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ECONOMIC JUSTIFICATION OF THE INVESTMENT PROMOTION PROJECT

This analysis seeks to provide a quantitative justification for the Investment Promotion Project. We have tried to establish a relationship between expenditures on investment promotion, total foreign investment that may be expected to result from this project, and the benefits accruing to the economy as measured by gross and net exports (or value added) and employment generation. To this end, we have reviewed studies and AID project papers in a large number of countries in which investment promotion projects were put into effect. Unfortunately, we found only one project evaluation which provided some data to permit establishment of a quantitative relationship between the cost of an investment promotion project and the benefits that could be attributed to it, including its impact on exports and employment. This was the study undertaken for CINDE in Costa Rica by Corrales, Céspedes and Vega, entitled "Evaluación Económica del Programa de Inversiones y Exportaciones", PIE/CINDE, June 1990. No other study provided, or attempted to utilize, empirical data to establish quantitative relationships between the cost of investment promotion programs and their impact on the economy.

Studies other than the one cited above which provided some useful data include one by CINDE's Marketing Division, entitled "Second and Third Quarters Report, 1990", AID's "Overview of Investment Promotion (Networking) Projects", and INE's 1/ input-output table for Bolivia.

A note of caution should be sounded with respect to the reliability of the results yielded by the models we have developed for the following reasons: (1) there is some question with respect to the applicability of one country's experience to another. In the case of the Costa Rican data, it can be argued that the overall investment climate is much more favorable in Costa Rica than in Bolivia owing to factors such as the length of the democratic tradition, closeness to the United States market, a more developed infrastructure, etc. To compensate at least partially for such differences, we have adopted much more conservative assumptions with respect to the relationship between investment and benefits than the Costa Rican evaluation indicated; (2) data on the

1/ Instituto Nacional de Estadísticas of the GOB.

experience of other countries are extremely scarce, which forced us to rely very heavily on the CINDE evaluation, and (3) even in case of the CINDE evaluation, the data permitted no more than the establishment of estimates that could be used to establish ratios relating the cost of an investment promotion project to the final country benefits that may be expected to result therefrom.

Two alternative projection models were developed here to deal with the problem of the project's impact on net employment, viz.: should we assume that the employment generated by the additional foreign investment represents a net increase in total employment (i.e. that the labor employed would have remained unemployed in the absence of the investment)? Or does a significant proportion of the employment generated represent a diversion of labor from employment in other sectors? The assumption made with respect to this issue is crucial for both the employment and value added projections.

Two models were developed to deal with this issue. Model I assumes that all labor employed as a result of the direct foreign investment resulting from the project represents a net addition to the employed labor force (i.e. which implies that these workers would be drawn from Bolivia's large pool of unemployed and under-employed), while Model II assumes that half of the labor employed as a result of the investment is diverted from other sectors. Quite possibly, the actual outcome would fall somewhere between these two cases. In fact, we believe that Model I is more realistic in the Bolivian situation owing to (1) the high level of unemployment and underemployment that prevails in this country, and (2) the likelihood that the labor diverted from other industries or occupations will be replaced by drawing on the large pool of the unemployed or under-employed.

We shall first summarize the results obtained, then describe the methodology in some detail. In the case of both models, it is assumed that all foreign investment will be focused on the export market, so that total direct value added ^{2/} generated by the foreign investment would be equal to total net exports (gross exports less imported inputs).

^{2/} "Direct" value added abstracts from the Keynesian income multiplier effect, but includes the income directly generated in the production of all domestically produced inputs.

Results

The results obtained are as follows:

	<u>Model I</u>	<u>Model II</u>
Internal Rate of Return	42.6%	34.2%
Net Present Value with a 10% annual discount rate (in millions US\$)	10.8	7.3
Net Present Value with a 15% discount rate (in millions US\$)	7.1	4.5
Net Present Value with a 20% discount rate (in millions US\$)	4.6	2.7
Employment Generation Total (including employment multiplier effect)	10,468	5,234
Direct only (excluding employment multiplier effect)	5,234	2,617

These are clearly very high rates of return, particularly when account is taken of the fact that these calculations are in terms of constant US dollars.^{3/} Note that Model I shows that the net present value of the benefits from the investment promotion project, when discounted at an average annual rate of 10%, exceeds the total amount spent on investment promotion over the five-year "Life of Project" period. Direct employment generation (in the industries directly affected) is estimated at 5,234 under Model I, and 2,617 under Model II, while total employment generation, including the employment impact on the industries producing the inputs and on other activities subject to the income multiplier effect, is estimated at 10,468 under Model I, and half that number under Model II. The basis for these estimates (admittedly very crude) is discussed further in the Methodology Section.

Methodology

The first step is to establish, on the basis of available empirical information, a link between the investment promotion expenses and the total foreign investment that these promotion expenses may be expected to

^{3/} Current dollar projections were reduced to constant dollars by assuming that the annual US inflation rate will be 5.5%, equal to the average annual inflation rate over 1979-89.

generate. The relevant estimates are presented in Table 1. The first line of the table shows the scheduled amounts of investment in the project that AID plans to undertake over the five-year project implementation period. The second line indicates the assumed ratio between these expenditures and the amount of direct foreign investment that these promotion expenditures are expected to yield each year. This ratio probably is the most crucial assumption of the model. In Costa Rica, the CINDE study suggested that \$6.9 million spent on investment promotion over 1987-88 gave rise to \$47 million in foreign investment directly attributable to investment promotion during this period.^{4/} This indicates a ratio of 6.8 to 1.0 - i.e. \$1 million spent on investment promotion resulted in \$6.8 million in total foreign investment. This ratio struck us as being far too optimistic for Bolivia. We decided, therefore, to adopt a much more conservative ratio of 3 to 1 in our projections. Line 3 of Table 1 was obtained by multiplying the figures in line 1 by a factor of 3.

The figures on line 4 (showing the amount of foreign investment in each of the four sectors) were obtained by dividing the totals on line 3 by four, on the assumption that the foreign investment would be equally distributed among four major sectors, viz. agriculture, textiles, wood and wood products, and "various manufactured products". This assumption is obviously arbitrary, but we have no basis for assuming any particular distribution of foreign investment among the major economic sectors.

We are now ready to move from direct foreign investment to estimating the value added resulting from this investment. This is accomplished by means of the input/output table elaborated by INE. Table 2 presents in highly summarized form the results of the input/output analysis as applied to our four major categories - agriculture, textiles, wood and wood products and "various manufactured products". In the case of textiles, for example, a dollar spent on finished output is broken down as follows: 22 cents is spent on imported inputs, 40 cents is spent on domestic inputs other than salaries, 24 cents goes for salaries and 14 cents remain for on profit. If we assume that all profits are repatriated (a worst-case assumption), the amount of value added generated that remains in the country would be 64 cents (i.e. the amount spent on domestic inputs and salaries) for every dollar of gross output.

We are now ready to estimate the impact of foreign investment expenditures (in line 3 of Table 1) first on gross output (assumed to be equal to gross exports), then on net value added. This is done in Table 3 (for Model I) and Table 4 (Model II). Focusing on Table 3, note that the first two lines (investment promotion expenses and foreign investment

^{4/} The CINDE study took care to separate total foreign investment from the foreign investment that could be attributed to the AID investment promotion project. Its analysis focused only on the latter.

in each sector) were carried over from Table 1. Line 3 of Table 3, showing "total output generated in each sector as a result of prior year investments" is based on the following assumption: a direct foreign investment of \$1.0 in year 1 produces an increase in gross exports of 50 cents in year 2 (we assume a one-year lag) and 75 cents in year 3 and in each year thereafter through year 10. This assumption is a much more conservative version of the Costa Rican experience which showed an average increase of \$1.15 in gross exports for each dollar of direct foreign investment. This assumption is the basis for line 3 of Table 3 which shows that a foreign investment of \$1.43 million in year 2 results in a gross output (or gross exports) of \$0.72 million ($\$1.43 \times .50$) in year 3. In year 4, the \$1.43 million invested in year 2 results in a gross output of \$1.07 million ($\$1.43 \times .75$), while the \$1.5 million invested in year 3 results in an output of \$0.75 million in that same year. Thus, in year 4, the total increase in gross output resulting from the foreign investment in years 2 and 3 is \$1.07 plus \$0.75 = \$1.82 million. Each of the figures on line 3 is based on the same methodology. In each case, it is assumed that the foreign investment undertaken in one year has an impact on gross output (or gross exports) in each of the following years. Note that the total output figures reach a maximum in year 7 and remain constant thereafter.

To move from gross output (or gross exports) to net value added, we utilize the input/output coefficients presented in Table 2. For example, in the case of textiles, we note that 40 cents out of every dollar is spent on domestic inputs (See Table 2). Table 3 shows that in year 3, \$0.72 million was spent in each of the four sectors (line 3). Multiplying \$0.72 by 0.40 gives us 0.29, which is the figure entered for textiles on the line corresponding to Domestic Intermediate Consumption for year 3 in Table 3. In the same manner, the figure for salaries was obtained by multiplying \$0.72 million by 0.24 (the coefficient for salaries from Table 2) yielding \$0.17 million, entered on the salary line for year 3 in Table 3. The same methodology was utilized to obtain each of the figures in the body of Table 3.

The Net Value Added figures in line III represent the difference between Total Value Added on line II and the Investment Promotion Expenses on line I. These Net Value Added figures were then deflated by the projected annual increase in the US price level (assumed to be 5.5% a year, as over 1979-89) to express the figures in constant US dollars.

Table 4, illustrating Model II, is based on the same methodology. The only difference is that table 4 assumes that only half the labor employed as a result of the investment program would have been remained unemployed without it. Thus, the figures on the salary line for each of the four sectors are half the level shown in Table 3.

Estimates of the employment impact are based on the ratios of total investment to job generation for each of the four major sectors presented in Table 5. The direct employment estimates refer to total employment generated after all direct foreign investment projected over the

four-year LOP period has been completed. Total direct foreign investment expected to result from the investment promotion project over the four-year period comes to \$5.68 million for each sector. Thus, for textiles, for example, the figure of 1,415 jobs generated in textiles (see line 2 of Table 5) was obtained by dividing \$6.68 million by \$4720 (the estimated amount of investment required to generate one job in that industry). Sources for the data used are cited in Table 5. The total employment estimates (direct plus indirect) were obtained by assuming an employment multiplier of 2.0. The indirect effects are significant as these include the impact on the industries producing the inputs, as well as the impact on other activities subject to the income multiplier effect. The net employment impact in Model II is half that projected for Model I.

Sensitivity Analysis

There are three key variables that significantly affect our projections of the impact of the project on value added or net exports. The first relates to the net employment impact of the foreign investment, which was already taken into account in developing Models I and II. The other two refer to the relationship between the investment promotion expenses and the foreign investment in each sector resulting therefrom (with a one-year lag), which we have assumed to be 1 to 3 in our analysis (i.e. 1 dollar in investment promotion expenses will generate a total of \$3 in direct foreign investment). Our sensitivity analysis will reduce that ratio to 1 to 2, i.e. every dollar spent on investment promotion will eventually result in \$2 in new foreign investment.

A second key assumption of the analysis was that each dollar of foreign investment in year 1 would result in additional gross exports of 50 cents in the second year and of 75 cents in the third year and in each year thereafter. In the sensitivity analysis, we have reduced the assumed impact on gross exports to 30 cents in the second year and to 50 cents in the third year and each year thereafter.

The results obtained (see Table 6) still show highly positive IRRs in three out of four cases. Even under Model II (which we think is too pessimistic), we still get a high IRR of 22%, except in the most unlikely situation when all worst-case assumptions are used in combination. Even in that event, the IRR declines to about 11%, still an acceptable outcome when account is taken of the fact that the projections are in real terms (i.e. expressed in constant US dollars).

Conclusion

Expenditures of the proposed foreign investment promotion program are projected at \$8.9 million over the life of the project. The most important benefits that would accrue to the economy include (1) additional foreign investment of about \$26.7 million, (2) net export earnings between \$38.2 million and \$48.3 million, in current dollars,

over the next ten years, and (3) new jobs estimated between 5,234 and 10,468. It is estimated that the investment promotion program will cost between \$850 and \$1700 for every direct and indirect job generated.

Thus, the investment promotion program will contribute significantly and directly to Bolivia's major economic needs: the generation of foreign exchange, higher output and productivity, and the reduction of the high unemployment rate. There are, in addition, a number of other economic benefits that the analysis did not attempt to quantify - such as technology transfer, economic diversification, and development of the industrial base, - which may be as important as the variables that were quantified.

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Table 1

INVESTMENT PROJECTIONS										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Initial Investment Promotion Expenses (Mill. of \$)	1.90	2.00	2.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00
Proportion of Total Direct Foreign Investment to Investment Promotion Expenditures	-	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1	3:1
Expected Initial Total Foreign Investment (Mill. of \$)	-	5.70	6.00	6.00	6.00	3.00	0.00	0.00	0.00	0.00
Amount of Investment in Each of Four Projected Sectors* (assuming equal distribution of foreign investment among them; Mill. of \$)	-	1.43	1.50	1.50	1.50	0.75	0.00	0.00	0.00	0.00

* Agriculture, Textiles, Wood and Wood Products, and Various Manufacturing Products.

Table 2

BREAKDOWN OF INTERMEDIATE CONSUMPTION AND VALUE ADDED PER DOLLAR OF OUTPUT				
	AGRICULTURE	TEXTILES	WOOD AND WOOD PRODUCTS	VARIOUS MANUFACT. PRODUCTS
TOTAL VALUE OF PRODUCTION	1.00	1.00	1.00	1.00
IMPORTED INPUTS	0.09	0.22	0.29	0.04
VALUE ADDED	0.91	0.78	0.71	0.96
- Domestic Inputs	0.05	0.40	0.22	0.30
- Salaries	0.13	0.24	0.09	0.19
- Indirect Taxes	0.00	0.00	0.01	0.00
- Profit (assumed repatriated)	0.73	0.14	0.39	0.47

Table 3

TOTAL VALUE ADDED RESULTING FROM THE INVESTMENT PROMOTION PROGRAM (1)
(Over a Ten-Year Period)

	(Mill of \$)									
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
I. INVESTMENT PROMOTION EXPENSES	1.90	2.00	2.00	2.00	1.00	0.00	0.00	0.00	0.00	0.00
Foreign Investment in Each Sector		1.43	1.50	1.50	1.50	0.75	0.00	0.00	0.00	0.00
Total Output Generated in Each Sector as a Result of Prior Year Investment			0.72	1.32	2.35	4.07	4.52	5.01	5.01	5.01
II. TOTAL VALUE ADDED (Undiscounted)	0.00	0.00	1.21	3.01	4.94	6.58	7.90	8.21	8.21	8.21
AGRICULTURE										
Economic Benefits			0.14	0.34	0.34	0.74	0.38	0.21	0.21	0.21
-Domestic Intermediate Consumption			0.04	0.09	0.15	0.20	0.24	0.25	0.25	0.25
-Salaries			0.09	0.24	0.38	0.53	0.63	0.63	0.53	0.53
-Net Indirect Taxes			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TEXTILES										
Economic Benefits			0.47	1.17	1.90	2.52	3.10	3.22	3.22	3.22
-Domestic Intermediate Consumption			0.29	0.73	1.13	1.63	1.93	2.00	2.00	2.00
-Salaries			0.17	0.44	0.71	0.99	1.16	1.20	1.20	1.20
-Net Indirect Taxes			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
WOOD AND WOOD PRODUCTS										
Economic Benefits			0.24	0.59	0.95	1.31	1.55	1.61	1.61	1.61
-Domestic Intermediate Consumption			0.16	0.40	0.65	0.90	1.06	1.10	1.10	1.10
-Salaries			0.06	0.16	0.27	0.37	0.43	0.45	0.45	0.45
-Net Indirect Taxes			0.01	0.02	0.03	0.04	0.05	0.05	0.05	0.05
-Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
VARIOUS MANUFACTURED PRODUCTS										
Economic Benefits			0.36	0.90	1.45	2.01	2.37	2.46	2.46	2.46
-Domestic Intermediate Consumption			0.22	0.55	0.88	1.22	1.45	1.50	1.50	1.50
-Salaries			0.14	0.33	0.56	0.77	0.92	0.95	0.95	0.95
-Net Indirect Taxes			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
-Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
III. NET VALUE ADDED (I-I)(In Current \$)	-1.90	-2.00	-0.79	1.01	3.94	6.58	7.90	8.21	8.21	8.21
IV. NET VALUE ADDED (In Constant \$)	-1.90	-1.90	-0.57	0.21	2.94	4.34	5.42	5.23	5.07	4.90
Internal Rate of Return (Economic)	42.64%									
Net Present Value at 10% disc. rate	10.77 million of dollars									
Net Present Value at 15% disc. rate	7.07 million of dollars									
Net Present Value at 20% disc. rate	4.57 million of dollars									

(1) Assuming that all labor employed as a result of this investment program would have been unemployed without it (i.e. marginal product of labor = 0).

Table 4

TOTAL VALUE ADDED RESULTING FROM THE INVESTMENT PROMOTION PROGRAM (1)										
(Over a Ten-Year Period)										
(Mill of \$)										
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
I. INVESTMENT PROMOTION EXPENSES	1.90	2.00	2.00	2.00	1.90	0.00	0.00	0.00	0.00	0.00
Foreign Investment in Each Sector		1.43	1.50	1.50	1.50	0.75	0.00	0.00	0.00	0.00
Total Output Generated in Each Sector as a Result of Prior Year Investment			0.71	1.88	3.00	3.75	3.94	3.94	3.94	3.94
II. TOTAL VALUE ADDED (Undiscounted)	0.00	0.00	0.98	2.42	3.89	5.22	6.23	6.45	6.45	6.45
AGRICULTURE										
Economic Benefits			0.09	0.23	0.35	0.44	0.46	0.46	0.46	0.46
- Domestic Intermediate Consumption			0.04	0.09	0.15	0.19	0.20	0.20	0.20	0.20
- Salaries			0.05	0.12	0.20	0.24	0.26	0.26	0.26	0.26
- Net Indirect Taxes			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
TEXTILES										
Economic Benefits			0.38	0.96	1.54	2.13	2.52	2.62	2.62	2.62
- Domestic Intermediate Consumption			0.29	0.73	1.18	1.63	1.93	2.00	2.00	2.00
- Salaries			0.09	0.22	0.35	0.49	0.58	0.60	0.60	0.60
- Net Indirect Taxes			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
WOOD AND WOOD PRODUCTS										
Economic Benefits			0.21	0.51	0.82	1.13	1.34	1.39	1.39	1.39
- Domestic Intermediate Consumption			0.16	0.40	0.65	0.90	1.05	1.10	1.10	1.10
- Salaries			0.03	0.08	0.13	0.18	0.22	0.23	0.23	0.23
- Net Indirect Taxes			0.01	0.02	0.03	0.04	0.05	0.05	0.05	0.05
- Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
VARIOUS MANUFACTURED PRODUCTS										
Economic Benefits			0.29	0.73	1.17	1.62	1.91	1.99	1.99	1.99
- Domestic Intermediate Consumption			0.22	0.55	0.88	1.22	1.45	1.50	1.50	1.50
- Salaries			0.07	0.17	0.28	0.39	0.46	0.48	0.48	0.48
- Net Indirect Taxes			0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
- Corporate Taxes			0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
III. NET VALUE ADDED (II-I) (In Current \$)	-1.90	-2.00	-1.02	0.42	2.89	5.22	6.23	6.45	6.45	6.45
IV. NET VALUE ADDED (In Constant \$)	-1.90	-1.80	-0.87	0.34	2.71	3.86	4.28	4.21	3.99	3.78
Internal Rate of Return (Economic)	34.21%									
Net Present Value at 10% disc. rate	7.32 million of dollars									
Net Present Value at 15% disc. rate	4.52 million of dollars									
Net Present Value at 20% disc. rate	2.55 million of dollars									

(1) Assuming that half of the labor employed as a result of this investment program would have been unemployed without it (i.e. marginal product equals half the average salary period).

Table 5

EMPLOYMENT GENERATION	
Agriculture (\$5,800/job) ⁺ (1)	1,152
Textiles (\$4,720/job)(2)	1,415
Wood and Wood Products (\$6,860/job)(1)	974
Various Manufact. Products ^{**} (\$3,945/job)(1)	1,693
Total Direct Employment Generation	5,234
Assumed Employment Multiplier = 2.0	
Total Employment Effect	10,468

* Owing to the lack of data, this ratio of investment employment generated is for agroindustry.

** Averaging available data of sporting goods, electronics/data entry, souvenirs, agroindustry and pharmaceuticals.

SOURCES:

- (1) Project Development Assistance Program, prepared for USAID/RDC/C by Louis Berger International, Inc., taken from Arthur D. Little 1984 Evaluation: "USAID Private Sector On-Lending Programs".
- (2) CINDE's Marketing Division, II Quarter Report, 1990.

Table 6

SENSITIVITY ANALYSIS				
Proportion of Total Direct Foreign Investment to Investment Promotion Expenditures			3:1	2:1
			Gross Exports Generated per Dollar of Direct Foreign Investment in Year 1 (2nd Year) (3rd Year and On)	
<u>MODEL I</u>				
0.5	0.75	IRR:	42.6%	20.3%
0.3	0.50	IRR:	27.6%	15.6%
<u>MODEL II</u>				
0.5	0.75	IRR:	34.2%	22.3%
0.3	0.50	IRR:	20.0%	10.9%

NOTE.- Shaded boxes represent results of main model (used in text). Other figures show results of sensitivity analysis.