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HOW THE BONDHOLDERS FARED:  
REALIZED RATES OF RETURN  
ON FOREIGN DOLLAR BONDS  
FLOATED IN THE 1920S

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Key words: debt, default.

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## 1. Introduction

Since its abrupt appearance on the international scene in the summer of 1982, the debt crisis of the 1980s has borne an eerie resemblance to debt crises past. The current crisis was preceded by a wave of optimism concerning the prospects for developing-country lending, followed by a pessimistic revision of expectations and a sudden halt to new foreign lending. In all these respects it closely resembled the run-up to the debt crisis of the 1930s and its 19th century predecessors. The onset of default coincided with a worldwide recession, real interest rate shocks, dramatic declines in primary commodity prices, and resurgent protectionism, in all these respects resembling the situation in the 'thirties. The current crisis has elicited both ambitious global schemes for restructuring the international lending process and modest proposals for renegotiating existing obligations on a bilateral basis, both of which bear a remarkable resemblance to proposals considered by interwar policymakers.

The parallels have served to encourage renewed attention to the history of foreign lending and default. Most studies to date have concentrated on the process of lending and its denouement. Fishlow (1985), Eichengreen and Portes (1986) and Stallings (1987), for example, have studied the pattern of lending and the incidence of default. Only recently have authors turned to the resolution of past debt crises. Eichengreen, Humm and Portes (1987a, b) have studied the history of bilateral negotiations. Eichengreen (1987) has analyzed global plans floated during the interwar years. Perhaps the most controversial aspect of the history of default is the question of how the bondholders fared. From the creditor's perspective, investigators compute the rate of return

realized by investors in foreign bonds; from the debtor's, they compute the ex post cost of foreign capital to sovereign, municipal and corporate borrowers. Observers of the current crisis use these historical rate-of-return calculations as benchmarks or precedents when assessing how much debt relief or what concessional rescheduling terms are consistent with prior experience (viz. Williamson, 1987).

Such calculations have a history of their own. Already in the 1930s, observers such as Madden et al. (1937) and the editors of the South American Journal estimated the rate of return received by investors in foreign bonds issued in the 1920s. But their estimates have limited value since they contain no information on the terms of debt settlements in the 1940s and 1950s. More recently, there have been four studies of the rates of return realized on foreign loans. Michael Edelstein (1977, 1982) estimated the realized rates of return on samples of British home and foreign portfolio investments in the forty years prior to World War I. He found that foreign investment paid handsomely, in the sense that the realized return on foreign bonds consistently exceeded the returns on domestic portfolio investments. While Edelstein's estimates have so far stood the test of time, there are grounds for doubting their generality. While default recurred sporadically during the age of high imperialism, there was no single debt crisis comparable to the worldwide crisis of the 1930s. Hence it is questionable whether estimates for later periods would yield such favorable results. In addition, rates of return enjoyed by British investors were probably more favorable than those realized by their foreign counterparts. British lending tended to be directed toward investment in infrastructure and other export-generating projects -- purchases of U.S. railway bonds providing the prototypical example --

while French and German lending tended to be directed toward governments engaged in military campaigns or for other reasons attempting to finance budget deficits (Fishlow, 1985). Default was more prevalent on these French and German loans, suggesting that the returns were less satisfactory.

A recent study by Lindert and Morton (1987) sheds some light on this question. Lindert and Morton set out to calculate realized rates of return on bonds floated between 1850 and 1970, which they follow from date of issue to final settlement or to the end of 1983. This ambitious task is rendered tractable by their concentration on sovereign debt and on the experience of a limited number of borrowing governments: Argentina, Australia, Brazil, Canada, Chile, Egypt, Japan, Mexico, Russia and Turkey. Like Edelstein, they find that foreign lending paid. The real internal rate of return realized on all foreign bonds issued between 1850 and 1973 averaged 2.7 per cent for their four Latin American countries and 2.4 per cent for their other six sovereign borrowers. Both realizations exceed the returns on creditor-country government bonds purchased in the same periods. Comparison with Hickman's (1958) study of returns on large U.S. corporate bonds suggests that foreign debt paid only slightly less than risky investments in U.S. corporations. One perplexing aspect of Lindert and Morton's study is that investors appear to have reaped a higher return on bond lending to foreign governments than to domestic governments between 1915 and 1945 but not between 1850 and 1914. Another study of interwar lending to Latin American governments, by Jorgenson (1987), arrives at somewhat less optimistic conclusions.

A more detailed perspective on interwar experience is provided by Eichengreen and Portes (1986). That article computed realized rates of

return on samples of dollar and sterling bonds floated in the 1920s on behalf of not just foreign governments but states, provinces, municipalities and corporations. Those calculations confirmed that the performance of loans to sovereign governments differed from that of loans to other foreign entities. The nominal own-currency internal rate of return on dollar loans to sovereigns was in excess of five percent; loans to state governments yielded three percentage points less, loans to foreign corporations fully 10 percentage points less. The performance of sterling loans differed in level but not in composition: the overall rate of return on sterling loans was consistently superior to the rate of return realized on dollar loans, although (as in the case of dollar loans) loans to foreign corporations performed less well than loans to governments. Overall, sterling loans paid, in the sense of yielding more ex post than simultaneous investments in domestic government bonds. In contrast, foreign dollar bonds yielded less than alternative domestic investments. Eichengreen and Portes conjectured that the superior performance of loans to national governments compared with loans to corporations was due to a greater ability to negotiate with foreign governments, especially when they evinced an interest in re-entering the international capital market, than with foreign corporations that might go out of existence in times of economic hardship or war. They hypothesized further that the superior performance of sterling loans compared with their dollar counterparts was due to the direction of British lending (oriented disproportionately toward the Empire and Commonwealth), more active intervention on the part of the British government, and more effective representation of British bondholders by the Council of Foreign Bondholders.

That previous study was subject to three obvious limitations. First, it was based on a relatively small sample: 50 dollar and 31 sterling issues. While that sample should have been representative of average experience, it may have been too small to shed much light on the experience of particular countries. For example, the two Italian dollar issues included in the sample, a 1926 loan to Fiat and a 1927 loan to the Credit Consortium for Public Works, provide only limited insight into average Italian experience. Second, Eichengreen and Portes's sample of foreign dollar bonds covered only the years 1924-1930. That sample was designed to span the period of large-scale foreign lending, which reached a peak in 1927. An earlier study by Ilse Mintz (1951) suggests, however, that realized rates of return may have been higher earlier in the 1920s.

Third, Eichengreen and Portes's calculations did not incorporate surreptitious repurchases at deep discounts of defaulted foreign bonds. In the 1930s it was not uncommon for governments in default on interest and sinking fund payments to use foreign exchange to repurchase their obligations at depressed market prices. Creditors who sold their bonds at a discount received only partial repayment of loan principal; hence Eichengreen and Portes's calculations may tend to overstate realized rates of return.

This paper extends the analysis of foreign dollar bonds in Eichengreen and Portes (1986) in an attempt to transcend these limitations. A larger sample of nearly 250 foreign dollar bonds issued in the United States between 1920 and 1929 is drawn. Nominal internal rates of return realized by investors are calculated, incorporating adjustments for repurchases of discounted foreign bonds. While the results display a number of interesting differences from the estimates in Eichengreen and Portes (1986), a consistent story emerges.

## 2. Methodology

For this paper we drew a stratified sample of 250 foreign dollar bonds issued in the 1920s from lists of foreign dollar issues compiled by the U.S. Department of Commerce and published in the Handbook on American Underwriting of Foreign Securities. Upon studying individual bonds, we were forced to make a number of adjustments, resampling if we discovered that a "foreign" security was in fact a stock rather than a bond, resampling if we discovered that a foreign security had been issued on behalf of an American corporation, combining portions of a single issue that had been marketed over a period of years and resampling, and dropping a small number of observations for which it proved impossible to obtain the required information. Further information on the construction and composition of the sample and on other procedures described here is provided in the appendix to this paper.

We then tracked interest payments and repayment of principal on these bonds throughout their lifetime, computing the nominal own-currency realized internal rate of return. Buybacks at discounted prices were treated as partial repayment of principal, extinguishing that portion of the loan represented by repurchased bonds. When existing bond issues were converted or replaced by successor issues in the course of negotiations over defaulted loans, those successor bonds were treated as parts of the initial issue in the rate of return calculation. When domestic currency, blocked balances or scrip was issued in lieu of foreign exchange (in the case of Germany), alternative rates of return were calculated under different assumptions about their shadow price. In the estimates reported in this paper, we assumed a zero shadow price.

### 3. Results

Our results are summarized in Table 1. For the entire sample, the internal rate of return (weighted by the value of the issue in order to replicate the properties of the population) is almost exactly 4 per cent. There is considerable variation by type and location of borrower: loans to governments, for instance, yielded 4.6 per cent, loans to private entities 2.5 per cent. Loans to the Far East, notably Japan and Australia, yielded the most favorable rates of return (6.0 per cent), followed by Canadian issues (yielding 5.1 per cent). Loans to Europe performed considerably less well (the internal rate of return equaling 3.2 per cent), with loans to Latin America (yielding 3.1 per cent) bringing up the rear.

While consistent with the results of Eichengreen and Portes (1987), those in Table 1 differ in several respects. The return on government and government-guaranteed loans is quite similar (3.25 per cent according to Eichengreen and Portes, 4.64 per cent here). The 1.4 point difference is attributable largely to the extension of the sample period to include 1920-23. For these earlier years, our sample includes two exceptionally large loans to foreign governments (a French governmental loan issued in 1920 and a Dominion of Canada loan issued in 1922). By virtue of their size these two loans have a considerable influence over the sample average: eliminating them from the sample reduces the return on governmental loans from 4.64 to 4.37 per cent. In contrast, the estimated return on loans to private entities was considerably lower in Eichengreen and Portes. We attribute the difference to the larger sample and the more intensive efforts undertaken here to follow the fate of foreign corporations (German corporations in particular) through World War II and the postwar period.

Table 1

Summary of Realized Rates of Return

Entire Sample

Overall IRR .0399

Europe .0324

North America .0513

Latin America .0306

Far East .0596

Government .0464

Private .0254

Sample minus 2 bonds (1) Govt. of France \$100 M. 1920  
(2) Dominion of Canada \$100 M. 1922

Overall IRR .0376

Europe .0270

North America .0515

Latin America .0306

Far East .0596

Government .0437

Private .0254

=====

Source: see text.

Our overall estimate of the internal rate of return on the new sample of foreign dollar bonds is somewhat higher than in Eichengreen and Portes. But the estimated return remains below the yields on high grade municipals, railroad bonds, and corporate bonds issued in the same period. Moreover, it is lower than Eichengreen and Portes's estimate of the realized internal rate of return on overseas sterling issues. While moderating the extent of the differences, this paper's results reinforce previous conclusions: that sterling loans outperformed dollar loans and that foreign dollar loans yielded lower returns than contemporaneous domestic investments.

What was the impact on estimated rates of return of incorporating buybacks at discounted market prices? Information can be gleaned from internal rates of return on bonds included both in the Eichengreen and Portes sample, where buybacks were not incorporated, and in the present sample, where they were. One such bond is a 1928 Republic of Colombia issue. The estimated internal rate of return according to Eichengreen and Portes was 3.92 per cent; according to our present calculations it was 2.18 per cent. It appears that factoring in buybacks makes a noticable difference without reversing the thrust of previous results.

The next set of tables tabulates our estimated internal rates of return by year of issue and location of borrower. Together these tables convey a picture of strong performance by bonds issued at the beginning of the decade, followed by a deterioration in 1927 and 1928. Consider first loans to European central governments, as listed in Table 2. Realized rates of return on governmental loans issued prior to 1924 consistently exceed six per cent, well in excess of the realized return on contemporaneous domestic loans. This being the period preceding monetary

Table 2

Internal Rates of Return on Central Government-Issued Bonds  
By Year and By Region

| <u>YEAR/REGION</u> | <u>EUROPE</u> | <u>LATIN AMERICA</u> | <u>NORTH AMERICA</u> | <u>FAR EAST</u> |
|--------------------|---------------|----------------------|----------------------|-----------------|
| 1920               | .0805 (3)     | -                    | -                    | -               |
| 1921               | .0641 (1)     | .0843 (2)            | .0668 (1)            | -               |
| 1922               | .0686 (3)     | .0236 (3)            | .0493 (2)            | .0597 (1)       |
| 1923               | .0665 (1)     | -                    | -                    | .0611 (1)       |
| 1924               | .0516 (4)     | .0582 (1)            | .0509 (1)            | -               |
| 1925               | .0500 (2)     | .0643 (1)            | -                    | -               |
| 1926               | .0752 (1)     | .0528 (2)            | .0441 (1)            | -               |
| 1927               | .0077 (4)     | -.0407 (2)           | -                    | -               |
| 1928               | .0453 (1)     | .0265 (2)            | .0466 (1)            | .0456 (1)       |
| 1929               | -             | -.0026 (1)           | -                    | -               |

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Notes:   Number of observations = 43.  
          Number of observations in each cell in parentheses.

Source:   See text.

Table 3

Internal Rate of Return on State and Locally-Issued Bonds  
By Year and Region

| <u>YEAR/REGION</u> | <u>EUROPE</u> | <u>LATIN AMERICA</u> | <u>NORTH AMERICA</u> | <u>FAR EAST</u> |
|--------------------|---------------|----------------------|----------------------|-----------------|
| 1920               | -             | -                    | .059 (6)             | -               |
| 1921               | -             | -                    | .0597 (6)            | -               |
| 1922               | -             | .0334 (1)            | .0516 (5)            | -               |
| 1923               | -             | -.0278 (1)           | .0491 (2)            | -               |
| 1924               | -             | .0907 (1)            | .0499 (4)            | -               |
| 1925               | .0158 (4)     | .0432 (1)            | .0457 (3)            | -               |
| 1926               | .0142 (4)     | .0536 (4)            | .0467 (2)            | -               |
| 1927               | -.0075 (2)    | .0171 (5)            | .0454 (6)            | .0399 (1)       |
| 1928               | .0297 (4)     | .0227 (4)            | .044 (1)             | -               |
| 1929               | -             | -.0024 (1)           | .0486 (4)            | -               |

Notes: Number of observations = 72.  
Number of observations in each cell in parentheses.

Source: See text.

Table 4

Internal Rate of Return on Privately-Issued Bonds  
By Year and By Region

| <u>YEAR/REGION</u> | <u>EUROPE</u> | <u>LATIN AMERICA</u> | <u>NORTH AMERICA</u> | <u>FAR EAST</u> |
|--------------------|---------------|----------------------|----------------------|-----------------|
| 1920               | .0619 (1)     | .0711 (1)            | .0893 (3)            | -               |
| 1921               | -             | .0466 (1)            | .0727 (2)            | -               |
| 1922               | .0604 (1)     | .0707 (1)            | .0752 (3)            | -               |
| 1923               | -             | -                    | .0691 (1)            | -               |
| 1924               | .0726 (1)     | .0617 (1)            | .0648 (1)            | -               |
| 1925               | .0644 (6)     | .0609 (1)            | .0571 (3)            | .0699 (1)       |
| 1926               | .0153 (8)     | -.0048 (3)           | .0579 (8)            | -               |
| 1927               | -.0177 (7)    | .0005 (2)            | .0513 (6)            | .0553 (1)       |
| 1928               | -.033 (11)    | -.0278 (1)           | .0469 (5)            | .0631 (1)       |
| 1929               | -.0121 (5)    | -                    | .0546 (6)            | -               |

Notes:   Number of observations = 92.  
          Number of observations in each cell in parentheses.

Source:   See text.

stabilization in Germany and Eastern Europe, most of these loans were to countries with admirable records of debt service, the notable exceptions being a Yugoslavian loan of \$15.25 million issued in 1922 and the \$25 million U.S. tranche of the Austrian stabilization loan in 1923. In contrast, 1927 is dominated by loans to German governmental entities; hence the exceptionally low rate of return realized on loans floated in those years.

Compared to Europe, the performance of loans to Latin American central governments is more uneven, the return sinking to an internal rate of little more than two per cent in 1922, for example, as a result of loans to Chile and Bolivia. There is some improvement thereafter, followed by the familiar end-of-decade deterioration. Just as in Europe, the worst performance is that of loans issued in 1927, due in this instance to a disastrous loan to Bolivia.

Rates of return on the state and local bonds whose performance is summarized in Table 3 display a similar time profile but at a lower level. Proceeding by year of issue, loans to local authorities in Europe again reach their trough in 1927, although loans issued in the preceding two years perform almost as poorly. The nadir for Latin American local issues occurs in 1923 due to a single defaulted bond floated on behalf of Ceara (in Brazil). Other than this, the lowest rates of return again accrue on bonds issued in 1927. In contrast, rates of return on the Canadian bonds that comprise the column headed "North America" display little movement over the decade, although American investors received somewhat higher compensation for loans extended in the unsettled conditions of the early 1920s.

The performance of corporate issues on behalf of European and Latin American borrowers similarly deteriorates by year of issue. For both regions, there is a sharp break in the rate of return series between 1925 and 1926. For Canada, there is again little movement except for the decline from the exceptional risk premia of the early 1920s.

One way of summarizing these results is with regression. Tables 5 through 7 use the larger sample to replicate the analysis in Eichengreen and Portes (1986). Table 5 shows a regression of rate of return by year of issue. The omitted year is 1920. (Observations are weighted by the value of the bond issue; hence the appearance of the weight in place of the constant term.) Comparing bonds by year of issue, realized rates of return decline in stages from their 1920 peak to their trough in 1927, the deterioration over those seven years amounting to fully ten percentage points on the rate of return. Thereafter, there is a recovery in 1928, as the volume of total lending falls off, but renewed deterioration in lending performance in 1929. The only difference of note from Eichengreen and Portes is that they found loans issued in 1928 to perform more poorly than those issued in 1929, where we find the opposite.

Table 6 compares rates of return by country or region, where the omitted alternative picked up by the constant is loans to Germany. The realized internal rate of return on loans to Eastern Europe and Central America differs insignificantly from the 1.1 per cent average return on loans to Germany. In contrast the average return on South American loans is 2.4 percentage points higher, and significantly so at the 90 per cent confidence level. Loans to Western Europe and North America perform still better, and the stellar performers are Australia and Japan. The main difference from Eichengreen and Portes is that the contrast between

Table 5

Rates of Return by Year of Issue

(Dependent Variable is Weighted IRR  
Omitted Variable is 1920)

|        | <u>COEFFICIENT</u> | <u>STANDARD ERROR</u> | <u>T-STATISTIC</u> |
|--------|--------------------|-----------------------|--------------------|
| WEIGHT | 0.08110            | 0.00469               | 17.2856            |
| 1921   | -0.00907           | 0.01132               | -0.80154           |
| 1922   | -0.02879           | 0.00594               | -4.84349           |
| 1923   | -0.01786           | 0.01439               | -1.24155           |
| 1924   | -0.02807           | 0.00810               | -3.46465           |
| 1925   | -0.03151           | 0.01076               | -2.92592           |
| 1926   | -0.02726           | 0.00645               | -4.22613           |
| 1927   | -0.10070           | 0.00765               | -13.1538           |
| 1928   | -0.03762           | 0.00594               | -6.32902           |
| 1929   | -0.08496           | 0.00899               | -9.44842           |

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R-squared                0.7984
Adjusted R-squared       0.7892
S.E. of regression       0.0423
207 Observations
Log likelihood            366.04
Mean of dependent variable 0.0400
S.D. of dependent variable 0.0921
Sum of squared residual   0.3527
F-statistic              86.722
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Table 6

Rates of Return by Region of Borrower

(Dependent Variable is Weighted IIR  
Omitted Variable is Germany)

|                   | <u>COEFFICIENT</u> | <u>STANDARD ERROR</u> | <u>T-STATISTIC</u> |
|-------------------|--------------------|-----------------------|--------------------|
| WEIGHTED CONSTANT | 0.01117            | 0.01033               | 1.08156            |
| CENTRAL AMERICA   | 0.00338            | 0.03006               | 0.11262            |
| SOUTH AMERICA     | 0.02383            | 0.01260               | 1.89061            |
| AUSTRALIA         | 0.04846            | 0.01460               | 3.31794            |
| JAPAN             | 0.05082            | 0.01374               | 3.69728            |
| WESTERN EUROPE    | 0.03708            | 0.01110               | 3.33879            |
| EASTERN EUROPE    | 0.00917            | 0.02055               | 0.44626            |
| NORTH AMERICA     | 0.03955            | 0.01110               | 3.56317            |

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R-squared                0.6078
Adjusted R-squared       0.5940
S.E. of regression       0.0587
207 Observations
Log likelihood            297.14
Mean of dependent variable 0.0400
S.D. of dependent variable 0.0921
Sum of squared residual   0.6864
F-statistic              44.064

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Table 7

Rates of Return by Type of Borrower

(Dependent Variable is Weighted IIR  
Omitted Variable is National Government)

|                   | <u>COEFFICIENT</u> | <u>STANDARD ERROR</u> | <u>T-STATISTIC</u> |
|-------------------|--------------------|-----------------------|--------------------|
| WEIGHTED CONSTANT | 0.05814            | 0.00274               | 21.2186            |
| STATE GOV.        | -0.02274           | 0.00860               | -2.64293           |
| MUNICIPALITY      | -0.02446           | 0.01819               | -1.34413           |
| NATIONAL BANK     | -0.05436           | 0.02023               | -2.68674           |
| OTHER BANK        | -0.09042           | 0.02076               | -4.35401           |
| CORPORATION       | -0.03209           | 0.00519               | -6.17394           |

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|                            |        |
|----------------------------|--------|
| R-squared                  | 0.6636 |
| Adjusted R-squared         | 0.6553 |
| S.E. of regression         | 0.0541 |
| 207 observations           |        |
| Log likelihood             | 313.04 |
| Mean of dependent variable | 0.0400 |
| S.D. of dependent variable | 0.0921 |
| Sum of squared residual    | 0.5887 |
| F-statistic                | 79.330 |

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contrast between Germany on the one hand and Central America and Eastern Europe on the other is attenuated here, due mainly to our greater success in tracking the fate of German corporations.

Finally, Table 7 analyzes returns by type of borrower, the omitted alternative picked up by the constant term being national government loans. The internal rate of return on loans to national governments exceeds the returns on every other category of borrower distinguished in Table 7, significantly so except for municipalities. The poorest rates of return are those on loans to national banks, other banks and corporations. Interestingly, it is the "other bank" category rather than the corporations on which the realized returns are lowest. (This result is heavily influenced by the disastrous returns on the Saarbroecken loans included in our sample.) Again, these results are consistent with those of Eichengreen and Portes, who found as here that the highest returns were realized on sovereign loans followed by loans to states, provinces and municipalities. The main difference between our Table 7 and their Table 8 is our higher estimated returns on loans to banks and corporations, due once again to our greater success in tracing their post-World War II corporate reorganization.

#### 4. Conclusions

This paper has reported new estimates of realized rates of return on foreign dollar bonds issued in the 1920s, following and extending the procedures of Eichengreen and Portes (1986). Our results differ by virtue of a larger sample, our incorporation of buybacks at discounted market prices, and our greater success in tracing the fortunes of German corporations which failed or were reorganized as a result of World War II.

Together, these differences form a picture consistent with that drawn by Eichengreen and Portes but with different shadings. One of the striking

findings of Eichengreen and Portes, that despite the disasters of the 1930s and 1940s foreign dollar loans issued in the 1920s still yielded positive rates of return, emerges also from the present study. This remains true despite our incorporation of deep-discount repurchases of defaulted bonds. A second finding of Eichengreen and Portes, that sovereign bonds performed better, from the viewpoint of the creditors, than loans to private entities, similarly is replicated in the present study, although the distinction between the two categories of loans is attenuated, due largely to our upward revision of estimated rates of return on foreign corporate loans. A third finding of Eichengreen and Portes, that American loans performed less well than contemporaneous British loans, also appears to emerge from the present study, although definitive comparisons must await comparable extensions of the British rate of return estimates. A fourth finding of Eichengreen and Portes, that foreign dollar loans floated in the 1920s yielded less ex post than comparable domestic investments, again is replicated in the present study, although this difference too is attenuated.

The obvious question is how these outcomes affected the economic performance of the debtor countries, the financial stability of the creditor country banking systems, and the post-World War II recovery of the international capital market. It is to these questions that we plan to turn in future work.

## Appendix

In this appendix we describe in detail procedures followed when drawing the sample of bonds and computing rates of return.

### I. The Sample

The basis for the sample was the Handbook on American Underwriting of Foreign Securities (1931), edited by Ralph A. Young for the U.S. Department of Commerce. The population of bonds sampled was limited to those issued in the years 1920-29, the decade of the 'twenties being the heyday of interwar lending and hence of special historical interest. We stratified the Commerce Department's list of foreign capital issues publicly offered in the United States along three dimensions:

1. year of issue
2. region of issuer
  - a. Europe
  - b. Latin America
  - c. The Far East
  - d. North America
3. government and government-guaranteed versus corporate issues

The target sample size was 250, approximately 1 in 6 of the bonds listed by the Department of Commerce, drawn on the basis of numbers generated randomly. Table A.1 shows the composition of the Department of Commerce list and our sample by region, year, and type of issuer.

Table A.1

Foreign Dollar Bonds in the Commerce Department Survey and in the  
250 Bond Sample

The Commerce Dept. Survey (N = 1468)

REGION/YEAR OF ISSUE

Government Issues:

|            | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | Total |
|------------|------|------|------|------|------|------|------|------|------|------|-------|
| Europe     | 19   | 7    | 17   | 6    | 25   | 45   | 40   | 40   | 48   | 7    | 254   |
| N. America | 48   | 51   | 39   | 18   | 38   | 24   | 22   | 43   | 14   | 29   | 326   |
| L. America | 0    | 13   | 21   | 5    | 11   | 14   | 36   | 41   | 35   | 9    | 185   |
| Far East   | 0    | 2    | 5    | 5    | 2    | 1    | 1    | 5    | 3    | 0    | 24    |
| Total      | 67   | 73   | 82   | 34   | 76   | 84   | 99   | 129  | 100  | 45   | 789   |

Corporate Issues:

|            | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | Total |
|------------|------|------|------|------|------|------|------|------|------|------|-------|
| Europe     | 6    | 1    | 6    | 4    | 4    | 25   | 42   | 34   | 45   | 26   | 193   |
| N. America | 18   | 20   | 29   | 19   | 19   | 31   | 46   | 55   | 45   | 49   | 331   |
| L. America | 10   | 14   | 15   | 8    | 11   | 11   | 17   | 19   | 16   | 15   | 136   |
| Far East   | 0    | 1    | 1    | 0    | 1    | 5    | 2    | 4    | 3    | 2    | 19    |
| Total      | 34   | 36   | 51   | 31   | 35   | 72   | 107  | 112  | 109  | 92   | 679   |

The Sample

1920 1921 1922 1923 1924 1925 1926 1927 1928 1929 Total

Government Issues:

|            | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | Total |
|------------|------|------|------|------|------|------|------|------|------|------|-------|
| Europe     | 3    | 1    | 3    | 1    | 4    | 8    | 7    | 7    | 8    | 1    | 43    |
| N. America | 8    | 9    | 6    | 3    | 6    | 4    | 4    | 7    | 2    | 5    | 54    |
| L. America | 0    | 2    | 4    | 1    | 2    | 2    | 6    | 7    | 6    | 2    | 31    |
| Far East   | 0    | 0    | 1    | 1    | 0    | 0    | 0    | 1    | 1    | 0    | 4     |
| Total      | 11   | 12   | 14   | 6    | 12   | 14   | 17   | 22   | 17   | 8    | 132   |

Corporate Issues:

|            | 1920 | 1921 | 1922 | 1923 | 1924 | 1925 | 1926 | 1927 | 1928 | 1929 | Total |
|------------|------|------|------|------|------|------|------|------|------|------|-------|
| Europe     | 1    | 0    | 1    | 1    | 1    | 4    | 7    | 6    | 8    | 4    | 35    |
| N. America | 3    | 3    | 5    | 3    | 3    | 5    | 8    | 9    | 8    | 8    | 57    |
| L. America | 2    | 2    | 3    | 1    | 2    | 2    | 3    | 3    | 3    | 3    | 23    |
| Far East   | 0    | 0    | 0    | 0    | 0    | 1    | 0    | 1    | 1    | 0    | 3     |
| Total      | 6    | 5    | 9    | 5    | 6    | 12   | 18   | 19   | 20   | 15   | 118   |

To verify Commerce Department information and trace the repayment of these loans, the following sources were used:

1. Foreign Bonds Issued in the United States (various issues, 1924-1936), A. Iselin and Co.
2. Foreign Dollar Bonds 1954, White, Weld, & Co.
3. Foreign Bondholders Protective Council Annual Reports (1934-1975).
4. Moodys (1920-1986).
5. Standard and Poors (1970-1986).
6. Fitch's Bond Book (1928, 1932).

With these sources we tracked each bond from issue to retirement, determining amount outstanding at the end of each year, issue price, price at which sinking fund purchases took place, call prices, retirement values, and interest payments. This information was used to create cash flows for the calculation of internal rates of return.

Several adjustments had to be made to the initial sample drawn from the Department of Commerce list.

1. After taking the original sample of 250 issues, we found that the Department of Commerce list contained some equity issues. About 14% of the original sample was comprised of equities. We resampled in each case by taking the next bond (within the sampling category, defined by region, year and type of issuer) that appeared in the Department of Commerce list after the stock we wished to drop. This same procedure was followed in other cases where resampling was necessary, as described below.
2. Three bonds in the original sample were issued in foreign currency. Since we had determined to study dollar bonds only, we dropped these and resampled.

3. The Department of Commerce identified as government guaranteed a number of bonds that other sources record as private. This problem was most prevalent for Germany. Often the conflict seems to be attributable to government taking over a bond upon the original issuer's default. We adopted the rule of following the classification at the time of issue as reported by the Foreign Bondholders Protective Council.

4. In several cases individual bond issues shown in the Department of Commerce list were actually portions of a single offering. The most common reason why an issue might be split into parts entering separately in the Department of Commerce list is that the issue was marketed over the course of two or more years. When the original issue date was prior to 1920, the bond was dropped and we resampled. In a few instances the original 250 bond sample included more than one portion of a single offering that Commerce had split into parts. In such instances we treated the combined issue as a single bond and resampled for the other parts of the issue. One exception to this rule was Gatineau Power of Canada. The original sample included four parts of one issue. We kept the overall issue in our sample, dropping, without resampling, three bonds. When there was any discrepancy as to the actual amount issued we relied on the latest published information, drawn typically from an Annual Report of the Foreign Bondholders Protective Council.

5. Since it was our intent to analyze returns on medium and long-term securities only, we eliminated all bonds with a maturity of less than five years and resampled. For bonds that matured serially, when the latest maturity date was less than five years after issue, the bond was dropped and we resampled.

6. Upon researching the performance of bonds in the sample in A. Iselin and Company's Foreign Bonds Issued in the United States and in Moodys, it became apparent that the Commerce Department list contained a number of entries issued by companies incorporated in the United States which floated bonds to finance foreign operations. For those few issues labeled "European" where a U.S. company was involved, we dropped the bond and resampled. Similarly, a small number of "Canadian dollar bonds" in our sample were also issued by U.S.-based companies with one or more Canadian operations. Again, we dropped those bonds and resampled. In two cases in which a bond was issued by a Canadian firm which was taken over by a U.S. firm while the issue was still outstanding, the bonds were retained. Cleona Lewis (1938) similarly adjusted the Commerce Department's list, dropping securities of American-controlled enterprises from her estimates of the volume and composition of U.S. foreign lending. We might have followed the same procedure for Latin America. But we found that nearly all of the dollar bonds issued by "Latin American corporations" in the Department of Commerce list were actually issued by companies incorporated in Delaware or New Jersey. Resampling was not possible since the Commerce Department list does not contain as many medium-term bonds (as opposed to stocks) issued by Latin American companies as called for by our original stratification. Including only bonds issued by companies not incorporated in the U.S. would have left our final sample devoid of any Latin American corporate issues except for those of the Colombian and Chilean Mortgage Banks. Hence we chose to retain bonds issued by companies which, while incorporated in the U.S., (i) were also incorporated in a Latin American country and/or (ii) conducted most or all of their operations in Latin America.

To determine whether a corporation satisfied these criteria, we relied on Moodys and Winkler's Investments of United States Capital in Latin America. We retained Cuban Railway and Cuba Northern Railroad bonds on these grounds, for example. Ultimately this procedure reduced the size of our original sample of 250 by about 25 bonds.

7. Relying on Iselin and Co., White & Weld, and The Foreign Bondholders Protective Council to track the individual issues, we were unable to find information on 94 of the 250 bonds sampled. 75 of these 94 were Canadian private and municipal issues, on which none of our three basic sources provide information. Using Moodys, however, we were able to track all but 12 of these 94 bonds. We are uncertain about the reasons for the absence of information on the 12 remaining bonds. It could be that they were planned for issue but never actually marketed, or that they were retired soon after issue due to a change in borrowers' circumstances. In the end, we dropped these bonds without resampling.

## II. Computing Rates of Return

To compute the internal rate of return realized by investors in foreign bonds issued in the United States in the 1920s, it was necessary to track the value of bonds outstanding (netting out complete or partial repayments of principle through repurchases by the issuer at market or call price), interest paid biannually, and any special payments made as a result of negotiations surrounding defaulted loans.

### A. Value Outstanding

As a rule, tracking the value of bonds outstanding was straightforward. When defaults and reissues caused changes in a bond's cash flow, the necessary adjustments were made to interest payments. When a bond was

reissued or supplementary adjustment bonds were issued, we tracked the altered bond from the time it began accruing interest. In the case of missing data, we interpolated intervening years, following the pattern suggested by the bond covenants (when available) or, in the absence of such information, by taking simple averages. We did not adjust the value of bonds outstanding for the month in which purchases/sales occurred. Such refinements, while time consuming, would have had a negligible impact on the estimated rate of return.

Problems arose when investors holding defaulted bonds were offered alternative settlement terms (reissues, alternative forms of payment of coupons, extensions, etc.), since there is limited information on the share of bondholders who opted for the various plans. When, some years after an option was offered, either Moody's or the Foreign Bondholders Protective Council reported the value of the bonds whose holders had accepted an offer, overall rates of assent could be inferred. But in many cases such information was not available.

There are a number of possible resolutions to this problem. One is to make an arbitrary assumption about the share of investors who accepted each option, assuming for example that half the bondholders accepted one alternative and half accepted the other. In this case, the internal rate of return realized on average would simply be the mean of realized rates of return under the two schemes. Another and, in our view, preferable possibility is to assume perfect foresight and proceed as if bondholders opted for what proved ex post to be the most attractive offer. We chose the latter course, which tends to bias our estimated realized rates of return upward. The estimated realized rate of return on those bonds where this assumption had to be invoked might best be interpreted as the return to

those bondholders who had the foresight or good fortune to accept the the best offer made.

A number of privately-issued bonds in our sample were sold with warrants and stock-purchase options attached. Since we set out to study only the value of bonds, we ignored these warrants and options. Pursuing them would have taken us well beyond the scope of this study. In some cases, ignoring warrants and stock options imparts at least a slight downward bias to the estimated rate of return.

## B. Prices

### Issue Price

In four cases (all Canadian bonds issued in the early 1920's) we were unable to find any information on issue price. These bonds were dropped from the sample without replacement. In the case of conflicting information, we used the issue price given by the most recently published source. In the case of serial maturities and multipart issues, sources sometimes express the issue price as a range. In such cases, we averaged high and low values.

### Retirement/Call Price

The call price was available for all bonds except a few small Canadian municipal and provincial issues. In these instances we assumed a call price of 100. We used the covenanted price except when the bond was in default. When an issuer resumed service on a defaulted bond, barring information to the contrary we again assumed that the covenanted call price was paid. In cases where the debtor reduced the call price as part of the readjustment process, we did the same in our calculations.

### Sinking Fund Purchases

As with issue prices, the market prices quoted in sources other than Standard and Poors are reported as the high and low price on an annual basis. We used the average of these two prices in our calculations.

Identifying the prices at which sinking fund purchases took place was complicated by lack of information and by defaults. The following situations arose:

1. In the most straightforward cases, information in Moodys and the Foreign Bondholders Protective Council Reports indicated the amount of sinking fund purchases and the price at which they were made. The decline in the value of shares outstanding followed the indicated pattern.
2. Although the level of sinking fund purchases followed the pattern predicted by the provisions of the bond covenant, in a few cases it was unclear whether those purchases were to take place at call or market price. Sometimes we inferred that the call price was appropriate from the fact that par and market prices were virtually identical. When market price and par value diverged and we were otherwise unable to determine which price was used (a situation limited to a few Canadian issues), we used par value for state and local issues but market price for corporate issues. Usually the difference was slight. For Canadian government serial maturities no indication of retirement price could be found so a call price of 100 was assumed.
3. In a few cases, sinking fund purchases were made at a market price on which we were unable to obtain information. In instances where no more than a year or two of data were missing, we interpolated on the basis of the market prices of similar bonds. For several Canadian private bonds for which it was difficult to find a counterpart, we used the call price.

4. For a substantial number of bonds, the description (in Moodys or Foreign Bondholders Protective Council Reports) did not mention a sinking fund, yet the value of shares outstanding declined steadily. We assumed that such purchases took place at the call price except when default occurred. In event of default, we used market price until it was clear that a reorganization plan was in place. This assumption may have substantial consequences since the difference between call and market prices was, at times, considerable.

5. In cases in which a post-default readjustment plan includes the issue of shares of stock (invariably common stock, typically issued in exchange for several defaulted coupons), we "cashed out" these stocks as soon as they were issued at current market prices. Since this situation typically arose in the wake of default and other events which had damaged the creditworthiness of the debtor, the market price of these shares was invariably depressed. This may have imparted a downward bias to the internal rate of return calculations in a few instances. Since, however, the price of the defaulted company's stock usually remained depressed for many years thereafter, assuming instead that these stocks had been sold subsequently would have had little impact on the calculations.

#### Interest Rates

If the month of issue given in the Department of Commerce list was between January and June, then one-half of the covenanted interest was credited to the bondholders' account in the first year. Otherwise, no interest was shown as paid in year of issue and interest was assigned at the full rate from the second year of issue. The exact month of retirement was known for roughly two-thirds of the sample. When that date was in the first half of the calendar year, one-half of covenanted interest was assigned for

the last year of the bond's existence. When retirement or call date was unknown, one-half of the covenant rate was imputed if it had also been imputed in the issue year; otherwise interest was shown as paid for two coupons in the year of retirement.

In many cases where default occurred, the reorganization plan included a reduction in the interest rate. This reduction was incorporated into our calculations in the same manner as described in the preceding paragraph. For bonds which never lapsed into default, calculation of interest paid was straightforward. For defaulted bonds, the situation was more complex. What follows is a general discussion of adjustments made to translate the denouement of defaulted bonds into a cash-flow series on the basis of information on price, value outstanding and interest rates.

1. Major difficulties might arise when defaulted coupons were finally paid only after many of the bonds which had been outstanding at the time of default were repurchased (usually at deep discounts). The question is whether bondholders received compensation for their unpaid, matured coupons. In a number of cases, such as Germany, the answer is clearly no. For other public issues for which less information is available, we proceeded on this same assumption.

For private issues the situation is more complex. Many private defaults (especially on Canadian bonds) were well-behaved in the sense that no buybacks occurred until a readjustment plan had been agreed to. Furthermore, readjustment plans frequently included provisions for disposal of and compensation for unpaid coupon liabilities. In these instances, it was straightforward to add the unpaid coupons for which compensation was received to interest payments in a given year.

In contrast to the treatment of public issues, in the case of a number of private issues there is evidence in the Foreign Bondholders Protective Council Annual Reports that back interest was paid to bondholders when repurchases occurred. The correction to interest receipts proceeded as follows. If 10% of bonds outstanding in a given year were repurchased and sellers were compensated for four defaulted coupons at a reduced interest rate of 2.5% (on each coupon), then the appropriate addition to the interest rate for that year is  $(.10)(10\%) = 1\%$ .

Compensation for back interest was the exception rather than the rule. If no indication to the contrary was provided, we assumed, as for government issues, that no compensation was offered for defaulted coupons at the time of repurchases of private bonds in default.

2. Often in Latin America and occasionally in Europe, readjustment plans called for the issue of funding bonds in compensation for one or more defaulted coupon payments. Typically funding bonds bore a lower interest rate than the original issue (sometimes as low as zero). Where information was incomplete, we assumed that funding issues were provided in compensation for interest arrears on only those bonds outstanding at the time of the readjustment and not on those bonds outstanding when the coupons initially lapsed into default. Funding bonds were added to the account of the original bonds as adjustments to interest.

It is nearly always evident that debtor repurchases of funding bonds took place at market price. We proceeded on this assumption. The major complication arises from the fact that an issue of funding bonds often provided compensation for defaulted coupons on several previously-issued bonds, including in a few cases one or more of the bonds in our sample. Hence it is unclear what share of the funding issue should be assigned as

compensation for interest arrears to one or more of the bonds in our sample. Throughout, we assumed that the percentage issued and sold of a particular funding bond that pertained to our sample bond was always the same as the share of the value of bonds outstanding of the original issue in the total value of bonds being covered by the funding issue.

3. Complications arose when holders of defaulted bonds were offered new bonds (with lower interest rates and longer maturities) to replace their original securities. In some cases (almost all Latin American), acceptance of the offer of these new issues was staggered. Moreover, the terms on which bondholders might acquire further reissues designed to succeed the initial reissue might depend on the date at which the bondholder had assented to the first reissue. Often, as was the case for funding bonds, reissues combined several bonds, only one (or perhaps two) of which were part of our sample. We treated these in the same fashion as funding bonds.

Ancillary assumptions were required when it was unclear what percentage of those assenting to a second adjustment had also assented to the first. We adopted a proportionality assumption. If, for instance, 60% of the original bondholders assented to a first reissue, we assumed that 60% of those who assented to the second adjustment had also assented to the first.

Further complications are created by the timing of assents to first and subsequent reissues. Often a second reissue plan included lump-sum payments of unpaid coupons for those who did not assent to the first plan. The amount of that lump-sum compensation might depend on the date of assent. Again, a proportionality assumption was adopted. If, for instance, 20% of the 60% of bondholders who assented to the first reissue did so two years after the first plan came out, then 12% of those assenting to the second

plan qualify for the scheduled lump sum payment for the second year assent to the first plan.

All lump-sum payments were multiplied by the number of bonds to which they applied and divided by value of shares outstanding at the time of payment in order to obtain a percentage rate which was added to the interest rate for that year.

4. The single worst computational problems arose when adjustment, as in the above paragraph, occurred simultaneously with repurchases of either the original bonds or reissues. Since reissue terms were usually advantageous (due to payment of old coupons), unless the Foreign Protective Bondholders Council indicated otherwise we assumed repurchases involved assented bonds only. All original bonds were converted before being sold. To estimate the cash flow associated with these repurchases, we needed to calculate the total dollar value of the payments by the issuer, divide by value of share outstanding at year of repurchases, and add this to the year's interest rate.

#### C. The Case of Defaulted German Bonds

Since public and private bonds issued in Germany in the 1920's represent a significant proportion of the defaults of the 1930's and since additional assumptions were required to trace the life histories of these bonds, it is worthwhile examining these bonds more closely.

All German bonds defaulted in 1933 due to a government-imposed foreign exchange transfer moratorium. A schedule of partial interest payments was then adopted in the form of "free" RM, then "blocked" RM, and ultimately 3% German Conversion Office notes. These arrangements varied by the nationality of bondholders, with the Swiss generally obtaining the most favorable treatment and the Americans the least. A yearly breakdown of the

value of bonds outstanding by nationality of owner is not available, however. When default adjustment terms varied by nationality we calculated the IRR based on the experience of U.S. bondholders.

A first complication arising in connection with German defaults concerns bonds with maturity dates between 1933 and 1938. Since issuers could not retire bonds due to the transfer moratorium, they presented extension plans with multiple options typically providing compensation for interest arrears in excess of that permitted by the German Government for other bonds. Contemporary FBPC and Moodys' descriptions suggest that such plans were put into effect, although later issues of Moodys imply that no such exceptional payments were made. Relying on the most recent sources (post-war Moodys), we assume the latter to be the case.

Tracking the value of defaulted German bonds outstanding was the most problematic aspect of our data-gathering exercise. Our three basic sources (Moodys, FBPC, and the Occupation Authorities as reported in FBPC) provide different figures for the value of German bonds outstanding in 1934-1954. The figures provided by each source are not always consistent over time. These discrepancies probably reflect the operation of two factors:

1. In 1934/35 a number of German bondholders, depending on nationality, experienced the forced conversion of their dollar bonds into RM issues;
2. Although German bonds were in default purportedly due to a shortage of foreign exchange with which to make coupon payments, in many cases substantial repurchases were occurring.

Since published sources did not consistently track the share of bonds held by each nationality (and when they did the figures are often clearly in error), point (1) poses a major problem. From the information available, it appears that the percentage of dollar bonds exchanged into RM bonds was

substantial, on the order of 50% of each issue. Since most of these exchanges occurred in 1934/35, we have imputed the decline in value of the amount outstanding in those years to such exchanges at current market prices.

No explicit recognition of repurchases by Germany at depressed market prices during the period of default appears in either Moodys or FBPC. It is clear nonetheless that the volume of such transactions was considerable. Since Moodys and FBPC present the value of the amount outstanding as reported by the bonds' fiscal agents for years up to 1953, heavily discounted repurchases would not be reflected in their figures. Beginning in approximately 1946, FBPC also reported the value of shares outstanding as estimated by the Occupation Authorities, presumably on the basis of German government accounts. This figure is often less than one-fourth of the fiscal agents' totals.

When the Bondholders' Compensation Plans were concluded (generally in 1954-1956), another figure enters the calculation: the value of shares qualifying for revalidation and hence for receipt of interest. This figure is almost invariably smaller (in some cases much smaller) than the figures for bonds outstanding reported for 1942-1953. The discrepancy presumably does not reflect repurchases by the German authorities during and immediately following the Occupation, since such activity was illegal and impractical. While there is some uncertainty whether and to what extent bonds outstanding might have been repurchased during hostilities, we proceed on the assumption that any such repurchases occurred prior to 1942. We assume that these bonds were repurchased at market prices between 1936 and 1941 in a manner unbeknownst to the FBPC or other American observers.

To quantify the compensation offers of 1954-1956, several further assumptions were required. We assumed that all bonds qualifying for revalidation were submitted, with lags as indicated by the amount of validated bonds outstanding reported in Moodys or, absent such information, the year after the offer was made. These offers typically involved lump sum compensation for principal and back interest (at a below-coupon rate), plus a per-coupon figure (which included some interest on the overdue coupons).

The number of old coupons attached to revalidated bonds is difficult to determine. This depends on how many 1954 bond- holders had accepted the partial interest payments (and 3% Conversion bonds) offered by the German authorities in the mid-1930s, since receipt of those payments involved surrender of coupons for which compensation was offered in the 1950s. Lacking information on this question, we have estimated the internal rate of return for three types of bonds: a bond presented with all of its post-1933 coupons attached; a bond presented with 50% of its post-1933 coupons attached; and a bond presented with none of its coupons attached.

For those bondholders who surrendered some or all of their coupons for partial payments, blocked RM, and 3% Conversion Office bonds, assumptions are needed regarding the shadow price of blocked RM payments. Blocked RM were not worthless, since they could be spent in Germany (but generally not on real estate or financial instruments). For at least some of the bondholders who chose to accept blocked RM, they must have had some value. We considered two cases: valuation of blocked RM at 50% of face value; and valuation of the blocked RM at zero, but report here only the zero shadow price results.

The appendix tables that follow provide a summary of our calculations for individual bonds.

Table A.2  
All Central Government and Bonds Guaranteed by the Central Government

| <u>YEAR</u>  | <u>REGION</u> | <u>ISSUE NAME</u>              | <u>AMOUNT</u> | <u>COUPON</u> | <u>YIELD TO MATURITY</u> | <u>IRR</u> |
|--------------|---------------|--------------------------------|---------------|---------------|--------------------------|------------|
| 1920         | EU            | Kingdom of Norway              | 20            | 8             | 8                        | 0.0827     |
| 1920         | EU            | Gvmt. French Republic          | 100           | 8             | 8                        | 0.0818     |
| 1920         | EU            | Italy                          | 9.975         | 6.5           | 7.13                     | 0.0626     |
| 1921         | EU            | Denmark                        | 30            | 6             | 6.5                      | 0.0641     |
| 1921         | NA            | Canadian Northern Railway      | 25            | 6.5           | 6.8                      | 0.0668     |
| 1921         | LA            | Uruguay                        | 7.5           | 8             | 8.2                      | 0.0591     |
| 1921         | LA            | Chile                          | 24            | 8             | 8.21                     | 0.0922     |
| 1922         | EU            | Norway                         | 18            | 6             | 6                        | 0.0567     |
| 1922         | EU            | Paris-Lyon-Med Railway         | 40            | 6             | 7.45                     | 0.088      |
| 1922         | EU            | Yugoslavia                     | 15.25         | 8             | 8.4                      | 0.0319     |
| 1922         | NA            | Dominion of Canada             | 100           | 5             | 5                        | 0.0499     |
| 1922         | NA            | Newfoundland                   | 6             | 5.5           | 5.4                      | 0.0387     |
| 1922         | LA            | Argentina                      | 27            | 7             | 7.25                     | 0.0674     |
| 1922         | LA            | Chile                          | 18            | 7             | 7.48                     | 0.0209     |
| 1922         | LA            | Bolivia                        | 29            | 8             | 8                        | -0.0154    |
| 1922         | FE            | Netherlands East Indies        | 60            | 6             | 6.48                     | 0.0597     |
| 1923         | EU            | Austria                        | 25            | 7             | 8                        | 0.0665     |
| 1923         | FE            | Netherlands East Indies        | 25            | 5.5           | 6.57                     | 0.0611     |
| 1924         | EU            | French National Mail Steamship | 10            | 7             | 7.8                      | 0.0597     |
| 1924         | EU            | Switzerland                    | 30            | 5.5           | 5.7                      | 0.0558     |
| 1924         | EU            | Sweden                         | 30            | 5.5           | 5.5                      | 0.0518     |
| 1924         | EU            | Hungary                        | 9             | 7.5           | 8.85                     | 0.0276     |
| 1924         | NA            | Canadian National Railways     | 50            | 5             | 5.03                     | 0.0509     |
| 1924         | LA            | Argentina                      | 30            | 6             | 6.35                     | 0.0582     |
| 1925         | EU            | Denmark                        | 30            | 5.5           | 5.5                      | 0.05       |
| 1925         | EU            | Mortgage Bank of Denmark       | 22            | 6             | 6.05                     | 0.0499     |
| 1925         | LA            | Peru                           | 7.5           | 7.5           | 7.75                     | 0.0643     |
| 1926         | EU            | Belgium                        | 50            | 7             | 7.5                      | 0.0752     |
| 1926         | NA            | Dominion of Canada             | 40            | 4.5           | 4.65                     | 0.0441     |
| 1926         | LA            | Argentina                      | 16.9          | 6             | 6.1                      | 0.0549     |
| 1926         | LA            | Panama National Bank           | 1             | 6.5           | 6.47                     | 0.0115     |
| 1927         | EU            | Central Bank of Agric. Germany | 30            | 6             | 6.36                     | 0.0018     |
| 1927         | EU            | Central Bank of German State   | 5             | 6             | 6.4                      | 0.0094     |
| 1927         | EU            | Danish Export Credit Committee | 3             | 4.5           | 4.9                      | 0.0408     |
| 1927         | EU            | Estonia                        | 4             | 7             | 7.4                      | 0.0253     |
| 1927         | LA            | Bolivia                        | 14            | 7             | 7.12                     | -0.0482    |
| 1927         | LA            | Costa Rica Pacific Railroad    | 1.8           | 7.5           | 7.5                      | 0.0174     |
| 1928         | EU            | Denmark                        | 55            | 4.5           | 4.8                      | 0.0453     |
| 1928         | NA            | National Transcontinental Ry   | 65            | 4.5           | 4.6                      | 0.0466     |
| 1928         | LA            | Panama                         | 12            | 5             | 5.2                      | 0.0401     |
| 1928         | LA            | Republic of Colombia           | 35            | 6             | 6.35                     | 0.0218     |
| 1928         | FE            | Oriental Development           | 19.9          | 5.5           | 6.24                     | 0.0456     |
| 1929         | LA            | Mortgage Bank of Chile         | 20            | 6             | 6.6                      | -0.0026    |
| TOTAL ISSUED |               |                                | 1170.825      |               |                          |            |

Table A.3  
All State and Local Government Bonds Including Government Guaranteed

| <u>YEAR</u> | <u>REGION</u> | <u>ISSUE NAME</u>              | <u>AMOUNT</u> | <u>COUPON</u> | <u>YIELD TO MATURITY</u> | <u>IRR</u> |
|-------------|---------------|--------------------------------|---------------|---------------|--------------------------|------------|
| 1920        | NA            | Nova Scotia                    | 0.5           | 6             | 5.78                     | 0.0572     |
| 1920        | NA            | Ontario                        | 6.8           | 6             | 7.2                      | 0.0636     |
| 1920        | NA            | Manitoba                       | 0.75          | 6             | 7.5                      | 0.0644     |
| 1920        | NA            | Ontario                        | 5             | 6             | 5.21                     | 0.0513     |
| 1920        | NA            | Ottawa                         | 1.409         | 6             | 6.34                     | 0.0608     |
| 1920        | NA            | Ottawa                         | 0.357         | 6             | 6.55                     | 0.0634     |
| 1921        | NA            | Manitoba                       | 1             | 5             | 7.38                     | 0.0644     |
| 1921        | NA            | Saskatchewan                   | 3             | 6             | 6.15                     | 0.0618     |
| 1921        | NA            | British Colombia               | 3             | 6             | 5.99                     | 0.0574     |
| 1921        | NA            | British Colombia               | 1             | 6             | 7.5                      | 0.0656     |
| 1921        | NA            | Winnipeg Water                 | 0.15          | 5.5           | 5.2                      | 0.0519     |
| 1921        | NA            | City of St. Boniface           | 0.4           | 6             | 6.5                      | 0.0383     |
| 1922        | NA            | St. James City                 | 0.4           | 6             | 6.5                      | 0.0368     |
| 1922        | NA            | Alberta                        | 3.5           | 5.5           | 5.75                     | 0.0542     |
| 1922        | NA            | S. Vancouver                   | 0.885         | 5             | 4.9                      | 0.0494     |
| 1922        | NA            | Saskatchewan                   | 2.64          | 5             | 5.05                     | 0.0499     |
| 1922        | NA            | New Westminster                | 0.4           | 6             | 6.06                     | 0.0604     |
| 1922        | LA            | City of Sao Paulo              | 4             | 8             | 8                        | 0.0334     |
| 1923        | NA            | Winnipeg                       | 1             | 5             | 5.2                      | 0.0509     |
| 1923        | NA            | Alberta                        | 4.8           | 5             | 5.2                      | 0.0487     |
| 1923        | LA            | Ceara, Brazil                  | 2             | 8             | 8.02                     | -0.0278    |
| 1924        | NA            | Westmount                      | 0.2           | 5             | 4.9                      | 0.0517     |
| 1924        | NA            | British Colombia               | 3.0423        | 5             | 5.05                     | 0.0502     |
| 1924        | NA            | Nova Scotia                    | 1.5           | 5             | 4.7                      | 0.0479     |
| 1924        | NA            | Barnaby District BC            | 0.25          | 5.5           | 7.23                     | 0.0578     |
| 1924        | LA            | Medellin, Colombia             | 3             | 8             | 8.19                     | 0.0907     |
| 1925        | EU            | Rhine-Main-Danube Corp.        | 6             | 7             | 7.35                     | 0.0132     |
| 1925        | EU            | Dusseldorf                     | 1.75          | 7             | 7.32                     | 0.0169     |
| 1925        | EU            | Duisberg                       | 3             | 7             | 7.3                      | 0.0295     |
| 1925        | EU            | Bremen State                   | 15            | 7             | 7.65                     | 0.0139     |
| 1925        | NA            | Quebec                         | 15            | 4.5           | 4.65                     | 0.0433     |
| 1925        | NA            | Saskatchewan                   | 2.25          | 4.5           | 4.8                      | 0.0465     |
| 1925        | NA            | Ontario                        | 21            | 4.5           | 4.75                     | 0.0474     |
| 1925        | LA            | City of Barranquilla, Colombia | 0.5           | 8             | 8.12                     | 0.0432     |
| 1926        | EU            | Anhalt State                   | 2             | 7             | 6.9                      | -0.0412    |
| 1926        | EU            | Saxon Public Works             | 15            | 6.5           | 7.24                     | -0.0107    |
| 1926        | EU            | Prussia                        | 20            | 6.5           | 6.92                     | 0.0235     |
| 1926        | EU            | Styria, Austria                | 5             | 7             | 7.75                     | 0.0737     |
| 1926        | NA            | Saskatchewan                   | 2.5           | 4.5           | 4.85                     | 0.048      |
| 1926        | NA            | Province of Quebec             | 7.5           | 4.5           | 4.6                      | 0.0462     |
| 1926        | LA            | Buenos Aires Province          | 4.2           | 7             | 7.15                     | 0.058      |
| 1926        | LA            | Buenos Aires Province          | 10.6          | 7             | 7.3                      | 0.0539     |
| 1926        | LA            | Buenos Aires Province          | 24.121        | 7             | 7.4                      | 0.0597     |
| 1926        | LA            | Montevideo                     | 5.171         | 6             | 6.5                      | 0.0209     |
| 1927        | EU            | Nuremburg                      | 5             | 6             | 6.5                      | -0.009     |

Table A.3 (Cont.)

|              |    |                                |          |     |      |          |
|--------------|----|--------------------------------|----------|-----|------|----------|
| 1927         | EU | Saarbruecken Mortgage Bank     | 1        | 6   | 6.2  | 0.0002   |
| 1927         | NA | Manitoba                       | 6.449    | 4.5 | 4.85 | 0.0477   |
| 1927         | NA | Ontario                        | 24       | 4.5 | 4.6  | 0.0461   |
| 1927         | NA | Quebec Province                | 4        | 4.5 | 4.5  | 0.045    |
| 1927         | NA | Alberta                        | 3.875    | 4.5 | 4.88 | 0.0428   |
| 1927         | NA | Alberta                        | 1.275    | 4.5 | 4.8  | 0.0444   |
| 1927         | NA | Nova Scotia                    | 12.37    | 4.5 | 4.47 | 0.0441   |
| 1927         | LA | Tucuman, Argentina             | 2.1225   | 7   | 7.5  | 0.0603   |
| 1927         | LA | City of Cordoba                | 4.67     | 7   | 7.1  | 0.0264   |
| 1927         | LA | Dept. of Antioquia             | 4        | 7   | 7.6  | 0.0065   |
| 1927         | LA | Pernambuco State, Brazil       | 6        | 7   | 7.2  | -0.0002  |
| 1927         | LA | Callao Province, Peru          | 1.5      | 7.5 | 7.6  | 0.025    |
| 1927         | FE | Brisbane                       | 7.5      | 5   | 5.26 | 0.0399   |
| 1928         | EU | Warsaw                         | 10       | 7   | 7.95 | 0.0158   |
| 1928         | EU | Silesia                        | 11.2     | 7   | 7.94 | 0.0095   |
| 1928         | EU | Antwerp                        | 10       | 5   | 5.4  | 0.0516   |
| 1928         | EU | Oslo Gas and Electric          | 6        | 5   | 5.3  | 0.0544   |
| 1928         | NA | Winnipeg                       | 1.7      | 4.5 | 4.59 | 0.044    |
| 1928         | LA | City of Buenos Aires           | 3.396    | 6   | 6.1  | 0.0579   |
| 1928         | LA | Province of Buenos Aires       | 41.101   | 6   | 6.25 | 0.0458   |
| 1928         | LA | State of Rio Grande Del Sul    | 23       | 6   | 6.96 | -0.0195  |
| 1928         | LA | Dept. of Antioquia             | 4.35     | 7   | 7.29 | -0.0006  |
| 1929         | NA | British Columbia               | 6.417    | 4.5 | 4.8  | 0.049    |
| 1929         | NA | Manitoba                       | 3.495    | 5   | 5    | 0.0493   |
| 1929         | NA | Harbor Commission of Montreal  | 19       | 5   | 5    | 0.049    |
| 1929         | NA | Montreal                       | 14       | 4.5 | 5    | 0.0476   |
| 1929         | LA | Chilean Consolidated Municipal | 15       | 7   | 7.5  | -0.0024  |
| TOTAL ISSUED |    |                                | 463.9958 |     |      |          |
| AVERAGE IRR  |    |                                |          |     |      | 0.034618 |

Table A.4  
All Private Bonds

| <u>YEAR</u> | <u>REGION</u> | <u>ISSUE NAME</u>               | <u>AMOUNT</u> | <u>COUPON</u> | <u>YIELD TO<br/>MATURITY</u> | <u>IRR</u> |
|-------------|---------------|---------------------------------|---------------|---------------|------------------------------|------------|
| 1920        | EU            | Solvay and Cie Belgium          | 10            | 8             | 8                            | 0.0619     |
| 1920        | NA            | Canadian Western Steamship      | 0.85          | 7             | 8.5                          | 0.1127     |
| 1920        | NA            | Shawinigan                      | 4             | 7.5           | 8                            | 0.0851     |
| 1920        | NA            | Riordon                         | 6.5           | 8             | 8.1                          | 0.0339     |
| 1920        | LA            | Cuba Railroad                   | 1.7           | 7             | 7.5                          | 0.0711     |
| 1921        | NA            | Border Cities Hotel             | 0.85          | 7.5           | 7.5                          | 0.0418     |
| 1921        | NA            | Shawinigan                      | 6             | 6             | 6.75                         | 0.0771     |
| 1921        | LA            | Cuba Railway                    | 4             | 7.5           | 7.55                         | 0.0466     |
| 1922        | EU            | United Steamship Denmark        | 5             | 6             | 6.5                          | 0.0604     |
| 1922        | NA            | Nova Scotia Tramways            | 1.5           | 7             | 7.34                         | 0.0913     |
| 1922        | NA            | Firestone                       | 1.5           | 7             | 7.1                          | 0.0736     |
| 1922        | NA            | Fort William Paper              | 2.1           | 7             | 7                            | 0.0648     |
| 1922        | LA            | Paulista Railway                | 4             | 7             | 7.1                          | 0.0707     |
| 1923        | NA            | Continental Paper               | 0.75          | 6.5           | 6.55                         | 0.0691     |
| 1924        | EU            | Intl. Power Securities France   | 4             | 6.5           | 7                            | 0.0726     |
| 1924        | NA            | Thomsen and Clark Timber        | 1             | 7             | 7                            | 0.0648     |
| 1924        | LA            | Cuba Northern Railway           | 1.68          | 6.5           | 6.75                         | 0.0617     |
| 1925        | EU            | Westphalia United Elec.         | 7.5           | 6.5           | 7.62                         | 0.0806     |
| 1925        | EU            | Hamburg Electric                | 4             | 7             | 7.65                         | 0.0251     |
| 1925        | EU            | Hamburg-American Line           | 6.5           | 6.5           | 6.56                         | 0.0599     |
| 1925        | EU            | August Thyssen                  | 12            | 7             | 7.35                         | 0.0738     |
| 1925        | EU            | Siemens and Halske              | 5             | 7             | 7.65                         | 0.0679     |
| 1925        | EU            | Burmeister and Wain Copenhagen  | 2             | 6             | 6.8                          | 0.0308     |
| 1925        | NA            | Victoria Lumber                 | 1.5           | 5.5           | 5.6                          | 0.0532     |
| 1925        | NA            | National Grocers                | 2             | 6.5           | 6.6                          | 0.0592     |
| 1925        | NA            | Canadian Bakeries               | 0.8           | 6.5           | 6.5                          | 0.0592     |
| 1925        | LA            | Andian National Corp., Colombia | 10            | 6             | 6                            | 0.0609     |
| 1925        | FE            | Ujigawa                         | 14            | 7             | 7.9                          | 0.0699     |
| 1926        | EU            | Consol. Hydroelectric Wirtembe  | 4             | 7             | 7.6                          | 0.0243     |
| 1926        | EU            | Stettin Public Utilities        | 3             | 7             | 7.55                         | -0.0619    |
| 1926        | EU            | Good Hope Steel                 | 10            | 7             | 7.8                          | 0.0309     |
| 1926        | EU            | Leonhard and Tietz              | 3             | 7.5           | 7.8                          | -0.0058    |
| 1926        | EU            | Rheinlbe Union                  | 25            | 7             | 7.55                         | 0.0192     |
| 1926        | EU            | European Mortgage Co., Hungary  | 7.348         | 7.5           | 7.8                          | -0.0177    |
| 1926        | EU            | Fiat                            | 10            | 7             | 7.69                         | 0.0679     |
| 1926        | EU            | Hungarian Land Mortgage Inst.   | 3             | 7.5           | 7.9                          | -0.0767    |
| 1926        | NA            | Powell River Pulp and Paper     | 4             | 5             | 5.04                         | 0.0464     |
| 1926        | NA            | Asbestos Corp.                  | 2.6           | 6             | 6                            | 0.0251     |
| 1926        | NA            | Canada Paper                    | 2             | 6             | 6.15                         | 0.0623     |
| 1926        | NA            | Port Alfred Pulp and Paper      | 1.175         | 6.5           | 6.5                          | 0.0592     |
| 1926        | NA            | Manitoba Paper                  | 4             | 6.5           | 6.5                          | 0.0759     |
| 1926        | NA            | Gatineau Power                  | 72            | 5             | 5.4                          | 0.0573     |
| 1926        | NA            | Fort William Paper              | 3.5           | 6             | 6.13                         | 0.08       |
| 1926        | NA            | St. Anne Paper                  | 5             | 6.5           | 6.5                          | 0.0601     |
| 1926        | LA            | Mortgage Bank of Colombia       | 6             | 7             | 7.4                          | -0.0141    |
| 1926        | LA            | Cuba Northern Railways          | 0.4           | 5.5           | 5.6                          | 0.0496     |
| 1926        | LA            | Cuba Railway                    | 1.376         | 6             | 6.06                         | 0.0201     |

Table A.4 (Cont.)

|              |    |                                 |         |     |       |          |
|--------------|----|---------------------------------|---------|-----|-------|----------|
| 1927         | EU | International Match, France     | 50      | 5   | 5.125 | -0.0785  |
| 1927         | EU | Natl. Central Savings, Hungary  | 1.5     | 7.5 | 7.5   | -0.1057  |
| 1927         | EU | Deutsche Bank                   | 25      | 6   | 6.1   | -0.003   |
| 1927         | EU | United Steel Works              | 10.815  | 6.5 | 6.7   | 0.0111   |
| 1927         | EU | Norwegian Hydro Electric        | 20      | 5.5 | 5.85  | 0.0539   |
| 1927         | EU | Isarco Hydroelectric            | 5       | 7   | 7.6   | 0.0418   |
| 1927         | EU | Meridionale Electric            | 11.95   | 7   | 7.35  | 0.046    |
| 1927         | NA | Investment Bond and Share       | 4       | 5   | 5     | 0.0514   |
| 1927         | NA | United Securities               | 3.6     | 5.5 | 5.5   | 0.04886  |
| 1927         | NA | Murray Bay Paper                | 2       | 6.5 | 6.5   | 0.0587   |
| 1927         | NA | United Grain Growers            | 3.75    | 5   | 5.3   | 0.0441   |
| 1927         | NA | Power Corp. of Canada           | 5       | 5   | 5.1   | 0.0539   |
| 1927         | NA | Queens Hotel                    | 1.25    | 6   | 6     | 0.0568   |
| 1927         | LA | Mortgage Bank of Colombia       | 3       | 7   | 7.23  | -0.0181  |
| 1927         | LA | Cuba Northern Railways          | 20      | 5.5 | 5.65  | 0.0033   |
| 1927         | FE | Shinyetsu                       | 7.65    | 6.5 | 7.07  | 0.0553   |
| 1928         | EU | Brown Coal                      | 2       | 6.5 | 7.05  | 0.0038   |
| 1928         | EU | Unterebbe                       | 5       | 6   | 6.55  | -0.0074  |
| 1928         | EU | Vesten                          | 1.75    | 7   | 7.2   | 0.0287   |
| 1928         | EU | Isotta Fraschini                | 1.75    | 7   | 7.35  | 0.064    |
| 1928         | EU | Allgemeine Elektrizitats        | 15      | 6   | 6.5   | 0.0226   |
| 1928         | EU | Ruhr Chemical                   | 4       | 6   | 6.7   | 0.0039   |
| 1928         | EU | Koholyt Corp. Germany           | 4       | 6.5 | 6.75  | 0.0032   |
| 1928         | EU | British and Hungarian Bank      | 1.5     | 7.5 | 7.6   | -0.1359  |
| 1928         | EU | City Savings Bank               | 1.75    | 7   | 7.35  | -0.1283  |
| 1928         | EU | Europ. Mort. & Invest., Hungary | 13      | 7   | 7.3   | -0.1435  |
| 1928         | EU | Rudolph Karstadt                | 15      | 6   | 6.3   | -0.0231  |
| 1928         | NA | Canadian Power and Paper        | 2.5     | 5   | 5     | 0.0204   |
| 1928         | NA | Shawinigan                      | 10      | 4.5 | 4.6   | 0.0443   |
| 1928         | NA | London Canadian Investment      | 6       | 4.5 | 4.5   | 0.047    |
| 1928         | NA | Howard Smith Paper              | 7       | 5.5 | 5.57  | 0.0576   |
| 1928         | NA | Aluminum Ltd.                   | 20      | 5   | 5     | 0.0478   |
| 1928         | LA | Bank of Colombia                | 2       | 7   | 7.5   | -0.0278  |
| 1928         | FE | Tokyo Electric                  | 70      | 6   | 6.8   | 0.0631   |
| 1929         | EU | Prussian Electric               | 4       | 6   | 6.75  | -0.0074  |
| 1929         | EU | Harpen Mining                   | 10      | 6   | 6.93  | 0.0145   |
| 1929         | EU | Ernesto Breda                   | 5       | 7   | 7.4   | 0.0303   |
| 1929         | EU | Kreuger and Toll                | 50      | 5   | 5.12  | -0.0283  |
| 1929         | EU | Foreign Power Securities        | 5       | 6   | 6     | 0.0503   |
| 1929         | NA | Dominion Tar and Chemical       | 4       | 6   | 6     | 0.0612   |
| 1929         | NA | Montreal Tramways               | 2.5     | 4.5 | 5.15  | 0.0492   |
| 1929         | NA | Consolidated Investment Corp.   | 15      | 4.5 | 4.5   | 0.0361   |
| 1929         | NA | Dryden Paper                    | 1.5     | 6   | 6     | 0.0569   |
| 1929         | NA | Simpsons                        | 10      | 6   | 6     | 0.058    |
| 1929         | NA | McCall Frontenac Oil            | 9.88    | 6   | 6     | 0.0774   |
| TOTAL ISSUED |    |                                 | 761.774 |     |       |          |
| AVERAGE IRR  |    |                                 |         |     |       | 0.025244 |

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