	3479382.191	3476395.191
		-
3	3479548.8	-3476048.8
		-
4	3492044.507	3488368.507
		-
5	3499119.854	3495169.854
		-
6	3486213.177	3481504.177
		-
7	3483902.86	-3478033.86
		-
8	3484547.083	3477647.083
		-
9	3526121.687	3517341.687
		-
10	3484724.8	-3475648.8
		-
11	3685500.257	3674044.257
		-
12	3477105.196	3465387.196
		-
13	3819143.226	3806490.226
		-
14	3555033.975	3541847.975
		-
15	3475616.818	3461486.818
		-
16	3568207.226	3553967.226
		-
17	3568162.797	3552253.797
		-
18	3476449.865	3452502.865
		-
19	3483991.718	3456602.718
		-
20	3494921.296	3467375.296
		-
21	3483069.813	3450876.813

PROBABILITY OUTPUT

<i>Percentile</i>	<i>Export</i>
0.306748466	0
0.920245399	0
1.533742331	0
2.147239264	0
2.760736196	0
3.374233129	0
3.987730061	0
4.601226994	0
5.214723926	0
5.828220859	0
6.441717791	0
7.055214724	0
7.668711656	0
8.282208589	0
8.895705521	0
9.509202454	0
10.12269939	0
10.73619632	0
11.34969325	0
11.96319018	0
12.57668712	0

22	3579603.31	-3546339.31	13.19018405	0
		-		
23	3651722.974	3612038.974	13.80368098	0
24	3474172.87	-3430742.87	14.41717791	0
25	3595453.42	-3547021.42	15.03067485	0
		-		
26	3503096.265	3453096.265	15.64417178	0
		-		
27	3494676.936	3428890.936	16.25766871	0
		-		
28	3484324.937	3411324.937	16.87116564	0
		-		
29	3600729.385	3509983.385	17.48466258	0
		-		
30	3629674.994	3535377.994	18.09815951	0
		-		
31	3760729.963	3666388.963	18.71165644	0
		-		
32	3484713.692	3378305.692	19.32515337	0
		-		
33	3522134.168	3399284.168	19.93865031	0
		-		
34	3735238.722	3605586.722	20.55214724	0
		-		
35	3920486.182	3764406.182	21.16564417	0
		-		
36	3484125.006	3286194.006	21.7791411	0
		-		
37	3499841.828	3293586.828	22.39263804	0
		-		
38	3629852.711	3395036.711	23.00613497	0
		-		
39	3480726.174	3225532.174	23.6196319	0
		-		
40	3477471.736	3197471.736	24.23312883	0
		-		
41	3536929.084	3238798.084	24.84662577	0
		-		
42	3491233.674	3154924.674	25.4601227	0
		-		
43	3651378.648	3312780.648	26.07361963	0
		-		
44	4246485.278	3902864.278	26.68711656	0
		-		
45	3543049.204	-	27.3006135	0

		3040819.204		
46	3517035.92	-3004352.92	27.91411043	0
		-		
47	3519101.877	2864370.877	28.52760736	0
		-		
48	3518535.405	2803187.405	29.14110429	0
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49	4350171.873	3576930.873	29.75460123	0
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50	3673182.267	2840168.267	30.36809816	0
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51	3614635.717	2708900.717	30.98159509	0
		-		
52	3545403.95	-2622285.95	31.59509202	0
		-		
53	3496609.605	2568285.605	32.20858896	0
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54	3502929.656	2560194.656	32.82208589	0
		-		
55	3516824.881	2551045.881	33.43558282	0
		-		
56	3562509.184	2596553.184	34.04907975	0
		-		
57	3513825.912	2531039.912	34.66257669	0
		-		
58	3521967.559	2537882.559	35.27607362	0
		-		
59	3555011.76	-2538308.76	35.88957055	2577
		-		
60	3483580.748	2444178.748	36.50306748	2987
		-		
61	3498908.815	2326432.815	37.11656442	3500
		-		
62	3966881.351	2465238.351	37.73006135	3676
		-		
63	3714990.124	2094810.124	38.34355828	3950
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64	3596919.583	1957025.583	38.95705521	4709
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65	3576337.766	1900912.766	39.57055215	5869
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66	3797728.362	2071748.362	40.18404908	6900
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67	4457446.124	2464292.124	40.79754601	8780
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68	3514003.628	1506527.628	41.41104294	9076
69	3538672.93	-1278204.93	42.02453988	11456

70	3521345.55	-814492.55	42.63803681	11718
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71	4093626.69	933541.6898	43.25153374	12653
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72	3528709.686	13173.68636	43.86503067	13186
73	3477827.17	95613.83021	44.47852761	14130
74	3518379.902	181876.0976	45.09202454	14240
75	3530964.467	361596.5328	45.70552147	15909
76	4027849.291	174428.7088	46.3190184	23947
77	3532752.742	888660.2584	46.93251534	27389
78	3493010.842	1223766.158	47.54601227	27546
79	3497798.085	1262892.915	48.1595092	32193
80	3491167.031	1344393.969	48.77300613	33264
81	3509738.427	1365221.573	49.38650307	39684
82	3549791.332	2309366.668	50	43430
83	3562953.476	3939674.524	50.61349693	48432
84	3482314.517	4787120.483	51.22699387	50000
85	3535973.857	4849549.143	51.8404908	65786
86	3478882.363	5190545.637	52.45398773	73000
87	3501208.025	5652913.975	53.06748466	90746
88	3496920.609	5712077.391	53.6809816	94297
89	3615213.297	5602878.703	54.29447853	94341
90	3593754.004	6628905.996	54.90797546	106408
91	3578825.8	8577201.2	55.52147239	122850
92	3484069.469	10026098.53	56.13496933	129652
93	3796484.345	14963898.66	56.74846626	156080
94	3599329.865	15276275.13	57.36196319	197931
95	3501263.561	17302048.44	57.97546012	206255
96	3627764.54	19372511.46	58.58895706	234816
97	3514947.748	23565762.25	59.20245399	255194
98	3636083.903	23903612.1	59.81595092	280000
99	3556411.279	30633109.72	60.42944785	298131
100	3763340.178	31577488.82	61.04294479	336309
101	3521367.765	33638867.24	61.65644172	338598
102	3484946.946	34615688.05	62.26993865	343621
103	3647657.704	34574720.3	62.88343558	502230
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105	3956584.889	37820032.11	64.11042945	654731
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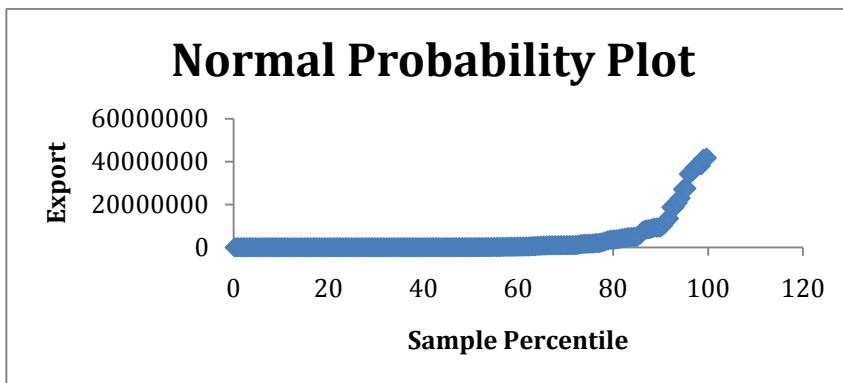
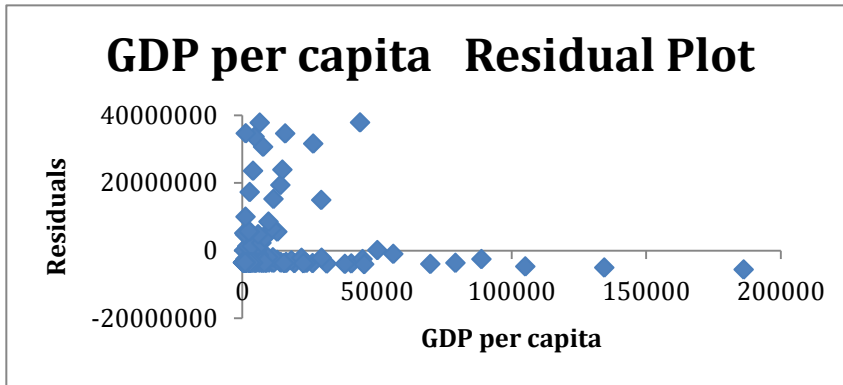
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144	5539607.623	5539607.623	88.03680982	8669428
		-		
145	3489178.825	3489178.825	88.65030675	9154122
		-		
146	3476460.973	3476460.973	89.26380368	9208998
		-		
147	3561387.347	3561387.347	89.87730061	9218092
		-		
148	3477505.058	3477505.058	90.49079755	10222660
149	3502540.9	-3502540.9	91.10429448	12156027
		-		
150	3475494.638	3475494.638	91.71779141	13510168
		-		
151	3485657.812	3485657.812	92.33128834	18760383
152	3486079.89	-3486079.89	92.94478528	18875605
		-		
153	3499186.497	3499186.497	93.55828221	20803312
		-		
154	3479659.873	3479659.873	94.17177914	23000276
155	3477294.02	-3477294.02	94.78527607	27080710
		-		
156	3477171.839	3477171.839	95.39877301	27539696
		-		
157	3476494.294	3476494.294	96.01226994	34189521
		-		
158	3504928.969	3504928.969	96.62576687	35340829
		-		
159	3515069.929	3515069.929	97.2392638	37160235
		-		
160	3477149.625	3477149.625	97.85276074	38100635
161	3501718.96	-3501718.96	98.46625767	38222378

162 3484125.006 3484125.006

99.0797546 41305474

163 3482703.272 3482703.272

99.69325153 41776617



Appendix 2: Raw data of countries that P.R currently exports country risk, GDP per capita and P.R exports

Country	Risk	GDP per capita	Export
Zimbabwe	9.94	449	2,577
Mali	7.56	691	2,987
Cambodia	8.99	706	3,500
Bhutan	6.45	1831	3,676
Ukraine	8.98	2468	3,950
Kiribati	8.04	1306	4,709
Ghana	8.04	1098	5,869
Uzbekistan	8.52	1156	6,900
Azerbaijan	7.10	4899	8,780
Papua New Guinea	5.51	1172	9,076
Malta	2.05	19248	11,456
Afghanistan	10.01	486	11,718
Cyprus	2.05	31280	12,653
Gabon	6.62	7502	13,186
Niger	8.51	352	14,130
Seychelles	9.94	8688	14,240
Russian Federation	5.69	8684	15,909
Nepal	8.03	427	23,947
Cote d'Ivoire	9.94	1106	27,389
Iraq	9.46	2090	27,546
Senegal	7.09	1023	32,193
Libya	9.94	9714	33,264
Oman	2.52	16207	39,684
Liberia	9.46	222	43,430
Lithuania	4.57	11141	48,432
Armenia	8.52	2826	50,000
Sri Lanka	6.45	2068	65,786
Cameroon	7.56	1136	73,000
Latvia	5.03	11616	90,746
Croatia	7.10	14222	94,297
Bahrain	5.04	26021	94,341
Sao Tome and Principe	9.94	1171	106,408
Iran, Islamic Rep.	9.94	4540	122,850
Slovenia	4.28	23726	129,652
Macao SAR, China	2.52	40404	156,080
Nigeria	7.10	1118	197,931
Swaziland	7.56	2533	206,255
Estonia	4.10	14238	234,816

Comoros	8.51	812	255,194
Guinea-Bissau	8.03	519	280,000
Serbia	7.56	5872	298,131
Bolivia	7.09	1758	336,309
Slovak Republic	4.28	16176	338,598
Qatar	2.52	69754	343,621
Bulgaria	5.68	6423	502,230
Angola	7.56	4081	512,683
Namibia	4.10	4267	654,731
Jordan	5.51	4216	715,348
Norway	3.17	79089	773,241
Czech Republic	2.05	18139	833,014
Hungary	3.63	12868	905,735
Montenegro	8.52	6635	923,118
Paraguay	7.10	2242	928,324
Morocco	4.58	2811	942,735
Belize	6.45	4062	965,779
Lebanon	8.98	8175	965,956
Tunisia	5.05	3792	982,786
Bosnia and Herzegovina	8.51	4525	984,085
Romania	5.68	7500	1,016,703
Nicaragua	8.51	1069	1,039,402
Georgia	7.56	2449	1,172,476
Finland	2.05	44581	1,501,643
Portugal	3.17	21903	1,620,180
Poland	3.63	11273	1,639,894
Uruguay	3.93	9420	1,675,425
New Zealand	2.05	29352	1,725,980
Bermuda	4.58	88747	1,993,154
Albania	8.04	3808	2,007,476
Grenada	8.04	6029	2,260,468
Peru	4.10	4469	2,706,853
Denmark	3.17	55992	3,160,085
Dominica	8.04	5132	3,515,536
Bangladesh	7.09	551	3,573,441
Ecuador	8.98	4202	3,700,256
St. Vincent and the Grenadines	8.05	5335	3,892,561
United Arab Emirates	5.69	50070	4,202,278
St. Lucia	8.51	5496	4,421,413
Honduras	8.04	1918	4,716,777
Indonesia	6.15	2349	4,760,691
Philippines	4.57	1752	4,835,561
El Salvador	6.15	3424	4,874,960
Malaysia	2.52	7030	5,859,158

Turkey	6.63	8215	7,502,628
Pakistan	8.51	955	8,269,435
South Africa	5.05	5786	8,385,523
Haiti	9.46	646	8,669,428
Guyana	7.56	2656	9,154,122
Egypt, Arab Rep.	7.11	2270	9,208,998
Antigua and Barbuda	8.52	12920	9,218,092
St. Kitts and Nevis	8.04	10988	10,222,660
Chile	2.52	9644	12,156,027
Vietnam	8.98	1113	13,510,168
Greece	4.28	29240	18,760,383
Venezuela, RB	4.28	11490	18,875,605
Guatemala	6.62	2661	20,803,312
Barbados	5.04	14050	23,000,276
Thailand	4.58	3893	27,080,710
Saudi Arabia	3.63	14799	27,539,696
Argentina	8.51	7626	34,189,521
Israel	3.94	26256	35,340,829
Jamaica	7.56	4471	37,160,235
India	4.58	1192	38,100,635
Trinidad and Tobago	3.63	15841	38,222,378
Costa Rica	4.58	6386	41,305,474
Sweden	2.05	43654	41,776,617

Appendix 2.1: Regression Analysis for Country risk

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.216561397
R Square	0.046898839
Adjusted R Square	0.037645429
Standard Error	10221328.65
Observations	105

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	5.29511E+14	5.29511E+14	5.068276668	0.026491286
Residual	103	1.0761E+16	1.04476E+14		
Total	104	1.12905E+16			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	11651624.18	2875875.059	4.051505696	9.8873E-05	5948004.451	17355243.91	5948004.451	17355243.91
Risk	-961772.7268	427210.8759	2.251283338	0.026491286	1809044.716	114500.7377	1809044.716	114500.7377

RESIDUAL OUTPUT

<i>Observation</i>	<i>Predicted Export</i>	<i>Residuals</i>
		-
1	2094809.187	2092232.187
		-
2	4377416.459	4374429.459
		-
3	3002081.459	2998581.459
		-
4	5444984.185	5441308.185
		-
5	3011699.187	3007749.187
		-
6	3918971.459	3914262.459
		-
7	3918971.459	3913102.459
		-
8	3460526.459	3453626.459
		-
9	4826243.731	4817463.731
		-
10	6352256.458	6343180.458
		-
11	9676784.183	9665328.183
		-
12	2027485.096	2015767.096
		-
13	9676784.183	9664131.183
		-
14	5284688.731	5271502.731
		-
15	3470144.186	3456014.186
		-
16	2094809.187	2080569.187
		-
17	6182343.276	6166434.276
		-
18	3928589.186	3904642.186
		-
19	2094809.187	2067420.187
		-
20	2553254.187	2525708.187
		-
21	4835861.458	4803668.458

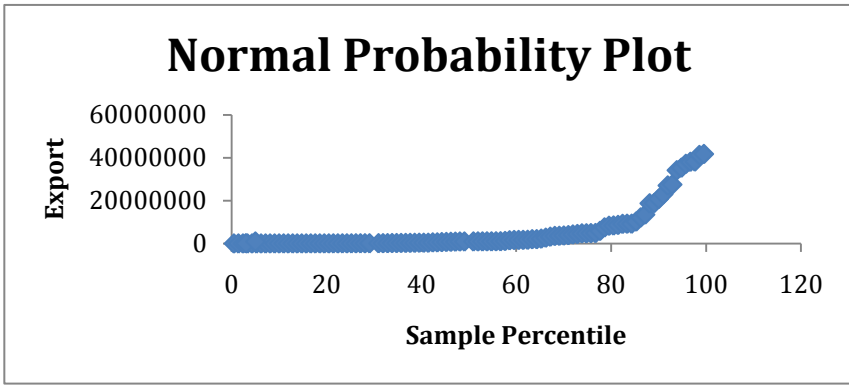
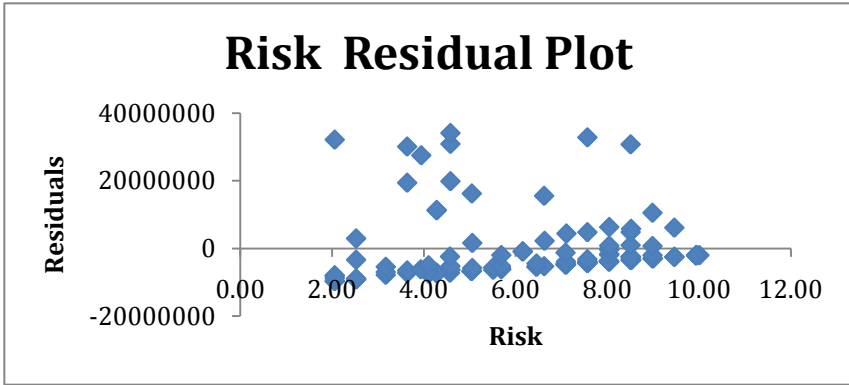
PROBABILITY OUTPUT

<i>Percentile</i>	<i>Export</i>
0.476190476	2577
1.428571429	2987
2.380952381	3500
3.333333333	3676
4.285714286	3950
5.238095238	4709
6.19047619	5869
7.142857143	6900
8.095238095	8780
9.047619048	9076
10	11456
10.95238095	11718
11.9047619	12653
12.85714286	13186
13.80952381	14130
14.76190476	14240
15.71428571	15909
16.66666667	23947
17.61904762	27389
18.57142857	27546
19.52380952	32193

			-		
22	2094809.187	2061545.187		20.47619048	33264
			-		
23	9227956.911	9188272.911		21.42857143	39684
			-		
24	2553254.187	2509824.187		22.38095238	43430
25	7259528.73	-7211096.73		23.33333333	48432
			-		
26	3460526.459	3410526.459		24.28571429	50000
			-		
27	5444984.185	5379198.185		25.23809524	65786
			-		
28	4377416.459	4304416.459		26.19047619	73000
			-		
29	6810701.457	6719955.457		27.14285714	90746
			-		
30	4826243.731	4731946.731		28.0952381	94297
31	6801083.73	-6706742.73		29.04761905	94341
			-		
32	2094809.187	1988401.187		30	106408
			-		
33	2094809.187	1971959.187		30.95238095	122850
			-		
34	7538442.821	7408790.821		31.9047619	129652
			-		
35	9227956.911	9071876.911		32.85714286	156080
			-		
36	4826243.731	4628312.731		33.80952381	197931
			-		
37	4377416.459	4171161.459		34.76190476	206255
			-		
38	7708356.002	7473540.002		35.71428571	234816
			-		
39	3470144.186	3214950.186		36.66666667	255194
			-		
40	3928589.186	3648589.186		37.61904762	280000
			-		
41	4377416.459	4079285.459		38.57142857	298131
			-		
42	4835861.458	4499552.458		39.52380952	336309
			-		
43	7538442.821	7199844.821		40.47619048	338598
			-		
44	9227956.911	8884335.911		41.42857143	343621
			-		
45	6191961.003	5689731.003		42.38095238	502230
			-		
46	4377416.459	3864733.459		43.33333333	512683

47	7708356.002	7053625.002	44.28571429	654731
48	6352256.458	5636908.458	45.23809524	715348
49	8606010.547	7832769.547	46.19047619	773241
50	9676784.183	8843770.183	47.14285714	833014
51	8157183.275	7251448.275	48.0952381	905735
52	3460526.459	2537408.459	49.04761905	923118
53	4826243.731	3897919.731	50	928324
54	7249911.003	6307176.003	50.95238095	942735
55	5444984.185	4479205.185	51.9047619	965779
56	3011699.187	2045743.187	52.85714286	965956
57	6791466.003	5808680.003	53.80952381	982786
58	3470144.186	2486059.186	54.76190476	984085
59	6191961.003	5175258.003	55.71428571	1016703
60	3470144.186	2430742.186	56.66666667	1039402
61	4377416.459	3204940.459	57.61904762	1172476
62	9676784.183	8175141.183	58.57142857	1501643
63	8606010.547	6985830.547	59.52380952	1620180
64	8157183.275	6517289.275	60.47619048	1639894
65	7871857.366	6196432.366	61.42857143	1675425
66	9676784.183	7950804.183	62.38095238	1725980
67	7249911.003	5256757.003	63.33333333	1993154
68	3918971.459	1911495.459	64.28571429	2007476
69	3918971.459	1658503.459	65.23809524	2260468
70	7708356.002	5001503.002	66.19047619	2706853

71	8606010.547	5445925.547	67.14285714	3160085
72	3918971.459	403435.4589	68.0952381	3515536
73	4835861.458	1262420.458	69.04761905	3573441
74	3011699.187	688556.8133	70	3700256
75	3909353.732	16792.73163	70.95238095	3892561
76	6182343.276	1980065.276	71.9047619	4202278
77	3470144.186	951268.8136	72.85714286	4421413
78	3918971.459	797805.5411	73.80952381	4716777
79	5733516.003	972825.0034	74.76190476	4760691
80	7259528.73	-2423967.73	75.71428571	4835561
81	5733516.003	858556.0034	76.66666667	4874960
82	9227956.911	3368798.911	77.61904762	5859158
83	5275071.004	2227556.996	78.57142857	7502628
84	3470144.186	4799290.814	79.52380952	8269435
85	6791466.003	1594056.997	80.47619048	8385523
86	2553254.187	6116173.813	81.42857143	8669428
87	4377416.459	4776705.541	82.38095238	9154122
88	4816626.004	4392371.996	83.33333333	9208998
89	3460526.459	5757565.541	84.28571429	9218092
90	3918971.459	6303688.541	85.23809524	10222660
91	9227956.911	2928070.089	86.19047619	12156027
92	3011699.187	10498468.81	87.14285714	13510168
93	7538442.821	11221940.18	88.0952381	18760383
94	7538442.821	11337162.18	89.04761905	18875605
95	5284688.731	15518623.27	90	20803312
96	6801083.73	16199192.27	90.95238095	23000276
97	7249911.003	19830799	91.9047619	27080710
98	8157183.275	19382512.73	92.85714286	27539696
99	3470144.186	30719376.81	93.80952381	34189521
100	7862239.639	27478589.36	94.76190476	35340829
101	4377416.459	32782818.54	95.71428571	37160235
102	7249911.003	30850724	96.66666667	38100635
103	8157183.275	30065194.73	97.61904762	38222378
104	7249911.003	34055563	98.57142857	41305474
105	9676784.183	32099832.82	99.52380952	41776617



Appendix 2.2: Regression Analysis for GDP

SUMMARY OUTPUT

<i>Regression Statistics</i>	
Multiple R	0.058754823
R Square	0.003452129
Adjusted R Square	-
Standard Error	10451700.01
Observations	105

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	3.89762E+13	3.89762E+13	0.356801038	0.551599152
Residual	103	1.12515E+16	1.09238E+14		
Total	104	1.12905E+16			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	5167891.229	1230599.976	4.199489136	5.69645E-05	2727286.488	7608495.971	2727286.488	7608495.971
GDP per capita	37.66759212	63.06012166	0.59732825	0.551599152	87.39728268	162.7324669	87.39728268	162.7324669

RESIDUAL
OUTPUT

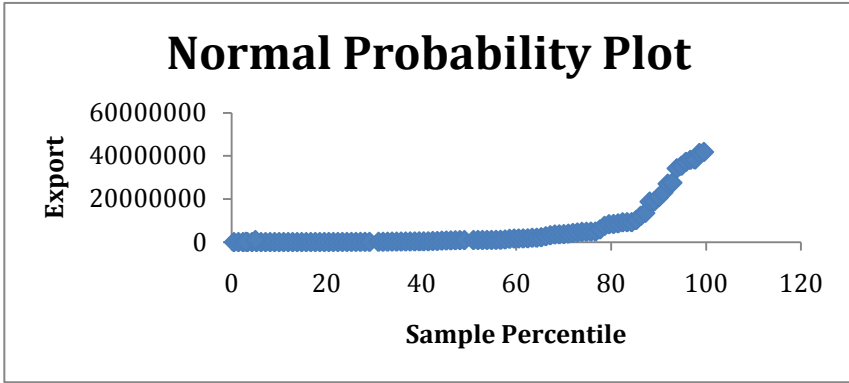
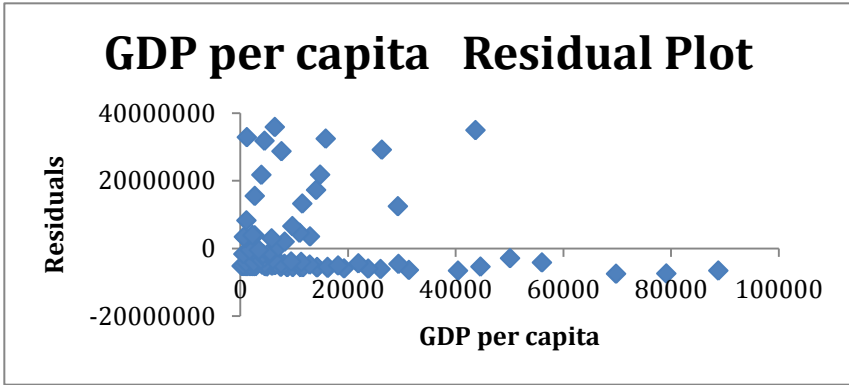
PROBABILITY OUTPUT

<i>Observation</i>	<i>Predicted Export</i>	<i>Residuals</i>	<i>Percentile</i>	<i>Export</i>
1	5184803.978	5182226.978	0.476190476	2577
2	5193919.535	5190932.535	1.428571429	2987
3	5194484.549	5190984.549	2.380952381	3500
4	5236860.59	-5233184.59	3.333333333	3676
5	5260854.847	5256904.847	4.285714286	3950
6	5217085.105	5212376.105	5.238095238	4709
7	5209250.245	5203381.245	6.19047619	5869
8	5211434.966	5204534.966	7.142857143	6900
9	5352424.763	5343644.763	8.095238095	8780
10	5212037.647	5202961.647	9.047619048	9076
11	5892917.042	5881461.042	10	11456
12	5186197.679	5174479.679	10.95238095	11718
13	6346133.511	6333480.511	11.9047619	12653
14	5450473.505	5437287.505	12.85714286	13186
15	5181150.222	5167020.222	13.80952381	14130
16	5495147.27	-5480907.27	14.76190476	14240
17	5494996.599	5479087.599	15.71428571	15909
18	5183975.291	5160028.291	16.66666667	23947
19	5209551.586	5182162.586	17.61904762	27389
20	5246616.497	5219070.497	18.57142857	27546
21	5206425.176	5174232.176	19.52380952	32193

22	5533794.219	5500530.219	20.47619048	33264
23	5778369.895	5738685.895	21.42857143	39684
24	5176253.435	5132823.435	22.38095238	43430
25	5587545.873	5539113.873	23.33333333	48432
26	5274339.845	5224339.845	24.28571429	50000
27	5245787.81	-5180001.81	25.23809524	65786
28	5210681.614	5137681.614	26.19047619	73000
29	5605437.979	5514691.979	27.14285714	90746
30	5703599.724	5609302.724	28.0952381	94297
31	6148039.644	6053698.644	29.04761905	94341
32	5211999.98	-5105591.98	30	106408
33	5338902.098	5216052.098	30.95238095	122850
34	6061592.52	-5931940.52	31.9047619	129652
35	6689812.621	6533732.621	32.85714286	156080
36	5210003.597	5012072.597	33.80952381	197931
37	5263303.24	-5057048.24	34.76190476	206255
38	5704202.406	5469386.406	35.71428571	234816
39	5198477.314	4943283.314	36.66666667	255194
40	5187440.71	-4907440.71	37.61904762	280000
41	5389075.33	-5090944.33	38.57142857	298131
42	5234110.856	4897801.856	39.52380952	336309
43	5777202.199	5438604.199	40.47619048	338598
44	7795356.45	-7451735.45	41.42857143	343621
45	5409830.173	4907600.173	42.38095238	502230
46	5321612.673	4808929.673	43.33333333	512683
47	5328618.845	4673887.845	44.28571429	654731
48	5326697.798	4611349.798	45.23809524	715348

49	8146983.422	7373742.422	46.19047619	773241
50	5851143.683	5018129.683	47.14285714	833014
51	5652597.805	4746862.805	48.0952381	905735
52	5417815.703	4494697.703	49.04761905	923118
53	5252341.971	4324017.971	50	928324
54	5273774.831	4331039.831	50.95238095	942735
55	5320896.988	4355117.988	51.9047619	965779
56	5475823.795	4509867.795	52.85714286	965956
57	5310726.739	4327940.739	53.80952381	982786
58	5338337.084	4354252.084	54.76190476	984085
59	5450398.17	-4433695.17	55.71428571	1016703
60	5208157.885	4168755.885	56.66666667	1039402
61	5260139.162	4087663.162	57.61904762	1172476
62	6847150.153	5345507.153	58.57142857	1501643
63	5992924.499	4372744.499	59.52380952	1620180
64	5592517.995	3952623.995	60.47619048	1639894
65	5522719.947	3847294.947	61.42857143	1675425
66	6273510.393	4547530.393	62.38095238	1725980
67	8510777.027	6517623.027	63.33333333	1993154
68	5311329.42	-3303853.42	64.28571429	2007476
69	5394989.142	3134521.142	65.23809524	2260468
70	5336227.698	2629374.698	66.19047619	2706853
71	7276975.047	4116890.047	67.14285714	3160085
72	5361201.312	1845665.312	68.0952381	3515536
73	5188646.073	1615205.073	69.04761905	3573441

74	5326170.451	1625914.451	70	3700256
75	5368847.833	1476286.833	70.95238095	3892561
76	7053907.567	2851629.567	71.9047619	4202278
77	5374912.316	953499.3156	72.85714286	4421413
78	5240137.671	-523360.671	73.80952381	4716777
79	5256372.403	495681.4032	74.76190476	4760691
80	5233884.851	398323.8507	75.71428571	4835561
81	5296865.065	421905.0647	76.66666667	4874960
82	5432694.402	426463.5981	77.61904762	5859158
83	5477330.499	2025297.501	78.57142857	7502628
84	5203863.78	3065571.22	79.52380952	8269435
85	5385835.917	2999687.083	80.47619048	8385523
86	5192224.494	3477203.506	81.42857143	8669428
87	5267936.354	3886185.646	82.38095238	9154122
88	5253396.663	3955601.337	83.33333333	9208998
89	5654556.519	3563535.481	84.28571429	9218092
90	5581782.732	4640877.268	85.23809524	10222660
91	5531157.488	6624869.512	86.19047619	12156027
92	5209815.259	8300352.741	87.14285714	13510168
93	6269291.623	12491091.38	88.0952381	18760383
94	5600691.863	13274913.14	89.04761905	18875605
95	5268124.692	15535187.31	90	20803312
96	5697120.899	17303155.1	90.95238095	23000276
97	5314531.165	21766178.83	91.9047619	27080710
98	5725333.925	21814362.07	92.85714286	27539696
99	5455144.287	28734376.71	93.80952381	34189521
100	6156891.528	29183937.47	94.76190476	35340829
101	5336303.034	31823931.97	95.71428571	37160235
102	5212790.999	32887844	96.66666667	38100635
103	5764583.556	32457794.44	97.61904762	38222378
104	5408436.473	35897037.53	98.57142857	41305474
105	6812232.296	34964384.7	99.52380952	41776617



Appendix 3: Countries that Puerto Rico is currently exporting their goods with the country risk ratings

Countries PR currently exports	Country Risk successful filter 1.1	Country Risk not successful filter 1.1	Last transactions	
Albania		8.04		2009
Anguilla		8.52		2002
Antigua and Barbuda		8.52		2009
Argentina		8.51		2009
Aruba	4.1		2009	
Bahamas	4.58		2006	
Barbados	5.08		2009	
Belgium	3.17		2008	
Brazil	5.69		2008	
British Virgin Islands	4.11		2009	
Burundi		9.46		2007
Canada	3.17		2009	
Chile	2.52		2009	
China People's Rep (Mainland)	4.74		2009	
Colombia	5.68		2006	
Costa Rica	4.58		2008	
Cuba		9.46		2004
Dominica		8.04		2009
Dominican Republic		6.46		2009
East Timor		8.99		2001
Ecuador		8.98		2007
France	3.17		2009	
Georgia		7.56		2002
Germany	2.05		2009	
Greece	4.28		2009	
Grenada		8.04		2009
Guadeloupe	3.63		2008	
Guatemala		6.62		2007
Guyana		7.56		2004
Haiti		9.46		2009
Honduras		8.04		2004
Hong Kong	2.05		2002	
Indonesia		6.15		2005
Israel	3.94		2008	
Italy	4.28		2009	
Jamaica		7.56		2007
Japan	2.05		2009	
Kenya		8.04		2001
Korea Rep (south Korea)	2.05		2004	

Kuwait	4.11		2001	
Malaysia	2.52		2008	
Mexico	5.21		2009	
Montserrat		7.40		2009
Namibia	4.1		2009	
Netherland Antil EXC Aruba	5.51		2009	
Netherlands	3.7		2009	
Nicaragua		8.51		2009
Niger		8.51		2007
Panama	4.58		2009	
Peru	4.1		2005	
Philippines	4.57		2000	
Russia	5.69		2004	
Saint Kitts and Nevis		8.04		2009
Saint Lucia		8.51		2009
Saint Vincent and Grenadines		8.05		2009
Singapore	2.05		2004	
Slovenia	4.28		2005	
South Africa	5.05		2006	
Spain	3.17		2009	
Sweden	2.05		2004	
Switzerland	2.05		2007	
Syria		8.98		2004
Thailand	4.58		2001	
Trinidad and Tobago	3.63		2009	
Turks and Caicos islands	4.11		2006	
United Kingdom of Great Britain	3.17		2009	
Venezuela		8.98		2009
Total	39	26		

Appendix 4: Countries with the Highest risk appendix

Countries with the Highest risk	
Country	Country Risk
Afghanistan	10.01
Albania	8.04
Anguilla (Great-Britain)	8.52
Antigua and Barbuda	8.52
Argentina	8.51
Armenia	8.52

Belarus	9.94
Bosnia and Herzegovina	8.51
Burkina Faso	8.03
Burundi	9.46
Cambodia	8.99
Central African Republic	8.51
Chad	8.51
Comoros	8.51
Congo (Democratic Republic)	9.46
Congo (Republic)	8.03
Côte d'Ivoire	9.94
Cuba	9.46
Djibouti	9.46
Dominica	8.04
Ecuador	8.98
Equatorial Guinea	8.03
Eritrea	9.94
Ethiopia	8.51
Gambia	8.98
Ghana	8.04
Grenada	8.04
Guinea	9.46
Guinea-Bissau	8.03
Haiti	9.46
Honduras	8.04
Iran	9.94
Iraq	9.46
Kenya	8.04
Kiribati	8.04
Korea (North)	9.94
Kosovo	8.51
Kyrgyzstan	8.98
Lao	8.51
Lebanon	8.98
Liberia	9.46
Libya	9.94
Madagascar	8.99
Malawi	8.98
Marshall Islands	9.46
Mauritania	8.98
Micronesia	8.52
Moldova	8.51
Montenegro	8.52
Myanmar	9.46
Nepal	8.03
Nicaragua	8.51
Niger	8.51
Pakistan	8.51

Palestine	9.94
Rwanda	8.98
Sao Tome and Principe	9.94
Seychelles	9.94
Sierra Leone	8.51
Somalia	9.94
St.Kitts and Nevis	8.04
St.Lucia	8.51
St.Vincent and the Grenadines	8.05
Sudan	9.94
Suriname	8.51
Syria	8.98
Tajikistan	9.46
Timor-Leste	8.99
Togo	8.03
Tonga	8.05
Turkmenistan	8.04
Ukraine	8.98
Uzbekistan	8.52
Venezuela	8.98
Yemen	9.94
Zimbabwe	9.94
Total Countries	76

Appendix 5: Countries Passed Filter 1.1

Country Passed Filter1.1
Andorra
Aruba (Netherlands)
Australia
Austria
Azores (Portugal)
Bahamas
Bahrain
Barbados
Belgium
Bermuda (Great-Britain)
BIOT (Chagos) (Great-Britain)
Botswana
Brazil
Brunei
Bulgaria
Canada
Canary Islands (Spain)
Cayman Islands (Great-Britain)
Ceuta and Melilla (Spain)

Channel Islands (Great-Britain)
Chile
China
Christmas Island (Australia)
Colombia
Cook Islands
Coral Sea Islands (Australia)
Costa Rica
Cyprus (Greek) (South)
Czech Republic
Denmark
Estonia
Faeroe Islands (Denmark)
Falkland Islands (Great-Britain)
Finland
France
French Guiana (France)
French Polynesia (France)
Germany
Gibraltar (Great-Britain)
Greece
Greenland (Denmark)
Guadeloupe (France)
Guam (United States)
Hong Kong (China)
Hungary
Iceland
India
Ireland
Israel
Italy
Japan
Jordan
Korea (South)
Kuwait
Latvia
Lesotho
Liechtenstein
Lithuania
Luxembourg
Macau
Madeira (Portugal)
Malaysia
Malta
Man (Isle of) (Great-Britain)
Mariana Islands (Northern)
Martinique (France)
Mauritius

Mayotte (France)
Mexico
Monaco
Morocco
Namibia
Netherlands
Netherlands Antilles (Netherlands)
New Caledonia (France)
New Zealand
Niue (New Zealand)
Norfolk (Australia)
Norway
Oman
Panama
Papua New Guinea
Peru
Philippines
Pitcairn (Great-Britain)
Poland
Portugal
Puerto Rico (United States)
Qatar
Reunion (France)
Romania
Russia
Samoa (American)
Samoa (Western)
San Marino
Saudi Arabia
Singapore
Slovakia
Slovenia
South Africa
Spain
St.Helena (Great-Britain)
St.Pierre and Miquelon (France)
Sweden
Switzerland
Taiwan
Thailand
Tokelau (New Zealand)
Trinidad and Tobago
Tunisia
Turks and Caicos Islands (Great-Britain)
Tuvalu
United Arab Emirates
United Kingdom

United States
Uruguay
Vanuatu
Vatican City
Virgin Islands (American)
Virgin Islands (British)
Wallis and Futuna (France)

Appendix 6: Countries that were successful on the Filter 1 of the DSM approach

Country name Passed filter 1	
1	Andorra
2	Australia
3	Austria
4	Bahrain
5	Belgium
6	Bermuda
7	Brazil
8	Canada
9	China
10	Cyprus
11	Denmark
12	Faeroe Islands
13	Finland
14	France
15	Germany
16	Greece
17	Greenland
18	Hong Kong SAR,
19	Iceland
20	India
21	Ireland
22	Israel
23	Italy
24	Japan
25	Kuwait
26	Korea
27	Liechtenstein
28	Luxembourg
29	Macao SAR, China
30	Mexico
31	Monaco
32	Netherlands
33	New Zealand

34	Norway
35	Portugal
36	Qatar
37	Russian Federation
38	San Marino
39	Singapore
40	Slovenia
41	Spain
42	Sweden
43	Switzerland
44	United Arab Emirates
45	United Kingdom