CBO PAPERS

POTENTIAL ECONOMIC IMPACTS OF
CHANGES IN PUERTO RICO'S STATUS
UNDER S. 712

April 1990

NOTES

Puerto Rican fiscal years start on July 1 of the preceding calendar year.

U.S. fiscal years start on October 1 of the preceding calendar year.

Details in the text and tables of this report may not add to totals because of rounding.

Puerto Rican gross product is referred to as gross national product (GNP).

The provisions of S. 712 considered in this report are those contained in the bill as reported by the Senate Committee on Energy and Natural Resources.

Corporations in Puerto Rico that, if current status continues, would qualify under the provisions of Section 936 of the Internal Revenue Code are referred to throughout this report as "Section 936 corporations." This designation is used here for convenience, even though S. 712 stipulates that, for such firms, application of the provisions of Section 936 would be phased out under statehood and would be eliminated under independence.

PREFACE

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Puerto Rico is scheduled to hold a referendum in the summer of 1991 to determine its future as a political entity: citizens will vote on whether to remain a commonwealth within the United States, to become a state of the Union, or to become an independent nation. A bill now pending in Congress, S. 712, would make the results of the referendum binding under specific legal and financial terms that are set out in the bill.

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SUMMARY OF CONCLUSIONS

A bill now before the Congress provides for a referendum in Puerto Rico scheduled for 1991 to determine the island's political status. In the referendum, voters in Puerto Rico would choose to become a state, to become an independent republic, or to remain a commonwealth within the United States (although with enhanced status). The Congressional Budget Office (CBO) has been asked to estimate how a change in Puerto Rico's status, if it were made under the stipulations of the current version of the bill (S. 712), would affect the island economy over the remainder of the decade.

As S. 712 defines them, the various status options could have important implications for Puerto Rico's economy, though the outcomes are hard to predict with confidence. Many of the most important economic implications of the changes in status are impossible to quantify with the usual economic methods, and this report makes no attempt to do so.

Those aspects of statehood under S. 712 that CBO is able to quantify may eventually bring about a significant reduction in the growth of the Puerto Rican economy. Increased federal transfers (less new taxes) would initially stimulate the economy. Later, however, statehood could lead to slower economic growth than would be expected under commonwealth status because statehood could reduce the growth of investment, output, and employment in the manufacturing sector. This reduction would be initiated because, under statehood, U.S. corporations operating in Puerto Rico would no longer enjoy tax advantages provided by Section 936 of the Internal Revenue Code.

The results would depend, in part, on the speed and degree with which U.S. corporations would slow the rate at which they invest on the island. They would also depend on the size of the Section 936 sector compared with the rest of the Puerto Rican economy. The possible scenarios that CBO investigated suggest that between 1992 and 2000, projected annual growth in Puerto Rico's real (inflation-adjusted) gross national product under statehood might be slower by about one to two percentage points than under current commonwealth status. These declines in growth are consistent with a reduction of between 10 percent and 15 percent in the level of Puerto Rico's gross national product (GNP) in the year 2000 from the levels that would otherwise be projected for that year. These reductions in the growth of real GNP would be accompanied by annual growth in employment about one-half to one percentage point slower than that projected under commonwealth status.

These figures should be regarded as rough guides to the magnitudes involved, not as precise estimates of the behavior of the Puerto Rican economy under statehood. They cannot take into account the unquantifiable gains from statehood, such as the effects of reduced uncertainty about Puerto Rico's future status and increased awareness of the opportunities that it offers. These effects, which generally would work to improve the economic outlook under statehood, may be significant, though CBO can give no estimate of their size.

If Puerto Rico became independent, the economic changes might be quite different but are even harder to predict. CBO has not attempted to prejudge how much direct investment Puerto Rico could attract under independence. If direct investment from outside were to remain at the levels projected under a continuation of commonwealth status, the reduction and eventual elimination of federal transfers

to Puerto Rico from baseline levels mandated by S. 712 would be likely to cause relatively small reductions in the growth of real GNP--on the order of 0.2 to 0.3 percentage point per year over the period from 1992 to 2000. In addition, an independent Puerto Rico would face interest rates on funds borrowed abroad that would be at least two percentage points higher than those it would pay under other status options. These changes may be accompanied by others, either positive or negative, that could potentially be larger, but CBO has not been able to quantify them. These possible changes include expansion in direct investment in Puerto Rico by countries other than the United States, reduced economic dependency among the Puerto Rican people, and complications in obtaining external finance for the balance of payments.

INTRODUCTION

The Congress is now considering a Senate bill, S. 712, that provides for and would recognize the results of a referendum in Puerto Rico scheduled for 1991 to determine the island's political status. In the referendum, voters in Puerto Rico would choose to enter the Union as a state, to become an independent republic, or to remain a commonwealth within the United States (although with enhanced status). If no majority is attained, even after a runoff, the island would retain its current commonwealth status. S. 712 would recognize the results of the referendum as binding, and partially specifies legal and financial arrangements under which any of the three status options--statehood, independence, or an enhanced version of the commonwealth arrangement--would be implemented. The Congressional Budget Office (CBO) has been asked to estimate how a change in Puerto Rico's status, if it were made under the stipulations of the current version of S. 712, would affect the island economy over the remainder of the decade.

As S. 712 defines them, the various status options could have important implications for Puerto Rico's economy, though the outcomes are hard to predict with confidence. Enhanced commonwealth status would establish procedures under which federal laws and regulations applying to Puerto Rico could be modified selectively in order to enhance the island's economic growth. At present, a heavy regulatory burden is imposed by many federal laws and regulations; some of these are inappropriate when applied to a developing region in a tropical and insular setting. Under S. 712, federal agencies would be required to be guided by a new federal policy of accelerating the island's economic development, taking local conditions into account. Proponents of enhanced commonwealth status argue that these changes could improve the current program for economic development of the island, which focuses primarily on expansion of tourism and of manufacturing. These activities are now encouraged by both Puerto Rican and federal tax law--the latter through provisions of Section 936 of the Internal Revenue Code, which effectively exempt from taxation a substantial part of the profits earned by U.S. corporations in Puerto Rico.

Enhanced commonwealth status could also lead to more favorable tariff treatment of Puerto Rico's exports and imports. Other countries would be encouraged to treat the island's exports favorably, while Puerto Rico would be given limited power to set tariffs on its imports in order to encourage the growth of particular local industries.

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Promoters of enhanced commonwealth status argue further that it will lead to further expansion of direct investment in Puerto Rico's manufacturing industry. They point especially to the possibility of increased investment by corporations from outside the United States that might invest on the island as expansions of their mainland operations under the provisions of Section 936, through the intermediation of third countries, or through direct agreements with Puerto Rico under expanded powers of "tax sparing" that could be facilitated under the provisions of S. 712. Others argue, however, that there is no guarantee that Section 936 will remain in full force since efforts have been made to remove or amend it in the past.[1]

While it is difficult to measure the effects of these enhancements, they would inevitably increase Puerto Rico's ability to compete economically with other middle-income developing countries.

Statehood under S. 712 could bring more sweeping economic changes to the island, some of them potentially restrictive and others favorable. Statehood would entail losing the benefits of Section 936 tax provisions which, by all accounts, have been central to the island's rapid development as a manufacturing economy during the past 40 years. As in other states, the U.S. corporate tax would apply with full force in Puerto Rico. In addition, resident Puerto Rican individuals and firms would become subject to U.S. federal taxation, while certain federal transfer programs would be significantly expanded. The economic consequences of these aspects of statehood under S. 712 can be at least roughly quantified, and this report presents estimates of their effects.

Statehood could also have economic consequences that cannot be quantified but are nevertheless potentially quite important. Proponents argue that statehood would bring about fundamental changes in Puerto Rico's economic prospects, in part by ending the uncertainty about possible changes in the island's status that they feel has retarded its progress. Furthermore, they argue, statehood could end the ambiguous way in which Puerto Rico is perceived on the mainland, where it is commonly viewed as a foreign location even though it is part of the United States. As a result, supporters argue that statehood would bring increased recognition among outsiders of the opportunities for investment and tourism that the island offers. Proponents of statehood suggest that these consequences would be supplemented by a program of economic development focusing on tourism, agricultural development, and expansion of the island's manufacturing base.

Independence for Puerto Rico also carries the possibilities of both restraints on, and fundamental improvements in, the island's economic progress. Independence would necessarily remove Puerto Rico from the scope of Section 936. Moreover, S. 712 implies a gradual diminution (and elimination after 2000) of federal transfers to the island from the levels that would otherwise obtain, a fact with some worrisome implications for the island economy. In addition, some analysts are concerned that, like other developing countries in Latin America and elsewhere, the island might suffer from a shortage of external capital.

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1. Since the discussions leading up to the Tax Reform Act of 1976, the Treasury has repeatedly proposed scaling back Section 936 or replacing it with a partial credit for wages paid, arguing that it constitutes an inefficient subsidy for a developing region with excess labor.

But as an independent nation, Puerto Rico might offset, wholly or in part, the loss of tax incentives for direct investment by U.S. corporations and, in addition, may be better able to attract direct investment from third countries than the island has in the past. Moreover, proponents argue that independence offers a unique chance to wean the island of the debilitating effects of its dependence on federal grants and transfers, and to awaken a new economic spirit in its people.

In this analysis, CBO compares the economic effects of statehood and independence with those of continuing the current commonwealth status and its associated benefits. The report does not deal at length with the economic effects of the option of enhanced commonwealth status. While the provisions of enhanced commonwealth status may benefit the island, CBO is unable to quantify their effect. In any case, the overall economic difference between enhanced commonwealth and current status is likely to be relatively small. The economic impacts and ranges of uncertainty associated with either statehood or independence are clearly much larger than those associated with relatively minor changes in current status.

When dealing with statehood and independence, CBO has been able to estimate the magnitudes of only a few of the potential economic effects that were described above--the possible changes in manufacturing investment under statehood and the consequences of fiscal changes that are specified in S. 712 under either option. The other economic consequences of these options are largely in the realm of benefits that cannot be quantified by usual methods of economic analysis.

Because of the highly uncertain nature of future economic events in Puerto Rico, CBO can only outline a few reasonable possibilities among the many scenarios that could follow from either statehood or independence. The analysis is uncertain, in particular, because data are limited and because no economic model adequately represents the potential behavior of the U.S. corporations in Puerto Rico that would be affected by the complicated changes in tax provisions under either statehood or independence. CBO tries to deal with the quantifiable responses to a change in Puerto Rico's status by U.S. corporations and local firms and individuals, advances some plausible estimates of their reactions, and then spells out what their short-term implications for the wider island economy might be.

PUERTO RICO'S ECONOMIC DEVELOPMENT
AND THE ROLE OF TAX PREFERENCES

Puerto has grown and industrialized rapidly since 1948. Among other factors, this growth is attributable to federal and Puerto Rican tax preferences for fixed investment, especially in the manufacturing sector, that have been jointly in effect since that year.[2] In 1921, the federal government enacted a tax exemption for

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2. Puerto Rico's economic development is detailed in Department of the Treasury, *Operation and Effect of the Possessions Corporation System of Taxation: Sixth Report* (March 1989, processed); Puerto Rico Economic Development Association, Office of Economic Research, "An Analysis of the President's Tax Proposal to Repeal the Possessions Tax Credit in Section 936 of the U.S. Internal Revenue Code" (September 30, 1985, processed); and The Committee to Study Puerto Rico's Finances, "Report to the Governor" (December 11, 1975, processed).

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qualifying income of "possessions corporations"--U.S. corporations operating in U.S. territorial possessions. This provision is now known, in amended form, as Section 936 of the Internal Revenue Code. In 1948, Puerto Rico enacted complementary legislation, the Industrial Incentives Act, that, among its provisions, largely exempted manufacturers' profits from taxation.

The federal legislation was amended most recently by the Tax Reform Act of 1986. In its present form, Section 936 effectively exempts from U.S. tax almost half the income arising from the active conduct of business of Section 936 corporations--U.S. corporations with 80 percent or more of their active income generated in Puerto Rico and no more than 25 percent of their income drawn from financial and other passive investments there.[3] In addition, all the passive income arising from qualified investments is free of federal tax.

Section 936 is essentially an example of "tax sparing"--sparing from tax all or part of income earned abroad and normally subject to tax without regard to tax paid abroad on that income. Many developed countries enter tax-sparing agreements with second countries (usually less developed countries) so that businesses from the first country pay no tax to the first country on income earned in the second country. As a matter of policy, the United States does not enter into such arrangements with other countries and has barred U.S. possessions from doing so.

Puerto Rico's Industrial Incentives Act also accords generous tax treatment, and the island's government has provided nontax incentives. Nominally, all corporate income is taxed at a top marginal rate of 42 percent under the Puerto Rican revenue code (a rate that is scheduled to fall to 35 percent in 1993), although a "flexible depreciation" provision reduces the effective tax bite in qualifying industries, including manufacturing. In addition, the Industrial Incentives Act allows manufacturing and export service firms to qualify for tax exemption of up to 90 percent of their operating income for a period of 10 to 25 years, depending on location. The act entirely exempts from income tax the interest earnings of specified financial assets in Puerto Rico. Profits of manufacturers generally are subject to a "tollgate" tax of 10 percent upon repatriation, unless certain conditions regarding the length of time the profits have been retained in Puerto Rico are met, in which case the tollgate tax rate is reduced to 5 percent. In recent years, the provisions of the Industrial Incentives Act have resulted in Section 936 corporations paying effective Puerto Rican tax rates of 5 percent or less, not including liabilities under the tollgate tax. (The federal and Puerto Rican tax provisions governing investments by affected firms are described more fully in Appendix A.) Tax preferences have been complemented with active promotion of economic development by providing infrastructure, facilities, and education and skill training of the work force.

With the federal and Puerto Rican tax preferences jointly in effect, the Puerto Rican economy underwent a dramatic change. While real GNP per capita initially

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3. These corporations are almost always organized as wholly owned U.S. subsidiaries of U.S. "parent" corporations. Formally, their profits are subject to tax, but a credit is given for the amount of tax owed. The effect is the same as if these profits were tax exempt. Section 936 also applies to qualifying U.S. corporations operating in other jurisdictions--American Samoa, Guam, the Commonwealth of the Northern Marianas, the Federated States of Micronesia, the Marshall Islands, and the Virgin Islands.

grew rapidly, conditions of excess labor have persisted, and net migration from the island has continued (see Table 1). The island economy was transformed from one based on agriculture to one based on manufacturing as well as government, construction, and services (see Table 2). Although labor-intensive sectors such as food, textiles, apparel, and leather goods, initially dominated the manufacturing sector, the pattern of expansion gradually shifted toward such relatively high-technology, capital-intensive activities as chemicals (including pharmaceuticals), machinery, electronics, electrical equipment, and scientific equipment (see Table 3). Both the gross product and labor income paid in the manufacturing sector grew substantially as shares of the respective totals for the economy as a whole, but a declining share of manufacturing income accrued to labor. The concomitant rise in the share of profit income in manufacturing largely reflected the fact that the high-technology enterprises earn substantial amounts of income from intangible assets, such as patents, trademarks, or trade names.

Growth slowed during the 1970s and early 1980s as a result of a variety of adverse developments. Federal tax legislation reduced the value of Section 936 provisions either indirectly by reducing the effective tax rate on mainland investment, or directly by subjecting to tax part of the income from intangible assets of Section 936 corporations. Such legislation included liberalized depreciation allowances in 1971, the sharp reductions in taxation of capital income in the 1980s, and provisions in the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) and the Tax Reform Act of 1986 (TRA) that exposed intangible income to tax.[1]

Factors other than taxes also slowed growth. As early as the 1950s, Puerto Rican wages were rising relative to those in the United States and elsewhere, so that Puerto Rico gradually lost its advantage in supplying unskilled labor at low wages. The negotiations to reduce U.S. (and Puerto Rico's) tariffs during the 1960s helped reduce another advantage because goods from foreign locations offering cost advantages relative to Puerto Rico could now enter the U.S. market at lower cost. During the 1970s and early 1980s, the world price of oil shot up, and recession and high real interest rates plagued the economy on the U.S. mainland.[2] High oil prices disadvantage Puerto Rico both because it imports all its oil products and because it generates virtually all its electricity from oil, implying high power costs for industrial users.

Most recently, the economy of Puerto Rico has presented a mixed picture of progress and problems. After a decade of slow growth, GNP per capita has grown at 3.6 percent since 1985, while the unemployment rate has fallen from its 1983 peak of 23.5 percent. Still, per capita income, though well above levels typical of the Caribbean and Latin America, is substantially below that of Mississippi, the U.S.

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1. The first major tax act of the 1980s, the Economic Recovery Tax Act of 1981 (ERTA), further liberalized depreciation allowances, but its provisions were partially scaled back by TEFRA in 1982. In 1986, TRA further restricted depreciation allowances, but also reduced the statutory corporate tax rate. The net effect in most cases was to raise slightly the effective tax rate on capital income from its level under TEFRA.

2. In March 1979, the Commonwealth Oil Refining Company (CORCO) filed for protection under federal bankruptcy laws. It had been the largest private corporation in Puerto Rico, but had lost its cost advantage when the federal oil import quota system was abolished.

TABLE 1.   INDICATORS OF ECONOMIC CONDITIONS
(In percent for decade ending in year
given, by Puerto Rican fiscal years)

	Average Annual Growth Rate of Real GNP Per Capita	Average Annual Net Emigration As a Percentage of Mid-decade Population	Average Annual Unemployment Rate
1950	4.0	n.a.	n.a.
1960	4.7	2.2	14.3
1970	5.5	0.8	11.5
1980	1.6	0.3	15.5
1989	1.5	0.9[a]	19.5

SOURCE: Puerto Rico Planning Board; Puerto Rico Department of Labor and
Human Resources.

NOTE: n.a. = not available.

a.   Data extend only through 1988.

TABLE 2.   SECTORAL DISTRIBUTION OF EMPLOYMENT, PRODUCT, AND INCOME (In percent, by Puerto Rican fiscal years)

	Manufacturing	Agriculture	Government	Other	Total
Employment **(Industry share of total employment)**[a]					
1940	7.0	44.7	2.5	45.8	100.0
1950	7.4	35.9	7.6	49.1	100.0
1960	13.4	22.8	11.4	52.4	100.0
1970	18.2	9.9	· 15.5	56.4	100.0
1980	18.5	5.0	24.4	52.1	100.0
1989	17.2	3.9	23.0	55.9	100.0
Gross Domestic Product **(Industry share of total GDP)**					
1950	16.5	18.2	10.4	54.9	100.0
1960	21.7	9.7	11.1	57.5	100.0
1970	23.6	3.2	12.1	61.1	100.0
1980	36.8	2.6	13.1	47.5	100.0
1989	39.2	1.5	11.1	48.2	100.0
Labor Income **(Industry share of total labor income)**					
1950	15.9	17.0	18.1	49.0	100.0
1960	19.4	7.6	18.8	54.2	100.0
1970	21.7	2.4	21.8	54.1	100.0
1980	23.0	2.3	26.3	48.4	100.0
1989	21.6	1.7	24.5	52.2	100.0
Labor Income's Share of Net Industry Income[b]					
1950	69.4	44.2	100.0	51.9	58.4
1960	62.5	39.2	100.0	57.2	61.4
1970	63.5	37.6	100.0	58.4	65.0
1980	34.8	38.3	100.0	61.8	56.4
1989	26.7	44.9	100.0	57.6	49.9

SOURCE: Puerto Rico Planning Board.

a.   Manufacturing in this panel excludes sugar refining and home needlework.

b.   Last column in this panel represents labor income's share of total net domestic income.

TABLE 3.   COMPONENTS OF NET MANUFACTURING INCOME IN
            PUERTO RICO (As a percentage of total, by Puerto Rican fiscal
            years)

	1950	1960	1970	1980	1989
Food and Tobacco	52.5	26.7	20.6	12.0	12.5
Textiles and Apparel	20.9	22.4	22.2	8.6	5.0
Chemicals and Machinery	9.2	22.2	31.4	62.6	73.6
Other Manufacturing	17.4	28.7	25.8	16.8	8.9

SOURCE: Puerto Rico Planning Board.

state with the lowest per capita income, and the unemployment rate, at about 14 percent, is very high by mainland standards. Moreover, many Puerto Ricans are not counted in the reported unemployment rate because participation in the labor force is only about 45 percent, well below the level on the mainland. Reported unemployment is also affected by the relatively high rate of migration from the island. Although net emigration varies from year to year, those leaving the island each year represent about 1 percent of the population.

Some observers have interpreted the prominent role of federal and common-wealth governments in Puerto Rican economic life as a high degree of dependence among Puerto Ricans. As Table 2 shows, employment by government has grown steadily since the 1940s. This growth was financed in part by federal transfers to the commonwealth government, and also by growing deficits in the commonwealth government's operating budget. Moreover, at 31 percent, the proportion of federal transfer payments in personal income is more than twice as high as the mainland average and half again as high as the five states with the highest combined proportion. The figure for Puerto Rico would be even higher--about 35 percent--if all federal entitlement programs were fully available to Puerto Ricans.

Many firms in labor-intensive sectors such as apparel and shoe manufacturing have been leaving the island for countries with lower wage rates. The remaining manufacturing firms are concentrated in capital-intensive sectors. Economists interpret this concentration in part as a reflection of the incentives for such production methods embodied in both the Section 936 tax provisions applicable to tangible corporate income, which they see as a subsidy to capital income, and of the wage levels in Puerto Rico, which are high relative to those in other Caribbean and Latin American countries.

Even more than its incentive to use capital-intensive methods, however, Section 936 also offers a unique opportunity for operations that generate income from intangible assets, such as patents or trademarks. By transferring such intangible assets to subsidiaries in low-tax jurisdictions, firms seek to have the costs of producing the intangible assets appear on the U.S. parent's books, where the tax deduction is valuable, and to have the income appear on the subsidiary's books, where the tax rate is low.

Some types of producers are particularly able to take advantage of such opportunities to shield income. These firms usually have high marketing costs (which generate marketing intangibles) or high research and development costs (which generate manufacturing intangibles) and produce a product that is easily transported and requires a mass-production stage in light industry. For this reason, Section 936 activity in Puerto Rico is dominated by firms in such industries as pharmaceuticals, electrical and electronic equipment, and scientific instruments. Many such firms have subsidiaries in a number of foreign locations. Determining the response of these firms to the loss of tax advantages under Section 936 is one of the principal analytical issues presented by the possibility of either statehood or independence.

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While data necessary to determine the response to losing Section 936 are not publicly available, some measure of the problem is suggested by theory and by aggregate data. Theory suggests that firms will make investments in all feasible locations until the after-tax rates of return of the last investment in each location are all equal. This assumes that taxes are treated like other costs, so that tax advantages in a given location can offset nontax cost disadvantages. Removing those tax advantages would leave the location at a cost disadvantage for the marginal investment. Then investment in that location would be curtailed or assets relocated until after-tax rates of return in all locations are again equal for the last investment.

The first step in applying the theory is to determine the quantitative difference in after-tax rates of return that either statehood or independence would imply compared with alternative locations available to the firm. CBO has made rough estimates of the change in after-tax rates of return to investment in Puerto Rico under statehood using the reported before-tax returns shown in Table 4.[6]

Given that roughly one-half of reported profits in Puerto Rico are exempt from U.S. tax under commonwealth status but by 1998 would be fully taxable under statehood, the reported after-tax profit rate would fall by about 9 percentage points for the average Section 936 manufacturer and about 11 percentage points for firms in chemicals, electronics, and instruments--the group of industries that represents about three-quarters of Section 936 assets.[7]

For reference, these reductions in after-tax rates of return are roughly on the order of the levels of operating rates of return on the mainland, which are considered to represent the opportunity cost of holding capital. In principle, other things being equal, it would be profitable simply to abandon assets in Puerto Rico if higher after-tax returns elsewhere would more than cover this opportunity cost. But relocation is not costless, and there is no guarantee that higher after-tax returns are available elsewhere.

The relevant question becomes whether Section 936 firms can mitigate their losses under statehood by investing or locating elsewhere. CBO has neither the data nor resources to answer such a question precisely. Theory, however, suggests that mainland locations may again become competitive because locating in Puerto

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6.   As discussed below, the levels of reported profit rates do not accurately reflect the productivity of tangible capital in Puerto Rico: rather, they largely reflect the incentive for corporations to allocate profits to their Section 936 subsidiaries, especially through the transfer of intangible assets. Nevertheless, changes in reported profit rates can be used strictly for comparison.

7.   The calculations include the following assumptions: the effective Puerto Rican tax rate is 5 percent; the federal tax rate is 34 percent; the firm has no interest expense (borrowing by Section 936 firms is minimal because it is to the affiliated group's advantage to borrow on the mainland where tax deductibility of interest expense is valuable); the firm uses the "profit-split" method as most firms are expected to do under the provisions of the Tax Reform Act of 1986. This method allows the affiliated group to split its profits from Section 936 activity roughly equally between the subsidiary (paying no U.S. tax) and the parent (paying full U.S. tax). For a more complete explanation of this method, see Department of Treasury, *Sixth Report*, pp. 8-10.

TABLE 4. BEFORE-TAX OPERATING RATES OF RETURN FOR
SELECTED INDUSTRIES, 1983

| Industry | Before-Tax Operating Income As a Percentage of Operating Assets | |
	Mainland Operations	Section 936 Corporations[a]
All Manufacturing	10.3	54.1
Food and Kindred Products	13.7	40.2
Chemicals and Related Products	10.1	72.1
Pharmaceuticals	18.7	77.5
Fabricated Metal Products	10.6	27.8
Machinery, Except Electrical	9.1	42.6
Electrical and Electronic Equipment	8.5	67.3
Instruments and Related Products	12.1	69.5

SOURCE: Department of the Treasury, Office of Tax Analysis.

NOTE: Operating income is defined as gross sales less cost of goods sold and less all other deductions except taxes, interest, and charitable contributions. Operating assets include net property, plant and equipment, inventories, and net accounts receivable.

a. Section 936 corporations included are those that did not elect to use the profit-split method. Such firms represented about 80 percent of Section 936 assets in Puerto Rico. Most of their income from intangible assets was likely to arise from manufacturing intangibles, rather than marketing intangibles.

Rico would no longer offer tax advantages that could outweigh any cost disadvantages. Moreover, low-tax foreign locations may offer attractive alternatives.

The U.S. tax treatment of income earned in a foreign location is more favorable than that accorded domestic income. Generally, U.S. tax is due on foreign-source profits not as they are earned but when they are returned to the U.S. parent, and a credit is provided for any foreign tax that has been paid on them. This deferral of tax reduces the effective U.S. tax rate for such income—the longer the profits remain abroad, the lower the effective U.S. tax rate. Given deferral, the effective tax rate is below the U.S. rate as long as the foreign tax rate is below the U.S. rate.

In principle, intangible income is subject to current, rather than deferred, taxation, but U.S. firms located abroad are expected to be able to shield a significant portion of intangible income from current tax.[8] The extent to which this is possible is speculative, depending on regulations that have not yet been issued, but most authorities expect that significant opportunities to shield such income from current tax will remain.

Given this tax treatment of foreign-source income, low-tax foreign locations could offer tax advantages over Puerto Rico under statehood. The exact advantage cannot be stated precisely, but rough calculations suggest that, other things being equal, over half the tax loss that statehood would imply might well be preserved by relocating to a low-tax foreign jurisdiction. Because an independent Puerto Rico could serve as a low-tax jurisdiction, it also follows that Puerto Rican independence would not entail the same tax costs as statehood.

Because of the loss of full Section 936 benefits under either statehood or independence, firms may reduce investment or relocate their operations entirely. The extent to which they would do either is hard to quantify, but historical data contain some evidence that tax benefits affect investment decisions by parents of Section 936 corporations. Figures on the number of jobs promised by Section 936 firms and other nonlocal companies show sharp declines in years when news of possible changes in Section 936 benefits was announced (see Figure 1). On two previous occasions, in 1982 and 1985-1986, anticipation of changes in Section 936 rules sharply reduced the number of new jobs promised (committed) by nonlocal firms (mostly Section 936 firms), while commitments of local firms changed little. Nonlocal commitments are once again sharply down during the current discussion of changing Puerto Rico's status. A decision to change status would probably reduce commitments and investment even further.

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8. More formally, law requires that the foreign subsidiary make payments to the parent that reflect the market value of using the intangible asset during the year. This payment appears as income on the parent's books where it is subject to current federal tax. The ability to shield intangible income depends in part on being able to claim that the intangible asset properly belongs to the subsidiary, rather than the parent. It is easier to make such an argument in the case of manufacturing intangibles, which are used where the item is produced, than in the case of marketing intangibles, which are used where the item is marketed. Informal analysis suggests that most intangible income of Section 936 firms flows from manufacturing intangibles rather than marketing intangibles (see Department of Treasury, *Sixth Report*, pp. 61-64).

FIGURE 1.   NEW JOB COMMITMENTS

Thousands

Puerto Rican Fiscal Years
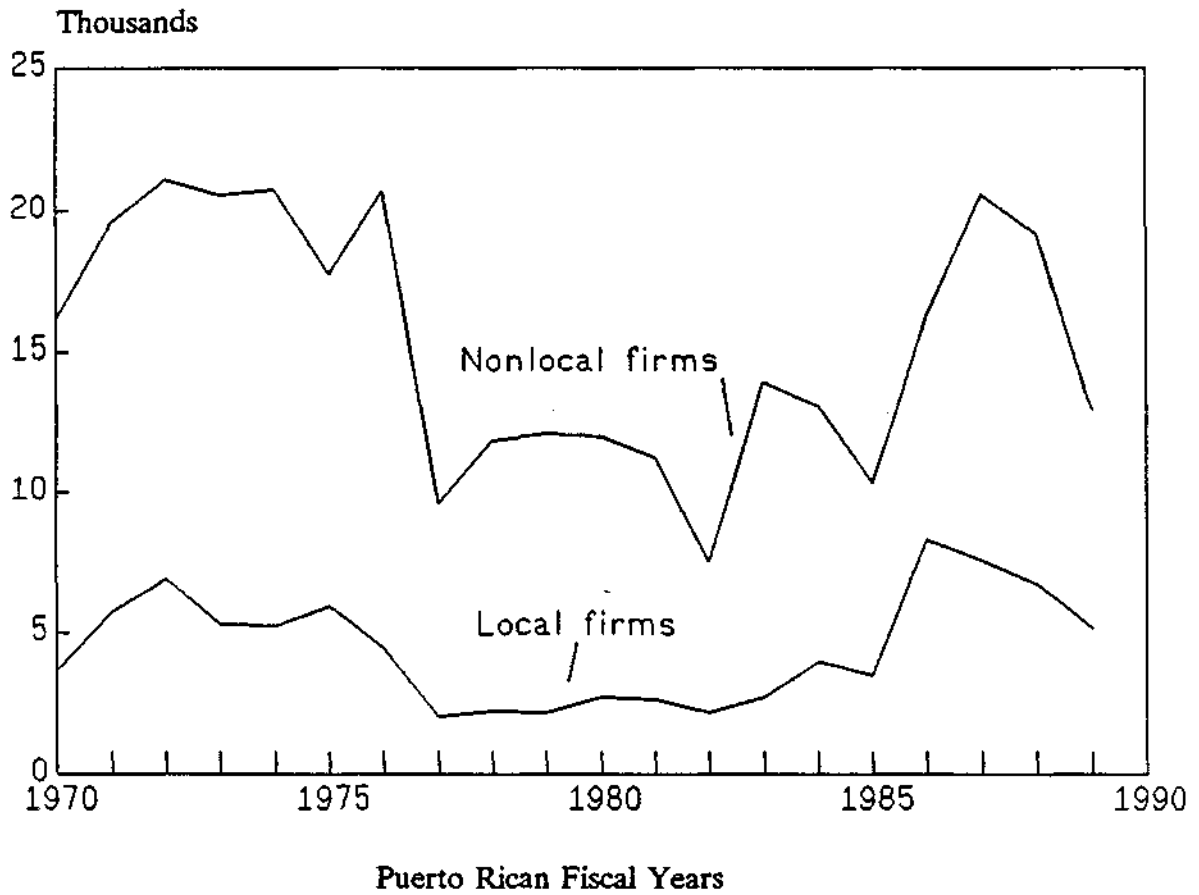
SOURCE: Puerto Rico Economic Development Administration.

NOTE: New job commitments filed with the Puerto Rico Economic Development
Administration by local and nonlocal (mainly Section 936) firms seeking partial
exemption from Puerto Rican taxes.

Firms less likely to move existing assets and production to a new location than to reduce new investment because relocation involves costs that do not apply when considering possible locations for expanded production. As a result, such relocations may not happen very quickly even when they may be profitable in the long run. Beyond their fixed capital investments, going-concern operations in Puerto Rico have substantial investments in the training of their staff to carry out their operations. They have already organized supply and distribution networks, developed relations with local unions and government organizations and other institutions, and acquired an understanding of the local culture. These efforts were all made at substantial cost, a cost that would need to be incurred again if these firms moved to a new location. In addition, moving assets to a foreign location would entail paying tax on any capital gains that had accrued to the assets while in Puerto Rico.

The importance of considerations of cost differs considerably from industry to industry and from firm to firm. Some industries, such as apparel, are notoriously "footloose" and seem to move fairly readily to the location of least operating cost. Some firms in Puerto Rico have kept down their commitments by using space rented from the commonwealth government rather than buying their own buildings.[9] Nevertheless, it is possible that only a few firms would actually cease operations in Puerto Rico as a result of a change in status, and that the loss of current Section 936 firms would not greatly exceed normal attrition that occurs as firms pass through a life cycle.

Several arguments suggest that Section 936 corporations in Puerto Rico may not reduce their investment significantly if the island were to become a state, but CBO has not incorporated all of them into its analysis. In some cases, CBO was unconvinced by the logic or evidence, and in other cases full consideration of the arguments would have required an analysis far beyond CBO's time and resources. The main arguments considered here are the apparently high pre-tax rate of profit in existing Section 936 corporations, which seemingly insulates them from changes in taxation; the apparent lack of response of Section 936 investment to past changes in U.S. tax laws; and the possibility that Puerto Rico may have substantial nontax advantages that would continue to induce firms to locate there.

The Importance of High Profit Margins. The first argument is that Section 936 firms have strong profit margins that could withstand an increase in taxation without becoming unprofitable. In CBO's view, however, the apparent profitability of Section 936 corporations does not necessarily mean that they will be unaffected by loss of Section 936 tax benefits. Much of their reported pre-tax profitability might disappear under statehood because that profitability apparently reflects the use of corporate accounting conventions that are themselves stimulated by Section 936. As was shown in Table 4, reported pre-tax profits of Section 936 companies are indeed very high compared with mainland corporations in similar industries, which seems to suggest that they would remain profitable even when they pay U.S. tax. But these profit rates do not represent the profitability of many Puerto Rican operations from the point of view of parent corporations in the United States. Current tax law

9.   About two-thirds of the space used by firms in the textile, apparel, electronics and scientific instruments industries—which account for over one-fifth of Section 936 assets—is rented rather than owned.

provides a strong incentive for the parent corporation to find ways to take profits in Puerto Rico rather than on their own books. The accounts of these Section 936 companies thus reflect profits accruing from their ownership of intangible assets. These returns to intangible assets would continue to accrue to the parent corporation wherever production is located and thus do not, in the absence of tax considerations, affect the location of production.

The Apparent Lack of Response of Section 936 Investment to TEFRA. A second argument to the effect that manufacturing investment in Puerto Rico would continue strongly under statehood is based on the effect of the Tax Equity and Fiscal Responsibility Act of 1982 (TEFRA) on new job commitments by Section 936 firms. The argument is that tightened rules about the reporting of income on intangibles that were included in the act do not seem to have slowed the rate of growth of Section 936 firms. Indeed, new job commitments, especially those of nonlocal firms (mostly Section 936 firms), were higher after 1982 than before (see Figure 1).[10] CBO is not convinced by this line of argument because even though these tightened rules reduced the tax-planning incentive to locate in Puerto Rico, they did not eliminate it, as statehood would. Puerto Rico therefore kept a unique tax advantage over any alternative site even after the TEFRA changes. Moreover, it is difficult to infer what effect TEFRA had on Section 936 investment because the data reflect not only the effects of this tax change but also the influence of recovery from a recession that was very severe in the United States and even more severe in Puerto Rico. It is not possible to know what the growth of Section 936 activity would have been in the absence of TEFRA, so it is not clear how much weight to put on the relative strength of growth in Section 936 investment since TEFRA was passed.

Nontax Cost Advantages of Location in Puerto Rico. Another argument implying that Section 936 corporations might stay in Puerto Rico under statehood is that Puerto Rico may still offer cost advantages for Section 936 firms relative to other potential locations. Average manufacturing labor costs are lower in Puerto Rico than in any state of the Union, though until recently the minimum wage in Puerto Rico was the same as on the mainland. Manufacturing wages exceed those of most alternative low-tax locations, but this differential is at least partially offset by the relatively high skill and experience of the manufacturing labor force in Puerto Rico, and by the tariff protection in the U.S. market that Puerto Rico would enjoy under statehood as well as under commonwealth status. However, power costs, costs of compliance with federal safety and environmental regulations, and shipping costs (in part the result of the Jones Act requirement to use U.S. ships and crews) disadvantage Puerto Rico, but these disadvantages apply equally to a commonwealth and to a state of Puerto Rico.

CBO does not have the means to examine possible nontax cost advantages, and as a result has not taken them into account. Furthermore, theory suggests that firms locate investment so that tax advantages offset cost disadvantages. Removal of the Section 936 tax advantage should leave Puerto Rico at a cost disadvantage for

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10. Firms seeking partial exemption from Puerto Rican taxes file commitments with the Puerto Rico Economic Development Administration to create a certain number of jobs within a specified period. Tax exemptions, in principle, are conditional on meeting these commitments.

at least some firms. A full comparison of costs of production in Puerto Rico with those in other possible locations is far beyond CBO's capabilities. Such a study would have to include not only U.S. states and other Caribbean locations, but also Ireland, Latin American countries, and the newly industrializing countries of the Pacific. Which cost factors are most relevant differs by industry and even by what particular investment project is contemplated, so that general statements cannot be made or supported. For this reason, though CBO recognizes the importance in principle of directly comparing production costs in Puerto Rico with those in other locations, such comparisons cannot be the basis of this analysis.

POTENTIAL ECONOMIC IMPLICATIONS OF STATEHOOD

The Congressional Budget Office, like other analysts, has considered several consequences of statehood that might affect the course of the Puerto Rican economy during the next several years. These effects include:

o   Slower growth in Puerto Rico's capacity to produce as a result of the possible reductions in the rate of investment by manufacturing corporations on the island stemming from the loss of Section 936 tax preferences;

o   Changes in aggregate demand in Puerto Rico that result from several developments: changes in the net flow of funds (income-support payments, grants-in-aid, and tax payments) between the federal government and Puerto Rico; and reductions in investment on the island in response to loss of Section 936 tax preferences;

o   Slower growth in the island's capacity to produce stemming from lower investment by businesses other than the Section 936 corporations, which would also experience increased costs because they would be liable for federal income taxes under statehood;

o   Contraction of Puerto Rico's financial sector, which has benefited from tax incentives for financial investment on the island by Section 936 corporations--incentives that would no longer obtain under statehood;

o   Possible changes in the tax and spending policies of the Puerto Rican government. Unless Puerto Rican taxes are reduced, the combination of federal and Puerto Rican income taxes would result in high income tax rates on the island. To avoid this, the Puerto Rican government might reduce both its taxes and expenditures--actions that could result in economic dislocation in the short term;

o   Changes in the incentives to work in or migrate to or from Puerto Rico. Such changes are embodied in liberalized eligibility for federal income-support payments in Puerto Rico and the higher marginal tax rates in Puerto Rico stemming from liability for federal and Puerto Rican income taxes;

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o   Changes in the incentives for foreign countries to invest in Puerto Rico because, as a state, U.S. tax treaties would apply. In particular, income of West German firms would not be liable to German tax were they to operate in a state of Puerto Rico (although U.S. tax would apply); and

o   Changes in perceptions of the island on the part of outsiders. A new perception of Puerto Rico may come about particularly as a result of a reduction in the uncertainty of its status, and perhaps through less of a perception on the United States mainland that Puerto Rico is a foreign location. Such a change in perception could bring greater awareness of opportunities for investment and tourism that the island could offer if it became a state.

Representatives of the statehood party have suggested that the state of Puerto Rico would reduce its state income tax rates from present levels and expand investment in the tourist industry. Lower income tax rates would be made possible by reducing expenditures on the provision of health care, recognizing that a greater share of health care could be supplied by the private sector and through federal programs. In addition, the state government might raise funds by divesting itself of public corporations.

While many of the economic consequences of statehood could be significant, CBO has been able to concentrate on the only two that are quantifiable: the reductions in the supply side of the economy stemming from a loss of Section 936 capital, and changes in aggregate demand from both changes in activity of Section 936 firms and changes in the net flow of funds with the federal government. CBO has focused on these effects because it could find little data permitting the quantification of the other consequences of statehood. While those consequences may be significant, there was little basis for estimating their magnitude.

Reductions in Investment Resulting from Loss of Section 936 Investment Benefits

One of the central economic consequences of any change in Puerto Rico's status follows from the loss of federal tax benefits under Section 936. If Puerto Rico elects statehood, S. 712 mandates that Section 936 be phased out in equal increments over five years beginning in 1994. A Section 936 firm would receive a credit against only 80 percent of its federal tax owed in 1994, 60 percent in 1995, 40 percent in 1996, 20 percent in 1997, and no credit thereafter.

As a result, the after-tax rate of return to Section 936 corporations located in Puerto Rico might fall below levels available on the mainland or in third countries. The drop in return could lead some firms to relocate their operations, while others might slow their investment in Puerto Rico without leaving. Firms that would otherwise have located in Puerto Rico may choose not to do so. Any of these outcomes would slow the growth of investment in Puerto Rico by these corporations, as well as the growth of their production, their exports, their imports of capital goods, and the income and employment that they generate in Puerto Rico.

If Section 936 firms slowed their investment, the impact on the Puerto Rican economy could be exacerbated by the reactions of other businesses and the state government of Puerto Rico. Many local businesses that supply Section 936 firms might reduce the growth of their production as a result of slowing activity in the Section 936 sector. Similarly, the growth of tax revenues to the state government might slow, and the government might then have to cut back its own expenditures and employment in order to maintain a balanced budget. Such cutbacks as a result of slowing economic growth are common among state governments on the mainland, which face constitutional requirements that their operating budgets remain in balance. Even in the absence of constitutional strictures, financial markets constrain the ability of state governments to run budget deficits without endangering their credit ratings. When state governments undergo such cutbacks, they at least temporarily accentuate the economic slowing that precipitated the budget-reduction measures. (The model CBO used for analysis, however, suggests that any slowing induced by budget reduction would be transient.)

Some of these effects could be offset, however, to the extent that uncertainty about Puerto Rico's future political status has deterred companies from investing there until now. Statehood could raise Puerto Rico's visibility as a place to locate for domestic producers. It could also eliminate any risk that was associated with its uncertain political status in the past. Thus, domestic or foreign firms looking for a secure, low-cost site of production within the United States could be attracted to Puerto Rico after statehood.

Changes in Net Federal Transfers to Puerto Rico

If Puerto Rico becomes a state, its fiscal relations with the federal government would change in several ways under S. 712:

- o   Puerto Rican residents would become fully eligible for the Food Stamp program, Medicaid, and Aid to Families with Dependent Children (AFDC);

- o   Puerto Rico would become eligible for Supplemental Security Income (though its eligibility for Aid to the Aged, Blind, and Disabled would end); and

- o   Puerto Rican individuals and firms would become liable for federal income and excise taxes (but individuals would also be eligible for the earned income tax credit).

CBO estimates that, in the absence of changes in economic behavior, payments from the U.S. government to Puerto Rico under entitlement programs could increase by $1.7 billion in fiscal year 1992, an amount that rises to $3 billion per year in fiscal year 1995 (see Table 5). In terms of the federal budget, these increased payments would be partially offset by higher taxes received from Puerto Rico, and from U.S.-based corporations as a result of their loss of Section 936 benefits.

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TABLE 5.   ESTIMATED FEDERAL OUTLAYS IN PUERTO RICO FOR
            CERTAIN ENTITLEMENT PROGRAMS (In billions of dollars,
            U.S. fiscal years)

Programs	1992	1993	1994	1995
Baseline Outlays	1.8	1.9	2.0	2.1
Increases Under Statehood				
Food Stamps	0.7	0.7	0.7	0.7
Medicaid	0.9	1.0	1.1	1.2
Medicare	0.1	0.1	0.1	0.1
Supplemental Security Income	0	0	0.6	0.9
Aid to Families with Dependent Children	a	a	0.1	0.1
Foster Care	a	a	a	a
Total Increase	1.7	1.8	2.6	3.0
Outlays Under Statehood	3.5	3.7	4.6	5.1

SOURCE: Congressional Budget Office.

a. Less than $50 million.

Increases in funding for social welfare programs and in marginal tax rates might reduce incentives to work, or to stay in Puerto Rico rather than migrate to the mainland. CBO has not taken these effects into account, however, in part because a significant portion of the increased welfare benefits goes to those unable to work, such as children, the elderly, and disabled people. Liberalized welfare benefits in Puerto Rico may also reduce an incentive to migrate to the mainland, partially offsetting the increased incentive to migrate that may come about as Puerto Ricans become liable for federal income taxes beginning in 1994, and as a result of the loss of Section 936 jobs. In any case, CBO has found no analysis of migration or labor supply in Puerto Rico on which to base a technical judgment of these effects on incentives to work or migrate, nor any source of data that would permit it to develop its own analysis in the time available.

Another economic implication of statehood under S. 712 stems from the fact that increased federal funding of entitlement programs in Puerto Rico would exceed the increases in tax payments received from residents and local corporations on the island. (Increased tax collections from Section 936 corporations, other things being equal, would also add to federal revenues, but this tax change would not lead to additional reductions in Puerto Rican aggregate demand because it would reduce incomes of mainlanders rather than islanders.) These increased net transfers would offset some of the loss in overall Puerto Rican demand for goods as a result of changes in the manufacturing sector, thereby mitigating the loss in Puerto Rican gross national product. CBO has also analyzed this effect using the formal econometric model that is described below.

CBO's Method of Estimation

As the above discussion points out, CBO's analysis of the possible economic consequences of statehood has concentrated on two particular changes: loss of Section 936 tax benefits for qualifying corporations; and increases in federal transfer payments to the island less increases in federal tax receipts from the island. CBO's analysis of the effects of these developments on the whole Puerto Rican economy consisted of three steps:

o   Developing two alternative baseline projections of economic variables over the 1990-2000 period, assuming Puerto Rico's current common-wealth status;

o   Deriving plausible responses of investment by Section 936 corporations to the loss of 936 tax benefits; and

o   Estimating the consequences of these changes in investment and of the changes in net federal transfers to the island for such economic variables as GNP and unemployment, using an economic model.

Developing the Baseline Projections. The first step in estimating the effects of statehood on Puerto Rico's economy was to develop two alternative baseline projections of such economic variables as real GNP, investment, employment, and exports over the 1990-2000 period. These are not forecasts of the performance of

the economy under commonwealth status; CBO does not have the expertise to develop accurate projections of the most likely course of Puerto Rico's economy. Instead, the baselines represent mechanical projections of the course of the economy over the next decade based on recent historical trends. The projections serve as benchmarks against which the performance of the economy under the different status options can be expressed.

The baselines were constructed in the following manner. First, CBO found the growth trend of real GDP since 1973 using a statistical adjustment to remove the influence of business cycles.[11] These calculations imply that the trend growth rate in Puerto Rico since 1973 has been about 3.4 percent per year. Next, the variation from trend of actual growth in real GDP for successive 10-year periods starting in 1973 was found. CBO used this variation to determine bands around the trend that would include deviations above and below the trend rate of growth that are at all likely based on experience since 1973.[12] The upper band was then treated as the high-growth baseline and the lower band as the low-growth baseline. The optimistic baseline incorporates growth in real GDP of 4.4 percent per year, while the lower baseline involves growth of 2.4 percent.

CBO chose the year 1973, a cyclical peak, as a base year because it seems to separate a period of generally strong trend growth from one of slower average growth in subsequent years. This pattern applies in the United States and many other countries as well as in Puerto Rico. The results would have been virtually identical if 1979 (also a cyclical peak year) had been chosen as the base year instead.

In constructing each of the baseline projections, CBO assumed that Section 936 activity would grow 2.6 percentage points faster than the rest of the economy. This figure reflects the amount by which growth in the manufacturing sector has exceeded that of the economy as a whole since 1974. (Manufacturing is taken to be a proxy for Section 936, for which recent data are unavailable, but which is known to account for most manufacturing in Puerto Rico.) Since 1974, manufacturing output has grown on average about 3.7 percentage points faster than the rest of the economy, but the extraordinary differential in 1976 accounts for over 1

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11. In particular, CBO estimated a statistical equation relating the logarithm of real GNP to a constant and to the deviation of the unemployment rate in the United States from CBO's estimate of the structural ("nonaccelerating inflation") unemployment rate for the United States (an adequate measure of cyclical unemployment in Puerto Rico is not available). In addition, this regression equation contained five time trends: one covering the whole estimation period (1953-1989) and four others beginning in the years following successive peaks in Puerto Rico's business cycle: 1958, 1961, 1974, and 1980. In this manner, the equation was able to estimate changes between business cycles in the trend rate of growth in Puerto Rico's GNP. In making projections with the equation, the deviation in the unemployment rate from the structural rate was set equal to zero.

12. In making this calculation, CBO first estimated the standard deviation of a sample of estimates of the average rate of growth of real GNP over successive 10-year intervals beginning in 1974. The resulting estimate of the standard deviation was 0.5 percentage point. This estimate was used to generate the high and low baseline paths by adding two standard deviations to the projected trend growth rate to derive the optimistic baseline path, and by subtracting two standard deviations to derive the pessimistic baseline. If growth rates are distributed normally about the trend, this procedure would imply that there is only a 5 percent chance that growth would be either faster than CBO's optimistic baseline or slower than its pessimistic one.

percentage point of this total. Therefore, the figure of 2.6 percentage points was chosen.

These assumptions determine the characteristics of the high-growth and low-growth baseline paths. With real GDP growing at 4.4 percent per year on the high-growth baseline, real Section 936 output grows at 5.6 percent, while real growth in the rest of the economy proceeds at 3.0 percent. Similarly, real GDP grows at 2.4 percent per year on the low-growth baseline, with real output in the Section 936 sector growing at 3.6 percent and the real output in the rest of the economy growing at 1.0 percent.

The Response of Investment to Loss of Section 936 Benefits. CBO has been able to make only rough estimates about the crucial issue of how much and how fast affected corporations operating in Puerto Rico would reduce the scale of their operations once statehood eliminated the tax benefits under Section 936. In order to be sure how much Section 936 benefits currently contribute to the rates of investment in Puerto Rico and, hence, what would happen if they are removed, CBO would need to know more about the Section 936 companies--for example, which investments would have occurred even without special tax advantages, and which investments are made profitable for the parent corporation only by the special tax advantages. This information is unavailable.

CBO assumed that recent rates of attrition of Section 936 firms would continue under statehood, and that the remaining firms would invest only enough to offset depreciation and maintain their capital stock. (Attrition of Section 936 firms occurs on an ongoing basis, but is normally more than offset by expansion of existing firms and the entrance of new firms.) These investment changes would lead to a loss of between 37 percent and 47 percent of the capital and production of Section 936 corporations in the year 2000 compared with what it might be in that year under the current status. The smaller of these losses in capital is similar to an assumption of a 35 percent loss used by the U.S. Treasury.[13] While CBO makes no explicit assumption about events after 2000, the loss in Section 936 activity seems likely to be permanent.

The actual outcome under statehood could be better or worse than is implied by CBO's assumption. It could be better if investment by Section 936 firms is insensitive to tax considerations, so that removal of tax advantages would have little effect on investment. It could be worse if tax advantages are crucial to the profitability of locating in Puerto Rico (from the point of view of the parent corporation), so that the removal of these advantages leads firms not merely to halt growth in their commitment to Puerto Rico but even to pull back from existing investments.

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13. A loss of 25 percent was cited in testimony of Kenneth Gideon, Assistant Secretary of the Treasury, before the Senate Committee on Finance, November 14, 1989. This percentage, however, understates the movement of firms and their income out of Puerto Rico, because some of the income of relocated firms would be subject to U.S. tax. Private communications with the Treasury suggest that the underlying loss in Puerto Rico production and income was estimated at 35 percent.

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Even current levels of activity of Section 936 corporations might not be maintained under statehood if tax advantages are crucial to the profitability to parent companies of current Section 936 operations. For reasons already discussed, CBO cannot accurately assess how likely such moves would be, as it does not know either how important tax considerations are to the Section 936 corporations, or in detail how other costs differ between locations.

CBO's Economic Model. CBO is charged with the task of estimating the implications for the overall Puerto Rican economy not only of the changes in corporate investment that have just been discussed, but also of changes in federal spending and taxes. It is impossible to estimate the combined effects of these separate developments without a model of the Puerto Rican economy. Even so, recent theoretical developments suggest that the results of econometric models must be used with extreme caution.[14] With this caveat in mind, CBO has used the results from a macroeconomic model that it developed for this study.[15] The model is described in Appendix B.

CBO's model concentrates on elaborating the demand side of the Puerto Rican economy, but also permits evaluation of some of the most important impacts of statehood on the supply side. It derives estimates of Puerto Rican GNP first by predicting how each of the components of aggregate demand (consumption, investment, government, and net exports), which--taken together--constitute GNP, will behave in a given year on the basis of assumed changes in variables external to the model. The components of demand are further influenced by the model's own subsequent predictions of changes in economic conditions that affect the components of aggregate demand. GNP is then determined by adding up the separate components of aggregate demand. The behavior of Puerto Rican employment is predicted chiefly on the basis of the evolution of overall GNP.

The model incorporates statistically estimated equations describing the behavior of Puerto Rican consumption and investment spending, as well as spending on merchandise imports and exports. Exports are determined largely on the basis of economic conditions on the U.S. mainland, which is by far the most important destination of Puerto Rico's exports. The behavior of the spending and taxes of Puerto Rico's government are predicted outside the model (treated as external variables).

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14. Many critiques of existing econometric models result from the advent of expectational analysis during the 1970s. Two of the most celebrated critiques are presented in Robert E. Lucas, "Econometric Policy Evaluation: A Critique," in K. Brunner and A. H. Meltzer, eds., *The Phillips Curve and Labor Markets*, Carnegie-Rochester Conference on Public Policy No. 1 (New York: North-Holland 1976); and Christopher Sims, "Macroeconomics and Reality," Econometrica (March 1980).

15. Existing models that helped guide CBO's work are described in Jorge Freyre, *El Modelo Económico de Puerto Rico* (San Juan: Inter American University Press, 1979); M. Dutta and V. Su, "An Econometric Model of Puerto Rico," *Review of Economic Studies* (July 1969), pp. 319-333; and Fernando Zalacaín, "Un Sistema de Modelos Económicos Para Puerto Rico," 1985 (processed).

Such a model differs from the input/output models that others have generally used to analyze the potential impacts of removing of Section 936 tax benefits.[16] CBO's model concentrates on predicting the magnitudes of the different components of total spending that make up GNP. It also, however, permits the consequences of such "supply-side" developments as a loss in productive capacity to be analyzed directly. As such, this model is adequate to the present task, which involves calculating the combined effects of two different implications of statehood: "supply-side" changes in the amount of capital (from Section 936 firms) located in Puerto Rico; and "demand-side" effects such as reductions in investment demand implied by loss of Section 936, and changes in consumer demand implied by changes in net federal transfers to the island.

This model permits analysis of the ultimate implications of these combined changes for such important overall economic conditions as national saving and the balance of payments. In all of these respects, models of the type that CBO used are more general than conventional input/output models. The "forward and backward linkages" that input/output models emphasize--linkages between activity in Section 936 corporations and other sectors of the Puerto Rican economy--are implicitly represented in the analysis provided by CBO's model.

Short-run models of the type that CBO has used have limitations, especially when it comes to representing the possible longer-term behavior of any economy. Such models take little account of the possibility that wages and other relative prices may change in response to shifts in unemployment and other developments, inducing resources to flow into new uses. (Input/output models also fail to address this issue.) Long-run models that emphasize flexible wages and other prices, for example, would suggest that unemployment would cause declining wages and expansion in productive sectors that absorbed idle workers as a result of their lower cost. Such models do not, however, necessarily reflect the likely short-term behavior of any economy, especially Puerto Rico's, where the federal minimum wage is thought to have helped restrict the downward flexibility of wages and where, as Tables 1 and 2 show, high levels of unemployment have not historically led quickly to shifts in the mix of employment.

Changes from Baseline. Changes from the baseline projections attributable to changes in Puerto Rico's status were computed by introducing several changes into the model representing the separate economic implications of statehood. Once all of the changes were introduced, the model was allowed to predict the combined effects of all of these changes. For each baseline path, CBO computed a separate solution of the model (a prediction of a set of overall economic effects) for the reduced rate of investment by Section 936 corporations resulting from loss of Section 936 tax benefits.

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16. See, for example, John R. Stewart and Theodore Lane, "An Analysis of the President's Tax Proposal to Repeal the Possessions Tax Credit in Section 936 of the U.S. Internal Revenue Code" (Puerto Rico Economic Development Administration: December, 1985); Angel L. Ruíz, "Impacto Intersectoral y Macroeconómico en la Economía de Puerto Rico de las Empresas Operando Bajo la Sección 936 del Codigo de Rentas Internas de Estados Unidos," January 29, 1988 (processed); and Fernando Zalacaín, "Un Analysis Preliminar de los Impactos Económicos del Proyecto de Ley S. 712 del Senado de Estados Unidos," September 1989 (unpublished).

In each solution, the slower growth in the economy's supply capacity as a result of lower investment by Section 936 corporations was first introduced by reducing investment from baseline levels. The path of the capital stock of Section 936 corporations was chosen by assuming that normal attrition of Section 936 firms would continue and that, beyond 1994, the remaining firms would invest only enough to maintain their capital stock. Based on information about attrition rates developed by the Puerto Rico Economic Development Administration, CBO judges that about 5 percent of Section 936 employment is lost each year by contraction or exit of existing Section 936 firms. But this employment loss occurs principally in sectors with relatively low amounts of capital per worker. Judging from the capital-to-worker ratios in the chemical industry (which includes pharmaceutical) and in the rest of the Section 936 sector, plant closings and reductions in usable capacity appear to reflect attrition of Section 936 capital at a rate of about 2.5 percent per year. As a result, the net capital stock of Section 936 corporations was assumed to fall at a rate of 2.5 percent per year under statehood. This assumption was implemented in the model by smoothly reducing gross investment of Section 936 below the baseline starting in 1992; after 1993, gross investment of Section 936 firms simply offsets depreciation of the capital stock of firms that remain.

The changes in investment and resulting percentage changes in capital stock differ according to how strongly Section 936 firms are assumed to grow in the baseline (under the current status). In the high-growth baseline, Section 936 capital grows at a rate of 7 percent, so that the 2.5 percent decline assumed under statehood represents a substantial loss relative to the baseline. By 2000, indeed, Section 936 capital stock under statehood would be about 47 percent lower than baseline levels, and gross investment would be reduced even more (see Table 6). Section 936 capital grows more slowly in the low-growth baseline, only 5 percent, so that statehood under those assumptions produces a smaller reduction in the Section 936 capital stock (37 percent) and a correspondingly smaller loss of gross investment.

Next, output (including exports) of Section 936 firms was assumed to fall from baseline levels in proportion to the previous year's reduction in capital. The reductions from baseline levels in investment and exports register as reductions from baseline levels of aggregate demand in the Puerto Rican economy.

The static increases in Puerto Rican income from baseline levels stemming from increased receipts of transfers (less tax payments) from the federal government--which work in CBO's model to increase aggregate demand--were incorporated by increasing disposable personal incomes and grants to the Puerto Rican government relative to their baseline levels by the amounts shown in Table 7. Those amounts exclude any increased collections from Section 936 corporations because they are effectively collected from mainland corporations and, therefore, do not affect aggregate demand in Puerto Rico. Some federal tax collections from Puerto Rican sources (excise taxes and customs duties) are currently "covered over"--returned to the Puerto Rican Treasury. These cover-overs will continue through 1998. Personal tax collections will be covered over through 1995. CBO has assumed that increases in tax collections that are covered over are redistributed to Puerto Rican entities, so that only tax collections net of cover-over affect aggregate demand.

TABLE 6.   CBO'S ASSUMED CHANGES IN SECTION 936 GROSS
            INVESTMENT, CAPITAL, AND EXPORTS (In percent of
            baseline levels, Puerto Rican fiscal years)

Item Changed	1991	1992	1993	1994	1995	2000
High-Growth Baseline						
Section 936 Gross Investment	0	-26	-30	-56	-59	-73
Section 936 Capital	0	-4	-8	-15	-21	-47
Section 936 Exports	0	0	-4	-8	-15	-43
Low-Growth Baseline						
Section 936 Gross Investment	0	-26	-30	-47	-49	-62
Section 936 Capital	0	-3	-7	-12	-17	-37
Section 936 Exports	0	0	-3	-7	-12	-33

SOURCE: Congressional Budget Office.

TABLE 7.   ASSUMED STATIC CHANGES IN FEDERAL EXPENDITURES AND REVENUES FROM LOCAL SOURCES AS A RESULT OF STATEHOOD (In millions of dollars, United States fiscal years)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Change in Total Spending	1,666	1,810	2,550	2,950	3,068	3,191	3,318	3,451	3,589
Change in Revenues from Local Sources[a]									
New excise taxes								395	414
Customs duties								163	171
Rum excise tax								265	268
Personal tax			163	10	539	739	773	809	846
Tax on local corporations					274	471	495	519	545
Total Change in Local Source Revenues			163	10	813	1,210	1,268	2,151	2,244
Change in Net Transfers to Puerto Rico	1,666	1,810	2,387	2,940	2,255	1,981	2,050	1,300	1,345

SOURCE: Congressional Budget Office; Department of Treasury.

NOTE: Revenue figures are expressed as net of cover-over—remission of federal collections to the Puerto Rican Treasury. The earned income tax credit is netted from personal tax, rather than appearing separately in expenditures. Beyond 1995, expenditure figures were assumed to grow at 4 percent per year. For more detail, see Congressional Budget Office, "Background Materials on the Costs of the Puerto Rico Status Referendum Act" (November 5, 1989, mimeo); and Testimony of Kenneth Gideon, Assistant Secretary of the Treasury, before the Senate Committee on Finance, November 14, 1989.

a.   Excluding increased tax collections from Section 936 corporations.

The demand for imports was constrained to yield reasonable results. Specifically, CBO assumed that 60 percent of Section 936 investment is imported --a figure suggested by the direct and indirect import content of investment goods in Puerto Rico. In this view, imports can be decomposed into two parts: imports that satisfy Section 936 investment demand and those that satisfy all other demand as represented, implicitly or explicitly, by the workings of CBO's model. In the absence of such a restriction, imports of capital goods would fall by only 20 percent to 40 percent of the fall in Section 936 investment--an unreasonably low figure.

Simulation Results on Economic Implications of Statehood. Under the quantifiable assumptions discussed here, statehood for Puerto Rico seems likely to reduce the average growth rate of the island's income over the balance of the decade. Puerto Rico would probably enjoy a temporary surge in growth during an initial transition period, reflecting the provisions of S. 712 that would increase federal transfers to the island before the reductions in the growth of Section 936 investment would be fully felt. Given the various assumptions, however, average growth in output over the balance of the decade would be reduced by about one to two percentage points, and average growth in employment by about one-half to one percentage point (see Table 8). The figures on employment would translate into increases in the unemployment rate in 2000 of between four and seven percentage points if there were no influence of statehood on migration, and if there were no increase in employment stemming from other developments that have not been taken into account here. This increase represents a total of 50,000 to 100,000 more unemployed persons in 2000 than would otherwise have been the case. The shortfall in growth translates into lower real GNP than would otherwise have occurred--about 10 percent to 15 percent below baseline by 2000 (see Figure 2).

Although normal growth rates would eventually return as the disinvestment process runs its course, the accumulated loss of output and income below levels that would otherwise have obtained would remain.

There are three interesting features of the results beyond those already discussed. First, real GNP and GDP growth is affected more in the case of the high-growth baseline than in the case of the low-growth baseline. This occurs primarily because the growth of Section 936 capital is higher in the high-growth case, and therefore its curtailment reduces investment by more. Second, in both cases, growth in employment is not affected as much as growth in real GDP because much of the loss in output is concentrated in the Section 936 sector, for which a given level of output requires less than half as much employment as other output. Finally, growth in real exports is affected more than growth in output because Section 936 firms contribute a greater share to exports than to output.

POTENTIAL ECONOMIC IMPLICATIONS OF INDEPENDENCE

Only very rough estimates are possible when trying to predict how Puerto Rico's economy would fare after such a fundamental change in its character as independence from the United States. Any such estimates are even more uncertain than

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TABLE 8.   ILLUSTRATIVE EFFECTS OF STATEHOOD ON THE
            PUERTO RICAN ECONOMY (Difference from baseline of
            average annual growth rate, in percentage points)

	1992-1995	1996-2000	1992-2000
High-Growth Baseline			
Real GNP	0.1	-3.3	-1.8
Real GDP	-0.4	-3.0	-1.9
Employment	0.1	-1.9	-1.0
Real Exports	-2.4	-4.5	-3.6
Low-Growth Baseline			
Real GNP	0.7	-2.3	-1.0
Real GDP	0.1	-2.2	-1.2
Employment	0.5	-1.4	-0.6
Real Exports	-1.8	-3.0	-2.5

SOURCE: Congressional Budget Office.

FIGURE 2.   ESTIMATED LEVELS OF REAL GNP UNDER STATEHOOD
             COMPARED WITH ALTERNATE BASELINE ASSUMPTIONS
             UNDER COMMONWEALTH STATUS (In billions of 1954
             dollars)

Puerto Rican Fiscal Year
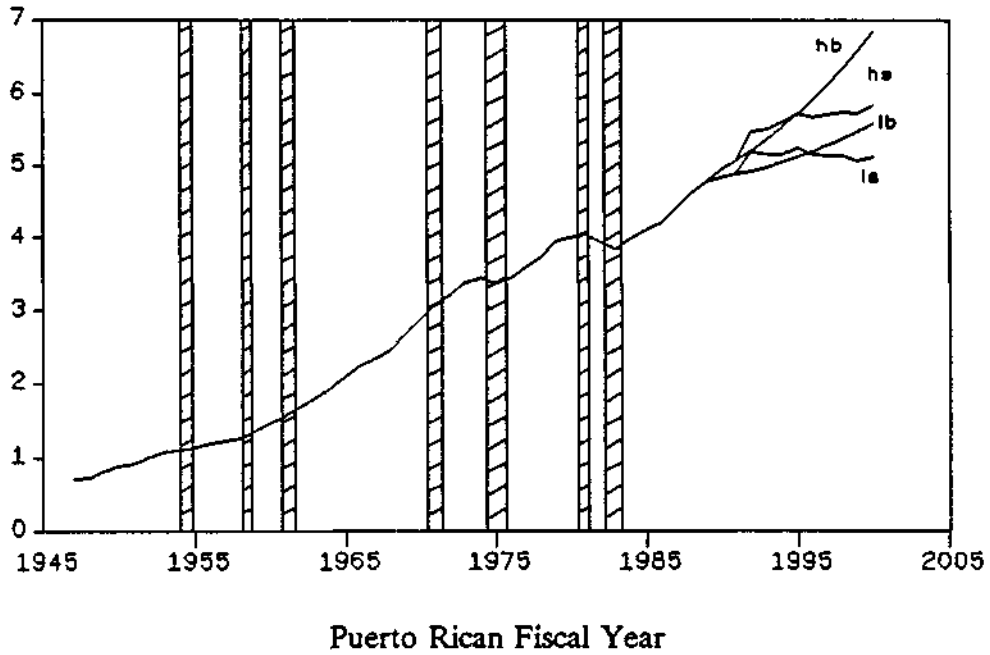
NOTES: Shaded areas represent recessions in the United States.

         hs = statehood with high growth.
         ls = statehood with low growth.
         hb = baseline with high growth.
         lb = baseline with low growth.

those associated with statehood. One can speculate, however, that independence could affect the economy in the short term in the following ways:

o   Through changes in the tax status of corporate profits generated in Puerto Rico.

o   Through changes in the net fiscal flows between Puerto Rico and the United States.

o   Through changes in Puerto Rico's own fiscal policy.

o   Through changes in monetary arrangements in Puerto Rico, such as possible institution of a new currency.

o   Through changes in trade policy affecting commercial relations between Puerto Rico and other countries. Puerto Rico's exports to the United States would no longer automatically be free from tariff duties. S. 712 provides that an independent Puerto Rico would qualify for most-favored-nation status and states that the United States would wish to enter into a free trade association with the new republic. But the bill makes no commitments regarding actual tariff provisions. Tariff-free entry to the U.S. market would preserve an important cost advantage to Puerto Rico and greatly increase its ability to attract investment from abroad as a republic.

o   Through changes in shipping costs to the U.S. mainland because U.S. shipping regulations would no longer apply. As an independent nation, Puerto Rico would no longer face the requirement that its shipments to U.S. markets be carried on vessels registered in the United States, which would reduce the cost of such operations.

o   Through changes in the terms under which Puerto Rico can borrow on world financial markets. These changes might stem either from loss of access to tax-exempt financial markets in the United States or from changes in outsiders' willingness to lend to or invest in Puerto Rico. Willingness to invest in Puerto Rico will depend on outsiders' perceptions of Puerto Rico's political stability, economic policy, and future economic institutions.

o   Through possible changes in attitudes on the part of Puerto Ricans themselves: on the one hand, they may respond to independence with still higher work effort, saving, and the like; on the other hand, they may demonstrate lack of confidence in the country's future by emigrating or sending their savings abroad.

Representatives of the independence party of Puerto Rico have described the policies that the government of an independent Puerto Rico might choose to carry out. In particular, the party has described the tax provisions that it believes would be effective in preventing losses of investment in the manufacturing sector. It also has suggested that it would be wise for Puerto Rico to create no monetary institu-

tions of its own during the first 10 years of independence, instead relying on the U.S. dollar as its currency.

The independence party representatives have also suggested that the government of an independent Puerto Rico might usefully institute a program of economic reforms involving such measures as selling unprofitable public enterprises, improving tax enforcement, increasing government investment, raising the productivity of public workers, and reducing the government work force. Such a government might also gradually reduce the dependence of some Puerto Ricans on government income-support payments by reducing the levels of such support in steps during the first years of independence.[17] The successful implementation of these types of reform is an extremely difficult and complex task, as indicated by the experiences of other developing countries over the past several years.

Of the many factors that might affect economic performance in Puerto Rico after independence, CBO has focused on three: the effects of the projected reduction in transfers from the U.S. government relative to the levels that would otherwise obtain; the possibilities for attracting direct foreign investment to the country; and the possible problems that the country might face in financing its balance of payments.

Changes in Net Federal Transfers to Puerto Rico

Compared with continued commonwealth status, under independence federal transfers to Puerto Rico would fall and federal revenues from local sources (as well as Section 936 firms) would rise. While some programs such as federal pension and veterans benefits would continue after independence, others such as Food Stamps, Medicare, Foster Care, Aid to Families with Dependent Children, and Supplemental Security Income would not. Instead, Puerto Rico would receive a federal block grant at a level equal to U.S. federal expenditures in Puerto Rico for such discontinued programs during the U.S. fiscal year in which independence is proclaimed. This grant would be paid annually to Puerto Rico through the ninth year following the certification of the referendum. The grant would be fixed in nominal terms, however, and would not allow for growth that would otherwise occur as a result of inflation or increased participation. Therefore the republic's annual income from this source would fall short of what Puerto Rico would receive under commonwealth status (see Table 9). In addition, Puerto Rico would lose the benefit of federal cover-overs, which currently protect it from liability for federal excises on rum. As a result, net payments to the U.S. Treasury for rum excises would increase after independence. The overall result is a significant reduction from projected baseline levels in net fiscal flows from the U. S. Treasury to Puerto Rico.

This shortfall can be expected to have two effects. One, which is discussed at greater length below, is that less financing through federal transfers will be available

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17. Some analysts have pointed to the possibility that less dependence on income-support payments at levels close to those provided on the U.S. mainland might well increase private saving and other economic initiatives in Puerto Rico. See Bernard Wasow, "Dependent Growth in a Capital-Importing Economy: The Case of Puerto Rico," *Oxford Economic Papers*, vol. 30 (1978), pp.117-129.

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TABLE 9.   ASSUMED STATIC CHANGES IN FEDERAL EXPENDITURES AND REVENUES FROM
LOCAL SOURCES AS A RESULT OF INDEPENDENCE (In millions of dollars, U.S. fiscal years)

	1992	1993	1994	1995	1996	1997	1998	1999	2000
Change in Total Spending	0	0	-100	-300	-500	-600	-800	-1,000	-1,200
Change in Revenues from Local Sources (Rum excise tax)[a]	0	188	252	255	257	260	262	265	268
Change in Net Transfers to Puerto Rico	0	188	-352	-555	-757	-860	-1,062	-1,265	-1,468

SOURCE: Congressional Budget Office; Department of Treasury.

NOTE: Figures assume proclamation of independence occurs on January 1, 1993. For more detail, see Congressional Budget Office, "Background
Materials on the Costs of the Puerto Rico Status Referendum Act" (November 5, 1989, processed); and Testimony of Kenneth Gideon,
Assistant Secretary of the Treasury, before the Senate Committee on Finance, November 14, 1989.

a.   Excluding increased tax collection from Section 936 corporations.

for any deficit in the current account of Puerto Rico's balance of payments. The other effect is that there will be less stimulation of aggregate demand from federal payments.

CBO has estimated the possible economic effects of these reductions in federal transfers using the CBO economic model that was described above. Compared with the same high- and low-growth baselines that were used in the analysis of statehood, growth in real GNP is projected to be slightly below the baseline projection--a shortfall amounting to 0.2 to 0.3 percentage point per year on average between 1992 and the year 2000.

Issues Affecting Direct Investment from Abroad

Several issues arise in assessing an independent Puerto Rico's potential for attracting investment from abroad. Under S. 712, Section 936 benefits would no longer be available to U.S. corporations. Puerto Rico could, however, offer several tax-related advantages that might effectively replace those available under its current status. First, the republic could offer the advantages of a low-tax foreign jurisdiction to U.S. firms. Further, the new nation would have the opportunity, unavailable under current status, to negotiate tax-sparing treaties making investments by corporations of third countries more attractive. Finally, the independence party of Puerto Rico has described a new set of provisions intended to duplicate the effects of Section 936.[18] According to their description, the scheme would involve levying a Puerto Rican tax on corporate profits at rates equal to those levied in the United States, and then returning the proceeds of the tax to manufacturing and other firms in the form of subsidies. Since affected United States corporations would have their U.S. tax liability reduced to zero through the foreign tax credit, and since all Puerto Rican tax would be rebated, companies could end up with little or no overall liability for tax.

Because the possibilities involved are largely unquantifiable, CBO is unable to provide numerical estimates of the extent to which an independent Puerto Rico might, on balance, gain or lose investment from abroad.

Other Issues Associated with External Finance in an Independent Puerto Rico

Although tax policies may provide continued incentives for foreign direct investment in an independent Puerto Rico, other issues may serve to deter such investment as well as the borrowing on foreign credit markets on which Puerto Rico has relied at times in the past. The island will rely heavily on both sources of "external finance" if it runs a significant deficit in the current account of its balance of payments, as the commonwealth has. A current-account deficit is inevitable for a country that, like Puerto Rico, generates little domestic saving but nevertheless carries out significant domestic investment. As Table 10 shows, Puerto Rico's deficit has historically arisen primarily because of large payments for factor services--

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18. See Erick Negrón, "S. 712--Manufacturing Incentives Made Possible by the Foreign Tax Credit," unpublished memorandum, February 6, 1990.

TABLE 10. PUERTO RICO'S BALANCE OF PAYMENTS AND ITS FINANCING, 1980-1989
(In millions of dollars, by Puerto Rican fiscal years)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
Current-Account Deficit	4,447	4,479	3,783	4,564	5,404	5,621	5,226	6,355	7,347	7,828
Deficit on Factor Services	3,586	4,007	4,350	4,529	5,311	5,647	6,347	7,108	8,115	8,548
Deficit on Merchandise and Non-factor Services	861	473	-567	34	93	-26	-1122	-754	-768	-720
Financing of Current-Account Deficit	4,447	4,479	3,783	4,564	5,404	5,621	5,226	6,355	7,347	7,828
Net transfers	3,252	3,345	3,515	3,561	3,590	3,706	3,833	3,741	3,879	3,913
U.S. government	3,021	3,126	3,249	3,240	3,232	3,389	3,503	3,354	3,456	3,556
Other	231	219	266	320	358	318	330	387	423	357
Net capital inflows	1,195	1,135	268	1,003	1,814	1,915	1,392	2,614	3,468	3,915
Section 936	2,048	2,215	577	1,306	1,001	4,050	1,011	n.a.	n.a.	n.a.
Other	-853	-1,080	-309	-303	813	-2,135	381	n.a.	n.a.	n.a.

SOURCE: Congressional Budget Office; Department of Treasury, Office of Tax Analysis; Puerto Rico Planning Board.

NOTE: n.a. = not available.

principally, dividends on Section 936 investment. Although the data on financing shown in the table are only suggestive, the financing of this deficit has apparently been accomplished primarily through two sources: large transfers from the U.S. government, and inflows of direct (Section 936) investment. Much of the remaining finance has apparently been derived through government borrowing in the United States, generally on the tax-exempt municipal bond market.

Potential difficulties in financing Puerto Rico's balance of payments stem from the fact that two of the major sources of finance in the past will be more restricted under independence. U.S. government transfers will gradually decline under S. 712 from the baseline levels that are projected in the absence of changes in Puerto Rico's status. Borrowing on U.S. credit markets, for its part, seems likely to be more costly at the least, and may be significantly curtailed.

In the event of independence, Puerto Rico may have more trouble using such borrowing and other measures to finance its balance of payments than it has in the past. At the very least, Puerto Rico would suffer a noticeable increase in borrowing costs because it would no longer have access to tax-exempt bond markets. CBO estimates that Puerto Rico would have to pay interest rates that would be at least two percentage points higher than at present. This is the difference between the tax-exempt rate that the island now pays and the rate that is paid by the few relatively low-risk developing countries, such as Thailand, that currently have access to bond markets in the United States. Even this outcome may not occur, however, if financial markets were sufficiently dubious of Puerto Rico's prospects. Indeed, most other Latin American countries have trouble borrowing abroad at any reasonable rate.

CBO contacted Wall Street institutions to ask how successfully an independent Puerto Rico could issue debt on open U.S. markets. Some were optimistic, but others took a cautious attitude, suggesting that the level of government debt would affect any bond rating and that the entire balance-of-payments picture would have to be assessed--especially the levels of investment income payments abroad compared with the rate of foreign direct investment inflows and the rate of growth of exports. The Wall Street analysts suggested that there would initially be questions about economic policies and institutions under independence that would require answers before an independent government on the island could have full access to world credit markets.

If no other means of finance are found, any "financing gap" in Puerto Rico's balance of payments is likely to cause a decline in economic activity in Puerto Rico. Unless fiscal policy measures are taken, the financing gap would cause a tightening in financial conditions on the island. If prices and wages in Puerto Rico were quite flexible, the financial outflow would cause prices to fall below the level they would otherwise take. Because of the minimum wage (which should be retained, according to independence representatives) and other restrictive policies, however, a decline in prices seems unlikely to occur quickly. The financing gap is more likely, therefore, to lead initially and for some time to increases in real Puerto Rican interest rates relative to those abroad, and to a contraction in domestic real output and income. Much the same restrictive effect would come about if Puerto Rico were to use fiscal restraint to keep its needs for external financing within the

available supply, rather than the passive monetary policy that has just been described.

Problems in financing the balance of payments could be reduced if the rest of the world were to step up its direct lending to Puerto Rico through multilateral institutions and commercial banks, but the financial environment in the world is not encouraging in this regard. In principle, the island economy could rely on multilateral institutions, such as the International Monetary Fund and the World Bank, as well as direct lending programs of commercial banks and the governments of industrial countries. Puerto Rico's admittance to the multilateral institutions could take some time, however, and such agencies are already hard pressed to meet the needs of other developing countries. The recent emergence of Eastern Europe has increased the number of developing countries needing finance from such multilateral institutions. Net new lending from commercial banks to similarly illiquid developing countries, in Latin America and elsewhere, has recently slowed to a virtual halt. Such lenders are likely in any case to be cautious in lending to Puerto Rico until they feel that uncertainties surrounding its economic policies, political stability, and financial system are removed. This leaves industrial governments as the most likely source of financing, with the United States the logical candidate for a lead role in any lending program.

A number of other factors could also work to alleviate Puerto Rico's difficulties in financing its balance of payments. Under independence, S. 712 specifies that tariff revenues collected by the U.S. government on imports transshipped to Puerto Rico will be rebated to the island government, providing a new flow of financing. Puerto Rico's terms of trade with the rest of the world would improve under independence because both shipping costs and nontariff restrictions on its trade with countries outside the United States would be reduced. As an emergency measure, the government would be free to restrict outflows of financial capital should such severe action be required.

CONCLUSIONS

S. 712 opens up the possibility of major political and economic change in Puerto Rico, especially if the referendum in 1991 results in a vote for independence or for statehood. Economic changes will result not only from changes in the fiscal relations between Puerto Rico and the mainland, but also, and much more importantly, from changes in the economic activity in Puerto Rico of firms that, under the current status, would benefit from Section 936 of the U.S. tax code. These effects, while extremely uncertain, lend themselves at least in principle to quantification. Other economic changes, such as increased recognition of opportunities in Puerto Rico, reduced economic dependence, or financing problems, are also likely to occur, but their importance is not easily quantified.

Fiscal relations between Puerto Rico and the federal government would change significantly with any change in status, according to the provisions of S. 712. Statehood would increase taxes paid by individuals and companies in Puerto Rico to the federal Treasury, but this increase would be more than offset by higher federal transfers to island residents and governments. As a result, net transfers (spending less taxes) to the island would be nearly $18 billion higher over the nine-

year period between 1992 and 2000, if no other economic changes took place. The net fiscal benefit from statehood would likely be permanent. Independence, on the other hand, would reduce net transfers from the federal government, by increasing amounts that add to nearly $7 billion over the eight-year period from 1993 to 2000. The annual fiscal loss to Puerto Rico would increase after 2000 as a result of the end of the block grant called for under S. 712.

While changes in fiscal relations with the federal government, taken alone, favor statehood over either independence or the current status, likely changes in the economic activity of firms that benefit from Section 936 under current status seem likely to worsen the economic outlook under statehood as compared with the other two options. Statehood would imply the eventual loss of Section 936 benefits. Under the current status, or under the "enhanced commonwealth" status described in S. 712, the tax advantages of Section 936 would continue (though Congress is free to repeal it at a later date). An independent Puerto Rico would not benefit from Section 936, but might be able to implement other tax provisions that might match the tax advantages currently available under Section 936.

The potential loss of investment under statehood is large, both absolutely and compared with the fiscal benefits of statehood to Puerto Rico. Under CBO's assumptions, statehood could reduce the growth rate of real GNP in Puerto Rico over the 1992-2000 period by between about one and two percentage points, depending on what is assumed about growth under the current status. These estimates reflect both the effect of higher net federal transfers--which work to increase real growth in the first few years of statehood--and the effects of the loss of investment and exports by Section 936 firms as compared with a current-status baseline in which both are growing.

Independence may also lead to large changes in investment, but these changes are not so easily anticipated as those under statehood, because an independent Puerto Rico may be able to construct a set of incentives--through a combination of tax-sparing treaties and local subsidies--that would approach the attractiveness of the current benefits under Section 936.

Other possible economic effects under independence are still more speculative. On the positive side, independence could lead to reduced dependence, improved tariff policies, reduced shipping costs, and other unquantifiable benefits. However, the access of an independent Puerto Rico to U.S. financial markets would be less advantageous than it is under the current status, or would be under statehood. At the very least, Puerto Rico would be likely to have to pay at least two percentage points more in interest than it currently does on its government debt. Another possibility, however, is that the new nation would have difficulty borrowing at any interest rate, as have other developing countries in recent years. This pessimistic outcome would be especially likely if direct investment in Puerto Rico were to be curtailed, thus leading both to lower growth in Puerto Rico's exports and to a smaller contribution from direct investment to financing the deficit in its balance of payments.

Because of the great importance of Section 936 to the island's economy, loss of its provisions will lead to major changes in its economic condition. The magnitude of these changes is, however, extremely uncertain and the analysis of the

changes contained in this paper, though they may be useful in the debate, cannot be regarded as definitive. As with any major political change, changes in the status of the island will require consideration of many factors beyond the strictly economic, and ultimately will be based on a leap of faith.

APPENDIX A

TAX PROVISIONS AFFECTING DIRECT

INVESTMENT IN PUERTO RICO

U.S. corporations that do business in Puerto Rico are currently eligible for generous tax treatment from both governments. The generous tax treatment results from the interaction of the United States and Puerto Rican tax laws. In an effort to attract U.S. corporations to the commonwealth, Puerto Rico has designed tax incentives to take full advantage of the benefits made available under U.S. law.

This appendix will first examine the general U.S. tax rules and show how Section 936 of the tax code offers preferential treatment to U.S. corporations that operate in Puerto Rico. It will then examine Puerto Rico's tax rules and show how they interact with the U.S. rules to grant very generous overall tax benefits to U.S. corporations.

General U.S. Tax Rules on Corporate Income from Foreign Operations

The United States taxes corporations on their worldwide income, allowing tax credits for foreign taxes paid. These foreign tax credits are designed to avoid taxing the same income both in the foreign country and in the United States. As a result of these credits, the corporation typically pays the higher of the United States and the foreign income tax rate. (The top U.S. corporate income tax rate is 34 percent.) If the foreign tax rate is less than the U.S. rate, then the firm must make a tax payment to the United States as well as to the foreign government. For example, if the foreign tax rate is zero, then the United States taxes the income from the foreign source at the full U.S. tax rate. If the foreign tax rate exceeds the U.S. rate, generally the firm owes no tax to the United States on the income from the foreign source. In this case, the firm may be placed in an "excess credit" tax position, in which it has foreign tax credits that it is unable to use.

A U.S. corporation may organize (charter) a subsidiary corporation under the tax rules of another country, with the "parent" owning the stock of the subsidiary. The subsidiary's profits are subject to different tax rules that may yield some tax benefits but with an important restriction. The United States generally does not tax the active income of these foreign-chartered subsidiaries in the year the income is earned. (Active income is that earned from the business operations of the firm, not by financial investments.) Instead, the income is taxed by the United States only when it is returned (repatriated) to the parent company, generally in the form of a dividend payment. This treatment results in a deferral of U.S. tax. Corporate funds that would otherwise be subject to U.S. tax can instead be reinvested and earn income free from U.S. tax until repatriated. A restriction applies, however, to certain income, including financial investment income, earned in countries with low tax rates. Such financial income, largely interest and rental income, is attributed to the U.S. parent and taxed without deferral. This income is called "Subpart F income" after its location in the tax code (see United States tax code Sections 951-

964.) Note that the foreign tax credit for taxes paid in the foreign location may act to reduce or eliminate the U.S. tax on Subpart F income.

SECTION 936 AND ITS PREFERENTIAL TAX TREATMENT OF POSSESSIONS CORPORATION

Section 936 of the United States tax code establishes the preferential rules whereby certain corporations are exempt from U.S. tax on qualifying income generated in uerto Rico and other United States possessions. Section 936 establishes "tax sparing," in which the qualifying corporation owes no tax to the United States on its Puerto Rico income, regardless of the amount of taxes it pays to Puerto Rico. (Section 936 also applies to income generated from other U.S. possessions, but virtually all such activity occurs in Puerto Rico.)

A corporation that qualifies for these tax benefits is known as a Section 936 corporation, or a "possessions corporation." A Section 936 corporation is chartered in the United States and is almost always structured as a wholly owned subsidiary of a U.S. parent corporation. This arrangement is chosen because, in order to qualify for the tax benefits, at least 80 percent of the Section 936 corporation's gross income (income not reduced by expenses) must be earned from sources physically located within Puerto Rico. In addition, a Section 936 corporation must earn at least 75 percent of its income from active business operations, so that no more than 25 percent of its income can come from financial investment sources.

To qualify for the tax exemption in the United States, financial investment by Section 936 corporations must satisfy certain limitations of type and quantity. Not only must the financial income be less than 25 percent of the firm's total income, as described above, but the investments must be made in financial instruments located in Puerto Rico. In addition, the investment funds must be generated from active business in Puerto Rico. Financial income that passes these restrictions is known as Qualified Possessions Source Investment Income (QPSII.)

Income from intangible assets such as patents, trademarks, and trade names, transferred by a parent to its Section 936 subsidiary has received only partial tax exemption in the United States since 1982; this partial exemption is still preferential relative to general U.S. tax treatment of intangible transfers to subsidiaries operating in foreign countries. In an effort to reduce taxes, parent firms typically transfer to their Section 936 corporation the rights to certain intangibles, such as a drug patent. Before 1982, all of the Section 936 corporation's income from production in Puerto Rico that used the patent would be allocated on tax returns to the Section 936 corporation, making the income effectively tax-exempt in the United States. The research expenses that created the patent, however, would be generated in the United States and would reduce otherwise taxable U.S. income. The Congress considered these intangible transfers an abusive effort to avoid taxation, and in 1982 limited the amount of income from transferred intangibles that could be attributed for tax purposes to the Section 936 subsidiary. The treatment of intangible transfers to Section 936 corporations remains partly tax advantaged, however, relative to

general U.S. tax treatment of foreign transfers of intangibles (see United States tax code Sections 367 and 482).

Section 936 corporations and their parents can use several different tax accounting methods for the income arising from intangible transfers, but most will now use what is called the profit-split method.[1] Under this tax accounting method, generally half of the taxable income derived from the Puerto Rican operation is allocated to the Section 936 corporation, and the other half to the parent corporation. This method does not differentiate between types of intangibles, since it applies to production that uses both "marketing intangibles," such as trademarks and trade names, and "manufacturing intangibles," such as patents. Some part of the income from all intangibles, therefore, can be attributed to the Section 936 corporation and be tax exempt to the U.S. parent.

PUERTO RICO'S TAX RULES ON SECTION 936 CORPORATIONS

Puerto Rico's statutory corporate income tax rates currently are higher than the U.S. tax rates. In 1990, the statutory tax rates are between 22 percent and 42 percent, depending on the amount of income earned. According to legislation already in place, the top rate will fall to 35 percent by 1993, just above the top U.S. rate of 34 percent.

While Puerto Rico's statutory tax rate on Section 936 income is currently higher than that levied in the United States, Puerto Rico has legislated tax exemptions that dramatically reduce its effective tax rate on most Section 936 firms to near zero. Up to 90 percent of a Section 936 corporation's income earned within Puerto Rico is currently exempt from taxation, as long as the firm is engaged in manufacturing or export services. (Taken alone, this exemption would reduce the top 1990 tax rate from 42 percent to effectively as low as 4.2 percent.)

Puerto Rico's tax exemptions date back to the passage of the Industrial Tax Exemption Act of 1948, which was revised in 1953, 1963, 1978, and most recently in 1987. The exemptions are currently valid for 10 to 25 years, depending on the location of the plant and equipment; firms usually can expect extensions of the exemptions when they expire.[2]

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1. The cost-sharing method was widely used by firms with manufacturing intangibles until its benefits were curtailed sharply by the Tax Reform Act of 1986.

2. For a more complete discussion of the evolution of Puerto Rico's incentives through 1983, see the U.S. Department of Treasury, *The Operation and Effect of the Possessions Corporation System of Taxation, Fourth Report* (March 1983). For a more detailed discussion of the incentives as they were amended in 1987, see Joint Committee on Taxation, *Tax Rules Relating to Puerto Rico Under Present Law and Under Statehood, Independence, and Enhanced Commonwealth Status* (S. 712, Puerto Rico Status Referendum Act) (JCS-19-89), November 14, 1989.

The effective corporate tax rate on Section 936 corporations may be reduced further by a tax incentive called flexible depreciation. Under Puerto Rico's tax depreciation system, manufacturing firms (and other favored industries) can depreciate as much of the value of their available property as desired in any year, without regard to the tax lifetime, as long as the depreciation deductions do not make taxable income negative. This tax incentive may not be valuable, however, to some firms that pay Puerto Rico's alternative minimum tax; the excess of flexible depreciation over straight-line depreciation is considered a tax preference for purposes of that tax.

Puerto Rico has also enacted tax incentives for Section 936 firms to reinvest their profits on the island. Puerto Rico taxes income of Section 936 firms when taken out of Puerto Rico, and it generally does not tax the interest earnings on funds invested in its financial instruments. Puerto Rico levies a tollgate tax on dividends of foreign corporations that are paid to a parent corporation. The tollgate tax on Section 936 firms is generally 10 percent, although it is reduced to 5 percent if they retain half of their earnings in specified Puerto Rico investments for five years. Furthermore, when Section 936 corporations earn income in Puerto Rico and keep it invested there in specified assets, Puerto Rico does not tax the earnings.

INTERACTION OF THE UNITED STATES AND PUERTO RICO TAX RULES ON SECTION 936 CORPORATIONS

Since Puerto Rico exempts only manufacturing and export service firms from the bulk of its income tax, virtually all Section 936 firms are of those types. Only a few Section 936 firms do not qualify for the Puerto Rico tax exemptions, and they pay full Puerto Rico taxes.

Section 936 corporations tend to retain a large share of their earnings in Puerto Rico, either invested in financial instruments or reinvested in plant and equipment, in order to gain the tax-advantaged return and avoid Puerto Rico's tollgate tax. Generally, these firms pay out dividends to their U.S. parents only to the extent necessary to avoid earning more than 25 percent of their income from these financial investments; otherwise, they would lose their Section 936 status. They must pay the tollgate tax on these dividend payments.

APPENDIX B

CBO'S ECONOMETRIC MODEL OF PUERTO RICO

A change in Puerto Rico's political status would have a significant direct economic impact on the island's economy. These direct effects would, in turn, trigger indirect economic effects that cannot be easily calculated without the use of a macroeconomic model. In order to calculate the macroeconomic consequences of a change in the island's political status, therefore, CBO developed an econometric model of Puerto Rico. This appendix describes the CBO model.

OVERVIEW OF THE MODEL

The CBO model is a small system of equations designed to achieve a single primary objective: to simulate the island's short-run economic response to changes in Puerto Rican export activity and net U.S. government income flows to the island. The structure of the model was chosen so as to meet this objective. This choice, however, also implies an important limitation on interpreting the reported model simulation results, a limitation that is discussed in a later section.

The Structure of the Model

The model describes the demand side of the Puerto Rican economy. Aggregate demand equals the sum of consumption, investment, and government and export demands minus imports. In the CBO model, each of these components of demand is in turn affected by movements in aggregate demand.[1] Thus, the model determines aggregate demand as the outcome of simultaneous interactions among aggregate activity levels and the components of demand and is commonly referred to by economists as a Keynesian income-expenditure system.

The model's behavior is strongly affected by the behavior of imports of capital services. Because Puerto Rico's economy is critically dependent on foreign-owned physical capital (in particular, operations owned by U.S. corporations), a substantial portion of income generated in Puerto Rico leaves the island economy.[2] This net outflow of "factor income" constitutes the difference between Puerto Rico's 1989 GDP of about $28 billion and its GNP of about $21 billion.

Outflows of factor income are the return on capital that finances the deficit in the Puerto Rican balance of payments. Thus, they are sensitive both to the size of the balance-of-payments deficit and to how much is financed by direct investment,

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1. Consumption and investment by the Puerto Rican government are exogenous to the model.

2. The relevance of this fact to the design of econometric models for Puerto Rico is pointed out by Bernard Wasow, "Dependent Growth in a Capital-Importing Economy: The Case of Puerto Rico," *Oxford Economic Papers*, 30 (1978), p. 118.

which for reasons of tax planning described in the text has an exceptionally high recorded rate of return. Flows of factor income in turn affect how Puerto Rican income is related to its production. Because some of the income from production goes abroad, this factor limits the size of the domestic multiplier.

In constructing its model, CBO was guided by the earlier modeling efforts of others. The models that proved useful to the CBO research were Dutta-Su's model, published in 1969, and Freyre's model, published in 1979.[3]

While broadly similar in design to these two earlier models, the CBO model differs in two important respects, both of which are related to its more recent vintage:

o   It includes the determination and consequences of net factor income flows in a critical way; and

o   It is estimated through 1989, thereby encompassing the most recently available data.

A more detailed account of CBO's treatment of net factor income flows is given in the final section of this appendix.

The Model's Chief Structural Limitation

The CBO model's demand-oriented structure means it cannot directly explore many supply-side issues. For example, population is exogenous to the model, and labor supply plays no explicit role. Thus, the model provides no estimate of how economic changes are likely to affect either migration between Puerto Rico and the mainland, or labor force participation on the island. Moreover, prices in the CBO model are also exogenous and are used only to translate constant dollar into current dollar magnitudes and vice versa. These limitations imply that the aggregate supply curve in the CBO model is flat.

PROPERTIES OF THE INDIVIDUAL EQUATIONS

The CBO model consists of 74 equations, of which 19 are statistically estimated behavioral equations and the remaining 55 are identities. In addition, the model

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3.   See M.C. Dutta and V. Su, "An Econometric Model of Puerto Rico," *Review of Economic Studies*, 36(3) (July 1969), pp. 319-333; and Jorge Freyre, *El Modelo Economico de Puerto Rico* (San Juan: Inter-American University Press, 1979). A more recent model of Puerto Rico examined by CBO, while having a similar macroeconomic structure, also has an elaborate embedded interindustry structure; see F. Zalacain, "Un Sistema de Modelos Economicos Para Puerto Rico," 1985 (processed).

includes 38 exogenous variables.[4] This section presents the properties of the estimated equations for the components of aggregate demand and other income-side equations. A summary of the statistical fits for the estimated equations is given in Table B-1.

The Components of Aggregate Demand

Aggregate demand consists of six sectors--consumption, inventory investment, private fixed investment, government, exports, and imports.

Consumption. The consumption sector of the CBO model comprises four equations, for consumer durables, food, other nondurables, and services.

As can be seen from Table B-1, all the consumption equations fit the data relatively well. The normalized standard errors for this sector (rightmost column in Table B-1) are among the smallest in the model. The equations, each relating consumption to disposable income, differed only slightly in specification. With the exception of the equation for consumer durables, which was estimated under the assumption that consumers adjust their durable stocks gradually to an income-dependent target level, the consumption equations were related to a simple measure of permanent disposable income. Consumption of food was affected least by contemporaneous changes in income, and consumption of services seemed to have its own momentum, little affected by other variables.

The marginal propensity to consume (MPC) for each consumption category is given in the following table:

	MPC^{SR}	MPC^{LR}
CBO Model		
Durables	.1427	.2084
Food	.1193	.1193
Other Nondurables	.1183	.3066
Services	.2274	.2274
Total	.6077	.8617

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4. In general, the model was estimated using annual data for the 1947-1989 period. The only exceptions were equations that required balance-of-payments data, which were only available to CBO for 1971 on. The data were taken from *Ingreso y Producto 1984*, Junta de Planificacion de Puerto Rico, May 1985; and *Informe Economico al Gobernador: Appendice Estadistico*, Junta de Planificacion de Puerto Rico, 1989.

TABLE B-1.   SUMMARY OF MODEL GOODNESS-OF-FIT

Dependent Variable	Mnemonic	Adjusted R^2	Durbin Watson	Standard Deviation of Residual As a Percentage of Dependent Variable
Components of Real GNP				
Consumption				
Durables	CD54	.996	2.2	4.5
Food	CNFOOD54	.956	1.3	4.7
Other nondurables	CNOTH54	.991	1.1	4.4
Services[a]	CS54	.298	2.1	3.0
Inventory Investment	INV54CVH	.160	1.9	81.3
Private Fixed Investment				
Machinery	IM&EPRV54	.967	1.9	10.3
Structures	ICONPRV54	.928	1.5	16.4
Exports	EX54	.989	1.4	6.7
Imports				
Merchandise imports				
Consumer durables	MCD	.993	1.5	8.2
Food	MCNFOOD	.987	1.2	9.5
Other nondurables	MCNOTH	.989	1.7	11.6
Capital goods	MK	.957	1.1	19.2
Raw materials	MRAW	.988	1.1	8.8
Investment income outflows[a]	MYINV	.868	2.0	2.1
Other	MOTH	.988	1.4	4.3
Components of Income[a]				
Capital Depreciation	CCA	.688	2.6	4.5
Net Puerto Rican IBT	PRTX@SUB	.985	1.8	4.7
Wages and Salaries	WSD	.999	1.7	4.7
Nonlabor Net Income	YN@LABOR	.977	1.5	18.1

SOURCE: Congressional Budget Office.

NOTE: All equations were estimated using ordinary least squares.

a. Denotes that the equation was estimated in first differences.

Note that the short-run total MPC of 61 percent is considerably lower than the long-run MPC of 86 percent. These estimates for the total MPC are similar to Dutta-Su's estimates (59 percent in the short run and 87 percent in the long run).[5] In his model, Freyre does not distinguish between short- and long-run consumption effects. Freyre's total MPC of 83 percent is substantially larger than CBO's in the short run.

Inventory Investment. The inventory equation posits a gradual adjustment of real stocks to a long-term desired level which, in turn, depends upon real final sales. The equation implies a rather high long-run inventory-to-sales ratio of 52 percent and a rather low annual stock adjustment rate of 23 percent. As Table B-1 indicates, the inventory equation is the poorest fit in the model. Changes in the demand for real inventories, however, will have very little influence on the magnitude of economic effects of external shocks to Puerto Rico, since a rise in final sales leads to a short-term rise in inventory demands of only 12 percent of the increase in final sales.

Private Fixed Investment. The CBO model contains equations for private fixed investment in machinery and equipment, and in structures. Each of these equations has an "income-accelerator" specification relating real investment to lagged investment and the contemporaneous change in real GDP. The equations provide an adequate, though not exceptional, fit to the historical data (see Table B-1). The estimated equations suggest that the short-term (static) response of private fixed investment to a unit change in the level of real GDP is only 0.23.

Government. The government sector, consisting of a consumption and an investment component, is exogenous to the CBO model. This is a traditional approach used in many macroeconomic models such as those of the United States, but it contrasts sharply with Freyre's more elaborate treatment that relates government spending to taxes. Since CBO's main interest was in the fiscal relations between the island and the federal government, rather than in predicting the behavior of the island government, the traditional approach was followed. A treatment such as Freyre's would most likely have increased the predicted impact on the economy of shocks such as the loss of Section 936 investment.

Exports. Real exports are specified to depend upon the exogenously determined level of U.S. real GNP and lagged exports, and are thus effectively exogenous. The proportionate response in Puerto Rico's exports (in 1954 dollars) to a shock in U.S. real GNP (in 1982 dollars) is 0.37 in the short run and 1.59 in the long run. For the simulations reported in the text of this paper, exports were changed exogenously based on a side calculation of the loss in Section 936 activity.

Imports. The model distinguishes five categories of merchandise imports--consumer durables, food, other consumer nondurables, capital goods, and raw materials--in addition to outflows of investment income, and a final import class called "other" in

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5.   The individual MPCs for equations in the CBO model differ somewhat more from those of Dutta-Su.

Table B-1. The model's import sector is estimated in current dollars because constant dollar figures are not available for components of imports.

The basic specification for the equations for merchandise imports relates each category of merchandise imports to a relevant demand variable. The determinants of the first three import categories are the corresponding current-dollar consumption expenditures. Imports of capital goods depend upon nominal fixed investment, while imports of raw materials depend upon current-dollar GDP.

The marginal propensities to import (MPI) for merchandise imports, which are listed below, indicate a rather high import response:

	MPI^{SR}	MPI^{LR}
Consumer Durables	.4696	.4696
Food	.3699	.3699
Other Nondurables	.1978	.1978
Capital Goods	.1362	.2927
Raw Materials	.3825	.3825

The final category of import demand, called "other" in Table B-1, consists largely of trade services and is determined by the aggregate volume of merchandise imports and a measure of non labor net income. This equation's dependence on merchandise imports (the coefficient is 0.11) adds to the model's overall import response.

Other Income-Side Equations

Most of the model's equations outside the demand relationships described above are identities. The four exceptions, discussed below, are capital depreciation, net Puerto Rican indirect business taxes, wage and salary disbursements, and nonlabor net income.

Capital Depreciation. The depreciation equation relates the change in depreciation to the contemporaneous level of current-dollar fixed investment (public and private). This specification was adopted because an official estimate of Puerto Rico's total net capital stock was not available. The equation fits reasonably well over the post-war period (see Table B-1) and implies that a unit change in investment stimulates a change of 0.03 in depreciation.

Net Puerto Rican Indirect Business Taxes. This equation relates indirect business taxes paid to the Puerto Rican government, less subsidies paid by the Puerto Rican government, to the level of durable and nondurable consumption expenditures. The equation fits fairly well (see Table B-1).

<u>Wage and Salary Disbursements</u>. Wages and salaries are assumed to be a fixed share of national income. While this assumption is somewhat unrealistic, it does not affect the macroeconomic behavior of the model.

<u>Nonlabor Net Income</u>. Nonlabor net income consists chiefly of profits of corporations and public enterprises, corporate profit tax receipts, and payments of interest by the Puerto Rican government. This time series is quite cyclical. The equation for nonlabor net income is estimated using a lagged independent variable (coefficient of 0.46) and national income minus wages and social insurance contributions (coefficient of 0.32).

THE EFFECT OF FACTOR INCOME FLOWS ON THE SIMULATION PROPERTIES OF THE MODEL

As was emphasized in the first section of this appendix, the flows of net service factor income play a critical role in CBO's model of the Puerto Rican economy and have a decisive effect on the model's simulation properties. The CBO model determines net factor income flows as the negative of Puerto Rico's outstanding net direct and indirect external liabilities multiplied by a rate of return, assumed equal to 10 percent in 1971.[6] Because of the size of the deficit in Puerto Rico's balance of payments, tracking these flows proved crucial to the behavior of the model.

Changes in factor income flows work to increase the effect on the Puerto Rican economy of reductions in exports. When exports fall, Puerto Rico's balance-of-payments deficit widens. Financing this deficit requires a capital inflow, which will earn a rate of return (assumed in the model to be 10 percent).[7] In subsequent years, this return must be paid in the form of interest and dividends out of income generated by current production. Thus, domestic incomes are reduced relative to domestic production--that is, GNP falls relative to GDP. Domestic consumption spending is thus reduced which in turn adds to the reduction in activity levels that started with the loss of exports.

Changes in flows of factor income, however, work to reduce the effect of changes in the fiscal policy of the island government. When the Puerto Rican government cuts its spending, for example, imports fall through the large import propensities described above, and the balance-of-payments deficit that has to be financed is reduced. Over a period of years, this effect reduces dividend and interest payments out of the island, and thus increases the proportion of income that is kept on the island--GNP rises relative to GDP. This increase in domestic income

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6. Since adequate data on Puerto Rico's net external liabilities were not available to CBO, both the initial 1971 stock and rate of return were constructed so that this identity holds exactly.

7. The rate of return for direct investment by Section 936 firms is assumed to be 30 percent.

eventually offsets the impact on activity in Puerto Rico caused by the initial change in fiscal policy.

DOCUMENTATION FOR CBO'S MACROECONOMIC MODEL OF PUERTO RICO

ENDOGENOUS VARIABLES (74)

Stochastic (28)

CCA	CD54	CNFOOD54	CNOTH54	CS54
EX54	ICONPRV54	IM&EPRV54	INV54CH	MCD
MCNFOOD	MCNOTH	MK	MOTH	MRAW
MYINV	PCD	PCNFOOD	PCNOTH	PCS
PEX	PGC	PIFIX	PM@MYINV	PMYINV
PRTX@SUB	WSD	YN@LABOR		

Identities (46)

C	C54	CD	CNFOOD	CNOTH
CS	EX	EX@MSFI	EX@MSFI54	FEDTRP
FEDTW	GC	GDP	GDP54	GNP
GNP54	IFIX	IFIX54	INV54$	INVCH
M	M54	M@MYINV	NFEDTR	NIIP
NNP	PC	PEX@MSFI	PGDP	PGNP
PM	PRTW	PSF	SF	SF54
TCF	TP	TPF	TW	TX@SUB
UNEMPCH	YD	YD54	YN	YN@WSD
YP				

EXOGENOUS VARIABLES (38)

DUM7184	DUM7986	EX@MSFI54BASE	EX@MSFIBASE	FEDTRG
FEDTRO	FEDTRPBASE	GC54	GDP54BASE	GNPUS82
IG54	INV54CHBASE	INVCHBASE	NIIPBASE	NOTR
OTR&INT	PCDUS	PCNFOODUS	PCNOTHUS	PCOF
PCSUS	PEXUS	PGDPBUSHH	PIFIXUS	POP
RFEDTRP	RFEDTW	RNIIP	RPRTW	RTCF
RTP	RTPF	STAT	TCFADJ	TPFADJ
TWFADJ	UNEMPCOEFF	VBUS		

ECONOMETRIC MODEL GLOSSARY

MNEMONIC	DESCRIPTION
C	Personal Consumption Expenditures: Total
C54	Personal Consumption Expenditures: Total (Millions of 1954 dollars)
CCA	Capital Consumption Allowance
CD	Consumer Durables
CD54	Consumer Durables (Millions of 1954 dollars)
CNFOOD	Consumer Nondurables, Food
CNFOOD54	Consumer Nondurables, Food (Millions of 1954 dollars)
CNOTH	Consumer Nondurables, Other
CNOTH54	Consumer Nondurables, Other (Millions of 1954 dollars)
CS	Consumer Services
CS54	Consumer Services (Millions of 1954 dollars)
DUM7184*	Dummy Variable (= 1 for 1971-1984, 0 otherwise)
DUM7986*	Dummy Variable (= 1 for 1979-1984, 0 otherwise)
EX	Exports of Goods & Services
EX54	Exports of Goods & Services (Millions of 1954 dollars)
EX@MSFI	Balance on Investment Income Flows (Exports Less Imports)
EX@MSFI54	Balance on Investment Income Flows (Exports Less Imports) (Millions of 1954 dollars)
EX@MSFIBASE*	Balance on Investment Income Flows (Exports Less Imports) , Base
EX@MSFI54BASE*	Balance on Investment Income Flows(Exports Less Imports) (Millions of 1954 dollars), Base
FEDTRG*	Federal Transfers to the Puerto Rico Government
FEDTRO*	Federal Transfers to Other
FEDTRP	Federal Transfers to Persons
FEDTRPBASE*	Federal Govt. Transfers to Persons , Base
FEDTW	SI Contributions to Federal Govt.
GC	Puerto Rico Government Consumption Expenditures
GC54*	Government Consumption Expenditures (Millions of 1954 dollars)
GDP	Gross Domestic Product
GDP54	Gross Domestic Product (Millions of 1954 dollars)
GDP54BASE*	Gross Domestic Product (Millions of 1954 dollars), Base
GNP	Gross National Product
GNP54	Gross National Product (Millions of 1954 dollars)
GNPUS82*	Gross National Product, United States (1982$)
ICONPRV54	Private Fixed Investment: Construction (Millions of 1954 dollars)
IFIX	Fixed Investment
IFIX54	Fixed Investment (Millions of 1954 dollars)
IG54*	Fixed Investment, Puerto Rico Government and Public Enterprises (Millions of 1954 dollars)
IM&EPRV54	Private Fixed Investment: Machinery & Equipment (Millions of 1954 dollars)
INV54$	Inventory Stock (Millions of 1954 dollars)
INV54CH	Inventory Change (Millions of 1954 dollars)
INV54CHBASE*	Inventory Change (Millions of 1954 dollars), Base
INVCH	Inventory Change
INVCHBASE*	Inventory Change, Base
M	Imports of Goods & Services
M54	Imports of Goods & Services (Millions of 1954 dollars)
M@MYINV	Imports of Goods & Services excl. Investment Income Flows

MNEMONIC	DESCRIPTION
MCD	Imports of Durable Consumer Goods
MCNFOOD	Imports of Food
MCNOTH	Imports of Other Nondurable Consumer Goods
MK	Imports of Capital Goods
MOTH	Other Imports
MRAW	Imports of Raw Materials
MYINV	Investment Income Outflows
NFEDTR	Net Federal Govt. Transfers
NIIP	Net Direct and Indirect Liabilities of Puerto Rico
NIIPBASE*	Net Direct and Indirect Liabilities of Puerto Rico , Base
NNP	Net National Product
NOTR*	Other Net Transfers
OTR&INT*	Other Transfers and Interest Paid
PC	Implicit Price Deflator for Total Consumer Expenditures (= 1 in 1954)
PCD	Implicit Price Deflator for Consumer Durable (= 1 in 1954)
PCDUS*	Implicit Price Deflator for Consumer Durables, U.S. (= 1 in 1982)
PCNFOOD	Implicit Price Deflator for Food Consumption (= 1 in 1954)
PCNFOODUS*	Implicit Price Deflator for Food Consumption, U.S. (= 1 in 1982)
PCNOTH	Implicit Price Deflator for Other Nondurable Consumption (= 1 in 1954)
PCNOTHUS*	Implict Price Deflator for Other Non-Durables, U.S. (= 1 in 1982
PCOF*	Average U.S. Refiners' Acquisition Cost of Imported Oil (Dollars per barrel)
PCS	Implicit Price Deflator for Services Consumption (= 1 in 1954)
PCSUS*	Implicit Price Deflator for Services Consumption, U.S. (= 1 in 1982
PEX	Implicit Price Deflator for Total Exports (= 1 in 1954)
PEXUS*	Implicit Price Deflator for U.S. Exports (= 1 in 1982
PEX@MSFI	Implicit Price Deflator for Net Investment Income Exports (= 1 in 1954)
PGC	Implicit Price Deflator for Government Consumption (= 1 in 1954)
PGDP	Implicit Price Deflator for GDP (= 1 in 1954)
PGDPBUSHHUS*	Implicit Price Deflator For Gross Domestic Product: Nonfarm, Nonhousing Business, U.S. (= 1 in 1982)
PGNP	Implicit Price Deflator for GNP (= 1 in 1954)
PIFIX	Implicit Price Deflator for Fixed Investment (= 1 in 1954)
PIFIXUS*	Implicit Price Deflator for Fixed Investment, U.S. (= 1 in 1982)
PM	Implicit Price Deflator for Total Imports (= 1 in 1954)
PM@MYINV	Implicit Price Deflator for Total Imports excl. Investment Income (= 1 in 1954)
PMYINV	Implicit Price Deflator for Investment Income (= 1 in 1954)
POP*	Population (thousands of persons)
PRTW	Social Insurance Contributions to Puerto Rico Govt.
PRTX@SUB	Puerto Rico Indirect Business Taxes Minus PR Govt. Subsidies
PSF	Implicit Price Deflator for Final Sales
RFEDTRP*	Marginal Federal Govt. Transfers to Persons Per Person Employed
RFEDTW*	Marginal Rate of SI Contributions to Federal Govt. Per Dollar of Wages
RNIIP*	Marginal Return On Direct and Indirect Investment in Puerto Rico
RPRTW*	Rate of Social Insurance Contributions to Puerto Rico Govt. Per Dollar of Wages
RTCF*	Marginal U.S. Corporate Income Tax Rate
RTP*	Marginal Personal Income Tax Rate

MNEMONIC	DESCRIPTION
RTPF*	Marginal U.S. Personal Income Tax Rate
SF	Final Sales
SF54	Final Sales (Millions of 1954 dollars)
STAT*	Statistical Discrepancy
TCF	U.S. Corporate Income Taxes
TCFADJ*	Adjustment to U.S. Corporate Income Taxes
TP	Personal Income Taxes
TPF	U.S. Personal Income Taxes
TPFADJ*	Adjustment to U.S. Personal Income Taxes
TW	Social Insurance Contributions
TWFADJ*	Adjustment to Social Insurance Contributions to Federal Govenment
TX@SUB	Indirect Business Taxes Minus Subsidies
UNEMPCH	Simulated Change in Unemployment (thousands of persons)
UNEMPCOEFF*	Coefficient in Unemployment Equation
VBUS*	Transfer Payments By Business
WSD	Wage & Salary Disbursements
YD	Disposable Personal Income
YD54	Disposable Personal Income (Millions of 1954 dollars)
YN	National Income
YN@LABOR	Undistributed Corporate & Public Enterprise Profits+Interest Received by Govt
YN@WSD	National Income Minus Wages & Salaries
YP	Personal Income

ECONOMETRIC MODEL EQUATION LISTING

C   PCE: Total ($)
(Identity)

c

$\quad$ = cd+cnfood+cnoth+cs

C54   PCE: Total (1954$)
(Identity)

c54

$\quad$ = cd54+cnfood54+cnoth54+cs54

CCA   Capital Depreciation ($)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

diff(cca)

$\quad$ =   0.03154 * ifix + 0.37161
$\quad\quad$ (9.5510)   (0.06961)

Sum Sq   19837.3 Std Err 22.2695 LHS Mean 39.3929
R Sq   0.6952 R Bar Sq 0.6876 F 1, 40 91.2224
D.W.(1) 2.5861 D.W.(2) 1.9198

CCA=cca[-1]+??

CD   PCE: Durables ($)
(Identity)

cd

$\quad$ = pcd*cd54

CD54   PCE: Durables (1954$)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

cd54

$$= \ 0.31524 * cd54[-1] + 0.42905 * yd54 - 0.28637 * yd54[-1]$$
$$\quad (2.80994) \qquad\quad (10.6564) \qquad (7.16309)$$

$$\quad - \ 83.3962$$
$$\quad (5.82116)$$

Sum Sq	14041.0	Std Err	19.2224	LHS Mean	409.369
R Sq	0.9957	R Bar Sq	0.9953	F 3, 38	2908.37
D.W.(1)	2.2433	D.W.(2)	1.4768		
H	-1.5700				

CNFOOD   PCE: Food ($)
(Identity)

cnfood

$$= pcnfood*cnfood54$$

CNFOOD54   PCE: Food (1954$)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

cnfood54/pop

$$= \ 0.11925 * yd54/pop + 0.09484$$
$$\quad (29.9727) \qquad\qquad (26.3724)$$

Sum Sq	0.0033	Std Err	0.0090	LHS Mean	0.1942
R Sq	0.9574	R Bar Sq	0.9563	F 1, 40	898.365
D.W.(1)	1.2676	D.W.(2)	2.4873		

CNFOOD54=??*pop

CNOTH   PCE: Other Nondurables ($)
(Identity)

cnoth

$$= pcnoth*cnoth54$$

CNOTH54   PCE: Other Nondurables (1954$)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

(cnoth54/pop)

   =   0.61401 * (cnoth54/pop)[-1] + 0.11834 * (yd54/pop) - 0.00152
      (3.64492)   (2.40733)   (0.33083)

Sum Sq   0.0040   Std Err   0.0101   LHS Mean   0.2379
R Sq   0.9912   R Bar Sq 0.9908   F 2, 39 2206.94
D.W.(1) 1.0508   D.W.(2) 1.3649

CNOTH54=??*pop

CS   PCE: Services ($)
(Identity)

cs

   = pcs*cs54

CS54   PCE: Services (1954$)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

diff(cs54/pop)

   =   0.22738 * diff(yd54/pop) + 0.00602
      (4.29308)   (3.06092)

Sum Sq   0.0031   Std Err   0.0088   LHS Mean   0.0121
R Sq   0.3154   R Bar Sq 0.2983   F 1, 40 18.4305
D.W.(1) 2.0644   D.W.(2) 2.2503

CS54=cs54[-1]+(??*pop[-1])

EX   Exports of Goods & Services ($)
(Identity)

ex

   = pex*ex54

EX54   Exports of Goods & Services (1954$)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

ex54

    =   0.76930 * ex54[-1] + 0.36665 * gnpus82 - 387.185
        (6.83160)   (2.59069)   (2.48409)

Sum Sq   548911   Std Err   118.637   LHS Mean 1732.25
R Sq   0.9900   R Bar Sq 0.9895   F 2, 39 1926.97
D.W.(1) 1.4210   D.W.(2) 1.9942
H   2.3396

EX@MSFI   Net Factor Income Exports ($)
(Identity)

ex@msfi

  = ex@msfibase+(-rniip*(niip[-1]-niipbase[-1]))
EX@MSFI54   Net Factor Income Exports (54$)
(Identity)

ex@msfi54

  = ex@msfi54base+(ex@msfi-ex@msfibase)/pgdp

FEDTRP   Federal Govt. Transfers to Persons ($)
(Identity)

fedtrp

  = fedtrpbase+rfedtrp*unempch

FEDTW   SI Contributions to Federal Govt. ($)
(Identity)

fedtw

  = rfedtw*wsd+twfadj

GC   Government Consumption Expenditures ($)
(Identity)

gc

   = pgc*gc54
GDP   Gross Domestic Product ($)
(Identity)

gdp

   = gnp-ex@msfi

GDP54   Gross Domestic Product (1954$)
(Identity)

gdp54

   = gnp54-ex@msfi54

GNP   Gross National Product ($)
(Identity)

gnp

   = sf+invch

GNP54   Gross National Product (1954$)
(Identity)

gnp54

   = sf54+inv54ch

ICONPRV54 Private Fixed Investment: Construction (1954$)
Ordinary Least Squares
ANNUAL data for 42 periods from 1948 to 1989
Date: 6 MAR 1990

iconprv54

$$= \ 0.90511 * iconprv54[-1] + 0.07458 * diff(gdp54)$$
$$\quad (20.8369) \qquad\qquad (1.94364)$$

$$\quad - \ 17.4971 * dum7986 + 12.2321$$
$$\quad\quad (1.63000) \qquad (1.41189)$$

Sum Sq	27903.1	Std Err	27.0978	LHS Mean	159.336		
R Sq	0.9330	R Bar Sq	0.9277	F 3, 38	176.329		
D.W.(1)	1.5462	D.W.(2)	1.7225				
H	1.5323						

IFIX Fixed Investment ($)
(Identity)

ifix

$$= pifix*ifix54$$

IFIX54 Fixed Investment (1954$)
(Identity)

ifix54

$$= im\&eprv54+iconprv54+ig54$$

IM&EPRV54 Private Fixed Investment: Machinery & Equipment (1954$)
Ordinary Least Squares
ANNUAL data for 42 periods from 1948 to 1989
Date: 6 MAR 1990

im&eprv54

$$= \ 0.94624 * im\&eprv54[-1] + 0.15649 * diff(gdp54) - 3.21450$$
$$\quad (27.5507) \qquad\qquad (5.85025) \qquad\qquad (0.57948)$$

Sum Sq	11939.3	Std Err	17.4967	LHS Mean	165.500	
R Sq	0.9689	R Bar Sq	0.9673	F 2, 39	607.702	
D.W.(1)	1.9004	D.W.(2)	1.2561			
H	-0.6068					

B-18

INV54$ Inventory Stock (1954$,proxy)
(Identity)

inv54$

$$= \text{inv54\$}[-1] + \text{inv54ch}$$

INV54CH   Inventory Change (1954$)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

inv54ch

$$= \begin{array}{ccc} 0.12145 * \text{sf54} & - 0.23331 * \text{inv54\$}[-1] & - 79.3765 \\ (2.59290) & (2.40763) & (1.80928) \end{array}$$

Sum Sq	54916.8	Std Err	37.5250	LHS Mean	44.9667	
R Sq	0.2007	R Bar Sq	0.1597	F 2, 39	4.8950	
D.W.(1)	1.8930	D.W.(2)	2.5556			

INVCH   Inventory Change ($)
(Identity)

invch

$$= \text{invchbase} + \text{psf}*(\text{inv54ch} - \text{inv54chbase})$$

M   Imports of Goods & Services ($)
(Identity)

m

$$= \text{m@myinv} + \text{myinv}$$

M54   Imports of Goods & Services (1954$)
(Identity)

m54

$$= (\text{m@myinv}/\text{pm@myinv}) + (\text{myinv}/\text{pmyinv})$$

M@MYINV   Imports of Goods & Services excl MYINV ($)
(Identity)

m@myinv

$$= \text{mcd} + \text{mcnfood} + \text{mcnoth} + \text{mk} + \text{mraw} + \text{moth}$$

MCD   Imports of Durable Consumer Goods ($)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

mcd

$$= 0.46974 * cd - 5.80454$$
   (78.7651)   (0.82422)

Sum Sq	41253.0	Std Err	32.1143	LHS Mean 388.345
R Sq	0.9936	R Bar Sq	0.9934	F 1, 40 6203.96
D.W.(1)	1.5024	D.W.(2)	1.4600	

MCNFOOD   Imports of Food ($)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

mcnfood

$$= 0.36980 * cnfood + 127.895 * dum7184 + 3.31245$$
   (47.4786)   (6.55390)   (0.26016)

Sum Sq	111604	Std Err	53.4943	LHS Mean 549.771
R Sq	0.9879	R Bar Sq	0.9873	F 2, 39 1597.16
D.W.(1)	1.2337	D.W.(2)	1.7560	

MCNOTH   Imports of Other Nondurable Consumer Goods ($)
Cochran-Orcutt
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

mcnoth

$$= 0.19783 * cnoth + 71.4741$$
   (14.9594)   (2.44221)

Sum Sq	41423.3	Std Err	32.5904	LHS Mean 379.867
R Sq	0.9899	R Bar Sq	0.9893	F 2, 39 1902.05
D.W.(1)	1.7239	D.W.(2)	2.0151	

MK   Imports of Capital Goods ($)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

mk

$$= \quad 0.53460 * mk[-1] + 0.13623 * ifix - 22.7961$$
$$\quad (2.41922) \qquad (2.95558) \qquad (1.72070)$$

Sum Sq	118649	Std Err	55.1570	LHS Mean	279.476
R Sq	0.9589	R Bar Sq	0.9568	F 2, 39	455.006
D.W.(1)	1.0946	D.W.(2)	0.8579		

MOTH   Other Imports ($)
Ordinary Least Squares
ANNUAL data for   19 periods from 1971 to 1989
Date: 6 MAR 1990

moth

$$= \quad 0.11186 * (mcd+mcnfood+mcnoth+mk+mraw) + 0.44125 * yn@labor$$
$$\quad (10.2213) \qquad\qquad\qquad\qquad\qquad (5.73171)$$

$$+ 355.133$$
$$\quad (7.25492)$$

Sum Sq	94171.6	Std Err	76.7185	LHS Mean	1663.13
R Sq	0.9893	R Bar Sq	0.9879	F 2, 16	736.855
D.W.(1)	1.3920	D.W.(2)	2.0986		

MRAW   Imports of Raw Materials ($)
Ordinary Least Squares
ANNUAL data for   29 periods from 1961 to 1989
Date: 6 MAR 1990

mraw

$$= \quad 0.38246 * gdp + 32.4238 * pcof - 564.363$$
$$\quad (29.9273) \qquad (3.57611) \qquad (4.82129)$$

Sum Sq	3504237	Std Err	367.122	LHS Mean	3998.45
R Sq	0.9889	R Bar Sq	0.9881	F 2, 26	1160.36
D.W.(1)	1.1006	D.W.(2)	1.5333		

MYINV   Investment Income Outflows ($)
Ordinary Least Squares
ANNUAL data for   18 periods from 1972 to 1989
Date: 6 MAR 1990

diff(myinv)

   = - 1.03605 * diff(ex@msfi) + 71.9544
      (10.6261)   (1.49845)

Sum Sq   161587   Std Err   100.495   LHS Mean 515.811
R Sq   0.8759   R Bar Sq 0.8681   F 1, 16 112.914
D.W.(1) 2.0371   D.W.(2) 1.7627

MYINV=myinv[-1]+??

NFEDTR   Net Federal Govt. Transfers ($)
(Identity)

nfedtr

   = fedtrp+fedtrg-fedtw-fedtro-(tpf+tcf)

NIIP   Net Direct and Indirect Liabilities of Puerto Rico
(Identity)

niip

   = niip[-1]+(m-ex)-(nfedtr+notr)

NNP   Net National Product ($)
(Identity)

nnp

   = gnp-cca

PC   Implicit Price Deflator for Consumption
(Identity)

pc

   = c/c54

PCD   Implicit Price Deflator for Durable Consumption
(imposed)
ANNUAL data for   43 periods from 1947 to 1989
Date: 6 MAR 1990

pcd

$$= \quad 1.00000 * pcd[-1]*(pcdus/pcdus[-1]) + 0.00000$$
$$(\quad NC) \qquad\qquad\qquad (\quad NC)$$

_____

PCNFOOD   Implicit Price Deflator for Food Consumption
(imposed)
ANNUAL data for   43 periods from 1947 to 1989
Date: 6 MAR 1990

pcnfood

$$= \quad 1.00000 * pcnfood[-1]*(pcnfoodus/pcnfoodus[-1]) + 0.00000$$
$$(\quad NC) \qquad\qquad\qquad\qquad (\quad NC)$$

_____

PCNOTH   Implicit Price Deflator for Other Nondurable Consumption
(imposed)
ANNUAL data for   43 periods from 1947 to 1989
Date: 6 MAR 1990

pcnoth

$$= \quad 1.00000 * pcnoth[-1]*(pcnothus/pcnothus[-1]) + 0.00000$$
$$(\quad NC) \qquad\qquad\qquad\qquad (\quad NC)$$

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PCS   Implicit Price Deflator for Services Consumption
(imposed)
ANNUAL data for   43 periods from 1947 to 1989
Date: 6 MAR 1990

pcs

$$= \quad 1.00000 * pcs[-1]*(pcsus/pcsus[-1]) + 0.00000$$
$$(\quad NC) \qquad\qquad\qquad\qquad (\quad NC)$$

PEX Implicit Price Deflator for Total Exports
(imposed)
ANNUAL data for 43 periods from 1947 to 1989
Date: 6 MAR 1990

pex

■   1.00000 * pex[-1]*(pgdpbushhus/pgdpbushhus[-1]) + 0.00000
    (NC)   (NC)

PEX@MSFI Implicit Price Deflator for Net Factor Income Exports ($)
(Identity)

pex@msfi

■ ex@msfi/ex@msfi54

PGC Implicit Price Deflator for Government Consumption
(imposed)
ANNUAL data for 43 periods from 1947 to 1989
Date: 6 MAR 1990

pgc

■   1.00000 * pgc[-1]*(pgdp/pgdp[-1]) + 0.00000
    (NC)   (NC)

PGDP Implicit Price Deflator for GDP
(Identity)

pgdp

■ gdp/gdp54

PGNP Implicit Price Deflator for GNP
(Identity)

pgnp

■ gnp/gnp54

PIFIX Implicit Price Deflator for Fixed Investment
(imposed)
ANNUAL data for 43 periods from 1947 to 1989
Date: 6 MAR 1990

pifix

- = 1.00000 * pifix[-1]*(pifixus/pifixus[-1]) + 0.00000
  (NC)   (NC)

PM   Implicit Price Deflator for Total Imports
(Identity)

pm

= m/m54

PM@MYINV   Implicit Price Deflator for Total Imports excl. MYINV
(imposed)
ANNUAL data for   43 periods from 1947 to 1989
Date: 6 MAR 1990

pm@myinv

- = 1.00000 * pm@myinv[-1]*(pexus/pexus[-1]) + 0.00000
  (NC)   (NC)

PMYINV   Implicit Price Deflator for MYINV
(imposed)
ANNUAL data for   43 periods from 1947 to 1989
Date: 6 MAR 1990

pmyinv

- = 1.00000 * pmyinv[-1]*(pex@msfi/pex@msfi[-1]) + 0.00000
  (NC)   (NC)

PRTW   SI Contributions to Puerto Rico Govt. ($)
(Identity)

prtw

= rprtw*wsd

PRTX@SUB   Indirect Business Taxes Minus PR Govt.Subsidies ($)
Ordinary Least Squares
ANNUAL data for   19 periods from 1971 to 1989
Date: 6 MAR 1990

prtx@sub

$$\text{=}\quad 0.15530 * (cd+cnfood+cnoth) + 13.5418$$
$$\quad (34.5573) \qquad\qquad (0.40289)$$

Sum Sq   47112.5   Std Err   52.6433   LHS Mean   1097.49
R Sq   0.9860   R Bar Sq   0.9851   F 1, 17   1194.20
D.W.(1) 1.8036   D.W.(2)   2.8658

PSF   Implicit Price Deflator for Final Sales ($)
(Identity)

psf

$$\text{=} \; sf/sf54$$

SF   Final Sales ($)
(Identity)

sf

$$\text{=} \; c+ifix+gc+(ex-m)$$

SF54   Final Sales (1954$)
(Identity)

sf54

$$\text{=} \; c54+ifix54+gc54+(ex54-m54)$$

TCF   U.S. Corporate Income Taxes ($)
(Identity)

tcf

$$\text{=} \; rtcf*yn@labor+tcfadj$$

TP   Personal Income Taxes ($)
(Identity)

tp

 = rtp*yp+tpf
TPF   U.S. Personal Income Taxes ($)
(Identity)

tpf

 = rtpf*yp+tpfadj

TW   Total SI Contributions
(Identity)

tw

 = fedtw+prtw

TX@SUB   Indirect Business Taxes Minus Subsidies ($)
(Identity)

tx@sub

 = prtx@sub-fedtro

UNEMPCH   Simulated Change in Unemployed Persons (thousands)
(Identity)

unempch

 = -unempcoeff*(gdp54-gdp54base)
WSD   Wage & Salary Disbursements ($)
Cochran-Orcutt
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

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wsd

 =   0.65638 * yn + 98.7980
    (45.1982)   (0.69384)

Sum Sq   269271   Std Err   83.0927   LHS Mean 3414.41
R Sq   0.9993   R Bar Sq   0.9993   F 2, 39 28696.0
D.W.(1)   1.7160   D.W.(2)   2.0254

YD   Disposable Personal Income ($)
(Identity)

yd

$$= yp-tp$$

YD54   Disposable Personal Income (1954$)
(Identity)

yd54

$$= yd/pc$$

YN   National Income ($)
(Identity)

yn

$$= nnp-(tx@sub+vbus+stat)$$

YN@LABOR   Corp. & Public Ent. Profits + Interest Received by Govt ($)
Ordinary Least Squares
ANNUAL data for   42 periods from 1948 to 1989
Date: 6 MAR 1990

yn@labor

$$= \;\; 0.46010 * yn@labor[-1] + 0.32144 * (yn@wsd-tw) - 96.5457$$
$$\quad (4.29666) \qquad\qquad (5.81505) \qquad\qquad (3.89840)$$

Sum Sq	234934	Std Err	77.6141	LHS Mean	418.669
R Sq	0.9784	R Bar Sq	0.9773	F 2, 39	883.355
D.W.(1)	1.4777	D.W.(2)	1.4290		
H	2.3004				

YN@WSD   National Income Minus Wages & Salaries ($)
(Identity)

yn@wsd

$$= yn-wsd$$

YP   Personal Income ($)
(Identity)

yp

  = yn-(prtw+fedtw+yn@labor)+fedtrp+otr&int