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Defaults and interest rates in international lending

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Abstract

Since lenders cannot observe the riskiness of the projects that borrowers could choose, interest rates alone cannot be used as an instrument to discipline borrowers. A credible threat to exclude borrowers who default more than a certain number of times from participating in the capital markets makes international debt contracts incentive compatible. Since larger borrowers get fewer chances to default, they choose safer projects and are therefore charged lower interest rates. Also, borrowers, after each successive default, switch to safer and safer projects, which may result in lower and lower interest rates. This paper provides empirical evidence supporting these two predictions.

JEL classification: F34

Keywords: Default; International lending; Sovereign debt

1. Introduction

The literature on international lending suggests that borrowers who default on their loans should be charged higher interest rates on the subsequent loans they contract (for instance, see Feder and Just, 1977; Lindert and Morton, 1989; Ozler, 1993). This argument assumes that lenders can only imperfectly observe borrowers' risk characteristics. Hence, each instance of default conveys negative informa-

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tion about the borrower which causes lenders to revise upwards their estimates of the riskiness of the borrower (see Spatt, 1985; Diamond, 1989).

The riskiness of a borrower, however, also depends on the actions that the borrower could take, which lenders may be unable to observe or unable to write enforceable contracts on (see Harris and Raviv, 1979; Holmstrom, 1979; Townsend, 1979; Diamond, 1984; Gale and Hellwig, 1985). Stiglitz and Weiss (1983) demonstrates that interest rates alone cannot be used as an instrument to discipline the borrowers. A credible threat to exclude a borrower who defaults from participating in the capital markets may provide the appropriate incentives for borrowers (Eaton and Gersovitz, 1981; Stiglitz and Weiss, 1983). Chowdhry (1991) shows that it may be incentive compatible to allow a borrower to default a certain number of times before excluding him from participating in the capital markets. Since each instance of default reduces the borrower's accessibility to the capital markets, until he is completely excluded from the capital markets, the borrower switches to safer and safer projects after each successive default. Competitive lenders, rationally anticipating this, would reduce the interest rates they charge to borrowers with a history of defaults.

Defaults by borrowers may then have two opposing effects on interest rates that they are charged on subsequent loans. The negative effect of defaulting on the borrower's reputation may cause an increase in the rate of interest. The received view seems to consider this to be the obvious conclusion. But, since the borrower, anticipating an impending exclusion from the capital markets, becomes more cautious in project selection, the effect results in a lower rate of interest. The net result of these two opposite effects is ambiguous.

Empirical evidence by Lindert and Morton (1989) seems to suggest that the effect causing the rate of interest to fall may be strong enough to dominate the opposite effect. Even though borrowers may face smaller interest rates after default, they are not better off since their access to the private capital markets is reduced as a result of the default. In other words, we cannot simply look at the level of interest rates faced by the borrowers to judge their creditworthiness.

Lindert and Morton, however, find this evidence puzzling. They argue:

> . . . . . creditors . . . . . have taken little note of history in the 1970s . . . . . one would expect major banks to charge higher premia, or lend at shorter term, or lend less, to governments with a default history. They did slightly the opposite in 1976–1979 . . . . . Governments with histories of default and rescheduling paid about 0.04% less in interest, on slightly longer term loans, than governments with unblemished repayments records. Repayments history, which helps predict subsequent repayments crisis in the international cross-section, was ignored.

Controlling for various risk characteristics, regional effects and other systematic effects, this paper presents evidence consistent with Lindert and Morton's observation that countries with a history of default faced smaller spreads than the ones with no history of default.

Chowdhry (1991) also argues that larger international borrowers, precisely because their borrowing needs are large, have fewer alternatives and would be able to default and reenter the capital markets fewer number of times than would smaller borrowers. Consequently, they choose economic policies such that they are less likely to be in a situation in which they must default on their loans. This paper also supports this prediction, i.e. larger borrowers are perceived to be less risky and are charged smaller rates of interest.

Section 2 describes the data. Section 3 contains empirical evidence. Section 4 concludes.

2. The data

We collected data for 88 countries listed in the World Debt Tables 1983–1984 edition as developing countries. Table 1 shows these countries grouped into six different geographical areas similar to the World Debt Tables. We compiled the size of the outstanding level of debt owed to private creditors in the financial markets for each of these countries for the years 1976 through 1981. Also, data on variables listed as Principal Ratios in the World Debt Tables, considered to be important in determining borrower credit-worthiness, were compiled. These variables are:

- Debt Outstanding Disbursed-Financial Markets (Size)
- Principal Ratios
  - Debt Outstanding Disbursed/Exports of Goods and Services (DOD/XGS)
  - Debt Outstanding Disbursed/Gross National Product (DOD/GNP)
  - Total Debt Service/Exports of Goods and Services (TDS/XGS)
  - Total Debt Service/Gross National Product (TDS/GNP)
  - Interest Payments/Exports of Goods and Services (INT/XGS)
  - Interest Payments/Gross National Product (INT/GNP)
  - International Reserves/Debt Outstanding Disbursed (RES/DOD).

Data on interest rates were obtained from Borrowing in International Capital Markets (1976–1981). This period was chosen for three reasons. First, Borrowing in International Capital Markets started publishing quarterly data starting in 1976. Data available for the period 1973–1975 were too sparse and incomplete. Second, the publication of the data ceased after 1981. Third, the onset of the debt crisis in 1982, would make interpretation of the data for a period after 1981 much less clear.

Data on interest rates are on the publicized eurocurrency credits, which are expressed as a spread over the London Interbank Offered Rate (LIBOR). The spread over LIBOR for each loan was weighted by the size of the loan to obtain an average for the year. Only loans denominated in the US dollar were included in

the calculation. Commitment and participation fees were ignored, assuming that the error caused by the omission of fee income is small and unsystematic.

We also compiled data on Institutional Investor's Country Credit Rating, which is based on a survey of nearly 100 international banks. Banks are asked to rate each country on a scale of 0 to 100, with 0 representing the least credit-worthy country with the greatest chance of default and 100 representing the most credit-worthy with the least chance of default. Since these data were only available beginning in 1979, we only have 3 years of data for country ratings by Institutional Investor (1979–1981). This variable is denoted Rating.

The data on the history of defaults by various countries were obtained from an appendix in Lindert and Morton (1989). The paper lists countries that defaulted on privately held bonds in the period 1820–1929 and in the 1930s. Table 1 shows these data from Lindert and Morton (1989).

Chowdhry (1991) predicts a negative relationship between the interest rate faced by a borrowing country and its size. A negative relationship is also predicted between interest rates and default history. However, since these are ceteris paribus relationships, we need to control for other factors that might be important in determining these relationships.

First, since the distribution of all the principal ratios of the World Debt Tables is highly skewed, a log transformation of all these variables is taken.

Second, we introduce dummy variables for each of the six geographical regions shown in Table 1. These dummy variables attempt to control for the different political risks associated with each of these geographical region.

Finally, we include a dummy variable for each year to control for any systematic movements in interest rates that might have occurred over the period 1976–1981. [1]

To account for default history, three dummy variables are considered. The variable Default(1930s or before) equals 1 if the country defaulted either in the period 1820–1929 or in the 1930s. The variable Default(1820–1929) equals 1 if the country defaulted in the period 1820–1929. The variable Default(1930s) equals 1 if the country defaulted in the 1930s.

The interest rates are measured as percent spreads over the LIBOR, denoted Spread.

The size is measured by the variable Size. Since this variable is also skewed, a log transformation of this variable is taken.

3. The evidence

We run multiple regressions to test our propositions. Let us first look at the correlation matrix in Table 2.

[1] Several non-academic accounts have documented such movements.

Not surprisingly, a number of the principal ratios are highly correlated. The inferences about the standard errors for these variables, therefore, may not be correct. We rerun the regressions by dropping some of the highly correlated variables. Results are reported for both sets of regressions since the inferences about the standard errors of variables other than the principal ratios are meaningful in both sets of regressions.

All the regressions we run include the following as independent variables.

- Dummy variables for different geographical regions.
- Dummy variables for different years.
- One of the following subset of Principal Ratios:
  - All seven ratios.
  - The following three ratios:
    - log DOD/XGS
    - log INT/XGS
    - log RES/DOD
- One of the following for default dummies:
  - Default(1930s or before) or
  - Default(1820–1929) and Default(1930s)
- log Size.

The first set of regression results that we report has Spread as the dependent variable. Table 3 reports the results from OLS regressions. We analyzed the residuals to ensure that the regression assumptions are not violated.

The results are consistent with the predictions. First, notice that the relationship between Spread and log Size is negative and significant in all four regressions, which is consistent with the proposition that larger borrowers face lower interest rates. The evidence is also consistent with our other hypothesis that borrowers with a history of default face smaller interest rates. The coefficient for the dummy variable Default(1930s or before) in Regressions 1 and 3 is negative as predicted, and the *t*-statistics associated are marginally significant. When we look at the regressions with the dummy variables Default(1820–1929) and Default(1930s), the coefficients are still negative, but not significant.

Let us now interpret the results for other variables. First, we observe that cross-sectional variations associated with different geographic regions exist. Countries from South and East Asia seem to enjoy the lowest spreads, whereas countries from Africa and Latin America face the highest spreads. Different political and economic factors may account for this variation in spreads.

Second, the evidence does seem to capture the trend of falling spreads over the period 1976–1981. This trend has been documented by the followers of the Eurobank Syndicated Loan Market.[2]

[2] See Euromoney, various issues and McDonald (1982).

Table 1
Sovereign default history
d denotes an incidence of default.
Source: Lindert and Morton (1989).

No.	Country	Default history	
		1820–1929	1930s
Africa, South of the Sahara			
1	Benin		
2	Botswana		
3	Burundi		
4	Cameroon		
5	Central African Republic		
6	Chad		
7	Congo, People's Republic of		
8	Ethiopia		
9	Gabon		
10	Ghana		
11	Guinea		
12	Guinea Bissau		
13	Ivory Coast		
14	Kenya		
15	Lesotho		
16	Liberia	d	
17	Madagascar		
18	Malawi		
19	Mali		
20	Mauritiana		
21	Mauritius		
22	Niger		
23	Nigeria		
24	Rwanda		
25	Senegal		
26	Sierra Leone		
27	Sudan		
28	Tanzania		
29	Togo		
30	Uganda		
31	Upper Volta		
32	Zaire		
33	Zambia		
34	Zimbabwe		
East Asia and the Pacific			
35	Fiji		
36	Hong Kong		
37	Indonesia		
38	Korea, Republic of		
39	Malaysia		
40	Papua New Guinea		

Table 1 (*continued*)

No.	Country	Default history	
		1820–1929	1930s
East Asia and the Pacific			
41	Philippines		
42	Singapore		
43	Thailand		
44	Western Somoa		
Latin America and the Caribbean			
45	Argentina	d	d
46	Bahamas		
47	Barbados		
48	Bolivia	d	d
49	Brazil	d	d
50	Chile	d	d
51	Colombia	d	d
52	Costa Rica	d	d
53	Dominican Republic	d	
54	Ecuador	d	d
55	El Salvador	d	d
56	Guatemala	d	d
57	Guyana		
58	Haiti		
59	Honduras	d	
60	Jamaica		
61	Mexico	d	
62	Nicaragua	d	
63	Panama		d
64	Paraguay	d	d
65	Peru	d	d
66	Trinidad and Tobago		
67	Uruguay	d	d
68	Venezuela	d	
North Africa and the Middle East			
69	Algeria		
70	Egypt	d	
71	Jordan		
72	Lebanon		
73	Morocco		
74	Oman		
75	Syrian Arab Republic		
76	Tunisia		
77	Yemen Arab Republic		
South Asia			
78	Bangladesh		
79	Burma		

(*continued on next page*)

Table 1 (*continued*)

No.	Country	Default history	
		1820–1929	1930s
South Asia			
80	India		
81	Pakistan		
82	Sri Lanka		
Europe and the Mediterranean			
83	Cyprus		
84	Greece	d	d
85	Israel		
86	Portugal		
87	Turkey	d	d
88	Yugoslavia		

Finally, let us look at the coefficients for various principal ratios. Since many of these ratios are highly correlated, the *t*-statistics in Regressions 1 and 2 are small. The signs of the coefficients in Regressions 3 and 4, however, seem plausible. The evidence indicates that countries with high ratios of total debt to export earnings were perceived as having higher default risks and consequently faced higher spreads. On the other hand, countries with higher ratios of international reserves to total debt were seen more capable of meeting their debt repayments and therefore faced smaller spreads.

We now look at some regressions with the same set of independent variables, but now with Rating as the dependent variable. Recall that these are country ratings compiled by the Institutional Investor in which banks are asked to score each country on a scale of 0 to 100 with higher score representing smaller probability of default. The results are presented in Table 4.

The evidence for the relationship between Rating and log Size is positive and significant in all four regressions, which is consistent with the proposition that larger borrowers are seen as less likely to default resulting in higher ratings. The relationship between rating and default history, however, is much weaker. Most of the coefficients are positive, albeit with *t*-statistics not very large, consistent with our proposition that countries with default history are seen as less likely to default. Notice though that the sample size in these regressions is much smaller since we only had 3 years of data for Rating, whereas we had 6 years of data for Spread. Two of the coefficients are negative, but with extremely low *t*-statistics. Overall, the evidence is not very strong in favor of our hypothesis, but it is certainly not consistent with the competing hypothesis predicting an opposite relationship.

The results for cross-sectional variation based on geographic regions are somewhat different from previous regressions with Spread as the dependent variable but generally similar. The evidence on trend in worsening perception over

Table 2
Correlation matrix

	log DOD/XGS	log DOD/GNP	log TDS/XGS	log TDS/GNP	log INT/XGS	log INT/GNP	log RES/DOD	log Size
log DOD/XGS	1.0000							
log DOD/GNP	−0.9963	1.0000						
log TDS/XGS	−0.8670	0.8679	1.0000					
log TDS/GNP	0.8712	−0.8733	−0.9971	1.0000				
log INT/XGS	−0.2514	0.2425	−0.2620	0.2497	1.0000			
log INT/GNP	0.2607	−0.2594	0.2450	−0.2415	−0.9825	1.0000		
log RES/DOD	−0.0591	0.0929	0.0518	−0.0464	0.0462	−0.0481	1.0000	
log Size	−0.2948	0.3219	0.1861	−0.2025	0.1638	−0.2125	0.0951	1.0000

Table 3
OLS regressions on Spread
Figures in parentheses are *t*-statistics.

Spread	Regression 1	Regression 2	Regression 3	Regression 4
Constant	1.128	0.843	0.939	0.747
	(3.157)	(2.160)	(3.134)	(2.336)
Dummy(Africa)	0.185	0.286	0.172	0.282
	(1.947)	(2.710)	(1.816)	(2.726)
Dummy(East Asia)	−0.131	−0.052	−0.150	−0.051
	(−1.589)	(−0.576)	(−1.844)	(−0.567)
Dummy(Latin America)	0.109	0.152	0.101	0.146
	(1.378)	(1.796)	(1.288)	(1.740)
Dummy(Middle East)	−0.108	−0.042	−0.160	−0.073
	(−1.082)	(−0.410)	(−1.704)	(−0.728)
Dummy(South Asia)	−0.267	−0.191	−0.256	−0.164
	(−2.005)	(−1.348)	(−1.929)	(−1.194)
Dummy(1976)	0.814	0.823	0.846	0.855
	(9.274)	(9.157)	(9.963)	(9.836)
Dummy(1977)	0.618	0.617	0.648	0.655
	(7.475)	(7.298)	(8.100)	(8.008)
Dummy(1978)	0.296	0.291	0.334	0.336
	(3.599)	(3.455)	(4.232)	(4.173)
Dummy(1979)	0.139	0.144	0.158	0.165
	(1.917)	(1.933)	(2.215)	(2.276)
Dummy(1980)	0.103	0.102	0.112	0.116
	(1.420)	(1.379)	(1.568)	(1.590)
log DOD/XGS	−0.399	−0.630	0.170	0.180
	(−0.395)	(−0.595)	(2.307)	(2.370)
log DOD/GNP	0.492	0.753		
	(0.483)	(0.704)		
log TDS/XGS	0.463	0.593		
	(0.461)	(0.565)		
log TDS/GNP	−0.338	−0.454		
	(−0.338)	(−0.433)		
log INT/XGS	0.117	0.236	−0.022	−0.012
	(0.230)	(0.439)	(−0.299)	(−0.164)
log INT/GNP	−0.228	−0.357		
	(−0.453)	(−0.674)		
log RES/DOD	−0.111	−0.091	−0.099	−0.086
	(−4.119)	(−3.143)	(−4.193)	(−3.429)
Default(1930s or before)	−0.136		−0.110	
	(−1.943)		(−1.594)	
Default(1820–1929)		−0.104		−0.057
		(−1.424)		(−0.828)
Default(1930s)		−0.001		−0.001
		(−0.013)		(−0.022)
log Size	−0.055	−0.054	−0.047	−0.049
	(−3.151)	(−3.048)	(−3.056)	(−3.155)
R^2	0.67	0.67	0.66	0.67
Adjusted R^2	0.64	0.64	0.64	0.64
N	224	218	224	218

Table 4
OLS regressions on Rating
Figures in parentheses are *t*-statistics.

Rating	Regression 5	Regression 6	Regression 7	Regression 8
Constant	10.784	4.245	10.688	10.313
	(0.870)	(0.301)	(0.996)	(0.882)
Dummy(Africa)	6.985	9.021	7.089	8.692
	(2.158)	(2.482)	(2.193)	(2.552)
Dummy(East Asia)	10.894	12.263	10.266	11.835
	(3.698)	(3.824)	(3.423)	(3.696)
Dummy(Latin America)	6.656	6.138	6.101	5.204
	(2.267)	(2.022)	(2.115)	(1.766)
Dummy(Middle East)	10.053	11.714	11.325	13.000
	(3.500)	(3.811)	(4.058)	(4.410)
Dummy(South Asia)	12.820	15.311	14.232	16.295
	(2.725)	(3.035)	(3.055)	(3.444)
Dummy(1979)	5.315	4.782	6.708	6.418
	(2.825)	(2.484)	3.655)	(3.469)
Dummy(1980)	3.025	2.806	3.131	2.931
	(1.729)	(1.594)	(1.769)	(1.648)
log DOD/XGS	−6.306	5.563	−9.777	−10.108
	(−0.155)	(0.131)	(−4.540)	(−4.463)
log DOD/GNP	−5.425	−16.301		
	(−0.133)	(−0.384)		
log TDS/XGS	−12.873	−33.000		
	(−0.288)	(−0.695)		
log TDS/GNP	20.075	39.814		
	(0.448)	(0.838)		
log INT/XGS	11.482	19.236	0.670	0.779
	(0.465)	(0.717)	(0.281)	(0.319)
log INT/GNP	−16.795	−24.470		
	(−0.680)	(−0.917)		
log RES/DOD	3.799	4.121	3.917	3.799
	(3.963)	(3.865)	(4.538)	(4.098)
Default(1930s or before)	−0.301		1.342	
	(−0.114)		(0.519)	
Default(1820–1929)		−0.017		1.986
		(−0.006)		(0.747)
Default(1930s)		3.188		3.121
		(1.314)		(1.270)
log Size	6.909	7.150	6.993	7.068
	(10.114)	(10.379)	(10.646)	(10.663)
R^2	0.79	0.79	0.77	0.78
Adjusted R^2	0.76	0.76	0.75	0.76
N	131	128	131	128

the years about default probabilities is confirmed again. Finally, the evidence on the principal ratios is also consistent with our previous results.

4. Conclusion

We have presented some evidence that indicates that countries with a history of defaults in the 1930s and prior periods were charged smaller interest rates by commercial banks in the period 1976–1981. Notice that many of the countries in Table 1 that are classified as non-defaulting in our sample perhaps had no history of borrowing at all in the 1930s and prior periods. As a matter of fact, many of these countries were not even independent sovereign nations during those periods. One might wonder if our results are being driven by the fact that a large number of non-defaulting countries are either small — such as those from Sub-Sahara Africa — or from high risk regions such as Africa or Latin America. But notice that this result is obtained even though we do control for size, different geographical regions and other risk characteristics as measured by the principal ratios. Our results do confirm the suspicion that Sub-Sahara African and Latin American countries were charged the largest interest rates and suffered the lowest credit ratings. Southeast Asian countries, on the other hand, had the highest credit ratings and faced the lowest interest rates. We also find strong evidence that larger countries were perceived to be less risky and were charged lower interest rates.

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