

A First Approximation Model of the Balance of Payments, Output, Employment and Foreign Aid Requirements of a Democratic Cuba [\[1\]](#)

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Background

This paper presents some initial thoughts on the economic prospects of a post-Castro democratic Cuba. It provides rough figures of the growth prospects, balance of payments and debt-servicing capabilities of a democratic Cuba under three economic scenarios:

1. Partial Privatization à la Nicaragua,
2. Full Privatization / Caribbean Basin Initiative (CBI) scenario, where Cuba privatizes all its economy and becomes member of the CBI,
3. Full Privatization/North American Free Trade Act (NAFTA) scenario, where a post-Castro democratic Cuba achieves membership in NAFTA after a 15-year wait.

Projections of economic prospects are developed for four time periods: the base year t+0, t+5, t+10 and t+15 years after the change to a democratic government in Cuba. A list of sources can be found in Appendix B.

THE SCENARIOS

The first scenario, corresponding to a partial privatization, is akin to the current Nicaraguan governmental policies, where privatization moved very slowly and where members of the former regime (i.e. the Sandinistas) are still part of the government.

In this scenario, privatization proceeds very slowly and in a haphazard fashion, so that land and agricultural endeavors are hardly affected by privatization. This scenario is commonly referred to as "Fidelismo without Fidel" ("Fidelismo sin Fidel") within the Cuban exile community.

In the CBI scenario, a democratic Cuba rapidly proceeds to privatize its economy and by year t+5 has qualified to join the CBI. In this scenario, agriculture is privatized and Cuban agricultural and industrial exports to the United States begin to grow under the CBI trade system.

The third scenario (NAFTA) of full privatization is similar to the second (CBI) except for year t+15, when a post-Castro, democratic Cuba is accepted into the NAFTA pact after a long period of negotiation with the NAFTA trade partners.

THE ECONOMIC MODEL

The develop project an economic model to trace out the interrelationships between exports, investment, debt and their effects on the growth rate of the Cuban economy in a post-Castro democratic Cuba. The specified model is a variation of the model proposed by R.A.P. Thirlwald. [\[3\]](#)

The description of the model begins with the basic relationships from national income accounting:

$$I - S = M - X \quad (1)$$

where:

I = investment,

S = savings,

M = imports of goods and services,

X = exports of goods and services.

The foreign sector, F, is defined as the difference between imports and exports, and includes foreign private and public investment, other development assistance (such as balance of payment financing), repatriations of profits and capitals, interest paid on foreign lending and even international reparation payments. Thus the foreign sector is defined as:

$$F = M - X \quad (2)$$

$$F = I - S, \text{ and } (3)$$

$$F = FI + ODA + FPAY \quad (4)$$

where:

F = net foreign flows,

FI = foreign investment,

ODA = other development assistance and foreign flows,

FPAY = foreign payments for profits and capital repatriations, interest payments to overseas lenders and international reparation payments.

These relationships may be expressed in either domestic currency or in dollars. In this study some relationships are estimated in dollars, while others are estimated in domestic currency. What is important is that the elements in each of the above relationships (and others in the model as well) be valued in the same currency units; that is, care must be made not to add "apples and oranges" (i. e., dollars and pesos). Thirlwald specifies that:

$$Y = O - FPAY \quad (5)$$

where:

Y = income,

O = output.

so that the difference between output and income equals the factor payments abroad.

GROWTH RELATIONSHIPS

Two sources of output growth are distinguished in the economic model, namely: growth in the previously

state-owned domestic sector, referred to as sector 1, and growth in the foreign sector, or sector 2, which materializes after the privatization and democratic process.

Output, in terms of gross domestic product (GDP t) is defined as:

$$GDP_t = GDP1_t + GDP2_t \quad (6)$$

where:

GDP_t , $GDP1_t$, and $GDP2_t$, are the gross domestic products for the total economy, and for sectors 1 and 2 respectively during year t. All these sectoral outputs are valued in the same currency units (whether dollars or pesos).

The gross domestic product of the domestic pre-democratization period is estimated via a Cobb-Douglas production function specified as follows:

$$GDP1_t = A_o (K1_t)^{[\alpha]} (L1_t)^\beta (SUB1_t)^{[\gamma]} \quad (7)$$

where:

$K1_t$ = value of the capital stock installed in sector 1, the domestic sector in year t,

$L1_t$ = labor employed in sector 1 in year t,

$SUB1_t$ = value of the price subsidies in sugar and oil during year t,

A_o , $[\alpha]$, β , $[\gamma]$, are the constant and the output elasticities of the three factors of production specified in equation (7).

The output generated by the foreign sector, sector 2, is calculated by the product of the value of capital in the foreign sector times the inverse of the capital-output ratio, which is assumed to have a value of 3.5, that is, a median range of values estimated by Chenery and Strout: [\[4\]](#)

$$GDP2_t = (1/(c_2 / o_2)) (K2_t) \quad (8)$$

$$GDP2_t = (1/3.5)(K2_t)$$

where:

$K2_t$ = value of the capital installed in sector 2, the foreign sector, from private and public sources, during year t,

c_2 / o_2 = capital-output ratio for the foreign sector, sector 2, ($c_2 / o_2 = 3.5$).

The capital stock is estimated net of depreciation charges as follow:

$$K1_t = (I_t - D1_t) + K1_{t-1} \quad (9)$$

$$K2_t = (FI_t - D2_t) + K2_{t-1} \quad (10)$$

where $D1_t$ and $D2_t$, are the capital depreciation charges for domestic and foreign capital during year t.

The capital depreciation is estimated at 2% of the previous year's capital stock in the domestic sector and

Before the estimation results are discussed a few notes on the data sources are in order. The gross domestic product series for the period 1975-1989 comes from Tabares and Hidalgo of the University of La Habana. [6] For the period after 1989, Tabares and Hidalgo's GDP series was projected assuming that the percentage decline in the gross social product mentioned by Carranza [7] applied as well to the decline in the gross domestic product during the post-1989 period. Appendix B documents the data sources used.

The capital figures were developed assuming that the initial value of capital stock in 1961 was 8,900 millions of pesos. [8] Subsequent values were estimated from the Cuban government's official series on gross and net investments. Since there are gaps in the official series of depreciation from 1967 to 1974, estimates of net investments for these years were estimated assuming that capital depreciation charges for these years were 2% of the value of capital stock during the previous year.

The econometric issue of proper identification of production function parameters becomes more complex under socialism, since it is unclear whether the usual competitive market relationships of profit maximization and/or cost minimization in factor markets can be used to identify parameters of the production function at all. Thus, the potential simultaneous equation problem of production function is ignored as unimportant following Zellner, Kmenta and Dreze, [9] who argue that no identification problem occurs when the level of the production function disturbance does not transmit to the inputs, because the inputs were determined before the disturbance could be ascertained.

The collinearity between the capital and labor series made it necessary to estimate a Cobb-Douglas production function with constant returns to scale. The production functions contain the value of Russian oil and sugar subsidies as a factor of production. It is proper that these subsidies be considered as a factor of production in Castro's Cuba, since Russian oil and sugar prices subsidies are close to 20% of the Cuban GDP during the several years of rapid growth in the early eighties. The subsidies are estimated as: quantities of sugar exported to the former USSR multiplied by the difference between Soviet sugar prices paid to Cuba and world sugar prices, plus the quantities of oil imported by Cuba from the USSR multiplied by the difference between world oil prices and oil prices paid by Cuba to the USSR. The values of oil re-exports were not considered in order to avoid double counting.

As shown in Equation (7a) in Table 1, the capital elasticity of production is $[\alpha] = 0.32$ and the labor elasticity is $\beta = 1 - 0.32 = 0.68$. The elasticity of the subsidies is $[\gamma] = 0.06$. In Equation (7.c) the sum of the elasticities of all the factors are constrained to add to 1.0 and the labor elasticity is reduced to $\beta = 0.59$. The best function is Equation (7.b), which uses official, Cuban governmental figures on gross investments and which renders inconclusive the problem of serial correlation of residuals. There are few differences between the three functions, which lends some credibility to the capital figures developed in the section on Cuban debt. The capital elasticities, which range from $[\alpha] = 0.30$ to 0.35, are lower than capital elasticities of developing countries. [10] This may be due to the material balance system of national accounting used in Cuba and other countries formerly in the Soviet block, where there is no accounting for land rents, interest, housing rents and other capital factor payments. However, these lower capital elasticities may also reflect inefficiencies in capital utilization in Cuba.

BALANCE OF PAYMENTS RELATIONSHIPS

This section focuses on the balance of payments relationships of the Cuban economy during its post-Castro democratic period. The analysis begins by restating the ex-post relationship between imports (M_t) and exports (X_t) of goods and services and net foreign inflows (F_t) as specified earlier:

$$F_t = M_t - X_t \quad (2)$$

In this economic model, ex-ante exports are considered exogenous, while imports, except for the autonomous imports (MAUT t) estimated from the Cuban American National Foundation's Blueprint report, [11] are estimated as a function of the gross domestic product of the total economy (including domestic and foreign sectors). For the purpose of estimating import functions and import elasticities during the period analyzed, the current import categories of Cuba were grouped into four major categories: 1) imports of food, beverages and tobacco (MFOOD t), 2) imports of machinery and equipment (MMACH t), 3) imports of miscellaneous manufactures and intermediate goods, except oil, (MINT t), and 4) imports of oil (MOIL t). In the case of oil imports, the metric tons of imported oil (net of oil re-exports) were estimated as a function of oil prices and of the gross domestic product, while the price of oil is assumed to be exogenously determined. Specifying oil prices as exogenous will enable us to use the World Bank projections of world oil prices for projecting the import bill of the Cuban economy.

The import demand functions are:

$$\ln \text{MFOOD } t = \text{MFOOD } o + [[xi]] f \ln (\text{GDP } t) \quad (11)$$

$$\ln \text{MMACH } t = \text{MMACH } o + [[xi]] m \ln (\text{GDP } t)$$

$$\ln \text{MINT } t = \text{MINT } o + [[xi]] i \ln (\text{GDP } t)$$

$$\ln \text{QOIL } t = \text{QOIL } o + [[xi]] o \ln (\text{GDP } t, \text{POILS } t)$$

$$\text{MOIL } t = \text{QOIL } t \times \text{POILW } t$$

where:

QOIL t = thousands of metric tons of oil imports during year t,

POILW t = world price of oil in dollars per barrel, during year t,

POILS t = Soviet price of oil charged to Cuba in pesos per barrel, during year t,

[[xi]] f, [[xi]] m, [[xi]] i, and [[xi]] o, are the import elasticities for food, machinery and equipment, miscellaneous manufactured and intermediate goods, and oil quantities to be estimated,

MFOOD o, MMACH o, MINT o, QOIL o, are constants (intercepts) to be estimated.

To estimate the import elasticities, we assembled a data series on imports from the Anuario Estadístico de Cuba. [12] This data series included the following years: 1975, 1977 and from 1979 to 1989. The quantities of oil re-exports were deducted from the import quantities presented by Pérez-López [13] to develop a series of imported oil used by the Cuban national economy. The quantities of oil re-exports were estimated using: 1) the values in pesos of oil re-exports presented in the Anuario Estadístico, 2) the world crude oil price in dollars presented in the World Bank [14] study of prices of primary products, and 3) the exchange rates (pesos per dollar) presented in Cardoso and Hellwege's book. [15]

Simple import elasticities were then estimated, which we present in Table 2 and summarize in Table 3 below.

Table 2.
Import Demand Functions, 1975-1989

$$\ln \text{MFOOD } t = 0.8926 + 0.5910 \ln(\text{GDP}_t) \quad (11.a) \\ (4.542)$$

$$R^2 = 0.6523, \text{ D.W.} = 1.8003$$

$$\ln (\text{MFOOD } t/P_t) = 2.6035 + 0.4156 \ln(\text{GDP } t/P_t) \quad (11.b) \\ (2.646)$$

$$R^2 = 0.3890, \text{ D.W.} = 2.0168$$

$$\ln \text{MMACH } t = -4.6419 + 1.2578 \ln(\text{GDP } t) \quad (11.c) \\ (8.994)$$

$$R^2 = 0.8803, \text{ D.W.} = 2.4763$$

$$\ln (\text{MMACH } t/P_t) = -6.0332 + 1.4006 \ln(\text{GDP } t/P_t) \quad (11.d) \\ (8.114)$$

$$R^2 = 0.8568, \text{ D.W.} = 2.6745$$

$$\ln \text{MINT } t = -2.6473 + 1.0330 \ln(\text{GDP } t) \quad (11.e) \\ (6.427)$$

$$R^2 = 0.7897, \text{ D.W.} = 1.9342$$

$$\ln (\text{MINT } t/P_t) = -2.5846 + 1.0264 \ln(\text{GDP } t/P_t) \quad (11.f) \\ (4.844)$$

$$R^2 = 0.6809, \text{ D.W.} = 1.9313$$

$$\ln \text{QOIL } t = 4.7981 + 0.4603 \ln(\text{GDP } t) \quad (11.g) \\ (6.084)$$

$$R^2 = 0.7709, \text{ D.W.} = 1.0411$$

$$\ln QOIL_t = 3.2145 + 0.6224 \ln(GDP_t/P_t) \quad (11.h)$$

(6.914)

$$R^2 = 0.8130, \quad D.W. = 0.9632$$

where:

GDP_t = gross domestic product, in millions of pesos during year t,

MFOOD_t = imports of food, beverages and tobacco, in millions of pesos valued at official exchange rates, during year t,

MMACH_t = imports of machinery and equipment, in millions of pesos valued at official exchange rates, in year t,

MINT_t = imports of intermediate goods, in millions of pesos valued at official exchange rates, in year t,

QOIL_t = quantities of imported petroleum and oil products, in thousands of metric tons during year t,

P_t = implicit price deflator for the gross social product (P 1989 = 100.0).

Table 3.
Point Elasticities of Demands for Imports, 1975-1989

Imports	Elasticities With Respect To:	
	Current GDP (GDP _t)	Constant GDP (GDPT/Pt)
Food, Bev., & Tobacco (MFOOD _t)	0.59	0.42
Mach. & Equipment (MMACH _t)	1.26	1.40
Intermediate Goods (MINT _t)	1.03	1.03
Quantities of Oil (QOIL _t)	0.46	0.62

Source: See Table 2.

There are no major surprises in the estimated elasticities. Import elasticities for food, machinery and equipment, and intermediate goods all have reasonable values and are within the ranges for elasticities estimated for other countries. Only the import elasticities for oil quantities appear low, in addition to having problems of serial correlation. These lower values for oil elasticities could be the result of inadequate specification for this import function; however, the oil price variable was found to be statistically insignificant. There are other influences at work that we are not able to explain adequately.

SAVINGS AND INVESTMENT RELATIONSHIPS

The discussion of savings and investment relationships begin with restating the basic ex-post relationship between these economic aggregates, as shown in equation 12:

$$F_t = S_t - I_t \quad (12)$$

This equation specifies that differences between savings (S_t) and investments (I_t) must be covered by foreign capital flows (F_t).

As percentage of the gross domestic product (GDP t), the average savings rate of the Cuban economy during the 1950s had a range which varied from 8.4% in 1953 to 11.5% in 1957. [16] After several years of Castro's rule the savings rate began to rise. Luis Landau quoted, from United Nations sources, an average savings rate of 19% of gross domestic product in 1967. [17] By 1975, the average savings rate [18] was 20.55% of GDP, but was by then steadily declining to 14.93% in 1981, to 11.77% in 1985 and to 9.16% in 1989. This paper assumes that free consumer choice in a post-Castro democratic Cuba will initially reduce savings to 8% of GDP, but that the marginal savings rate will be larger, at a level of 19% of GDP. The marginal savings rate assumed for this study corresponds to the median value for this parameter estimated by Chenery and Strout [19] from a large cross section of countries.

The savings function of the Cuban economy is specified as follows:

$$S_t = s_o (GDP_o) + s_m (GDP_t - GDP_o) \quad (13)$$

or

$$S_t = 0.08 (GDP_o) + 0.19 (GDP_t - GDP_o)$$

where:

s_o = initial average savings rate ($s_o = 0.08$) at time $t+0$,

s_m = marginal savings rate, ($s_m = 0.19$),

GDP_o , and GDP_t = gross domestic products in years $t+0$, and year t .

Investments in the domestic Cuban economy are a function of total imports, terms of trade and the previous year's change in gross domestic product. This specification of demand for investments combines the notion that a key portion of current Cuban investment is imported (imports of machinery and equipment) from abroad, and also includes concepts of the investment accelerator on GDP. The investment demand function specified is estimated in equation 14:

$$I_t/P_t = f[(M_t/P_t), [[\Delta]](GDP_t/P_t), (PSUGAR_t/POIL_t)] \quad (14)$$

where:

I_t = gross investments in year t , expressed in pesos at official rates,

M_t = total imports in year t , expressed in pesos at official exchange rates,

$[[\Delta]]GDP_t = GDP_t - GDP_{t-1}$,

$PSUGAR_t$ = price per lb. of Cuban sugar exports to the former USSR, expressed in centavos de pesos at official exchange rates in year t ,

$POIL_t$ = price per barrel of oil imports imported from the former USSR, expressed in pesos at official exchange rates during year t ,

P_t = implicit price deflator for the gross social product ($P_{1989} = 100.0$).

The investment demand function estimated is:

$$\ln(I_t/P_t) = 0.7034 + 0.8390 \ln(M_t/P_t) + 0.1634 \ln(PSUGAR_t/POIL_t) \quad (15)$$

(5.280) (1.950)

$R^2 = 0.8237$; D. W. = 1.4198

In this equation, the figures in parenthesis denote t-values of the respective regression coefficients, while D.W. represents the Durbin-Watson statistic that measures serial correlation of residuals, and \ln represents natural logs. The above investment demand function was estimated with a data series from 1971 to 1990. The source of gross investment figures for the period 1971-1989 is the Anuario Estadístico de Cuba. The data series on gross investments was extrapolated from 1989 to 1992 from estimates presented by Julio Carranza. [20] The accelerator variable was unfortunately not found to be statistically significant. The price deflator for 1990 was taken from Mesa-Lago. [21]

EMPLOYMENT RELATIONSHIPS

The first approximation model can also be used to project employment in the Cuban economy in the free market environments of the post-Castro democratic Cuba.

Labor Supply

The supply of labor is determined from the natural increase of the economically active population (i.e the population of working age) plus net immigration. For simplicity, the combined result of the cohorts of growth in labor supply is assumed to take an exponential form:

$$N_t = N_o (1+n)^t \quad (16)$$

where:

N_t = economic active population (labor supply) in time t ,

N_o = economic active population in the initial year t_o ,

n = annual rate of growth of the economic active population.

The labor supply projections are taken from the International Labor Organization. [22] It measures the economically active population (aged 15-65 years old), which had been growing at annual rates of 3.07% during the seventies and 2.27% during the eighties, but is projected to slow down further during the next 15 years. The ILO projects annual growth rates for the economically active population of Cuba of 1.35% in the nineties, and 0.71% from 2000 to 2010. The economically active population was 3.987 million persons in 1985 and 4.461 million in 1990. Using the ILO's projected annual growth rates, the economically active population of Cuba has been projected as 4.582 million persons in year $t+0$, 4.966 million persons in year $t+5$, 5.208 million persons in year $t+10$, and 5.396 million persons in years $t+15$.

Labor Demand

The demand for labor or total demand for employment (L_t) is given by the sum of the demand for labor in the domestic sector ($L1_t$) and the demand for employment in the foreign sector ($L2_t$), as shown in equation 17:

$$L_t = L1_t + L2_t \quad (17)$$

Making use of the competitive market relationship that wages equal the value of the marginal productivity of labor, the following expression holds:

$$d(\text{GDP}_t)/d(L_t) = \beta (\text{GDP}_t / L_t) = W_t \quad (18)$$

where:

W_t = average annual wages in pesos in the domestic sector in year t ,

β = production function elasticity for labor,

GDP_t = gross domestic product originating in the domestic sector in year t ,

L_t = demand for labor in the domestic sector in year t .

The above expression can be translated into a labor demand equation for the domestic sector:

$$L_t = (\beta) (\text{GDP}_t) (1/W_t) \quad (19)$$

Evaluating the above relationship with 1989 official wage data [23] results in the following parameters:

$\text{GDP}_t/L_t = 5,173$ pesos of 1989,

$W_t = 2,455$ pesos for the 1989 average wage and 2,260 pesos for the 1989 median wage,

$\beta = 0.474 - 0.437$ depending on the wage figure used.

Thus, official average wages paid comprise 70% of the value of the marginal productivity of labor. However, the official wage data does not reflect additional benefits the Cuban worker derives from subsidies they receive as the result of state subsidized food and clothing expenditures, which absorbed substantial cost of living expenses. [24] By rationing consumption, Cuba attempts to guarantee the satisfaction of basic needs independent of levels of disposable income resulting from salaries and wages. For this reason we should expect larger labor elasticities than the ones above. In fact we should expect the larger production elasticities ($\beta = 0.6823$) estimated in Table 1. Employment generated by the foreign sector is given by:

$$L_t = (1/2/k_2) (K_2 t) \quad (20)$$

where:

$(k_2/2)$ = capital requirements in constant dollars per unit of labor in the foreign sector. (assumed to be \$50,000 per person employed),

$K_2 t$ = value of capital installed in the foreign sector during year t . (in constant dollars),

L_t = labor employed in the foreign sector during year t .

Labor Market Equilibrium

The labor market equilibrium condition is :

$$L_t \leq N_t \quad (21)$$

that is, demand for labor L_t can not exceed the supply (N_t). If demand for labor is less than the supply, the excess labor (U_t) can be estimated as:

$$U_t = N_t - L_t \text{ (22)}$$

To assist in selecting a target wage rate, the median annual wage of the Cuban economy was estimated in constant 1981 pesos (using the gross social product deflators) in the period 1975-1989. The real wage rate was found to have grown at annual rates of 1.6% annually from 1975-1989 and 1981-1989. [\[25\]](#)

Growth at 1.6% annually during the 15 year projection period was then set as the development target for the NAFTA scenario. Because of the difficulties that will be encountered during the first five years of transition, we assumed that wage rates would not grow at all (i.e., no growth in real wages) during the first five years. However, in the CBI scenario the target growth rate in real wages is projected at 1.0%, while the partial privatization scenario assumes that the wage rate will remain the same in real terms.

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Part II

EXPORTS OF GOODS AND SERVICES

This section analyzes the exports of the Cuban economy under the three scenarios described earlier. Exports are projected during a 15-year period after the onset of democratization in Cuba. Each of the major export markets is discussed next.

SUGAR

Sugar is the main engine of Cuba's economy. It is the only sector which consistently provides convertible currency and employs a substantial number of the civilian labor force. If employment in the sugarcane agriculture and sugar sectors is combined, the number of employees could exceed over 350,000, which makes the sugar industry "the largest employer in the nation." [\[26\]](#) Therefore, during a period of transition towards a market economy, the sugar industry can and will remain a valuable contributor to the economy of the country.

The role of the sugar industry during the transition period will be crucial. There will be ample opportunities for investments, which could transform the industry and enable the country to break away from a monocultural economy. Opportunities could be realized utilizing the comparative advantage of being the potential lowest cost producer of sugarcane, which could be diversified into the area of sugar by-products. Therefore, with serious private investments and a well-planned diversification program, the country could re-enter the sugar markets as a low-cost competitor. It could also potentially compete for a segment of the industrial chemical markets.

Boosting the sugar industry during the initial period of transition will be very difficult. In addition to the crucial issues of operating an industry which cannot afford many inputs, the blunders of the past thirty years in the fields and the mills, combined with the scarcity of convertible currency and the lack of credit in financial markets, (due to a non-performing debt with the Paris Club), will present a challenge during the initial period of transformation. On a positive note, the agricultural sugarcane sector received the benefit of improved mechanization, additional irrigation and fertilization, which was almost non-existent during the pre-revolutionary days. Despite this increased attention, a pre-requisite remains that, the price paid to the sugarcane farmer be equitable and profitable. This will insure the quality of the inputs to the mills.

Despite the improvements and achievements realized during the past thirty years, a note of caution about ecological damages and abuses to the soil is necessary. During this times, extensive and indiscriminate use of fertilizers and pesticides as well as mechanization might have damaged the soil. Evidence is very difficult to obtain, but several areas have been identified already. For example, agricultural yields in certain crops have not substantially improved despite increased fertilization and irrigation when compared to other countries in similar climatic area. The results of replenishing and rejuvenating the soil is a very complex task and in some cases, the damage is irreversible.

In addition to the above potential changes in the agricultural sugarcane industry, the industrial sector of the economy will necessitate structural changes to regain competitiveness. During the 70's, seven new mills were built to replace others demolished due to obsolescence, while many more were thoroughly repaired and new machinery was added. A cursory review of the state of the industry indicates that, until 1990, repairs were undertaken as needed. However, during the 1991-92 sugar campaign, serious shortages of parts and inputs were reported by the leadership. [\[27\]](#) Attention must be given to reducing the size of the industrial sugar park and to creating truly agro-industrial complexes that are well-automated, with modern plants for the sugar by-products. These must have an adequate supply of water and sugarcane. The goal should be to create an efficient and profitable industry. Foreexample, over 40.0% of the mills might be of uneconomical size, and many of them do not have sufficient sugarcane to grind for a period of 150 days per year. [\[28\]](#) While many of these small mills might have to suffer closure, other mills have plants attached that produce torula yeast, animal feed, yeast, dextran, etc. These plants could be made very efficient after a period of modernization, expansion and repairs. Therefore, the basis for the future industry might exist, but there are great limitations and serious investments to realize before the industry can again become competitive.

We would like to examine two possible scenarios for the future of this industry and to give an approximation of potential revenues, as well as costs, during a transition process. However, it must first be made clear that sugar markets abroad demand white sugar, but that sugar, as a commodity, has perfect substitutes such as aspartame and high fructose corn syrup. The effects of those perfect substitutes have undermined the size of the market for the product. In addition, sugar is vulnerable to price fluctuations and trade barriers. Thus, the question remains: Will the sugar industry be a major contributor to the transition and to economic recovery?

Scenario I: Partial Privatization.

The scenario portrayed in Tables 4 and 5, assumes that improvements will occur in agricultural practices and that by the year t+5, mills will begin to reflect higher yields with better returns to farmers and mill owners. During this period, government policy will not change industrial park location, size or composition. However, once operations begin under private ownership, any decision on closure and

profitability will be made by the mill owners. It is assumed that repairs and improvements will be carried out to keep the industry in operation. Essentially, the country remains a raw sugar producer. White sugar is produced for domestic consumption. Therefore, alterations made in the year t+0 composition of the industrial park will result from economies of scale and competition. Products such as ethanol and others are not significant contributors to earning foreign exchange. Those products are basically produced for domestic consumption. We assume the transitional government will make the decision to institute a

policy by which molasses is produced for animal feed, for the rum industry and for cooking fuel. Very little, or insignificant amounts of ethanol and other products could be exported in this scenario.

Both scenarios described below assume that those necessary steps for the establishment of commercial relations with the United States will have occurred. The steps include:

1. Lifting of the trade embargo and other trade restrictions imposed under the Cuban Democracy Act
2. Re-establishments of the Most Favored Nation - MFN - clause for Cuba
3. Re-instatement of the sugar quota or a direct trade agreement negotiated with the United States
4. Becoming members of CBI and NAFTA if both regional trade agreements exit.

Table 4.
Exports Potential of Raw Sugar, Partial Privatization Scenario
(in millions of tons)

Markets For Raw Sugar	Year			
	t+0	t+5	t+10	t+15
CIS and ex-socialist countries	3.5	2.0	2.1	2.5
China	0.8	0.5	0.6	0.7
Other Western economies	1.8	1.8	2.3	2.5
U.S.A. with CBI and NAFTA	0.0	0.5	0.5	1.5
Total potential sales to world markets	6.1	4.8	5.5	7.2
Production for domestic consumption	0.7	0.8	0.85	1.0
Estimated production	6.8	5.6	6.35	8.2

Note: It is assumed that CIS policy for the near future will be based on the production of grains rather than sugar beets for sugar.

Source: for period t+0 International Sugar Organization, Sugar Statistics, Jan.-Dec. 1992 and Rivero International data bank.

Table 5.
Projected Revenues from Raw Sugar Sales to World Market, Partial Privatization Scenario
Prices are FOB Caribbean, (in millions of dollars)

Estimated Prices	Year		
	t+5	t+10	t+15
At \$303.00 per ton	\$1,454.0		
At \$353.00 per ton		\$1,959.0	
At \$441.00 per ton			\$3,175.0

Note: The price per ton was obtained from: *Market Outlook for Major Primary Commodities, Vols. 1 and II*, Report No. 814/92, (Washington, D.C.:International Bank for Reconstruction and Development, 1992). See also "Revision of Primary Commodities Price Forecasts," *Quarterly Review of Commodity Markets* (December 1992): 5.

Scenario II: Full Privatization Scenarios

This proposed scenario could occur in Cuba with an economy under a market system and free trade without any kind of government regulation or interference. That is, free flow of all factors of production and no governmental controls are contemplated, apart from those related to taxation, agricultural and sanitation guidelines for the industry. Sugarcane farms and mills will be independently owned under a free enterprise system and concerned with optimizing profits and minimizing losses. Therefore, for this scenario to occur, several conditions must be met within the transition period, including the continuation of improvements in agricultural practices and the reorganization of the industry by the modernization of the factories. Factories deemed by the owners to be obsolete and unprofitable will close. Free flow of foreign and domestic investments will be received for the purpose of enhancing and transforming the facilities.

The transformation could eventually result in an industry which would produce raw and white sugar but white sugar will be the predominant product to the extent possible. Owners will determine the size and location of additional refining capacity, however it is expected that the new plants will be attached to their respective raw sugar factories. The process employed in the production of white sugar will be determined by the investor(s) and owners. In addition, several sucro-chemical industries already in place will enter production at full capacity. Products with potential for export will be ethanol, dextran, torula yeast, etc.

This scenario takes into consideration existing refineries and additional refining capacity. The domestic market will be supplied with

plantation white sugar (blanco directo) for domestic consumption and the price of white sugar is assumed to be slightly than that of raw sugar (See Tables 6 and 7.)

Among the advantages the production of white sugar offers are its marketability and employment benefits, which the country could realize. However, the investments required to modernize the mills and to convert the industry will be considerable. See appendix A for details on costs of potential built-in capacity.

An examination of the two outlines indicates that the production of raw sugar will continue as the transformation into white sugar occurs. Potential revenues will begin to materialize and the marketability of the product will improve due to demand factors in the world. Nonetheless, cost considerations and optimal allocation of resources should be a desired guideline for the industry.

It is assumed that by year, t+5 only 1.0 million tons of total exported sugar will be white sugar, and by year t+10, exports of white sugar will have risen to 2.5 million tons. This indicates that in 10 years the country will have doubled white sugar export capacity, and by year, t+15 at least 60.0% of the exports will be white sugar.

Table 6.
Export Potential of Raw and White Sugar, Full Privatization Scenario
(in millions of tons)

Countries	Year		
	t+5	t+10	t+15
CIS and ex-socialist countries	2.0	2.1	2.5
China	0.5	0.6	0.7
Other Western economies	1.8	2.3	2.5
U.S.A. under NAFTA AND CBI	0.5	0.5	1.5
Total potential sales to world markets	4.8	5.5	7.2
Production for domestic consumption	0.8	0.85	1.0
Estimated production	5.6	6.35	8.2

Table 7.
Projected Revenues From Sale of White Sugar, Full Privatization Scenario
Prices are FOB Caribbean, (in millions of dollars)

Scenarios	Year		
	t+5	t+10	t+15
3.8 mill. tons of raw at \$303.00 per ton	\$1,151.4		
1.0 mill. tons of white at \$358.00 per ton	358.0		
3.0 mill. tons of raw at \$353.00 per ton		\$1,059.0	
2.5 mill. tons of white at \$408.07 per ton		1,020.2	
3.7 mill. tons of raw at \$441.00 per ton			\$1,631.7
3.5 mill. tons of white at \$496.04 per ton			1,736.1
Potential revenues	1,509.40	2,079.20	3,367.80

Note: The price per ton was obtained from: *Market Outlook for Major Primary Commodities, Vols. I and II*, Report No. 814/92, (Washington, D.C.: International Bank for Reconstruction and Development, 1992). See also "Revision of Primary Commodities Price Forecasts," *Quarterly Review of Commodity Markets* (December, 1992): 5. The projected prices for white sugar were provided by Nicolás Rivero, of Rivero International, Sugar and Trade Consultants, Falls Church, Va.

ETHANOL

In addition to sugar and other byproducts, ethanol has some potential as an export industry. Given present capacity, the potential for exports of ethanol are limited due to competing uses for molasses as animal feed, for cooking, for rum production and for other by-products. However, under a democratic government, with a diversification program in place and full privatization in effect, it would be possible for Cuba to participate in the ethanol market of the United States.

Several conditions and policy decisions must be made in order to maximize the potential of this industry. Cuba will be required to: 1) change its present policy of using molasses for animal consumption and other uses 2) implement a national diversification program 3) undertake a modernization of the existing plants and 4) begin a moderate expansion of its capacity.

Scenario I: Partial Privatization With Expansion And Modernization Of The Industry

Background on the U.S. Ethanol Market. A market for ethanol was created in the United States with the passage of the of the Clean Air Act Amendments of 1990. Meanwhile, the Corporate Average Fuel Economy (CAFE) standards of 1978 provided credits to automobile manufacturers for the development and use of autos using non-petroleum based alternative fuels. Recently, the Energy Policy Act of 1992 promoted the use of alternative-fuel vehicles and required "to phase in use, in certain fleets, vehicles which operate with clean burn gasoline." [29] In addition, Federal Highway Administration regulations mandate the use of clean burning gasoline. Therefore, to undertake the production of clean burn fuels, known as reformulated gasoline, an oxygenant is needed. Ethanol is a product which meets the properties required because it blends well with gasoline.

The U.S. Market. Ethanol capacity in the United States is limited but will grow substantially to meet projected demand by 2010. Today, ethanol-producing plants of any considerable size use corn as and other inputs. Production in 1992 reached an annual average of 106.3 million gallons per year and stocks averaged annually about 30.6 million gallons per year. [30] Estimated consumption, by 1995, could reach 113.5 millions of gallons per year. By the year 2010 it is estimated that an ethanol demand will exceed over 1,930.0 million gallons per year. The growth projected for this market will be 63.5% between 1990 and 2010. [31] Thus, an import residual market will be created if supply can not meet demand by the year 2005 when a major market growth is expected.

Current CBI Member Participation in the U.S. Market. The Caribbean Basin countries are now benefiting from this newly created market. Some countries are taking advantage of the CBI legislation and are exporting ethanol to the United States. The advantages of being a CBI designated country lies in the lower duties imposed. CBI members with domestic ethanol feedstock receive the benefit of no trade barriers. A general duty of 3.0% is applied to imports from other areas. For example, in 1992, Jamaica exported 7.7 million of gallons while Costa Rica exported 11.7 million gallons. [32] It is conceivable that within the next ten years, the Caribbean Basin countries could increase imports of ethyl alcohol to meet the market expansion projected in the United States by the year 2010. For Cuba to enter the potential U.S. market after 1995 when demand increases, membership in the CBI must be a reality and NAFTA membership should follow thereafter.

Cuba's Industry and its Potential Participation in the U.S. Market. Presently, Cuba could compete for a small share of this market and benefit from using its installed capacity. Participation in the U.S. market would be feasible once policy decisions are undertaken as described below. There are 17 distilleries on line with a capacity of 66.0 million gallons of alcohol per year. [33] In 1987, Cuba exported 6.6 million gallons of ethyl alcohol, which is only 10.0% of the installed capacity. [34]

The partial privatization scenario assumes the use of installed capacity and contemplates the possibility of additions to capacity through a major overhaul and modification of the plants (see Tables 8 and 9). In addition, it is expected that the government will make some policy decisions with regard to molasses usage. Rum production for exports is expected to continue at present or higher levels because this is a mature industry and it has an existing international market. Therefore, this scenario contemplates an increase in ethyl alcohol production capacity at a rate of 5.0% per year until the year 2010. Thus, capacity by the year 2010 will reach 80.0 million gallons. By t+15, a 25.0% increase in export capacity will be reached. Exports projections made for ethanol are in constant 1992 dollars. Export prices were those quoted and obtained for 1992.

Table 8.
Projected Sales of Ethyl Alcohol to the United States, Partial Privatization Scenario
(in millions of gallons)

Product	Year		
	t+5	t+10	t+15
Ethyl Alcohol	7.2	8.0	10.0

Table 9.
Revenues From Sales of Ethyl Alcohol, Partial Privatization Scenario [35]
Prices are FOB Caribbean, (in million of dollars)

Scenario	Year		
	t+5	t+10	t+15
At \$1.15 per gallon	\$8.2		
At \$1.35 per gallon		\$10.8	
At \$1.40 per gallon			\$14.0

Scenario II: Full Privatization

An effective diversification program under a democratic Cuba will be a great challenge to private industry. There are choices to make and opportunity costs to consider in addition to substantial investments to realize. Under a diversification program several distilleries could be built annexed to existing sugar mills which would increase the present production capacity. Rivero provides some insight into the creation of an ethanol industry using sugar as feedstock:

A national ethanol program could be based on converting an equivalent 1.0 million tonnes of sugar into fuel alcohol and this would require 10 million tonnes of sugarcane to manufacture--based on a yield of one tonne of sugarcane equals 18 gallons of ethanol-- 180 million gallons of product. ³⁶

Therefore, using sugar as feedstock, industry expansion and production of over 60,000 gallons per day (in addition to other by-products such as furfural, yeast, etc.) could transform the sugar industry into a sucro-chemical base. In addition, the country must foster and facilitate the production of sugar by-products. The sugar by-products industry could become a mainstay source of new employment and provide the basis for the country diversification from sugar as a commodity. In addition, there are certain advantages to the sugar industry. For example, a modern ethanol industry could become a recycling industry for unsold sugars when the international market is not capable of absorbing the entire output. Raw sugar could be converted into syrup and ethanol could be manufactured at a rate of 142.8 gallons per metric ton of sugar. [37]

Assuming a national sugar diversification program is desired in a democratic Cuba, securing CBI status and NAFTA membership, with an addition of 20 distilleries to the present infrastructure (with a production capacity of 60,000 gallons of ethanol), the country could increase its market share in the United States. Tables 10 and 11 below provide projections of revenues and production possibilities for such an undertaking. Projections of ethanol exports in constant 1992 dollars are presented in the summary export table.

Table 10.
Projected Sales of Ethanol to the United States, Full Privatization Scenario
(in millions of gallons)

Product	Year		
	t+5	t+10	t+15
Ethyl Alcohol	60.0	80.0	100.0

Source: Rivero International database.

Table 11.
Revenues from Sales of Ethanol to the United States, Full Privatization Scenario
Prices are FOB Caribbean, (in millions of dollars)

Scenario	Year		
	t+5	t+10	t+15
At \$1.30 per gallon	\$78.0		
At \$1.50 per gallon		\$120.0	
At \$1.50 per gallon			\$150.0

Note: No duty is applicable as a result of having qualified as a member of the CBI countries. At year t+15, Cuba will be a CBI and NAFTA member. Prices were provided by Mr. B. Haigwood of Information Resources Inc. Washington, D.C. and Rivero International database. F.O.B. export prices were those quoted and estimated for 1992.

NON-SUGAR EXPORTS^[38]

Cuba's international tourism receipts had a 3.2% market share of the entire Caribbean region^[39] (excluding Mexico) in 1992, lagging behind important competitors, such as Puerto Rico, Bahamas, Dominican Republic, Jamaica, Bermuda, Barbados, and even the Caiman Islands. By year t+15, Cuba's market share of the Caribbean region's tourism receipts is expected to grow to 9% under the partial privatization scenario and to 11% under the full privatization scenario. Cuba's market share could grow to 15% of the Caribbean market if gambling would be allowed in Cuba.^[40] Deductions from tourism receipts must be made to reflect the high import content (i.e. as much as 64.5%) of the Cuban tourism industry.^[41] By year t+15, net receipts from tourism, were projected to be nearly 1.47 billion of 1992 dollars, as large (i.e. 97%) as the value of the Cuban sugar exports.

Nickel exports have been depressed since 1991 due to the plummeting of nickel prices in the World market. Current prices are less than half the costs of producing nickel in Cuba.^[42] In addition, a large increase in world wide nickel capacity is projected by the World Bank for the near future. The

projections assume exports of 55,000 tons by year t+15, well below the 100,000 tons projected by the Cuban government for year 2,000, but even our projections may be on the high side given the deplorable market conditions in nickel. Nickel exports were projected at 525 billion of 1992 dollars for year t+15 under the NAFTA scenario.

With demise of the centrally planned economies in the USSR and Eastern Europe, Cuban citrus exports have collapsed to a shade of their 1989 peak value of \$171 million. The projections assume that citrus exports will recuperate and grow moderately^[43] to 266-292 million of 1992 dollars by year t+15. Exports of fisheries peaked at 149 million in 1986 and have been declining ever since. Meanwhile, most of Cuba's catch -92% of its value- comes from domestic waters, the Gulf of Mexico, the Caribbean and the North coast of Brazil.^[44] The projections assume abandonment of far away fisheries and concentration on nearby areas. The projections also assume a significant farm-raised fish and shrimp activity. Fishery exports were projected at healthy rates and may be as large as 195-245 million of 1992 dollars in year t+15.

Cuban Coffee exports reached a peak of \$57 million in 1986 mainly due to the artificial rationing of internal consumption,^[45] but are projected downward assuming that consumption is full liberalized in a democratic Cuba. Exports of Cuban tobacco also peaked at \$100 million in 1985 but have declined since then due to production, production quality problems and other agricultural difficulties.^[46] A slight growth is projected in tobacco exports to \$100 million of 1992 dollars in the partial privatization scenario by year t+15 and to \$120 million of 1992 dollars under NAFTA.

Fruits and vegetables were projected to grow rapidly to 331 million of 1992 dollars by year t+15 under CBI, and to 555 million of 1992 dollars under NAFTA. The largest export volumes will be achieved in green peppers, tomatoes, ornamental plants, melons and honey. These projections assumed that under the CBI, Cuba would become the second largest exporter (after Mexico) for a variety of products for which it has competitive advantage. Under NAFTA, Cuban exports of fruits and vegetables were projected to capture 10% to 30% of Mexico's share depending on the product.

Industrial exports were projected for 21 industrial products. These exports would rise to 1,064 million of 1992 dollars after 15 years into the transition under the CBI trade regime and to 1,736 million of 1992 dollars under NAFTA. The major industrial export markets included biomedical products, textiles and clothing (Section 807), rum and orange juice concentrate. Table S-1 presents the total exports projected under each scenario.

Table 12.
Projection of Miscellaneous Agricultural Products
(in millions of 1992 dollars)

Misc. Agricultural Commodities	Full Privatization Scenarios		
	CBI Option Yr. t+5	Yr. t+15	NAFTA Yr. t+15
Potatoes	\$ 0.0	\$ 0.0	\$ 0.0
Green peppers	41.0	65.0	83.0
Honey	17.0	31.0	47.0
Yams	2.0	8.0	11.0
Taro (malanga)	1.0	6.0	8.0
Tomatoes	5.0	31.0	78.0
Onions	8.0	19.0	31.0
Bananas	0.2	8.0	19.0
Plantain	2.0	5.0	6.0
Mangoes	1.0	5.0	6.0
Guavas	3.0	12.0	23.0
Papayas	2.0	6.0	9.0
Yucca	1.0	3.0	5.0
Rice	0.0	0.0	0.0
Maize	0.0	0.0	0.0
Beans	1.0	3.0	6.0
Cucumbers	2.0	6.0	23.0
Broccoli *	1.0	20.0	31.0
Cauliflowers *	1.0	4.0	8.0
Fresh flowers & plants *	7.0	33.0	55.0
Asparagus *	1.0	5.0	9.0
White squash (chayote) *	1.0	6.0	8.0
Eggplant *	0.8	8.0	11.0
Peas	7.0	11.0	15.0
Pineapples	8.0	12.0	18.0
Avocados	1.0	2.0	3.0
Melons	3.5	22.0	42.0
Total	\$117.5	\$331.0	\$555.0

Note: * represents new crops which could be developed.

Table 13
Cuban Industrial Export Projections (Excluding Ethanol) 1989

(in millions of U.S. dollars for 1989 and in millions of 1992 dollars for the projection)

	1989	Full Privatization Scenario		
		Yr. t+5	CBI Yr. t+15	NAFTA Yr. t+15
Industrial Products				
Orange juice concentrate	\$ 0.0	\$4.0	\$45.0	\$80.0
Iron & Steel products	26.0	40.0	55.0	65.0
Machinery & Parts	32.0	45.0	65.0	75.0
Rum	17.4	34.0	74.0	124.0
Marble	4.5	6.0	7.0	15.0
Cement	0.5	15.0	30.0	50.0
Molasses	28.0	28.0	28.0	28.0
Furfural	0.0	1.0	2.0	4.0
Glass containers	0.0	4.0	8.0	20.0
Tile, roof & floor products	0.0	10.0	20.0	50.0

Salt	0.0	10.0	18.0	30.0
Sand & aggregates	0.0	4.0	8.0	12.0
Vehicle & engine parts	2.0	12.0	21.0	52.0
Magnetic tapes & radios	0.0	5.0	20.0	75.0
Electronic components	3.0	11.0	33.0	88.0
Footwear	0.1	10.0	25.0	34.0
Rubber manufactures	1.0	5.0	10.0	20.0
Books, magazines & printing	5.0	15.0	30.0	40.0
Textiles & clothing (Sec.807)	16.2	36.0	116.0	275.0
Biomedical products	65.0	120.0	500.0	800.0
Fruit preserves and others	14.9	25.0	50.0	60.0
Total	\$215.6	\$440.0	\$1,165.0	\$1,997.0

Note: Ethyl alcohol products (ethanol) are projected with sugar, see text. Cuba is assumed to continue exporting molasses in very minimal quantities as in 1989, with potential increases used in the manufacture of ethanol and rum products.

SUMMARY OF EXPORTS OF GOODS AND SERVICES

Our projections of the main Cuban exports of goods and services are summarized in Table 14. These export projections were developed in constant 1992 dollars. For interpreting the export projections into current dollars the reader is advised to use Table 15 estimated mostly from World Bank sources.

Table 14.

Balance of Payments Projections, Current Accounts

(in millions of 1992 U.S. dollars)

Current accounts transactions	Yr. t+0	Partial Privatization Scenarios			Full Privatization Scenarios			NAFTA Yr. t +15
		Yr. t+5	Yr. t+10	Yr. t+15	Yr. t+5	CBI Yr. t+10	CBI Yr. t+15	
EXPORTS								
Sugar	\$1,300.0	\$959.7	\$1,109.9	\$1,439.9	\$996.0	\$1,177.8	\$1,527.4	\$1,527.4
Ethanol	0.0	9.4	10.4	11.4	68.4	91.2	114.0	114.0
Nickel	200.0	272.6	325.3	385.3	325.6	403.1	455.3	525.3
Iron ore, scrap steel and other nonferrous metals	17.0	54.9	57.2	61.4	75.2	80.4	96.2	122.1
Tourism	\$108.0	\$238.6	\$520.1	\$1,212.2	\$285.3	\$843.0	\$1,476.8	\$1,476.8
Gross receipts	305.0	596.0	1040.2	2019.9	714.1	1274.8	2461.3	2461.3
Less: imports for tourism	197.0	357.4	520.1	807.7	428.8	431.8	984.5	984.5
Fisheries	120.0	135.0	141.0	150.0	148.0	175.0	195.0	245.0
Citrus	70.0	170.0	200.0	240.0	188.0	222.2	266.0	292.0
Coffee	26.0	50.0	50.0	50.0	35.0	30.0	25.0	25.0
Tobacco	95.0	95.0	98.0	100.0	107.0	113.0	120.0	120.0
Miscellaneous agricultural products	22.0	22.0	38.0	40.0	118.0	190.0	331.0	555.0
Net industrial exports	\$215.0	\$316.0	\$570.0	\$890.0	\$405.0	\$640.0	\$1,064.0	\$1,736.0
Industrial exports	215.0	316.0	570.0	890.0	440.0	705.0	1165.0	1997.0
Less: imports for assembly	0.0	0.0	0.0	0.0	35.0	65.0	101.0	261.0
TOTAL EXPORTS	\$2,173.0	\$2,323.2	\$3,119.9	\$4,580.2	\$2,751.5	\$3,965.7	\$5,670.7	\$6,738.6
EX-POST IMPORTS								
*Paying all claims and debts		\$1,373.3	\$1,961.9	\$3,389.1	\$2,658.6	\$3,309.5	\$5,254.6	\$8,095.5
*Paying all claims and debts,		\$2,264.4	\$2,705.7	\$4,080.4	\$3,549.7	\$4,053.3	\$5,945.9	\$8,786.8

except exile claims

Table 15.

Indexes Used for Converting Current Year Commodity Prices and Transactions to 1992 Constant Dollars

Products	Year			
	1992	t+5	t+10	t+15
Sugar	100.0	151.50	176.50	220.50
Ethanol	100.0	114.04	131.58	131.58
Nickel	100.0	141.57	181.09	192.86
Iron Ore	100.0	112.97	129.43	135.13
Tourism	100.0	121.98	146.14	157.23
Shrimp/Fish	100.0	115.16	120.55	123.74
Citrus	100.0	116.56	133.13	140.49
Coffee	100.0	193.62	232.62	241.13
Tobacco	100.0	111.73	128.43	135.18
Misc.Agriculture	100.0	125.42	149.16	158.49
Industrial Exports	100.0	120.29	140.00	147.94
Claims & Debts	100.0	121.98	146.14	157.23

Source: *Market Outlook for Major Primary Commodities*, Report No. 814/92.

(Washington, D.C.: The World Bank International Trade Division, 1992). The ethanol price index was obtained from Rivero International database and from *U.S. Imports for Consumption of the United States*, Report IM14, Series F. (Washington, D.C.: Department of Commerce, 1992). For tourism expenditures, debts and claims the World Bank's G-7 CPI Index is used, while for industrial exports the World Bank's G-5 MUV index is used.

Go to [Part III](#)

A First Approximation Model of the Balance of Payments, Output, Employment and Foreign Aid Requirements of a Democratic Cuba [\[1\]](#)

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Part III

IMPORT PROJECTIONS

Import projections include both autonomous imports; that is, imports independent of the growth of the gross domestic product (GDP t) and endogenous imports dependent on GDP t.

The autonomous imports, presented below, include capital imports required for the modernization of several sectors, such as : telecommunications, electric energy, transport nickel and sugar. While some of the capital import requirements appear undervalued (specially for mass transit), these estimates are nevertheless accepted in this first approximation model. The autonomous capital import requirements are presented in Table 16.

Table 16.
Projected Autonomous Annual Capital Imports Requirements
(in millions of 1992 dollars)

Sectors	Year		
	t+0	t+5	t+10
Telecommunications	\$500.0	\$500.0	\$500.0
Electric energy	100.0	50.0	22.0
Transport			
Mass transit	72.0	72.0	25.0
Railroads	135.0	135.0	45.0
Nickel processing	12.0	12.0	12.0
Sugar mill modernization	300.0	300.0	300.0
Total	\$1,119.0	\$1,069.0	\$517.0

Source: The capital costs of sugar modernization are estimated as close to \$1,000 per ton over a 15-year period. Nickel processing capital modernization are estimated as \$60 million over a 5-year period. The costs of capital imports of the other sectors come from Manuel Cereijo, *The Cuban Economy: Blueprint for Reconstruction*, (Miami, Florida: Cuban American National Foundation, 1993).

The endogenous import requirements are estimated from the import elasticities presented earlier in the section on the growth model. These import elasticities are: 0.42 for food, beverages and tobacco, 1.40 for machinery and equipment, 1.03 for intermediate goods and 0.62 for oil quantities. The prices of crude oil used in the import projections come from the World Bank : \$21.50 per barrel for year t+5, \$26.0 per barrel for year t+10, and \$26.8 per barrel for year t+15. The initial (for year t+0) import values and quantities are set at their 1992 levels: \$600 million for food, beverages and tobacco, \$350 million for machinery and equipment, \$390 million for intermediate goods and 6.3 million metric tons of oil imports. The oil imports are projected at \$126.29 per metric ton in 1992 dollars, corresponding to \$17.30 per barrel. The projections of imports for each scenario are presented in a later section.

FOREIGN CAPITAL FLOWS AND REMITTANCES.

Projections of capital accounts of the Balance of Payments include remittances, foreign direct private investments, portfolio investments and foreign aid. [\[47\]](#)

From their 1989 values of 173.4 million of 1992 dollars [\[48\]](#), remittances were projected to rise to 2,110 million of 1992 dollars for year t+15. These projections assumed an experience comparable to those of Mexico, El Salvador and the Dominican Republic; that is, of countries that have high rates of remittances per person residing in the United States. [\[49\]](#) Private foreign direct investments were expected to rise from their current levels of \$25-\$50 million annually to 1,050 million of 1992 dollars annually by year t+15 under the CBI scenario and to 3,500 million of 1992 dollars annually under NAFTA, that is, comparable to the current rate for Singapore. [\[50\]](#) Portfolio investments in Cuba's securities were projected to rise from nil to 400 million of 1992 dollars annually by year t+15 under CBI, and to 600 million of 1992 dollars annually under NAFTA; but given the current boom in portfolio investments in Mexico, and to a lesser extent in Chile, the projected portfolio investment rates may be underestimated.

Foreign aid flows were projected assuming rates per person comparable to Chile, Costa Rica, Uruguay and other countries that receive large amounts of foreign aid. US-AID funds were projected at 1,000 million of 1992 dollars annually during the first five years of the transition period. Loans and grants from the Inter-American Development Bank [\[51\]](#) were projected as 200 million of 1992 dollars annually in year t+5, growing to 300 million of 1992 dollars annually by year t+15. World Bank loans and grants [\[52\]](#) were projected to be 350 million of 1992 dollars annually by year t+5 under full privatization, growing to 500 million of 1992 dollars annually in year t+15. Cuba could qualify for balance of payment support loans of almost 200 million of 1992 dollars annually during a four year period from the International Monetary Fund. [\[53\]](#) The total foreign assistance requirements of a democratic Cuba were estimated as 2.5 billion of 1992 dollars annually during the first five years of the transition.

FOREIGN DEBT.

The foreign debt and claims on Cuba estimated included 6,500 million dollars owed to the Paris Club and other European creditors[54], the 15,000 million of transferable rubles owed to Russia[55], the 1,800 million dollars of United States property[56] confiscated without compensation in August 1960 and the 7,000 million dollars confiscated from the Cuban exiles in 1960-61. This last figure was estimated via two different analytical research methods.[57] Both research methods coincided with the same estimate of losses. In August 1993, the debt with the United States amounted to 5,364 million of current dollars and the value of the Cuban exile claims was in the order of 20,430 millions of current dollars. The claim figures were estimated using 6% simple interest rates in accordance with international practices and conventions. Payments for damages for human rights violations are assumed to be paid in local currency, as was the case in Romania.[58]

SUMMARY OF CAPITAL FLOW PROJECTIONS

A summary of all the capital flows analyzed previously is presented in Table 18, which displays the difficulties faced by the Cuban economy in servicing its debt and claims. Except for the year t+15 of the NAFTA scenario, the net capital flows are negative when the claims of the Cuban exiles are considered. But the Cuban economy also experiences difficulties in servicing its current debt in convertible currency and the U.S-Cuba claims. Again, only in the case of NAFTA does Cuba have the resources to meet both of these obligations while having positive capital flows. However, as will be discussed in this section, paying debt and claims always lowers the rate of growth of the Cuban economy, in some instances to negligible growth amounts, as in the earlier years of the partial privatization scenario.

Table 18.
Balance of Payments Projections: Capital Accounts (in millions of 1992 U.S. dollars)

Capital Account Transactions	Partial Privatization Scenarios				Full Privatization Scenarios		
	t+5	t+10	t+15	CBIt+5	CBIt+10	CBIt+15	NAFTAt+15
Remittances	\$450.0	\$600.0	\$700.0	\$600.0	\$1,000.0	\$1,500.0	\$1,500.0
Foreign direct investments	120.0	150.0	250.0	250.0	575.0	1050.0	3500.0
Less: Repatriation of Profits	50.0	145.0	309.0	93.0	371.0	975.0	1772.0
Net Foreign direct investments	\$70.0	\$5.0	(\$59.0)	\$157.0	\$204.0	\$75.0	\$1,728.0
Portfolio Foreign Investments	30.0	50.0	100.0	100.0	200.0	400.0	600.0
Less: Repatriation of portfolio interest	9.0	30.0	115.0	30.0	110.0	270.0	350.0
Net portfolio investments	\$21.0	\$20.0	(\$15.0)	\$70.0	\$90.0	\$130.0	\$250.0
Potential foreign assistance							
Development investments:	\$450.0	\$450.0	\$600.0	\$1,050.0	\$750.0	\$900.0	\$900.0
IBRD (World Bank) loans	150.0	250.0	350.0	350.0	400.0	500.0	500.0
IADB loans	100.0	150.0	200.0	200.0	250.0	300.0	300.0
USAID grants	200.0	50.0	50.0	500.0	100.0	100.0	100.0
Balance of payments and export credits	\$400.0	\$0.0	\$0.0	\$700.0	\$0.0	\$0.0	\$0.0
USAID loans	200.0	0.0	0.0	500.0	0.0	0.0	0.0
IMF loans	200.0	0.0	0.0	200.0	0.0	0.0	0.0

Note: We assumed that the debt with Russia is to be completely negotiated and no a firm value has been determined by both parties. Its book value is approximately 15,500 million transferable rubles, that is, \$18.22 million at current exchange rates for the ruble.

Table 18. (Continued)
Balance of Payments Projections: Capital Accounts
(in millions of 1992 U.S. dollars)

Capital Account Transactions	Partial Privatization Scenarios			Full Privatization Scenarios			
	t+5	t+10	t+15	CBIt+5	CBIt+10	CBIt+15	NAFTAt+15
Less: Foreign assistance loan payments	357.0	576.0	878.0	686.0	1043.0	1482.0	1482.0
Net foreign assistance	\$493.0	(\$126.0)	(\$278.0)	\$1,064.0	(\$293.0)	(\$582.0)	(\$582.0)
Capital outflows: payments on Cuba's Debt							
Convertible currency debt with western creditors	710.8	593.3	551.4	710.8	593.3	551.4	551.4
U.S.A.- Cuba claims	382.0	319.9	296.4	382.0	319.9	296.4	296.4
Russian debt in transferable rubles	nil	0.0	0.0	nil	0.0	0.0	0.0
Subtotal	\$1,092.8	\$913.2	\$847.8	\$1,092.8	\$913.2	\$847.8	\$847.8
Cuban exile claims	891.1	743.8	691.3	891.1	743.8	691.3	691.3
Total payments on claims and indebtedness	\$1,983.9	\$1,657.0	\$1,539.1	\$1,983.9	\$1,657.0	\$1,539.1	\$1,539.1
All net capital flows	(\$949.9)	(\$1,158.0)	(\$1,191.1)	(\$92.9)	(\$656.0)	(\$416.1)	\$1,356.9

All net capital flow excl. Cuban exile claims (\$58.8) (\$414.2) (\$499.8) \$798.2 \$87.8 \$275.2 \$2,048.2

Note: We assumed that the debt with Russia is to be completely negotiated and no a firm value has been determined by both parties. Its book value is approximately 15,500 million transferable rubles, that is, \$18.22 million at current exchange rates for the ruble.

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A First Approximation Model of the Balance of Payments, Output, Employment and Foreign Aid Requirements of a Democratic Cuba [\[1\]](#)

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Part IV

ANALYSIS OF ALTERNATIVE SCENARIOS.

The macroeconomic impacts of the balance of payments scenarios discussed earlier are summarized in Tables 19 and 20. An analysis of the labor market projections is presented in Table 21.

USE OF ELASTICITIES/PIVOT POINT PROJECTIONS METHODOLOGY

The macroeconomic impacts are estimated with a pivot point approach using the elasticities developed earlier in the first approximation model. In this pivot point projection methodology, elasticities are applied to the macroeconomic aggregates in the initial year of the transition, (i.e., to year t+0), to develop the projections of gross investments, gross domestic product, employment, and ex-ante savings and import demands. Thus, we made use of the elasticity of imports on gross domestic investments (equation 14) to project gross investments in each scenario. We also make use of the output elasticity of gross investments (equation 7.b) when projecting gross domestic product and the output elasticity of labor (equation 7.a) when projecting the demand for labor. Since elasticities are dimensionless (i.e. they involve the ratio of two percentages), they are appropriate for projection purposes in situations where there may be valuation problems, as is the case for the Cuban peso in foreign exchange markets. The pivot point methodology approach also minimizes problems created by changes in the underlying economic system as it changes from Castro's command economy to a free market economy.

EXCHANGE RATE VALUATION PROBLEMS

The analysis of the macroeconomic impacts is made difficult by the problems of exchange rate valuations. Translating the existing domestic sector growth of the Cuban economy into dollars (perhaps at the current black market rates of 60-100 pesos per U.S. dollar), makes the domestic sector insignificant when compared with the foreign sector and its financing from direct foreign investments and development aid. Because of the problems of exchange rate valuations, problems that we have been unable to solve yet in this first approximation model, we have kept separate contributions of both sectors. Thus, the existing local/domestic sector output is valued in constant 1992 pesos, while the foreign sector is valued in 1992 dollars.

OVERALL OUTPUT GROWTH

To evade the problems of exchange rate valuation alluded to above, a proxy for the growth of real output is estimated instead. This proxy variable is the rate of growth of employment assuming constant real wages (2,737 of 1992 pesos) throughout the 15-year period. In estimating the rate of growth of employment (and output) under constant real wages, the labor demand equation (equation 18) is used along with an output elasticity for labor of 0.6823 (as estimated in equation 7.a). The foreign sector employment is then added to the employment demand in the domestic sector, at constant real wages, to estimate the overall employment and output growth at constant real wages. The results are presented in Table 21.

Table 19.
Macroeconomic Impact of Paying Cuba's Debts and Claims
(In constant 1992 dollars and 1992 pesos, unless otherwise specified)

Items	Partial Privatization Scenarios				Full Privatization Scenarios			
	t+0	t+5	t+10	t+15	t+5	CBI t+10	t+15	NAFTA t+15
GDP output								
Domestic sector (in mill. 1992 pesos)	12,100	10,231	11,571	15,149	13,260	14,575	18,413	25,220
Foreign sector (in mill. 1992 dollars)	0	\$735	\$1,492	\$2,554	\$1,650	\$3,180	\$5,700	\$7,976
Employment - Total (in million jobs)	3.006	2.592	2.979	3.943	3.411	3.720	4.342	5.499
Domestic sector (in million jobs)	3.006	2.541	2.875	3.765	3.295	3.498	3.943	4.941
Foreign sector (in million jobs)	0.000	0.051	0.104	0.178	0.116	0.222	0.399	0.558
Labor market supply and wages								
Economic active population (in million persons)	4.582	4.966	5.208	5.396	4.966	5.208	5.396	5.396
Average annual wage (in 1992 pesos)	2,737	2,737	2,737	2,737	2,737	2,834	3,176	3,473
Accumulated foreign capital stock		\$2,574	\$5,221	\$8,941	\$5,779	\$11,127	\$19,954	\$27,919
Pvt. foreign direct investments (in mill. 1992 dollars)	- a	\$497	\$1,449	\$3,097	\$932	\$3,713	\$9,755	\$17,720
Develop. assistance investments (in mill. 1992 dollars)	- a	\$2,077	\$3,772	\$5,844	\$4,847	\$7,414	\$10,189	\$10,199
Savings/investment relationships								
Domestic gross investments (in mill. 1992 pesos)	1,649	1,135	1,508	2,411	1,949	2,361	3,592	5,392

Ex-post domestic savings (in mill. 1992 pesos)	1,661	2,085	2,666	3,602	2,042	3,017	4,008	4,035
Ex-ante savings								
Domestic sector savings (in mill. 1992 pesos)	968	818	926	1,547	1,188	1,438	2,167	3,461
Foreign sector savings (in mill. 1992 dollars)	0	\$140	\$283	\$485	\$313	\$604	\$1,083	\$1,515

Note: a There are no published data on these items

Table 19. (Continued)

Macroeconomic Impact of Paying Cuba's Debts and Claims (In constant 1992 dollars and 1992 pesos, unless otherwise specified)

Items	Partial Privatization Scenarios					Full Privatization Scenarios		
	t+0	t+5	t+10	t+15	t+5	CBI t+10	t+15	NAFTA t+15
Exports (in mill. 1992 dollars)	\$2,173	\$2,323	\$3,120	\$4,580	\$2,752	\$3,966	\$5,671	\$6,739
Ex-post imports (in mill. 1992 dollars)	\$2,185	\$1,373	\$1,962	\$3,389	\$2,659	\$3,310	\$5,255	\$8,096
Domestic sector ex-ante imports (in mill. 1992 dollars)	\$2,136	\$1,882	\$2,064	\$2,548	\$3,362	\$2,988	\$2,990	\$3,909
Autonomous capital imports	0	0	0	0	\$1,069	\$517	0	0
Food, beverages, & tobacco	\$600	\$561	\$589	\$664	\$624	\$652	\$731	\$873
Machinery & equipment	\$350	\$274	\$329	\$473	\$397	\$450	\$606	\$881
Intermediate goods	\$390	\$328	\$372	\$491	\$429	\$472	\$600	\$826
Imported oil quantities (mill. metric tons)	6.300	5.697	6.129	7.284	6.675	7.099	8.338	10.523
Imported oil (in mill. 1992 dollars)	\$796	\$719	\$774	\$920	\$843	\$897	\$1,053	\$1,329

Note: a There are no published data on these items

Table 20.

Macroeconomic Impact of Paying Cuba's Debts & Claims, Except Exile Claims

(in constant 1992 dollars and 1992 pesos, unless otherwise specified)

Items	Partial Privatization Scenarios				Full Privatization Scenarios			
	t+0	t+5	t+10	t+15	t+5	CBI t+10	t+15	NAFTA t+15
GDP output								
Domestic sector (in mill. 1992 pesos)	12,100	12,290	13,378	17,050	15,581	16,552	20,348	27,370
Foreign sector (in mill. 1992 dollars)	0	\$735	\$1,492	\$2,554	\$1,650	\$3,180	\$5,700	\$7,976
Employment - Total (in million jobs)	3.006	3.105	3.428	4.416	3.988	4.195	4.757	5.921
Domestic sector (in million jobs)	3.006	3.054	3.324	4.238	3.872	3.973	4.358	5.363
Foreign sector (in million jobs)	0.000	0.051	0.104	0.178	0.116	0.222	0.399	0.558
Labor market supply and wages								
Economic active population (in million persons)	4.582	4.966	5.208	5.396	4.966	5.208	5.396	5.396
Average annual wage (in 1992 pesos)	2,737	2,737	2,737	2,737	2,737	2,834	3,176	3,473
Accumulated foreign capital stock		\$2,574	\$5,221	\$8,941	\$5,779	\$11,127	\$19,954	\$27,919
Pvt. foreign direct investments (in mill. 1992 dollars)	- a	\$497	\$1,449	\$3,097	\$932	\$3,713	\$9,755	\$17,720
Development assistance investments (in mill. 1992 dollars)	- a	\$2,077	\$3,772	\$5,844	\$4,847	\$7,414	\$10,189	\$10,199
Savings/investment relationships								
Domestic gross investments (in mill. 1992 pesos)	1,649	1,699	1,979	2,849	2,513	2,832	4,030	5,829
Ex-post domestic savings (in mill. 1992 pesos)	1,661	1,758	2,393	3,349	1,715	2,745	3,755	3,781
Ex-ante savings								
Domestic sector savings (in mill. 1992 pesos)	968	1,004	1,211	1,909	1,629	1,814	2,535	3,869
Foreign sector savings (in mill. 1992 dollars)	0	\$140	\$284	\$485	\$314	\$604	\$1,083	\$1,515

Note: ^a There are no published data on these items.

Table 20. (Continued)

Macroeconomic Impact of Paying Cuba's Debts & Claims, Except Exile Claims

(in constant 1992 dollars and 1992 pesos, unless otherwise specified)

Items	Partial Privatization Scenarios				Full Privatization Scenarios			
	t+0	t+5	t+10	t+15	t+5	CBI t+10	t+15	NAFTA t+15
Balance of payments relationships								
Exports (in mill. 1992 dollars)	\$2,173	\$2,323	\$3,120	\$4,580	\$2,752	\$3,966	\$5,671	\$6,739

Ex-post imports (in mill. 1992 dollars)	\$2,185	\$2,264	\$2,706	\$4,080	\$3,550	\$4,053	\$5,946	\$8,787
Domestic sector ex-ante imports (in mill. 1992 dollars)	\$2,136	\$2,161	\$2,309	\$2,804	\$3,677	\$3,255	\$3,252	\$4,201
Autonomous capital imports	0	0	0	0	\$1,069	\$517	0	0
Food, beverages, & tobacco	\$600	\$604	\$627	\$703	\$673	\$693	\$772	\$918
Machinery & equipment	\$350	\$358	\$402	\$550	\$491	\$530	\$684	\$968
Intermediate goods	\$390	\$396	\$432	\$554	\$506	\$538	\$664	\$897
Imported oil quantities (mill. metric tons)	6.300	6.361	6.712	7.898	7.424	7.737	8.963	11.229
Imported oil (in mill. 1992 dollars)	\$796	\$803	\$848	\$997	\$938	\$977	\$1,132	\$1,418

Note: ^a There are no published data on these items.

Table 21.
Labor Market Summary, t+15 Years After Transition

Debt Scenarios	Privatization Scenarios	At Stationary Real Wage Rates	At Target Real Wage Rates		
		Annual Growth Rate of Output & Employment	Target Real Wage Growth Rate	Employment (millions)	Annual Growth Rate of Output & Employment
All claims paid	Partial Privatization	1.9%	0.0%	3.943	1.9%
	Full Privatization/CBI	3.4%	1.0%	4.342	2.5%
	Full privatization/NAFTA	5.6% ^a	1.6%	5.499 ^a	4.1% ^a
All claims paid, except exiles claims	Partial Privatization	2.6%	0.0%	4.416	2.6%
Full Privatization/CBI	4.1% ^a	1.0%	4.757	3.1%	
Full privatization/NAFTA	6.2% ^a	1.6%	5.921 ^a	4.6% ^a	

^a Since the supply of the economic active population (15 - 65 years old), is 5.396 million persons by year t+15, these alternatives involve delaying the retirement age past the current 60 years old limit.

LABOR MARKET PROJECTIONS

The demand for employment is projected in Table 21 as a function of different assumptions regarding the rate of growth of real wages. Constant real wages are assumed in the partial privatization scenario, resulting in annual employment growth rates of 1.9% to 2.6%. Employment growth rates in the full privatization scenarios are 2.5% to 3.1%, for the CBI scenario, and 4.1% to 4.6% in the NAFTA scenario. Table 21 assumes annual real wage growth targets of 1.6% for the NAFTA scenario and 1.0% for the full privatization/CBI scenario. Paying the Cuban exile debt tends to lower the annual rate of growth of employment from 0.5% to 0.7% depending on the scenario chosen.

THE PARTIAL PRIVATIZATION SCENARIO.

While exports grow in constant 1992 dollars at a healthy rate of 5.1% annually from year t+0 to year t+15, the effect of paying debt is to reduce the funds available for imports and investments. Thus, the domestic sector output measured in constant 1992 pesos grows at a much slower rate: 1.5% if all claims are paid, or 2.3% if all claims except the Cuban exile claims are met. This slower growth rate does not allow real wages to grow from their year t+0 level of 2,737 pesos, but total employment grows slowly to the level of 3.94 - 4.42 million jobs in year t+15 depending on the debt paying scenario assumptions. The annual rate of employment growth is 1.9% to 2.6% depending on the debt paying assumptions. The contribution of the foreign sector swamps the domestic sector output when the exchange rate is valued at 60-100 pesos per dollar.

The ex-ante demand for imports cannot be financed through exports and capital flows during the first eight years if all claims and debts are paid, but by year t+15 Cuba can meet all its debts and claims under this slow growth scenario. It takes an additional annual \$0.5 billion of constant 1992 dollars of net foreign aid (over the projected level of \$0.85 billion of constant 1992 dollars annually) to close the foreign exchange gap. If the savings from the foreign sectors are considered, the gap between savings and investments disappears.

Under this scenario, the Cuban exile claims should be met through other methods not involving direct up-front annual cash payments. These methods could include: 1) return of confiscated property, [59] 2) indemnization through bonds with a 15-year grace periods, 3) the use of zero coupon bonds, 4) and some combinations of scrip/coupons to be redeemed in bids for Cuban property. Also, under this partial privatization scenario, the U.S. Cuba claims should be renegotiated to levels affordable by the low growth rates of the Cuban economy under this scenario. [60]

THE FULL PRIVATIZATION SCENARIOS

During the 15 year projection period, exports (in constant 1992 dollars) are projected to grow at annual rates of 6.6% in the CBI scenario and 7.8% in the NAFTA scenario. Assuming constant real wages during this period would result in annual growth rates of output of 3.4% in the CBI alternative after paying all claims and debts, and a higher 4.1% annual growth rate in jobs if all claims are paid except for the Cuban exile claims. Comparable figures for the NAFTA scenario are 5.6% and 6.2% respectively. However, the NAFTA scenario employment growth rates exceed the labor supply of 5.396 million persons projected earlier from ILO figures. In view of this problem it was decided to assume 1.6% annual growth rate in real wages in the NAFTA scenario and a slower 1.0% annual growth rate in real wages for the CBI scenario. The higher real wage target results in slower annual employment growth rates: 4.1% - 4.6% in the NAFTA scenarios and 2.5% - 3.1% for the CBI scenario. The impact of paying the Cuban exile debt is to reduce the rate of employment recovery by 0.6% to 0.7% in the CBI scenario and by 0.5% under NAFTA. The employment and labor market analysis is presented in Table 21.

The Cuban local/domestic sector is projected to grow in real terms at annual rates of 2.8% -3.5% in the CBI scenario, and at 5.0% - 5.6% in the NAFTA scenario. The lower rate corresponds to the scenario where all claims and debts are paid. The higher growth rate in foreign sector output overwhelms the local/domestic economy output.

The foreign exchange gap is present in only the first five years of the projections. By year t+5 the extra foreign aid requirements on net terms are \$703 million 1992 dollars annually (over the initial level of foreign aid projection of \$1,750 million 1992 dollars projected annually). The foreign exchange gap is no longer relevant by year t+10. One way to insure that there will be no foreign exchange gap restraining the economic recovery in a post-Castro, democratic Cuba is to devalue the Cuban peso to a level where Cuba can qualify for grants and concessionary loans payable in soft currency from the World Bank and the Inter-American Development Bank. By year t+10 the claims of the Cuban exiles can be met, however at cost of a slower rate of economic recovery. There is no gap between savings and investments due mainly to the presence of savings in the foreign sector.

MEASURES AND POLICIES TO INCREASE GROWTH

Under the three scenarios we analyzed--partial privatization, full privatization/CBI and full privatization/NAFTA--Cuban exports grow briskly at annual real rates of growth ranging from 5.1% to 7.8%. However, these export increases fail to generate the growth of imports, employment and gross domestic product (GDP t) of the local/domestic sector needed to recover quickly from the current economic problems created by a substantial reduction in Soviet subsidies. Several reasons explain this failure in economic growth.

In the first place, exports of services, primarily international tourism, could grow at higher rates than the ones projected. Our projections assume that gambling will not be a component of the Cuban tourism strategy. Having gambling casinos would enable Cuba to capture as much as a 15% share of the Caribbean market for international tourism revenues, achieving a market share typical in gambling centers like Puerto Rico and the Bahamas. In addition, the supply of inputs from domestic sources could be significantly increased from the low levels of supply used in this paper.

A second problem concerns the fact that imports grow more slowly than exports in the first ten years of the transition. This is because of negative balances in the capital account of the Cuban balance of payments. Because of a foreign aid mix skewed towards loans (rather than grants), interest payments and loan repayments begin to exceed the new infusion of foreign aid after year t+5. The net result is that the net foreign aid account turns negative after just a few years into the transition. In fact, this paper estimates the need for an annual foreign aid budget of \$2.5 billion of 1992 dollars in the first five years of the transition, with more of the foreign aid coming in the form of grants. An opportunity for changing the mix of grants and loans is rendered by the low value of the Cuban peso in the black market. At black market rates of 60-100 pesos per U.S. dollar, Cuba could qualify for large grants and concessionary loans in soft currency both from the World Bank's IDA program, and from the Inter-American Development Bank. This would reduce the capital account deficit in its balance of payments.

Another problem concerns Cuba's large ratio of debt to exports. Because of this ratio, a significant portion of earned export revenues has to be earmarked for paying debts, thereby reducing the availability of funds for importing machinery and equipment. At the start of the transition in year t+0, the ratio of debt to exports will be 26.0, when considering all of Cuba's debt and claims. This is another policy area that the post-Castro government must target. The post-Castro government will need to gain concessions from its creditors, (including the Paris Club), the creditors certified in the U.S.-Cuba claims, the Russian government and the exiles. These concessions will protect the supply of foreign exchange and insure its allocation to productive growth-oriented activities.

A final explanation of the reasons for the low growth rates of the Cuban domestic sector focuses on the low productivity of the capital stock of the Cuban economy. The capital and investment elasticities estimated in the Cuban production functions are lower than in other developing countries. As a consequence, the domestic sector's GDP t grows less rapidly as a function of capital investment than in comparable economies. However, this is a long-term problem not amenable to a quick fix. Only the full privatization of the domestic sector will enable the achievement of higher rates of return of capital and thereby a faster recovery in the production sector.

There are several microeconomic problems which Cuba's economy exhibits. Among those are the vintage and the origin of the capital equipment. Most of the capital equipment of Cuba is either from the Eastern European countries and the Soviet Union (pre-November 1989) and/or of manufacture and design of the 1950s. Their quality, design and age makes these capital equipment obsolete. This is not to say that all the capital equipment are of the above described origin and age, since several factories were equipped--during different industrialization stages of the Revolution--with Swedish, German, French, Spanish, Japanese and other more modern equipment.

In addition to the problems of vintage and age, there are problems associated with lack of parts and adequate maintenance. These problems are akin to socialist economies and will reflect on output as well as the marginal productivity of capital and labor, thereby affecting growth.

For several decades a major problem of Cuba's economy has been the dependency on the sugar industry for growth, development and as a source of foreign exchange. The country would do well if under any of the privatization phases it seriously adopts a diversification program. This program should capitalize on the comparative advantage found in sugarcane and look for other uses for cane rather than for sugar as a commodity product.

Alternative products from sugarcane are becoming available, including furfural, alcohol, animal feed, yeast, bagasse boards (sugar cane particle boards), and as an additive in the production of reformulated gasoline. In addition, recently Dr. Navzer Sachinvala, a research chemist with the Hawaiian Sugar Planters' Association (HSPA), made a presentation on the use of sucrose in industrial applications. [61] He indicated the following:

In the research world, sucrose is considered a commodity chemical with similar industrial applications as methanol, ethylene, propylene, benzene, toluene, xylenes butadiene and urea. However, current U.S. industrial uses of sucrose is a paltry 126,000 short tons.

This quote implies that a legitimate goal for Cuba would be to expand the uses of sugarcane, for

the purpose of ending years of dependency on its monoculture. The ideal situation would be--under a privatization scenario--to create a sucro-chemical industry as described by Dr. Sachinvala. Any additional sucro-chemical industries which could result from expansion and diversification, in combination with the improvement and expansion of the already installed capacity in several sugar by-products, would bring needed convertible currency, and new sources of growth, development and employment.

FINAL WORD

The analysis and simulations presented in this paper suggest that the path to the recuperation of the Cuban economy is through the full privatization options, with a democratic Cuba joining the CBI initiative and later the NAFTA agreement. The half-way measures inherent in the partial privatization scenario will not bring the Cuban economy the growth needed to feed and increase the well-being of its population. Issues of compensation need to be analyzed in the context of each scenario. Under the partial privatization scenario, Cuba has difficulties meeting the claims of the Cuban exile and the U.S. Cuba claims. Under the full privatization scenario Cuba can meet all its claims and obligations after close to eight years without undue sacrifices in its rate of growth. However, in all instances analyzed paying claims and debts lower the rate of growth.

This paper presents a first approximation model to simulate Cuba's development options. Future expansions and updating of the model and the projections are contemplated as more information and sectoral studies becomes available from ASCE sources on the potential of the post-Castro Cuban economy under a free market and democratic system.

APPENDIX A

Additional sugar refining capacity would be desirable and perhaps necessary due to world market demand for a finished product other than raw sugar. Investments in the sugar industry would be an essential ingredient to transform the industry from its present state of obsolescence. Otherwise soon Cuba will have difficulties competing for markets abroad as well as producing sufficient sugar to contribute a substantial amount of convertible currency to the country.

The estimates below provide a first approximation of the cost of expanding and converting the industry into refining. [62] However, this is not necessary the only possible combination or mixture possible to convert to white sugar production. No rehabilitation costs or modernization of existing facilities is contemplated. It is unlikely that the present refineries in Cuba would be capable of being upgraded or modernized.

Assumptions:

1 Based on an expansion from present capacity to 6.0 million tons per year of refined sugar.

2 Cuba's actual refining capacity is approximately 1.0 million tons per year.

3 New refineries would be annexed to the sugar factories.

4 The refineries would process the output of the sugar factory annexed to them in addition to input from other factories in the area if necessary. It is vital to have sufficient raw sugar input to operate an economically viable size refinery year round.

5 The typical refinery size will be 1,000 tons per operating day.

Operating period:

During sugar campaign approximately 150 days

During "off season" 150 days

Total operating number of days/year 300 days

Number of refinery repairs days/year 60 days

Production, capacity and output

Total output of a designed refinery 300,000 tons per year

Number of new refineries needed 17 plants (typical size)

Inputs of raw sugar required per plant

From its own annexed raw sugar factory (6,000 TCD at 10.5% yield times 150 days

"zafra" per year 94,500 tons of raw

From other sugar factories (3 or 4 factories) 228,000 tons raw

Total raw sugar needed per year 322,500 tons raw

Capital Cost of a typical refinery as specified.

Basis U.S. costs in 1993 current dollars In millions

Refinery (bagging in 100 pounds bags only) \$40.0

Additional raw sugar & refined sugar storage 3.0

Improvements needed to raw sugar factory in
energy efficiency and production of high quality

raw sugar, etc. 15.0

Total investment for one typical refinery **\$58.0**

If industry were to convert to 100.0% refinery, cost will be **\$986.0**

APPENDIX B

NOTES ON DATA SOURCES

I. Gross Domestic Product:

From 1975-89

Eliana Cardoso and Ann Helwege, *Cuba After Communism*, (Cambridge, MA: The MIT Press, 1992), 124, Appendix C.

From 1990-92

Extrapolated by the authors' using information provided on his paper by Julio Carranza Valdés, "Cuba: Los Retos de la Economía," *Cuadernos de Nuestra América* 19 (1993), 139.

II. Labor:

Claes Brundenius, *Revolutionary Cuba: The Challenge of Economic Growth with Equity*, (Boulder, CO: Westview Press, Inc., 1984), 138.

D. Ghai, C. Kay, and P. Peek, *Labor and Development in Rural Cuba*, International Labor Organization, (London, England: McMillan Press, 1988), 96-105.

From 1990-92

"Empleo, desempleo y sobrempleo en Cuba," (La Habana, Cuba: Instituto Cubano de Opinión Pública y Estudios Sociales (ICOPES), Abril 1993), Unpublished manuscript.

Authors' estimation of the non-military labor force.

Concertación Democrática Cubana, "Nivel de Desempleo en la Sociedad Cubana (Mimeo), 1993.

III. Gross Investments:

From 1971-1989

Comité Estatal de Estadísticas, *Anuario Estadístico de Cuba*, Various Issues, (La Habana, Cuba: Comité Estatal de Estadísticas).

From 1989-92

Extrapolated from the data presented in Julio Carranza Valdés, "Cuba: Los Retos de la Economía," *Cuadernos de Nuestra América* 19 (1993).

IV. Sugar World Market Prices:

From 1971-91

José L. Rodríguez, "Las relaciones económicas entre Cuba y la antigua URSS : evaluación y perspectivas," *Cuadernos del Este*, (Madrid, España, Mayo, 1992): 51-66.

From 1990-92

Boletín GEPLACEA, Vol. X, no.2, (Febrero/February, 1993).

Sugar USSR Prices in Pesos:

Boletín GEPLACEA, Vol. X, no.2, (Febrero/February, 1993): 51-66.

V. Average Oil World Market Prices:

Market Outlook for Major Primary Commodities Vol. I and II, Report No. 814/92, (Washington, D.C.: International Bank for Reconstruction and Development, International Trade and International Economic Division, October 1992), 64.

VI. Oil USSR Pesos:

Authors' calculations resulted from dividing the price paid by Cuba into the quantity of oil received from the USSR. Resulting unit value pesos per tons were converted to pesos per barrels dividing the tons by 7.3 barrels per tons. The divisor was estimated using the standard quality parameters of oil received by Cuba which is of 34.0 degrees gravity and closely resembles oil shipped from Ras Tanura or the Urals. Information found in *Anuario Estadístico de Cuba*, (La Habana Cuba: Comité Estatal de Estadísticas, various issues), and *Cuba: Handbook of Trade Statistics (U)*, (Washington, D.C.: Directorate of Intelligence, 1993).

VII. Imports in Pesos:

Ibid.

VIII. Oil Re-exports:

Economic Report, (La Habana, Cuba: Banco Nacional de Cuba, May and October 1989 and earlier issues).

From 1989-91:

Estimated partner trade data obtained from, *Cuba: Handbook of Trade Statistics (U)*, (Washington, D.C.: Directorate of Intelligence, 1993).

XIX. Total Subsidy in Pesos:

Sugar and Oil data was primarily obtained from the *Anuario Estadístico de Cuba*, (La Habana, Cuba: Comité Estatal de Estadísticas, various Issues).

From 1989-91:

ISO (International Sugar Organization) Statistical Bulletin, 51, no. 12, (1992): 9-10 and data provided to the authors by Mr. Nicolás Rivero, Rivero Internation, Falls Church Va. who requested the information from the International Sugar Organization, in London, U.K. for the entire year 1993.

The subsidy for both commodities (sugar and oil) was computed using the same methodology as previously done by other authors. For

further detail on the methodology see: Jorge Perez López, *The Economics of Cuban Sugar*, (Pittsburgh, PA: University of Pittsburgh Press, 1991), and by José F. Alonso, Analyst with Radio Martí in *Cuba Annual Report: 1987, Third Quarter*, Office of Research & Policy, Radio Martí Program, Voice of America, United States Information Agency, (New Brunswick, N.J., and London, England: Transaction Publishers, 1991), 399, Appendix 3.

X. Exchange Rate (Pesos/U.S.\$)

From 1970-90:

Economic Report, (La Habana, Cuba: Banco Nacional de Cuba, Various Issues), and Elia Cardozo and Ann Helwege, *Cuba After Communism*, (Cambridge, MA: The MIT Press, Cambridge, Mass, 1992), Appendix C.

From 1991-93:

Cuba, Dominican Republic, Haiti, and Puerto Rico Country Report," *The Economist Intelligence Unit*, 4 (1992): 3.

Footnotes

A First Approximation Model of the Balance of Payments, Output, Employment and Foreign Aid Requirements of a Democratic Cuba

José F. Alonso, Office of Research, Radio Martí and Armando M. Lago, Ecosometrics, Inc.

¹ No discussion, interpretation, results or comments contained herein can be attributed to the U.S. Government or any of its Agencies, including the U.S. Information Agency, Office of Cuban Broadcasting, Radio Martí Program. The authors accept responsibility for any errors of omission or commission.

² The authors would like to acknowledge the assistance of Mr. Nicolás Rivero of Rivero International, Eng. José E. Lima of IPS Consulting Engineers and Mr. José (Pepe) Fanjul of Flo-Sun Corporation on the section on sugar and of Dr. Roger Betancourt of The University of Maryland for helpful advice on the growth models.

³ R.A.P. Thirlwald, "Financing Development from External Sources," Chap. 13 in *Growth and Development* (New York: Wiley & Sons, 1977).

⁴ Hollis B. Chenery and Allan Strout, "Foreign Assistance and Economic Development," in *Structural Change and Development Policy*, ed. Hollis B. Chenery (Oxford, England: Oxford University Press, 1979), 388.

⁵ The 1957 capital depreciation in Cuba was estimated at 1.7% of the value of capital by dividing the capital depreciation rates (from the Cuban GDP estimated by the Banco Nacional de Cuba) by the 3.2 capital-output ratio characteristic of the Cuban economy during that period. (See the section on debt for an explanation of these references.) The capital depreciation charges of the current Cuban economy are highly variable, thus we have taken an average of widely variable depreciation rates to estimate a 2% capital depreciation charge as representative for the domestic sector.

⁶ Lourdes Tabares and Vilma Hidalgo, "Una estimación de los principales agregados macroeconómicos de Cuba," Departamento de Economía: Universidad de La Habana, (Diciembre de 1990). Quoted in Eliana Cardoso and Ann Helwege, *Cuba After Communism* (Cambridge, MA: MIT Press, 1992), 124.

⁷ Julio Carranza Valdés, "Cuba: Los Retos de la Economía," *Cuadernos de Nuestra América* 19 (1993): 142.

⁸ These capital estimates are discussed in detail in the section on Cuba's debt to Cuban exiles in José F. Alonso and Armando M. Lago, "A First Approximation of the Foreign Assistance Requirements of a Democratic Cuba," *La Sociedad Económica*, Bulletin 41, 9 March, 1994, London, U.K.

⁹ A.J. Zellner, J. Kmenta and J. Dreze, "Specification and Estimates of Production Function Models," *Econometrica* 34 (1966): 784-795.

¹⁰ Bruton estimates that the capital share of output in Latin America ranges from 0.40 in Argentina to 0.50 in Chile and Mexico. See: Henry J. Bruton, "Productivity Growth in Latin America," *American Economic Review* 52 (December, 1967): 1101.

¹¹ Manuel Cereijo, *The Cuban Economy: Blueprint for Reconstruction*, (Miami, Florida: Cuban

American National Foundation, 1993).

¹² *Anuario Estadístico de Cuba*, (La Habana, Cuba: Comité Estatal de Estadísticas, Selected Years 1982, 1988 and 1989).

¹³ Jorge Pérez-López, "Cuba's Transition to Market-Based Energy Prices" in *Cuba in Transition* (Miami, Florida: Association for the Study of the Cuban Economy, Florida International University, 1992), 224.

¹⁴ *Market Outlook for Major Primary Commodities Vols. I and II*, Report No. 814/92, (Washington, DC.: International Bank for Reconstruction and Development, October 1992).

¹⁵ Eliana Cardoso and Ann Helwege, *Cuba After Communism* (Cambridge, MA: MIT Press, 1992), 124.

¹⁶ *Memoria 1957-1958*, (La Habana, Cuba: Banco Nacional de Cuba), 141.

¹⁷ Luis Landau, "Savings Functions in Latin America" in *Studies in Development Planning*, ed. Hollis B. Chenery (Cambridge, MA: Harvard University Press, 1971), 779-782.

¹⁸ Savings were estimated as gross investments plus exports and minus imports, as in:

$$St = It + (Xt - Mt)$$

¹⁹ Hollis B. Chenery and Allan Strout, "Foreign Assistance and Economic Development," in *Structural Change and Development Policy*, ed. Hollis B. Chenery (Oxford, England: Oxford University Press, 1979), 388.

²⁰ Julio Carranza claims that gross investments dropped 43% from 1989 to 1991. See: Julio Carranza Valdés, "Cuba: Los Retos de la Economía," *Cuadernos de Nuestra América* 19 (1993): 145.

²¹ Carmelo Mesa-Lago, "The Social Safety Net in the Two Cuban Transitions," in *Cuba in Transition*, (Miami, Florida: Florida International University, 1993), Table 4, page 883. Mesa-Lago's price deflator reflects the cumulative monetary surplus as percentage of the household income.

²² *Economically Active Population, 1950-2025, Vol 3: Latin America*, (Geneva, Switzerland: International Labor Organization, 1986). See also Sergio Díaz Briquets, "Collision Course: Labor Force and Educational Trends in Cuba," *Cuban Studies* 23 (1993).

²³ *Anuario Estadístico de Cuba, 1989*, (La Habana, Cuba: Comité Estatal de Estadísticas, 1990), 104, 114.

²⁴ Enrique Pérez-Marín and Eduardo Muñoz Baños, *Agricultura y Alimentación en Cuba*, (La Habana, Cuba: Editorial de Ciencias Sociales, 1991), 14-20, and José L. Rodríguez and George Carriazo Moreno, *Erradicación de la Pobreza en Cuba* (La Habana, Cuba: Editorial de Ciencias Sociales, 1990), 192-196.

²⁵ These estimates were developed from the figures presented in *Anuario Estadístico de Cuba 1989* (La Habana, Cuba: Comité Estatal de Estadísticas, 1990), 82, 114.

²⁶ Jorge F. Pérez López, *The Economics of Cuban Sugar* (Pittsburgh, PA: University of Pittsburgh Press, 1991), 76.

- ²⁷ Juan Herrera, Minister of Sugar, (Speech broadcast on Radio Rebelde, October 1991 for The Day of the Sugar Worker).
- ²⁸ Rivero International, Database.
- ²⁹ *Annual Energy Outlook 1993 with Projection to 2010*, Report No. DOE/EIA-0383 (Washington, D.C.: Energy Information Administration, Office of Integrated Analysis and Forecasting, U.S. Department of Energy, 1993), 26.
- ³⁰ *Petroleum Supply Monthly*, Report No. DOE/EIA-0109 (93/06) (Washington, D.C.: Energy Information Administration, Office of Oil and Gas, U.S. Department of Energy, June 1993), Appendix D, Table D2, 148.
- ³¹ *Ibid.*, Table E2.
- ³² *SICE* (database), Foreign Trade Information System, General Secretariat, Organization of the American States, OEA, U.S. Imports for Consumption, (Washington, DC: OAS, 1992).
- ³³ Oscar Almazán del Olmo, "Los derivados de la caña de azúcar: Actualidades y prespectivas en Cuba," *Cuba Socialista* 31 (January-February): 51-71.
- ³⁴ *Anuario Estadístico de Cuba 1987*, (La Habana, Cuba: Comité Estatal de Estadísticas, 1998), 479.
- ³⁵ No duty is applicable as a result of having qualified as member of CBI countries. At year t+15 Cuba, will be a CBI and NAFTA member. Prices were provided by Mr. B. Haigwood of Information Resources, Inc., Washington, DC.
- ³⁶ Nicolás Rivero, "Cuba & Sugar: The Inseparable Alliance," (paper presented at a seminar sponsored by The Cuban American National Foundation: "Cuba's Reconstruction: Prospects for the future, held at Dirksen U.S. Senate Office Building, Washington, D.C., May 25, 1993).
- ³⁷ Nicolás Rivero of Rivero International provided the conversion values used.
- ³⁸ An extensive and detailed discussion of non-sugar exports is presented in José F. Alonso and Armando Lago, "A First Approximation of the Foreign Assistance Requirements of a Democratic Cuba," *La Sociedad Económica*, Bulletin 42, March 1994, London, UK.
- ³⁹ *Yearbook of Tourism Statistics*, (Madrid, Spain: World Tourism Organization, Selected Years 1985-1992.)
- ⁴⁰ See the discussion on the effects of Cuban tourism on Puerto Rico in: E. Cabarrouy and F. Cué, "*Retos y Oportunidades para Puerto Rico de una Apertura de la Economía Cubana*," (paper presented at the 3rd. Annual Meeting of the Association for the Study of the Cuban Economy at Florida International University on August 12-14, 1993) and Reynaldo Alegría, Félix Cué and Gustavo Velez, "*Normalización de Relaciones entre Cuba y Estados Unidos: Retos y Oportunidades para Puerto Rico*," (San Juan, Puerto Rico: Consejo de Desarrollo Estratégico para Puerto Rico, 1992,) 58-60.
- ⁴¹ "Análisis Global de la Economía, Enero-Septiembre 1992" (Cuban American National Foundation: Secreto).

- ⁴² Most of the analysis of nickel export markets can be found in "Cuban Nickel: Market Analysis and Production Outlook," La Sociedad Económica, Bulletin 26, 19 January 1993, London, UK.
- ⁴³ Some analysts expect a larger share for Cuban fresh citrus products in the United States. See: University of Florida and Florida Department of Citrus, "Cuba's Citrus Industry," Working Paper Series, No. 10, 23 October 1991. Also "Price Prospects for Major Primary Commodities 1990-2005," Vol II, Washington, DC. (International Bank for Reconstruction and Development, 1991,) p. 123.
- ⁴⁴ José A. Suárez Caabro, *Cuba y su Pesca*, (Miami, Florida: 1988) pp. 80-81.
- ⁴⁵ Arturo Pino Navarro, *Cultivo del Café, Su Futuro*, in Desarrollo Agrícola de Cuba," (Miami, Florida: Colegio de Ingenieros Agronomos y Azucareros, 1992), pp.173-174.
- ⁴⁶ Napoleón Padilla, *El tabaco en el futuro de Cuba*, in Desarrollo Agrícola de Cuba, Miami, Florida: Colegio de Ingenieros Agronomos y Azucareros, 1992, pp.173-174.
- ⁴⁷ A more extensive discussion of foreign capital flows appears in José F. Alonso and Armando M. Lago, "A First Approximation of the Foreign Assistance Requirements of a Democratic Cuba," La Sociedad Económica, Bulletin 42, March 1992, London, UK.
- ⁴⁸ "Economic Benefits to Castro's Government from Humanitarian Provisions of the U.S. Embargo," (Cuban American National Foundation, undated mimeo,) p.10.
- ⁴⁹ U.S. Department of Commerce, *Survey of Current Business*, Washington, D.C.: Department of Commerce, August 1961, p. 22
- ⁵⁰ 1992 *Balance of Payments Statistics Yearbook*, Washington, DC.: International Monetary Fund, 1993.
- ⁵¹ 1992 Annual Report, Washington, DC.: The Inter-American Development Bank, 1993, p.12.
- ⁵² Annual Report 1992, Washington, DC.: The World Bank, 1993, p.117.
- ⁵³ Joaquín P. Pujol, "Membership Requirements in the IMF: Possible Implications for Cuba, " in *Cuba in Transition*, Miami, Florida International University, Association for the Study of the Cuban Economy, 1991, pp. 91-103.
- ⁵⁴ Alfredo Blanco Con, "Comercio Exterior y Movimientos Cambiarios," *Revista Cuba Económica*, Año II, No. 3, Octubre 1991-Marzo 1992) p.103.
- ⁵⁵ "To Whom We Have Loaned: Figures Released by Finance Ministry show 61 Countries Owe USSR 85.6 billion Rubles (Cuba Tops List)," from *Izvestia* cited in *Current Digest of the Soviet Press*, 42, No.9, 4 April, 1990, p.9.
- ⁵⁶ See: Ralph J. Galliano, "The Resolution of U.S.-Cuba Claims: Toward a Democratic, Free Market, Post Castro Cuba," Washington, DC. The Selous Foundation's Institute for U.S. Cuba Relations, 20 May, 1993. pp. 3-4 & 7.
- ⁵⁷ See: José F. Alonso and Armando M. Lago, "A First Approximation of the Foreign Assistance Requirements of a Democratic Cuba," La Sociedad Económica, Bulletin No. 42, March, 1993, London,

U.K.

⁵⁸ *Psychiatry Under Tyranny: An Assessment of Political Abuse of Romanian Psychiatry During the Ceasescu Years*, Amsterdam: The Hague, 1992, p.14.

⁵⁹ In most instances, the current value in dollars (at 60-100 pesos per U.S. dollar) of the confiscated property is less than their original dollar values when confiscated in 1960 and 1961; argument which suggests that it is less costly to the Cuban government to return the confiscated property to the previous owners (except perhaps the property ceded to a current owner, as is the case of housing) than to indemnify them at the current exchange rate.

⁶⁰ Our reviewer at the ASCE annual meetings, Professor Luis Locay points out that, to the extent that compensation demonstrates the new regime's commitment to private property, compensation could actually increase foreign investment in Cuba, including that from exiles. We concur with this view, but we are unable to quantify it with any precision.

⁶¹ B.W. Dyer & Company, *DYERGRAM*, #14-93, (September 1, 1993): 2. Also "Dynamics of Tomorrow's U.S. Sweetener Industry: Opportunities and Challenges," (Speech by Dr. Sachinvala at the Annual International Sweetener Symposium, Lake Tahoe, California, Mid-August 1993).

⁶² José E. Lima, IPS Consulting Engineers, New Orleans, Louisiana.