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Impact of foreign direct investment, human capital on the economic growth of Puerto Rico

Impacto de la inversión extranjera directa, capital humano en el crecimiento económico de Puerto Rico

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Abstract

During the past decades, disruptive events have been experienced, which have brought drastic changes in the economy, quality of life and other aspects of humanity. Puerto Rico has not been the exception and because it is an island and a US territory it limits negotiations with foreign countries. In the past, the island had economic incentives that allowed it to develop the economy and attract foreign direct investment. It is interesting to see how both variables have varied in the periods of this investigation. Its general objective is to explore the relationship between Investment in Human Capital and Foreign Direct Investment on the island and how it impacts economic development measured by Gross Domestic Product. The methodology of this research is quantitative using government databases and analyzing the data through multiple regression models divided into three historical periods to compare the study variables, investment in human capital and foreign direct investment against gross domestic product. to determine if any have a positive impact on the economic growth of the island. The main finding i s t hat, i n t he p eriods a nalyzed, investment in human capital and foreign direct investment contributed to the economic growth of Puerto Rico, with human capital being the variable with the greatest impact.

Keywords: *Economic growth; Human capital; Foreign direct investment; Economic growth.*

Resumen

Durante las pasadas décadas se han experimentado eventos disruptivos, que han traído cambios drásticos en la economía, calidad de vida y otros aspectos en la humanidad. Puerto Rico no ha sido la excepción y por ser una isla y ser un territorio estadounidense limita para negociaciones con países externos. En el pasado, la isla tenía incentivos económicos que le permitían desarrollar la economía y atraer inversión extranjera directa. Es de interés ver como ambas variables han variado en los periodos de esta investigación. La misma tiene como objetivo general explorar la relación entre la Inversión en el Capital Humano y la Inversión Extranjera Directa en la isla y cómo impacta en el desarrollo económico medido por el Producto Interno Bruto. La metodología de esta investigación es cuantitativa utilizando las bases de datos gubernamentales y analizando los datos mediante modelos de regresión múltiple divididos en tres periodos históricos para comparar entre sí las variables de estudio, inversión en el capital humano e inversión extranjera directa contra el producto interno bruto para determinar si alguna tiene un impacto positivo en el crecimiento económico de la isla. El hallazgo principal es que, en los periodos analizados, la inversión en el capital humano y la inversión extranjera directa aportaron al crecimiento económico de Puerto Rico, siendo el capital humano la variable de mayor impacto.

Palabras Clave: *Crecimiento económico; Capital humano; Inversión extranjera directa; Crecimiento económico.*

Introduction

Over the past decades, international trade, foreign direct investment (FDI) and investment in human capital (ICH) were components that led to the economic growth of countries (Borensztein et al., 1998; Fry, 1993). According to the literature, FDI has a direct effect on the quality of life and development of a country. However, HCI is key for countries to access FDI (Strat, 2015). In the era of globalization, the workforce needs to be more educated, adopting new technologies in a much more spontaneous way. Therefore, those economies whose workforce is poorly educated should have equal right or access to FDI for their development (Islam et al., 2016). The World Economic Forum (2013) emphasizes that FDI is a powerful instrument for economic growth and development. Therefore, this research is very important for Puerto Rico, because there are not many studies in this direction and during the last decades the country's economy has been in constant and great decline. Currently, the island faces a particularly professional talent drain that must be addressed with great haste, since the labor pyramid rests in a thin area due to the reduction of birth rate and the country is not replenished (Mena, 2018). By the above arguments, it is indicated that the general objective explores the relationship between investment in hHuman capital and foreign direct investment in Puerto Rico and how it impacts the economic development of the island as measured by gross domestic product (GDP). One of the specific objectives is to determine whether it was HCI or FDI that has contributed the most to Puerto Rico's economic development. With this data, valuable information is obtained in order to develop public policy and strategies to try to improve the island's current economic conditions.

Theoretical framework

Investment in human capital (ICH)

According to the literature, the first meaning of the concept of human capital was a work of the economist Adam Smith in the 18th century. It is understood as the set of skills, knowledge, experience, education, abilities and values possessed by workers and the labor force in general (Boisier, 2002). Therefore, one of its principles is the importance of useful and acquired skills for all members of society and the relationship between human capital and economic growth. That is, for the sake of economic progress and the well-being of nations, it is necessary to develop the skills of the labor force (United Nations Economic Commission for Europe [UNECE], 2016; Smith, 1776). In fact, much literature states that the most valuable capital is the capital invested in human capital (De la Dehesa, 1993; Marshall, 1890; Ruiz, 2016; Smith, 1776). To all this, it is in 1960 that it is mentioned that investing in education and training of the labor force can have an impact on the productivity of countries and economic systems (Schultz, 1961). Similarly, Becker (1964) argued that investing in human capital, through education and training, increases national and business productivity. However, Lucas (1988) suggested that "human capital should be considered as one of the inputs to production ...That a period of rapid growth is achieved through the accumulation of human capital...That a period of rapid growth is achieved through the accumulation of human capital..." (Lucas, 1988).

human capital" (p.17). Subsequent work by various researchers highlighted human capital as the main engine of economic growth (Barro, 1991; Romer, 1986; Spiegel and Benhabib, 1994; Stokey, 1991).

Foreign Direct Investment (FDI)

Foreign direct investment is one of the most important economic activities for long-term growth and stable economic development in any country, and is fundamental for developing countries. It is an indispensable tool of the economy to achieve commercial interactions with families, businesses and governments in other countries (Constant, 2010). In resu- men, FDI enhances technological progress and thus improves a country's productivity, and contributes to economic growth and human capital development (Constant, 2010; Nembot, 2010). Foreign direct investment is one of the main factors associated with the globalization process. Governments constantly seek to capture these capital inflows as a policy measure to increase employment, productivity and financial stability (Ba- sem-Hassan et al., 2012). While manufacturing is the leading sector in job creation. By 2008, foreign direct investment in Puerto Rico had grown rapidly, reaching more than $13 billion. However, after that year, FDI inflows have steadily declined (United Nations, 2014). Factors that influence the establishment of a business in Puerto Rico, and therefore have negative consequences for FDI inflows, are the inefficiency of government bureaucracy, followed by regulations, labor restrictions, fiscal regulations, tax rates and, ultimately, access to financing (World Economic Forum, 2013).

Economic Development

Economic development is defined as creating conditions conducive to economic growth, improving the quality of life, expanding the capabilities of individuals, firms and societies, maximizing the talent and skills of the community that support innovation, reducing transaction costs and producing high-value goods and services (US Bureau of Economic Development, n.d.). Todaro and Smith (2014), argue that economic development is defined as the ability of a country to generate and sustain an annual increase in GDP at a growth rate of 5% or more. Since the advent of classical and neoclassical economists, many indicators have emerged to measure economic development. These indicators include national income, per capita income, literacy, health, employment and poverty reduction (Sharma & Bhandari, 2005; Jahangir, 2012). The most common and oldest measure of economic development, used by national and international agencies, is per capita income, also known as gross domestic product (GDP).

Impact of the ICH on economic development

Lewis (1954; 1979); Becker (1964); Schultz (1979), who developed human capital theory, argue that acquiring more knowledge and skills increases the value of human capital. This has the effect of increasing employment opportunities, the earning potential

and individual productivity. According to Schulz's research articles, it was shown that investment in human capital, through education and training, is a prerequisite for economic growth (Pérez, 2006). Similarly, Pozega et al. (2011), in a study of 52 countries, found a positive relationship between education and economic development. Pérez (2006) analyzed the relationship between investment in human capital and Puerto Rico's Gross Domestic Product between 1977 and 2003. The results showed that the educational preparation of the labor force plays an important role in the growth of Puerto Rico's economy. The study concluded that the relationship between investment in human capital and Puerto Rico's Gross Domestic Product is strong and positive. Basem et al. (2012), emphasized the importance of developing highly skilled capital in Puerto Rico as part of economic development measures.

Impact of FDI on economic development

A large number of research articles have demonstrated the positive impact of FDI on the economic development of countries. Hlavacek and Bal-Domanska (2016) analyzed foreign direct investment and its impact on economic growth in Central and Eastern European countries from 2000 to 2012. They concluded that "increased foreign direct investment contributes significantly to the economy by increasing GDP. For these countries, foreign direct investment is a key indicator of economic stability and development" (p.294). Hojjati (2015) examined the relationship between economic growth and foreign direct investment flows in sub-Saharan Africa. The empirical results revealed that "foreign direct investment inflows have a positive impact on economic development in sub-Saharan African countries" (p.2). Rendón and Ramírez (2017) analyzed the impact of FDI on economic growth in Latin America from 1980 to 2010. The empirical model developed by these researchers showed that,

> FDI has a positive effect on GDP, but only in the short term. Since the long-term impact of FDI on GDP is zero, Latin American countries should allocate FDI to the technology sector, not to the natural resource and mining sectors, to ensure that the relationship between FDI and GDP is positive. (p.217)

In Puerto Rico, Basem- Hassan et al. (2012) used data from 1980 to 2010 and found that FDI inflows accounted for 8.1% of GDP in the short run and 12.1% of GDP in the long run. A proposal by this author is to create a model for Puerto Rico's economic development based on exports and foreign direct investment.

Contribution of FDI and Human Capital to Economic Development

In China, Su and Liu (2016), found that:

> The GDP growth rate is negatively correlated with the population growth rate, but positively correlated with the rate of investment in fixed capital and human capital. While FDI has a positive effect on the GDP per capita growth rate and that effect is enhanced by human capital skills. (p.97)

In Asia, Azam and Ahmed (2015), examined the impact of human capital and FDI on economic growth in 10 countries (Armenia, Azerbaijan, Belarus, Georgia, Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan and Ukraine). The results showed that:

> Human capital development is critical for economic growth. Similarly, they found that FDI has a facilitating role in promoting economic growth in the ten countries studied. Finally, they concluded that an investment in education and health is paramount to achieving economic growth. FDI alone does not have a significant effect on growth. (p.105)

In Malaysia, Shakar and Aslam (2015), examined the effects of FDI and human capital development on the economic growth of the previously mentioned country within the period from 1980 to 2010. The results revealed that there is no significant impact of FDI on economic growth in Malaysia. This implies that the Malaysian economy has focused on other more important factors and human capital is one of them. In other words, human capital had a positive and significant impact on growth. In the long run, a 1% increase in the skilled labor force is associated with a 0.33% growth in OIB per capita. In the Philippines, Agbola (2014), investigated the impact of FDI and human capital on economic growth. The empirical results showed that "FDI has a positive effect on growth only when there is an increase in human capital development" (p.272). Finally, in Nigeria, Augustina and Kenechukwn (2013) investigated the interaction between FDI and human capital on growth. Finding that "as much as FDI and human capital have a significant and negative effect on economic growth, the same can be explained by the lack of a highly skilled labor force" (p.1134).

Methodology

Research approach and scope

The methodology of this research is quantitative, using government databases and analyzing the data through multiple regression models divided into three historical periods to compare the variables under study, human capital investment and foreign direct investment against gross domestic product, to determine if either has a positive impact on the island's economic growth.

Hypothesis

H1: There is a positive relationship between investment in human capital and foreign direct investment in gross domestic product and, therefore, in the economic development of Puerto Rico in all the periods analyzed.

H2: Puerto Rico's economic development, measured by GDP at constant 1954 prices,

reveals a large contribution of investment in human capital and foreign direct investment in the early stages of the island's economic growth (1955-1975 period).

H3: Despite the economic recessions in Puerto Rico during the period from 1970 to 2016, the contribution of human capital investment and foreign direct investment declined relative to the previous period from 1955 to 1975.

Model

Hypothesis testing was performed in this study using a multiple regression with absolute value. In addition, the data will be analyzed using a logarithmic linear regression model. The reason for using linear regression to estimate parameters in nonlinear models is to transform that nonlinear equation to a linear one so that it can be estimated using the least squares technique. To estimate the parameters of a nonlinear equation it must be transformed to a linear one. This is achieved by obtaining the natural logarithms on both sides of the equation. The following multiple regression model has been developed, where the dependent variable is GDP and the independent variables are total employment, and the proxies of HCI and FDI. Each independent variable is expected to have a positive correlation with the dependent variable (GDP).

Below are the three multiple regression models, one for each period to be studied.

$$logPIB_{1955\text{-}1975} = a(\ log) + b(\ logICH) + c(\ logIED) + d(\ logE) + \varepsilon j$$

$$logPIB_{1975\text{-}2006} = a(\ log) + b(\ logICH) + c(\ logIED) + d(\ logE) + \varepsilon j$$

$$logPIB_{1970\text{-}2016} = a(\ log) + b(\ logICH) + c(\ logIED) + d(\ logE) + \varepsilon j$$

We now define the following relationships:

$$GDP' = ln\ ln$$

$$Y\ ICH' = ln\ ln$$

$$X\ IED' = ln\ ln$$

$$G\ E' = ln\ ln\ Z$$

$$a' = ln\ ln\ a$$

The linear transformation of the equation looks as follows:

$$Y' = a' + bX' + cG' + dZ'.$$

Source of data

The variables, corresponding to human capital, foreign direct investment and GDP, at constant prices and in millions of dollars, are shown below. All data are statistics from the Puerto Rico Planning Board and the Department of Labor and Human Resources. The data cover the period from 1950 to 2010.

Employment

The main source for employment statistics comes from the Department of Labor and Human Resources. The historical series of total employment of right-handed and non-right-handed workers was obtained from the Department of Labor and Human Resources.

Investment in Human Capital

Regarding the measurement of human capital, many researchers have used different proxy variables to measure human capital. Barro and Lee (1993) mentioned that school enrollment ratios, adult literacy rates, and degree attainment at different academic levels are ways of measuring human capital. Nehru et al. (1993), constructed a series of estimates of the stock of education in 85 countries to create a total estimate of productivity factor growth in the countries analyzed. The high correlation between the average education stock and other indicators of human capital, such as health, suggest the use of this proxy as a reasonable step. Of all these variables, it is mentioned that spending on education has microeconomic dimensions and social implications because an investment in human capital can bring benefits to society and the country in terms of competitiveness and economic development. The proxy variable to be used to measure investment in human capital is personal consumption expenditures in private education. This information was obtained from Table 5 (personal consumption expenditures by main type of product) of the Governor's Economic Appendices prepared by the PR Planning Board.

Foreign Direct Investment

As for FDI, there are currently no statistics that show the total amount of inward FDI to Puerto Rico. We used investment in construction, machinery and equipment by private companies whose investment amounts are expressed in millions of dollars. This is the proxy variable to measure FDI inflows to Puerto Rico. According to Basem-Hassan et al. (2012), of the aforementioned item, 99.8% of the investment comes from abroad. The data were obtained from Table 8 (gross domestic fixed capital investment) of the Governor's Economic Appendices.

Gross Domestic Product

To measure economic development, the Gross Domestic Product (GDP) indicator at constant 1954 prices will be used. Data were obtained from Table 1 (selected income and output series, total and per capita) of the Governor's Economic Appendices.

Data analysis

Several experiments with absolute value and logarithm were carried out in different economic periods in Puerto Rico. The statistical program used to perform the multiple regression analyses was E-Views 10. For the first experiments several regressions were estimated in which Gross Domestic Product (GDP) was used as the dependent variable and capital stock, private education expenditures and total employment as in- dependent variables, but the results were not very favorable. Other experiments were carried out in which the capital stock was replaced by private investment in construction, machinery and equipment. The results, with logarithmic values, were significant and superior to those obtained in the first experiments. Statistical significance tests of the estimated parameters were carried out to evaluate the estimated regression equation. In this way, it is possible to determine how much the estimated regression equation explains the variation in Y. The tests used to evaluate the model were: coefficient of determination, F-statistic, t-value and Durbin-Watson test.

Results

Table 1
Period 1955 to 1975

Variable Dependiente PIB

Variable	Coeficiente	Error Estándar	Estadística-t	Prob.
C	3,470933	4,417645	0,785698	0,4443
IED	0,344099	0,067165	5,123229	0,0001
ICH	0,442054	0,111237	3,973995	0,0012
E	0,292415	0,453319	0,645053	0,5286
AR (1)	0,720385	0,240556	2,994665	0,0091

n=21	Durbin-Watson= 1,888273
R^2=0,996024	Estadística-F= 751,4681
Error estándar de la regresión= 0,031246	Prob. (Estadística-F) =0,000000

Source: own elaboration with the collected data.

The t-statistic test of 3.973 for the private education expenditures variable and 5.123 for the private investment in construction, machinery and equipment variable, when compared with the critical t-value (at a significance level of 0.95) of 2.086, it can be inferred that both variables played a highly significant role in economic development. However, total employment with a t-test statistic of 0.645, being less than the critical value, did not play a significant role in economic development.

The P-value (Prob.) of The P-value (Prob.) of 0.0012 for the private education expenditures variable and 0.0001 for the private investment in construction, machinery and equipment variable is less than 0.05. Therefore, the null hypothesis that HCI and FDI are not associated with GDP is rejected. Regarding the total employment variable, since the P-value (Prob.) is 0.5286, the null hypothesis that total employment is not associated with GDP is not rejected. With three independent variables and 21 observations, the Durbin Watson result, with a value of 1.893, is between the minimum critical value of 1.669 and the suggested maximum critical value of 2.331. Therefore, it can be inferred that there is no (or little) autocorrelation between the independent variables.

Table 2
Period 1975 to 2006

Variable Dependiente PIB				
Variable	Coeficiente	Error Estándar	Estadística-t	Prob.
C	5,995202	2,530652	2,369035	0,0255
IED	0,143708	0,105119	1,367093	0,1833
ICH	0,358340	0,086327	4,150983	0,0003
E	0,512442	0,350360	1,462615	0,1556
AR (1)	0,737950	0,179870	4,102685	0,0004
n=32		Durbin-Watson= 1,893823		
R^2=0,995500		Estadística-F= 1150,227		
Error estándar de la regresión= 0,026458		Prob. (Estadística-F) =0,000000		

Source: own elaboration with the collected data.

The t-statistic test of 4.150 for the private education expenditures variable when compared to the critical t-value (at a significance level of 0.95) of 2.042, it can be inferred that this variable plays a significant role in economic development. However, total employment and private investment in construction, machinery and equipment with a t-test of 1.367 and 0.645, respectively, being less than the critical value, did not play a significant role in Puerto Rico's economic development. The P-value (Prob.) of 0.0003 for the private education expenditures variable is less than 0.05. Therefore, the null hypothesis that this variable is not associated with GDP is rejected. With respect to the total employment variable and private investment in construction, machinery and equipment, since the P-value (Prob.) is 0.1556 and 0.1833, respectively, greater than 0.05, the null hypothesis that both variables are not associated with GDP is not rejected. With three independent variables and 32 observations, the Durbin Watson result, with a value of 1.893, is between the minimum critical value of 1.650 and the maximum critical value of 2.349 suggested. Therefore, it can be inferred that there is no (or little) autocorrelation between the independent variables.

Table 3
Period 1970 to 2016

Variable Dependiente PIB

Variable	Coeficiente	Error Estándar	Estadística-t	Prob.
C	9,523423	2,083511	4,570853	0,0000
IED	0,105706	0,072349	1,461063	0,1516
ICH	0,313603	0,060841	5,154504	0,0000
E	0,374159	0,220691	1,695394	0,0976
AR (1)	0,989828	0,042811	23,12087	0,0000

n=47	Durbin-Watson= 2,001727
R^2=0,989828	Estadística-F= 3131,108

Error estándar de la regresión= 0,023045 Prob. (Estadística-F) =0,000000

Source: own elaboration with the collected data.

The t-statistic test of 5.154 for the private education expenditures variable when compared with the critical t-value (at a significance level of 0.95) of 2.021, it can be inferred that this variable plays a significant role in economic development. However, total employment and private investment in construction, machinery and equipment with a t-test of 1.695 and 1.461, respectively, being less than the critical value, did not play a significant role in the economic development of Puerto Rico. The P-value (Prob.) of 0.000 for the private education expenditures variable is less than 0.05. Therefore, the null hypothesis that this variable is not associated with GDP is rejected. With respect to the total employment variable and private investment in construction, machinery and equipment, since the P-value (Prob.) is 0.0976 and 0.1516, respectively, greater than 0.05, the null hypothesis that both variables are not associated with GDP is not rejected. With three independent variables and 47 observations, the Durbin Watson result, with a value of 2.001, is between the minimum critical value of 1.666 and the maximum critical value of 2.334 suggested. Therefore, it can be inferred that there is no (or little) autocorrelation between the independent variables. For all the periods analyzed, private education expenditures (ICH) and private investment in construction, machinery and equipment (FDI) show a positive and direct relationship with Puerto Rico's economic development. Private education expenditures, for all the periods analyzed, in maintaining a strong association with GDP and with its major contribution to Puerto Rico's economic development. Based on this result, we can infer the importance of investment in human capital on the economy. Although FDI had a significant impact in the period from 1955 to 1976, this does not imply that it did not contribute to Puerto Rico's economic development in the rest of the periods analyzed.

Discussion

For all the periods analyzed, private education expenditures, private investment in construction, machinery and equipment, and total employment show a positive and direct relationship with Puerto Rico's economic growth. This is in line with the large number of studies conducted globally that show this direct relationship between the variables under study and GDP. Expenditures on private education were the only variable to maintain a strong association with GDP in all the stages analyzed. While investment in construction, machinery and equipment had a strong association with GDP in the 1955-1975 period. In the early stages of Puerto Rico's economy, the labor force was focused on coffee, sugar and tobacco agriculture; but since 1947, several programs were initiated to develop human capital and attract foreign investment to the island, thus turning Puerto Rico into a model of economic development. An analysis of the results from 1955 to 1975 shows that education expenditures and private investment in construction, machinery and equipment contributed 44% and 34%, respectively, to Puerto Rico's economic development. This indicates that, during the early stages, both human capital development and foreign direct investment had a large contribution to GDP. In other words, both independent variables were the engines of Puerto Rico's economy. They contributed to the existence of increasing returns to scale.

In the second period, 1975-2006, total employment contributed 51% to Puerto Rico's economic development (GDP), followed by investment in private education with 35% and private investment in construction machinery and equipment with 14%. During this period, Puerto Rico faced several economic crises and recessions that affected all the variables under study, thus decreasing its contribution to economic development, with the exception of total employment, which increased. The growth rates, shown previously, reflect this decline in the growth of all variables under study. In the 1955-1975 period, the growth rate for GDP, private education expenditures, private investment in construction, machinery and equipment, and total employment had a growth rate of 6.34%, 8.12%, 6.28% and 1.31%, respectively. But for the 1975-2006 period, they decreased to 3.67%, 5.76%, 4.05% the first three variables in their respective order, and the last one, being total employment, increased to 1.91%. As for the return on scale, it was a constant one.

Finally, the period 1970-2016 was selected because it covers all economic crises, including the one currently affecting Puerto Rico. The contribution to GDP achieved by education expenditures and private investment in construction, machinery and equipment, 31% and 10%, in their respective order, was much lower than previous periods. The growth rates reflect the same pattern, where education expenditures and private investment in construction, machinery and equipment obtained a growth rate of 4.66% and 1.21%, in their respective order, being these values lower than previous periods.

GDP has also declined, as with the rest of the independent variables. This situation explains the declining scale performance for this period. Puerto Rico has entered an unprecedented economic crisis. The exit of manufacturing industries, the massive emigration of Puerto Ricans, the rise in the unemployment rate, and the closing of schools, all of which have led to an unprecedented economic crisis.

The decline pattern of all the variables can be clearly explained by the statistical tables and graphs located in Appendix B and C from 2006 onwards. This pattern can be observed in the statistical tables and graphs located in Appendix B and C from 2006 onwards. In summary, the analysis of results accepts the alternative hypotheses previously mentioned and shown below.

This research is based on two studies previously conducted using Puerto Rico as the country of analysis. The first, by Pérez (2010), investigates the contribution of investment in human capital to the economic development of Puerto Rico. The conclusion made by the researcher indicates that during the period from 1977 to 2003 the relationship between economic growth and investment in human capital is strong and positive. The second study, Basem-Has- san, et al. (2012), using data from the period 1980 to 2010, found that FDI inflows explain 8.1% of GDP in the short run and 12.1% of GDP in the long run. Therefore, the researchers conclude that an economic growth model for Puerto Rico should be based on FDI inflows. Both of these studies using data from Puerto Rico empirically validated, as does this study, the importance of FDI inflows and HHI for Puerto Rico's economic growth. The difference of this study, in comparison with the two mentioned researches, is that both FDI and ICH variables are integrated to analyze their joint impact on Puerto Rico's economic growth.

In the international arena, there are studies where the FDI and HCI variable were integrated to analyze their relationship with economic growth. Su and Liu (2016), found that FDI has a positive effect on the growth rate of GDP per capita, of China, and that effect is intensi- fied by human capital skills. Azam and Ahmed (2015), examined the impact of human capital and FDI on economic growth in 10 countries (Armenia, Azerbaijan, Belarus, Georgia, Kyrgyzstan, Kazakhstan, Tajikistan, Turkmenistan, Uzbekistan and Ukraine). The results showed that human capital development is critical for economic growth. Similarly, they found that FDI has a facilitating role in promoting economic growth in the ten countries studied, but this variable alone does not have a significant effect on growth as educated human capital is necessary. Agbola (2014), investigated the impact of FDI and human capital on economic growth in Malaysia. The empirical results showed that FDI has a positive effect on growth only when there is an increase in human capital development. These results coincide with this research, where in the three historical periods it was investment in human capital that made the greatest contribution to Puerto Rico's economic growth.

The contribution of human capital to the island's development coincides with the results and theoretical approaches of the new theory of economic growth, which emphasizes the role of investment in human capital in economic growth. This premise was suggested long before by important economists such as Adam Smith and Alfred Marshall. According to Smith (1776), he indicated that the development of qualities in workers is fundamental to achieve economic progress and welfare. In addition, Marshall (1890) stated that the most valuable capital was that which was invested in human capital. In each of these investigations, the critical role of human capital on economic growth is emphasized over the contribution of FDI.

The contribution of this study is to raise awareness about the importance of foreign direct investment and human capital for the economy of any country, but in this case Puerto Rico. The island does not have anything that can generate economic movement, we do not have oil, gold, or agriculture like other countries, we only have tourism and offer a prepared human capital, trained to another level that is the magnet that attracts investment to the country. When analyzing the three historical periods, which include the years from 1955 to 2016, show a reduction in the impact on economic growth due to the departure of foreign companies and the exodus of trained human capital outside the island for not having the opportunity of a good job with which they can support their homes.

Conclusions

The results were consistent with the opinions of different economists and research showing the relationship between FDI and FDI in the countries' GDP. The period from 1955 to 1975 was where FDI and HCI had their greatest impact on Puerto Rico's GDP compared to subsequent periods. This result is explained by the different programs established since 1947 to develop human capital and attract foreign investment to the island, thus turning Puerto Rico into a model of economic development. However, in the 1975-2006 period, the impact of FDI and HCI on GDP was lower than in the previous period, with HCI making the greatest contribution. This is primarily explained by the different worldwide economic recessions that aggravated and affected Puerto Rico's economy. All of these recessions caused too much instability in private investment in construction, machinery and equipment.

Second, the elimination of Section 936 in Puerto Rico in 1996 left many foreign companies without tax benefits. This had the effect of closing multiple manufacturing companies, thus causing a decrease in investment and an increase in the unemployment rate, and a massive outflow of capital. With respect to the ICH, during this period, student loans began to be provided to encourage more Puerto Ricans to continue their postgraduate studies.

The last period, from 1970 to 2016, includes all of the aforementioned recessions previously mentioned, and the current economic situation negatively affecting the country. Since 2006, at the end of the Section 936 grace period, Puerto Rico has entered into a deep recession, thus causing a decline in total employment, GDP and private investment in construction, machinery and equipment. Added to this is the massive emigration of Puerto Ricans to the United States.

Recommendations

Puerto Rico has the resources and human capital to emerge from the crisis. It is necessary to provide children, youth and adults with a world-class education that will give them the tools for their full development as people capable of directing their destiny and contributing to the human development of Puerto Rico.

Puerto Rico. The educational offer must be aligned with the needs of the country and with the labor market, thus eliminating the problem faced by graduates in entering the labor market on the Island. In addition to the above, the educational system must continue to promote business development, innovation and internationalization. Finally, it is important to articulate a knowledge economy model with the educational competencies necessary for the development of human capital, in order to achieve a positive impact on economic growth.

Future research

The following are three ideas for future research. First, conduct the same study, but comparatively, with other countries such as Ireland and Singapore. Second, add a proxy variable for health as part of human capital investment and study its relationship with education, FDI and economic development in Puerto Rico. Third, study the determinants of FDI entering the island and thus develop new policies in accordance with the main determinants.

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