The Economic Relation of the United States and the Puerto Rican Economies: An Interregional Input-Output Approach

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Introduction

The recent discussions on the issue of the political status of the island have brought to the surface, once again, the subject of the economic relations between Puerto Rico and the United States. Quite few number of studies have been commissioned by the political parties representing different status options for the island[1]. Some other studies or research papers have approached the subject with a more or less objective view and still some others were prepared by Federal Government Agencies[2]. Unfortunately most of the works dealing with economic impacts analysis approach the subject from an unilateral point of view. In other words, the analysis is bias toward the benefits the economy of the island has derived from the economic integration of both economies, paying little attention, or completely neglecting, the economic impact of locally generated economic activity in the U.S. economy.

The purpose of this work is to estimate and analyze the economic impact of the different economic flows between the Puerto Rican and United States economies. The impact of Puerto Rico's economy on the United States economy (and vice-versa) have been measured in terms of output, employment and labor income. These flows have been classified as transfer payments to the government and to persons, external trade transactions, tourist expenditures, expenditures of federal agencies in Puerto Rico, and investment flows. These balance of payment accounts are analyzed bilateraly, except in the case of investment and expenditures of the federal government on the island[3].

The Results

Impacts of Trade Between the Two Economies

In this section of the study we will select key elements of the interregional flows between the United States and Puerto Rico and evaluate the impacts on the Puerto Rican economy. The main flows between the two economies could be classified under external trade, transfer payments, tourism and investment.

The Aggregate Impact of the United Sates Economy

In this exercise all our exogenous variables will be added in order to measure the impact of the United States economy on the Puerto Rican economy and this latter impact on the U.S. economy. The aggregated impact will be described in terms of gross output, employment and wage income.

The six types of flows considered in this analysis generated 33 per cent of total employment in Puerto Rico. Total employment impact in Puerto Rico was 322,295 in 1992 compared to 209,100 in 1977[4].

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1. See for instance, KPMG Peat Marwick, Policy Economics Group, **Economic and Fiscal Impacts of Puerto Rican Statehood**, prepared for the Governor of Puerto Rico, February 1990; Price Waterhouse, **Benefits and Costs of Section 936,** work prepared for the Puerto Rico, U.S.A. Foundation volumes 1 and 2, May 1991; Mckee, Michael., **The Economic Consequences of Puerto Rican Statehood,** work prepared for the New Progressive Party, June 1990.

2. Congressional Budget Office, **Potential Economic Impacts of Changes in Puerto Rico's Status,** Washington, D.C., April 1990; General Accounting Office, **Tax Policy, Puerto Rico and the Section 936 Tax Credit,** Washington, D.C., June 1993; Department of the Treasury, **The Operation and Effect of the Possessions Corporation System of Taxation**, **Sixth Report,** Washington. D. C., March 1989; Finn Bertram, "The Implications of Statehood", in Jorge Heine (editor), **Time for Decision**: the U. S. and P. R., Lanham, MD: North-South Publishers. 1983.

3. There are, of course, direct investment of local residents in the U.S. economy. However, these flows are quite difficult to quantify. By the same token, our estimates of the economic impacts are underestimated, especially the impact of our economy in the U.S. economy since we are not including the repatriation of profits of U.S firms operating in Puerto Rico (and vice-versa).

In the following table we have summarized the aggregate impact including U.S. investments impact on the P.R. economy.

The leakage effects are also of considerable importance. These leakages are reflected in considerable output impact in the United States. In the next section, the analysis will emphasize these aspects of the relationship between the two economies. We first consider the impact of six different flows in gross output of both economies.

4. See Fernando Zalacaín (1981) unpublished Ph.D. dissertation, University of Illinois, Urbana Champain, Illinois.

TABLE 1

IMPACT ON GROSS OUTPUT OF FLOWS BETWEN THE U.S. AND PUERTO RICAN ECONOMIES IN 1992 (in million dollars, 1982=100)

	Impact on Goss Output	
	In Puerto Rico	In United States
Exports	19,463.88	22,556.57
From Puerto Rico to the United States	19448.78	4,150.07
From United States to Puerto Rico	15.10	18,406.50
Transfer Payments	5,472.34	4,529.92
From Puerto Rico to the United States	2.36	2,469.23
From United States to Puerto Rico	5,469.98	2,060.69
Tourits Expenditures	1,026.47	1,644.51
From Puerto Rico Residents in the United States	1.84	1,004.56
From United States Residents in Puerto Rico	1,024.63	639.95
Investment in Machinery and Equipment	1,555065	1,539.54
Expenditures of Federal Agencies in P. R.	730.80	31.37
Income on Externally Held Investment	10.70	9,479.90
Total Impact	**28,259.84**	**39,781.81**

Table 1 summarizes the results.

An examination of Table 1 shows that the U.S economy generated $28,259.8 million of output in the Puerto Rican economy during fiscal year 1992. This figure represents an estimate of 50.5 per cent of total output for the total economy for this year.

The impact of Puerto Rican economy in the U.S. economy is substantially higher, or $39,781 million. Exports is the final demand component of greater impact on the output of both economies followed by transfer payments.

The main impact of exports is on the gross output of manufacturing sector. Transfer payments impact on output is more evenly distributed favorably affecting some important service industries and trade. In the case of the U.S. economy, income on investment generated in Puerto Rico is the second major source of output.

TABLE 2

IMPACT ON EMPLOYMENT OF FLOWS BETWEEN THE U.S. AND PUERTO RICAN ECONOMIES (1982=100)

	Impact on Employment	
	In Puerto Rico	**In United States**
Exports	172,064	236,874
From Puerto Rico to the United States	171,932	43,868
From United States to Puerto Rico	132	193,006
Transfer Payments	82,501	66,061
From Puerto Rico to the United States	19	44,436
From United States to Puerto Rico	82,482	21,625
Tourits Expenditures	17,004	21,742
From Puerto Rico Residents in the United States	19	14,692
From United States Residents in Puerto Rico	16,985	7,050
Investment in Machinery and Equipment	26,359	15,065
Expenditures of Federal Agencies in P. R.	24,278	336
Income on Externally Held Investment	89	147,654
Total Impact	**322,295**	**487,732**

Table 2 shows the employment impact of flows between the two countries. An examination of the summarized table on employment impact shows, without any doubt, that the island economy has a considerable impact on the employment in U.S economy. During fiscal year 1992, economic flows between the two economies generated 487,732 direct and indirect jobs in the U.S. economy. Once again, most of the employment was generated by the trade flows between the two countries followed by the employment generated by the income on investment. The employment impact of the U.S economy in P.R., although considerable, falls short of the one generated there by our economy. The major source of employment in P.R. comes from the output generated by the trade relations of both countries. The second major source of employment generation comes from transfer payments from the U.S. to Puerto Rico, or 82,482.

Finally we will present the aggregated results of the impact on wage income of the six above mentioned flows. These results are of great importance since the labor income is the value added that remains on the island and one of the main sources for increasing the welfare of our people.

TABLE 3

IMPACT ON WAGE INCOME OF FLOWS BETWEEN THE U.S. AND PUERTO RICAN ECONOMIES IN 1992 (in million dollars, 1982=100)

	Impact on Labor Income	
	In Puerto Rico	**In United States**
Exports	2,362.75	6,783.81
From Puerto Rico to the United States	2,361.10	1,375.51
From United States to Puerto Rico	1.65	5,408.30
Transfer Payments	878.43	1,675.82
From Puerto Rico to the United States	0.26	1,091.73
From United States to Puerto Rico	878.17	584.09
Tourits Expenditures	144.70	406.69
From Puerto Rico Residents in the United States	0.22	252.44
From United States Residents in Puerto Rico	144.48	154.25
Investment in Machinery and Equipment	276.82	473.98
Expenditures of Federal Agencies in P. R.	374.76	9.39
Income on Externally Held Investment	1.20	3,155.42
Total Impact	**4,038.66**	**12.505.11**

Table 3 shows the income generated in both economies by the exogenous vectors analyzed in this work. An analysis of the table shows that direct and indirect wage income induced by the economic flows of both countries amounted to $4,038.7 million during fiscal year 1992. In that year total wages and salaries in Puerto Rico amounted to $10,132.9 million, in 1982 prices. These data reveal that 39.8% of these wages were induced by the six flows discussed in this work. By the same token, 58.5% out of a total of $4,038.7 million in wages were generated by trade flows between the two countries. It is worth observing that wages generated by our economy in the U.S. economy are three times as high as those generated by that economy in the island economy. In the U.S. also most wage generation comes from trade flows.

Looking at the aggregate impact by major industrial sectors and some specific industries, we can have a more integral view of the impacts of the various flows analyzed in this work (see table of aggregates by industrial sectors in Ruiz and Zalacaín, 1993). An analysis of the data shows that, for fiscal year 1992, the U.S. economy generated 109,734 manufacturing jobs in the economy of Puerto Rico, or 66.9% of total manufacturing employment on the island. Looking at the same sector, we observe that the specific manufacturing industries most benefited by the bilateral relation are industries such as: food and kindred products, apparel and accessories, drugs, electrical and electronic equipment and professional instruments. In the case of impact in the U.S. economy, industries such as: food, textile mill products, rubber and plastics, electrical and non-electrical machinery, and transportation equipment are among the most benefited in terms of employment. One important result is the impact of the relation on the service sector. In the case of Puerto Rico, as well as in the case of United States, industries such as: trade, transportation, personal and repair services, business services and health services create a great number of jobs. For instance, the number of jobs created in the Puerto Rican and the U.S economies in the trade sector, in 1992, amounted to 60,195 and 59,180 respectively. The corresponding figure for business services were 29,195 and 50,074 respectively.

Some Concluding Remarks

Most of the works dealing with impact analysis of the United States-Puerto Rico economic relations approach the subject from an unilateral point of view. The analyses are bias toward the benefits the economy of the island has derived from the economic integration of both economies. Little attention (if at all), is given to the important impact of locally generated economic activity in the U.S. economy. In this work we tried to start remedying this lack of information.

The purpose of our work has been to estimate and analyze the economic impact of the different economic flows between the Puerto Rican and United States economies. The flows were taken from the balance of payment and other national accounting. The impact of the Puerto Rico's economy on the United States economy (and vice-versa) was measured in terms of output, employment and labor income, as endogenous vectors. The exogenous vectors were the transfer payments to the government and to persons, external trade transactions, tourist expenditures, expenditures of federal agencies in Puerto Rico, investment in machinery and equipment and income flows derived from the direct investment of U.S firms in Puerto Rico. These balance of payment accounts are analyzed bilateraly. However, in the case of investment and expenditures of the federal government on the island, the impact on U.S economy was not taken into consideration.

The economic impact of bilateral flows in both economies was estimated using an interregional input-output model. The construction of an interregional input-output model using the Leontief-Isard formulation was the main empirical methodological tool used in this study. Some of the major problems encountered in constructing the model were: the construction effort involved in the elaboration of the export matrix for Puerto Rico ($\mathbf{R}^{21}$ in the model), the modification of the existing import matrix, and the work related to the compatibility of the coefficient matrices of Puerto Rico and the United States. Another major problem was that the U.S. 1982 input-output table was constructed using different methodological procedures. The new methodology adopted for the 1982 input-output model of the U.S. was based on the United Nations' recommended procedure which has not yet been adopted on the island.

The main characteristic of the model is that the input-output tables are computed on a commodity by commodity base. Since the model for Puerto Rico was constructed using the usual industry by industry approach, then the U.S. model had to be transformed to industry by industry in order to make it compatible with the P.R. input-output accounting.

Our results show that the U.S impact in our economy, especially concerning employment creation, is considerable. The 322,295 jobs created on the island account for 33% of total employment during fiscal year 1992. However, the employment generated by our economy in the United States was considerably higher, 487,731. Although this latter figure is minimal when compared with U.S. total employment, it can be of great significance for specific states or regions of that economy, especially in the eastern part of that country.

One of the most interesting results of our analysis was the fact that the flows from Puerto Rico to the United States economy, like for instance, exports from the island to the U.S. economy, create a considerable number of jobs not only locally but in that economy, while the reverse situation does not apply in the case of flows from the U.S economy to Puerto Rico. In other words, that the U.S. economy not only benefits from the demand for goods and services originating in Puerto Rico but also from their own demand for goods and services produced in Puerto Rico.

Looking at figures of value added in the form of wage income generated by the bilateral relation, we found that the wage income generated by our economy in the U.S economy was three times as large as the wage income generated by that economy in our economy.

Finally, the great impact on employment and output originating by trade and transfer payment flows is somewhat worrisome, since most exports to the U.S. are generated by firms under Section 936 of the U.S. Internal Revenue Code which, at present to say the least, is a controversial issue. By the same token, the great dependence on transfer payments for job creation, as shown by our results, is not a solid base for the long term economic growth of the Island, especially under the great uncertainties concerning our political status.

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