

APPENDIX B. (Continued)

State	Source of Information
South Carolina	Data were supplied by the Economic Development Division of the State Development Board.
South Dakota	The State Planning Bureau and the Industrial Development Division of the Department of Economic and Tourism Development provided data on IRB issues in South Dakota.
Tennessee	Data were received from the Industrial Development Division of the Department of Economic and Community Development. Reports included lists of bonds issued by both industrial development boards and municipalities and/or counties.
Texas	The Texas Industrial Commission furnished data on bond sales in 1980. The Commission was authorized by the Development Corporation Act of 1979 and began its activities in December of 1979; therefore, few, if any, small issue IRBs were sold prior to that time.
Utah	The Utah Economic and Industrial Development Division provided lists of bond issues within the state. The figures that appear in Appendix A were taken directly from those lists. State officials estimate that 80-90 percent of all issues are reported and listed. Therefore, the figures in Appendix A slightly underestimate total activity.
Vermont	The Vermont Industrial Development Authority provided lists of bond issues within the state for the years 1975-1980.
Virginia	The Division of Industrial Development supplied lists of bonds issued for all years up to and including 1979.

(Continued)

APPENDIX B. (Continued)

State	Source of Information
West Virginia	The Industrial Development Division of the Governor's Office of Economic and Community Development furnished lists of industrial development bonds. State officials believe the lists may be incomplete and/or inaccurate. No other statewide data were available.
Wisconsin	The Wisconsin Department of Business Development provided all data.
Wyoming	Data were provided by the Industrial Development Division of the Department of Economic Planning and Development.

APPENDIX C. SMALL ISSUE IRB USES

State	Industrial Facilities	Storage and Wholesale Distribution Facilities	Commercial Facilities	Comments
Alabama	x	x	x	Retail facilities permitted only under conditions specified by the Securities Commission. Litigation pending.
Alaska	x	---	x	Restricted to "small business, tourism, mining and commercial fishery enterprises." Retail facilities subject to \$1 million limit.
Arizona	x	x	x	
Arkansas	x	x	x	Office buildings permitted. No retail.
California	x	---	---	
Colorado	x	x	x	
Connecticut	x	x	x	Office buildings permitted. No retail.
Delaware	x	x	x	
Florida	x	x	x	Commercial uses targeted to slums and blighted areas.

(Continued)

APPENDIX C. (Continued)

State	Industrial Facilities	Storage and Wholesale Distribution Facilities	Commercial Facilities	Comments
Georgia	x	x	---	Corporate headquarters permitted. No retail.
Illinois	x	x	x	
Indiana	x	x	x	
Iowa	x	x	x	Commercial facilities permitted only in designated urban renewal or revitalization districts.
Kansas	x	x	x	
Kentucky	x	x	x	
Louisiana	x	x	x	
Maine	x	x	x	IRBs for retail stores and health care facilities eliminated as of October 1981.
Maryland	x	x	x	
Massachusetts	x	x	x	Commercial projects limited to specifically designated revitalization districts.
Michigan	x	x	x	
Minnesota	x	x	x	
Mississippi	x	x	---	
Missouri	x	x	x	

(Continued)

APPENDIX C. (Continued)

State	Industrial Facilities	Storage and Wholesale Distribution Facilities	Commercial Facilities	Comments
Montana	x	x	x	
Nebraska	x	x	---	
Nevada	x	x	---	
New Hampshire	x	x	---	Corporate head- quarters per- mitted.
New Jersey	x	x	x	Commercial uses targeted to designated distressed areas.
New Mexico	x	x	x	No retail.
New York	x	x	x	
North Carolina	x	---	---	
North Dakota	x	x	x	
Ohio	x	x	x	
Oklahoma	x	x	---	
Oregon	x	x	x	Although retail use is discour- aged, the state's 23 port districts may issue bonds for any purpose per- mitted under federal law.
Pennsylvania	x	x	x	
Rhode Island	x	x	---	Office buildings permitted in downtown areas of older cities.

(Continued)

APPENDIX C. (Continued)

State	Industrial Facilities	Storage and Wholesale Distribution Facilities	Commercial Facilities	Comments
South Carolina	x	x	x	Amendments to state legislation to permit shopping centers and other facilities are now being tested in the courts.
South Dakota	x	x	x	
Tennessee	x	x	x	
Texas	x	x	x	Commercial projects are targeted to distressed areas. Administratively, emphasis is almost entirely on industrial projects.
Utah	x	x	x	
Vermont	x	x	---	
Virginia	x	x	x	
West Virginia	x	x	x	
Wisconsin	x	x	x	Retail facilities loosely targeted to blighted areas.
Wyoming	x	x	x	

APPENDIX D. SMALL ISSUE IRB ISSUING AUTHORITIES

State	Local IDA	County/City ^a	State Agency
Alabama	x	x	---
Alaska	x	---	x
Arizona	x	---	---
Arkansas	x	x	---
California	x	---	---
Colorado	---	x	---
Connecticut	x ^d	x ^d	x
Delaware	---	x	x
Florida	x	x	---
Georgia	x	x	---
Illinois	---	x	---
Indiana	x	---	---
Iowa	---	x	---
Kansas	---	x	---
Kentucky	x	x	x
Louisiana	x	x	---
Maine	---	x	x
Maryland	---	x	---
Massachusetts	x	---	x
Michigan	x	x	x ^c
Minnesota	---	x ^b	---
Mississippi	---	x	---
Missouri	x	x	---
Montana	---	x	x
Nebraska	---	x	---
Nevada	---	x	---
New Hampshire	x	x	x
New Jersey	---	---	x
New Mexico	---	x	---
New York	x	---	---
North Carolina	x	---	---
North Dakota	---	x	---

(Continued)

APPENDIX D. (Continued)

State	Local IDA	County/City ^a	State Agency
Ohio	x	x	x
Oklahoma	x	x	x
Oregon	---	---	x
Pennsylvania	x	---	---
Rhode Island	---	---	x
South Carolina	---	x	---
South Dakota	---	x	---
Tennessee	x	x	---
Texas	x	x	---
Utah	---	x	---
Vermont	---	x ^d	x
Virginia	x	---	---
West Virginia	---	x	---
Wisconsin	---	x	---
Wyoming	---	x	---

- a. While in many states, cities and/or counties and local IDAs have by law the authority to issue IRBs, the local IDAs are by far more active because city/county approval often requires a local referendum.
- b. Port authorities and redevelopment agencies also issue IRBs.
- c. Refers only to the Michigan Job Development Authority.
- d. In practice, the state agency issues virtually all IRBs.

APPENDIX E. CALCULATION OF REVENUE LOSSES FROM SMALL ISSUE IRBS, CALENDAR YEARS 1975-1986 (In millions of dollars)

	New Issues	Retirement	Net New Issues, End of Calendar Year	Average New Issues for Calendar Year	BAA Interest Rate (in percent)	Marginal Tax Rate	Calendar Year Loss	Fiscal ^a Year Loss
Pre-1975 ^b	9,300	---	9,300	8,750	7.25	.3	190.4	174.9
1975	1,300	---	1,300	1,250	9.97	.3	37.4	34.7
1976	1,500	---	1,500	1,400	9.53	.3	40.0	38.7
1977	2,200	---	2,200	1,850	9.07	.3	50.3	45.3
1978	3,400	---	3,400	2,800	9.86	.3	82.9	67.0
1979	7,100	100	7,000	5,200	10.88	.3	169.7	127.3
1980	8,400	200	8,200	7,600	12.37	.3	282.0	227.1
1981	9,200	250	8,950	8,575	13.60	.3	347.9	317.9
1982	10,100	250	9,850	9,400	12.80	.3	361.0	355.0
1983	11,100	250	10,850	10,350	12.20	.3	378.8	370.7
1984	12,200	500	11,700	11,275	11.30	.3	382.2	380.7
1985	13,400	350	13,050	12,375	9.90	.3	367.5	374.2
1986	14,700	500	14,200	13,625	8.70	.3	355.6	361.0

68

- a. Fiscal year revenue losses are based on the assumption that 34 percent of tax-exempt bonds are held by individuals and 66 percent by corporations. The fiscal year/calendar year split beginning in 1980 is 0.63/0.37 for individuals and 0.50/0.50 for corporations. Before 1980, it was the same for individuals and 0.45/0.55 for corporations.
- b. Pre-1975 data reflect cumulative issues, a weighted average interest rate, and cumulative revenue losses.

APPENDIX F. CALCULATION OF REVENUE REFLOW EFFECTS

Estimating the revenue reflows from projected supplies of IRBs is a complicated three-stage procedure. First, the increase in the desired stock of physical capital that results from the increase in the supply of IRBs in each year must be estimated. Then the stream of increases in investment to which this higher desired capital stock gives rise is estimated, together with the consequent increases in GNP and taxable incomes. Finally, the reflows can be estimated by applying tax rates and timing factors to these increases in taxable incomes. The three stages of the process are described here in turn.

The reduction in effective interest rates that is allowed to eligible firms by tax-exempt financing is computed by applying an effective marginal tax rate of 30 percent to the projected interest rate on alternative means of finance, assumed here to be corporate bonds rated Baa.¹ This interest rate reduction can then be translated into an implied reduction in the overall cost of capital. This translation takes into account the fact that, when financing their total capital stock, firms use equity and alternative debt instruments like mortgages and bank loans as well as bonds, and that they take into account the investment tax credit and the structure of tax-allowable depreciation allowances.

A standard formula for the cost of capital is

$$CC = \frac{P(d + CF)(1 - tZ - k)}{1 - t}$$

Here, CC is the after-tax cost of capital; P is the price of capital goods; d is the depreciation rate of physical capital; CF is the cost of financial capital, representing a weighted average of the cost of equity and the after-tax costs of the various types of debt finance used by firms; t is the effective marginal corpo-

-
1. The derivation of the effective marginal tax rate and the choice of alternative financing instruments are discussed more fully in Chapter IV.

rate tax rate; Z is the present discounted value of tax allowable depreciation deductions per dollar of investment; and k is the rate of investment tax credit per dollar of investment.² CBO has used values of the various parameters in this cost-of-capital equation from the equipment investment sector of the Data Resources, Inc., econometric model. During 1980, the last year for which actual data are available, these figures implied that each 30 percent reduction in the cost of bond finance implied a 0.5 percent reduction in the cost of capital. This rule was used throughout the projection period to approximate the cost-of-capital effects of IRB financing.³

The percentage increase in the desired stock of capital of firms using IRB financing that results from this reduction in the cost of capital can be estimated using a standard formula.⁴ There

2. For detailed discussion of this formula, see R. E. Hall and Dale W. Jorgenson, "Tax Policy and Investment Behavior," American Economic Review 57 (June 1967), pp. 391-414; and T. Nicolaus Tideman, "Measuring the Cost of Capital Services," U.S. Treasury Department Office of Tax Analysis Paper #4 (April 1975).

3. Even this apparently low ratio is overstated because it assumes that all of the bond financing of eligible firms is made up of IRBs. In practice, of course, only a fraction of these firms' outstanding bonds is tax exempt.

4. This formula is

$$E_k = -(LS \times E_{k-1} + KS \times E_o)$$

where E_k is the elasticity of demand for capital with respect to the cost of capital, LS is labor's share in output, E_{k-1} is the elasticity of substitution between capital and labor, KS is capital's share in output, and E_o is the elasticity of demand for output. For a derivation of this formula, see R.G.D. Allen, Mathematical Analysis for Economists (London: MacMillan and Co., Ltd, 1964) pp. 369-374. Values of unity were used for both E_o and E_{k-1} . The former choice was made in conformity with other studies (see for example, Harvey Galper and Eric Toder, op. cit.), and the latter with reference to a large body of empirical work; see Dale W. Jorgenson, "Investment and Production: A Review," in M.D. Intriligator and D.A. Kendrick

is no entirely satisfactory way, however, to estimate the percentage increase that this implies for the total stock of capital. CBO has approximated this proportion by the ratio of the net increase in outstanding IRBs in each year to projected nonresidential fixed investment in that year.⁵ This procedure produces a crude approximation of the percentage increase in the total desired stock of nonfinancial corporate capital that results from each projected increase in outstanding IRBs. This percentage can be translated into an increase in the dollar value of desired nonfinancial corporate capital using a baseline projection of the capital stock. The results are shown in Table F-1.

The increased investment to which each increase in the desired capital stock gives rise does not happen instantaneously. Instead, the new investment is spread over a period of years. Exactly how many years must pass before the entire increase in desired capital is translated into an increase in actual capital is highly uncertain; CBO has used a relatively low estimate of five years.⁶

The time pattern of the increase in investment was estimated by simulating an investment-expanding tax policy on the Data Resources, Inc., econometric model and observing the fraction of the total five-year increase in nonresidential fixed investment that occurred in each year. Applying this timing pattern to the increases in desired capital shown in Table F-1 produced yearly

(eds.), *Frontiers of Quantitative Economics*, vol. 2 (Amsterdam: North-Holland, 1974); and Ernst R. Berndt, "Reconciling Alternative Estimates of the Elasticity of Substitution," *Review of Economics and Statistics*, LVIII, 1 (1976). These choices for E_0 and E_k make estimation of LS and KS unnecessary.

5. This approximation is accurate if, on average, investment of firms using IRB financing represents the same proportion of their total capital stock as does that of all firms, on average.
6. This estimate is based on the estimated timing of the long-run response to changes in the cost of capital in the "modified neoclassical" investment equation reported in Peter K. Clark, "Investment in the 1970's: Theory, Performance, and Prediction," *Brookings Papers on Economic Activity*, 1979:I, p. 86.

estimates of increased investment. These were translated into increases in GNP by applying CBO estimates of GNP-investment multipliers, rates of return to new investment, and rates of depreciation.

The revenue reflows, finally, were computed from the estimated increases in GNP by dividing the GNP changes into taxable incomes and applying CBO's revenue-estimating model to the results. Rather than using any sophisticated approach to the determination of the changes in taxable incomes, the fractions of actual GNP in 1980 that were accounted for by each component of taxable income were applied to each projected increase in GNP. The projected increases in investment, GNP, and taxable incomes are shown in Table F-2.

As discussed in Chapter IV, the reflow estimates that have been derived here may well be overstated because the magnitude of the underlying investment response may be overstated. There are four principal reasons:

- o The value assumed for the coefficient showing the sensitivity of investment to the cost of capital is near the top of the range of estimated values. Some analysts have argued strongly that the value is substantially lower, and many point estimates are at least somewhat lower.⁷
- o The analysis ignores the offsetting effects of increases in interest rates on financial assets other than IRBs. These rates increase when the supply of IRBs expands in order to maintain the appeal of these assets for wealthholders.
- o The impact of the IRB tax subsidy on the overall cost of capital is overstated by assuming that all outstanding bonds issued by affected firms are tax exempt. In practice, only a fraction of these bonds is exempt.

7. For a careful review of this evidence, as well as a rationale for the value used in this study, see Ernst R. Berndt, "Reconciling Alternative Estimates."

- o The five-year period assumed for the investment response to new issues of IRBs is too short. In practice, taking account of cash-flow considerations, variations in depreciation rates, disappointments in expectations, and other factors implies that this period may be substantially longer.⁸

8. Otto Eckstein and Allen Sinai, "Tax Policy and Investment Behavior Revisited," Data Resources, Inc., unpublished paper, 1981.

TABLE F-1. PROJECTED INCREASES IN IRB SUPPLY AND CHANGES IN LEVELS OF INTEREST RATES ON TAXABLE BONDS, WITH CONSEQUENT CHANGES IN DESIRED STOCK OF CORPORATE CAPITAL, CALENDAR YEARS 1982-1986 (In billions of dollars)

	Increase in IRB Supply	Interest Rate on Alternative Financing (in percent)	Increase in Desired Capital Stock
1982	9.9	12.8	1.7
1983	10.9	12.2	1.8
1984	11.7	11.3	1.8
1985	13.1	9.9	1.8
1986	14.2	8.7	1.7

SOURCE: CBO estimates.

TABLE F-2. PROJECTED INCREASES IN INVESTMENT, GNP, TAXABLE INCOMES, AND FEDERAL REVENUES DUE TO INCREASES IN IRB SUPPLY, CALENDAR YEARS 1982-1986 (In billions of dollars)

	Investment	GNP	Taxable Incomes			Federal Revenues (Fiscal Years)
			Wages and Salaries	Nonwage Income	Corporate Profits	
1982	0.02	0.40	0.20	0.07	0.04	0.06
1983	0.24	0.65	0.34	0.12	0.06	0.13
1984	0.72	1.63	0.86	0.30	0.16	0.29
1985	1.30	2.95	1.55	0.55	0.28	0.56
1986	1.80	4.20	2.21	0.78	0.40	0.88

APPENDIX G. SMALL ISSUE IRB SALES PER CAPITA

State	Small Issue IRBs, 1980 (in millions of dollars)	Population, 1978 (in thousands)	Per Capita Issues (in dollars)
Alabama	247.6	3,742	66
Alaska	---	403	--
Arizona	105.4	2,354	45
Arkansas	98.3	2,186	45
California	---	22,294	--
Colorado	40.3	2,670	15
Connecticut	96.5	3,099	31
Delaware	37.4	583	64
Florida	124.8	8,594	15
Georgia	156.9 ^b	5,084	31
Illinois	65.7	11,243	6
Indiana	386.1	5,374	72
Iowa	131.3	2,896	45
Kansas	106.8 ^c	2,348	45
Kentucky	77.0 ^c	3,498	22
Louisiana	30.9 ^c	3,966	8
Maine	36.8	1,091	34
Maryland	137.2 ^a	4,143	33
Massachusetts	369.2	5,774	64
Michigan	159.2 ^b	9,189	17
Minnesota	415.0	4,008	104
Mississippi	246.1 ^a	2,404	102
Missouri	NA	4,860	NA
Montana	21.6 ^a	785	28
Nebraska	29.7	1,565	19
Nevada	NA	660	NA
New Hampshire	54.4	871	62
New Jersey	578.0	7,327	79
New Mexico	7.4 ^a	1,212	6
New York	382.8	17,748	22
North Carolina	200.0	5,577	36
North Dakota	38.8	652	60
Ohio	805.4	10,749	75
Oklahoma	48.9	2,880	17
Oregon	31.0	2,444	13

(Continued)

APPENDIX G. (Continued)

State	Small Issue IRBs, 1980 (in millions of dollars)	Population, 1978 (in thousands)	Per Capita Issues (in dollars)
Pennsylvania	1,639.1	11,750	139
Rhode Island	63.1	935	67
South Carolina	199.2	2,918	68
South Dakota	17.1 ^a	690	25
Tennessee	244.5	4,357	56
Texas	281.8	13,014	22
Utah	55.2	1,307	42
Vermont	23.9	487	49
Virginia	380.7	5,148	74
West Virginia	34.6 ^a	1,860	19
Wisconsin	195.2	4,679	42
Wyoming	37.2	424	88

NOTE: NA - Data not available.

a. CBO projection

b. CBO estimate

c. CBO projection based on data for first 6 months.