World Bank Lending and Financial Sector Development

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A new database of World Bank loans to support financial sector development is used to investigate whether countries that received such loans experienced more rapid growth on standard indicators of financial development than countries that did not. Self-selection is accounted for with treatment-effects regressions. The results indicate that borrowing countries had significantly more rapid growth in M2/GDP than non-borrowers and swifter reductions in interest rate spreads and cash holdings (as a share of M2). Borrowers also had higher private credit growth rates than nonborrowers in some treatment-effects regressions but not in standard panel regressions with fixed country effects. On the whole, the results indicate some significant advantages in financial development for borrowers over nonborrowers. JEL codes: F33, G21, O16.

The World Bank has been making loans to governments of member countries since 1946. Over time, World Bank lending shifted from supporting post-World War II reconstruction to supporting economic growth and poverty alleviation. During its first four decades, it concentrated on financing investments in infrastructure and directly productive activities in agriculture and industry. This approach was driven by the assumption that the scarcity of foreign exchange for capital investments was the main constraint hindering economic growth in developing countries.

With the shift in analytic focus on constraints to growth in the 1980s (initially to the economic policies of developing countries and later to their institutional capacities), the World Bank introduced fast-disbursing loans for balance of payments support conditioned on changes in policies and institutions.

Consistent with its sharper focus on the importance of good macroeconomic policies and institutions for economic growth, the World Bank became an early proponent of supporting appropriate policies and capable institutions in the financial sector, which, it asserted, could also contribute to economic growth (World Bank 1989). These positions were later supported by extensive research establishing a causal link between financial development and economic growth (Levine and Zervos 1998; Rajan and Zingales 1998; Beck, Levine, and Loayza 2000; Levine, Loayza, and Beck 2000; Levine 2005) and by research showing that less government control over financial systems and institutions leads, over time, to deeper, stabler, and more efficient systems (Caprio, Honohan, and Stiglitz 2001; Barth, Caprio, and Levine 2001a,b; La Porta, Lopez-de-Silanes, and Shliefer 2002; Beck, Demirguc-Kunt, and Levine 2003).

In the early 1990s, most developing countries maintained policies and institutions that were considered detrimental to financial sector development—namely, government-administered financial systems, fixed interest rates, directed credit, and market dominance of publicly owned financial institutions. The World Bank began to target lending support to financial sector reforms addressing these constraints. Between 1992 and 2003, about one quarter of World Bank lending—some $56 billion—included support for financial sector reforms aimed at reducing direct government control over credit allocation, interest rates, and financial institutions and increasing government oversight of domestic financial markets and institutions by strengthening banking super-vision and prudential regulations. The basic objective of such support was to establish a strong enabling environment in which well-governed financial institutions would mobilize resources, allocate credit, and manage risks efficiently.

Most reforms focused on the banking sector and within the banking sector on the restructuring or privatization of state-owned banks. Reforms also sought to strengthen banking legislation, regulation, and supervision. An independent evaluation found that government ownership of banks in countries with Bank loans that included conditionality on bank privatization decreased substantially (with the per-centage of banking assets owned by governments dropping 60 percentage points within a decade) and by more than that in countries that did not borrow for bank privatization (where the decrease was 35 percentage points) (IEG 2006). The results were more ambiguous for differences in banking legislation and regulation; infor-mation on changes in banking supervision was not available for many countries.

Did these changes increase the mobilization of resources, allocate more credit, and make the financial sector more efficient? This article addresses these questions. Using quantitative indicators to measure changes in depth, efficiency, and credit to the private sector, it examines whether Bank assistance between 1992 and 2003 helped develop financial sectors in client countries and tests whether progress was greater in countries receiving loans for this purpose than in client countries that did not receive such loans.

The article contributes to a broader literature on the effects of economic reform programs in developing countries. Much of that literature focuses on the impact

of adjustment lending by the World Bank and the International Monetary Fund (IMF) on broad macroeconomic aggregates, notably real per capita growth.[1] This article examines the effects of World Bank lending on measures of financial sector development, which has been linked to economic growth.

Improvements in indicators of financial development were generally significant for borrowers—and more pronounced for borrowers than nonborrowers. Treatment-effects regressions are used that explicitly account for nonrandom selection (the possibility that borrowers tended to be countries that were likely to have improved their financial sectors without the loans). Additional robustness checks test whether the findings are specific to particular regions and whether improvements in financial indicators preceded or followed World Bank loans. (If improvement preceded the loans, it would seem unlikely that the loans had a large causal impact in borrowing countries.) A final set of checks incorporates additional controls for countries' readiness for and experience with financial reform. The results of these tests reinforce the main findings: borrowing countries tended to experience substantial improvement in their financial indicators, significantly more than the typical improvement in nonborrowing countries, even after accounting for selection.

The remainder of the article is organized as follows. Section I describes the data, including the indicators used to assess outcomes and the variables that summarize World Bank lending in support of financial sector reform from 1992 to 2003. Sections II and III describe the basic regression models and summarize the base results, and section IV presents results using estimation techniques that address selection problems. Section V runs additional robustness checks, including regional regressions and models that attempt to control for countries' history of and readiness for reform. The last section briefly summarizes the results of the various methods.

I. Data

The analysis relies on standard indicators, such as M2/GDP and private credit/GDP, that have been shown to be robustly associated with long-run economic growth (Beck, Levine, and Loayza 2000; Levine, Loayza, and Beck 2000; Levine 2005).[2] This analysis is restricted to banking indicators, because banks hold the vast majority of financial sector assets in developing countries.[3]

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1. Easterly (2005) describes this literature as including Barro and Lee (2002), Conway (1994), Corbo and Goldstein (1987), Corbo and Fischer (1995), Devarajan, Dollar, and Holmgren (2001), Dicks-Mireaux, Mecagni, and Schadler (2000), Goldstein and Montiel (1986), Haque and Khan (1998), Hutchinson (2001), Kapur, Lewis, and Webb (1997), Khan (1990), Killick, Gunatilaka, and Marr (1998), Knight and Santaella (1997), Summers and Pritchett (1993), Przeworski and Vreeland (2000), Svensson (2003), and Van de Walle (2001).

2. For descriptions of standard indicators of financial development and their use, see Beck, Demirgüç-Kunt, and Levine (2000).

3. The ratio of private credit to GDP can, however, include lending by nonbank financial institutions.

An advantage of these indicators is that they are available for many countries throughout the decade of this analysis. They do create some problems, however. For example, as part of the restructuring or privatization of problem banks, the value of nonperforming assets may be reduced or the loans eliminated from bank balance sheets, thereby reducing the private credit ratio. Successful restructuring efforts contribute to a healthier banking sector. Because such efforts reduce private credit, however, they would be viewed as detrimental to financial development in the models presented here.

Moreover, the private credit ratio does not provide information about which segments of society receive credit or about the quality of the loans made, because data on nonperforming loans are not available on a standardized basis across countries. The M2/GDP ratio provides information on deposit levels, but that information is not broken down by the income level of the depositors. Increases in the ratio may not mean that all segments of society are availing themselves of formal banking services.

Additional indicators—namely, the spread between the lending and deposit interest rates and the ratio of cash held outside of banks to M2 (a measure of the lack of confidence in the formal banking sector)—are incorporated to round out the assessment of financial development. These indicators were chosen largely because of data availability. They, too, have limitations. For example, interest rates were controlled in a number of developing countries at some point during the sample period; spreads are unlikely to be an accurate measure of efficiency in these instances. Measures of capital adequacy, portfolio quality, and profitability are not available in a standard format across countries.[4]

These caveats notwithstanding, it seems likely that taken together, M2/GDP, private credit/GDP, cash/M2, and interest rate spreads provide a reasonably complete picture of both short- and long-term banking development between 1992 and 2003.[5] In the short term, movements in the ratio of cash/M2 can show depositors' reactions to policy changes. The private credit ratio, while subject to short-term perturbations, tends to capture long-term financial development. M2/GDP and interest rate spreads are arguably somewhere between the two extremes.

4. In the robustness checks presented in the supplemental appendix, an index of financial sector efficiency and freedom developed by the Heritage Foundation is used as the dependent variable in the regressions. The results are qualitatively similar to those for the four quantitative indicators used here.

5. These measures could render an imprecise picture, because the opaqueness of the financial sector makes the effects of reform difficult to observe. As robustness checks, the base models were also rerun using credit ratings—which presumably offer a more nuanced assessment of the success of reforms—from three agencies (Moody's, Standard and Poor's, Fitch IBCA) as dependent variables. The unit of observation is the average rating of all sovereign debt issues for each country in each year. Though the coefficient on that variable was positive for borrowers and negative for nonborrowers, neither was significant. This is likely because there are so few observations to work with since only a subset of developing countries issued enough sovereign debt on a regular basis. This illustrates the key advantage of the quantitative indicators used in this paper, which is their yearly availability for a wide set of developing countries.

Standard financial outcome variables are combined with data on World Bank loans from a review by the World Bank's Independent Evaluation Group (IEG 2006) (formerly the Operations Evaluation Department). IEG examined 556 lending operations between 1992 and 2003 that involved support for reform of the financial sector,[6] including adjustment loans, technical assistance, and lines of credit.[7] The analysis focuses on adjustment loans because they were larger (in dollar terms) and included conditions aimed at spurring broad financial sector development. In contrast, lines of credit often focused on channeling funds through specific financial institutions; technical assistance loans tended to be much smaller than adjustment loans and focused on narrower issues.[8]

Sixty-eight countries received at least one adjustment loan with conditions tied to financial reform (table A-1). A control group of 38 countries received no such loans during the period under review. All developing countries for which reasonably complete financial indicator data were available were included in the analysis. Comparisons between the two groups form the basis of most of the statistical analysis that follows.[9]

II. Methodology

The base results rely on simple fixed-effects panel regressions of the form

$$(1) \quad Y_{it} = \alpha_i + \beta_{wb}t + \beta_{no-wb}t + \beta_1 \text{ first loan}_{it} + \beta_2 adj_{it} + \beta_3 \mathbf{ref}_{it} + \beta_4 \mathbf{X}_{it-1} + \varepsilon_{it}$$

where i represents the country and t represents time, measured in years since 1991. The time variable takes on values of 1 to 12. The estimated coefficient β_{wb} thus represents the average growth rate of the indicator of financial development (Y) for countries that received adjustment loans to support financial reform (table 1 provides descriptions and summary statistics for all the

6. The database of World Bank loans starts in 1992; country and financial sector data start in 1991. The data set was gathered as part of an IEG evaluation of Bank lending to the financial sector. IEG began its analysis in 1992 in an effort to avoid duplication of a previous study (which covered 1984–98) while still covering a sufficiently long period. This type of censoring could conceivably affect the results.

7. Lines of credit are funds passed through an intermediary for demand-driven purposes. The end-user has to repay the loan, usually with interest.

8. Regressions were run with various samples of loans. For models based solely on investment loans, technical assistance loans, or lines of credit, there were no robust significant differences between borrowers and nonborrowers. Including smaller subcategories, such as loans for technical assistance, along with the adjustment loans, did not change the qualitative differences between borrowers and nonborrowers for the adjustment loan-only sample. Variables based on small subcategories of financial sector loans (such as those devoted to pensions) did not produce stable significant differences between borrowers and nonborrowers.

9. The World Bank maintained a policy dialogue throughout the period with some countries in the control group. Nine of the 38 countries in the control group borrowed for financial sector reform before the period of study, although in almost all cases the borrowing consisted of a single loan, often granted as part of a multisector operation in which financial reforms were not central. These factors could make it harder to find statistically significant differences between the two groups in the regressions that follow.

TABLE 1. Variable Descriptions and Summary Statistics

Variable	Description	Mean	Median	High	Low
Growth rate	Equal to the year minus 1991. Estimated coefficient measures annual growth rate for dependent variable in question	6.68	7	12	1
Policy variables					
Adjustment loans	Cumulative number of adjustment loans by country in question at time t. In some models, total includes loans for technical assistance	0.70	0	6	0
Bank privatization	Number of adjustment loans with emphasis on bank privatization	0.24	0	4	0
Regulation and supervision	Number of adjustment loans with emphasis on bank regulation and supervision	0.39	0	4	0
Other banking	Number of adjustment loans with emphasis on banking reform other than privatization, regulation, or supervision	0.48	0	4	0
Auditing and accounting reform	Number of adjustment loans with emphasis on accounting and auditing reform	0.06	0	2	0
Capital market development	Number of adjustment loans with emphasis on capital and securities market development	0.19	0	3	0
General financial sector reform	Number of adjustment loans with emphasis on general financial sector development not covered under other variables	0.19	0	3	0
Rural finance	Number of adjustment loans with emphasis on rural financial sector development	0.03	0	2	0
Microfinance	Number of adjustment loans with emphasis on development of microfinance	0.01	0	1	0
Nonbank financial sector institutions	Number of adjustment loans with emphasis on development of nonbank financial institutions	0.04	0	2	0
Dependent variables					
Private credit/GDP	Claims on private sector (International Financial Statistics [IFS] line 22d) divided by GDP (IFS line 99b) multiplied by 100	25.1	17.7	158.5	0
M2/GDP	Money (IFS line 34) plus quasi-money (IFS line 35) divided by GDP (IFS line 99b) multiplied by 100	33.2	26.9	148.2	0.002
Cash/M2	Currency outside deposit money banks (IFS line 14a) divided by M2 (IFS line 34 + line 35) multiplied by 100	23.1	19.4	82.5	0
Interest rate spread	Lending rate (IFS line 60l) minus deposit rate (IFS line 60p), multiplied by 100	11.4	8.6	163.5	−6.9

(Continued)

TABLE 1. Continued

Variable	Description	Mean	Median	High	Low
Concentration	Percentage share of total banking sector assets held by three largest banks (based on asset information in Bankscope)	62.0	59.5	100.0	14.9
Macro/institutional controls					
CPIA score	Proxy for institutional development	3.23	3.28	5.35	1.0
Surplus (deficit)/ GDP	Overall budget balance, including grants, multiplied by 100 (World Bank)	−2.72	−2.11	10.26	−31.63
Annual GDP growth (percent)	Annual GDP growth (World Bank, various years)	3.00	3.94	106.3	−50.2
Inflation (percent)	GDP deflator (World Bank, various years)	78.1	9.41	6041.6	−25.2
Selection equation variables					
Government checks	Variable equals one if there is no chief executive. It rises by one under each of the following circumstances: there is a chief executive, the chief executive is competitively elected, and the opposition controls the legislature. In presidential systems, it rises by one for each chamber of the legislature, unless the president's party has a majority in the lower house and a closed-list system is in effect (implying stronger presidential control of the party and therefore of the legislature). It also rises by one for each party coded as allied with the president's party that has an ideological (left-right-center) orientation closer to that of the main opposition party than to that of the president's party. In parliamentary systems this variable rises by one for every party in the government coalition as long as the parties are needed to maintain a majority and for every party in the government coalition that has a position on economic issues (right-left-center) that is closer to that of the largest opposition party than to that of the party of the executive. In parliamentary systems, the prime minister's party is not counted if there is a closed rule in place (in this case the prime minister is presumed to fully control the party). The highest possible score is 18. Average checks 1991–2000 are calculated for each country. (World Bank Database on Political Institutions; see Beck and others 2001.)	2.65	2.50	10.1	1.0
Debt (as percent of GNI)	Average external debt 1970–89 (World Bank, various years)	56.2	48.1	222.2	4.0

(Continued)

TABLE 1. Continued

Variable	Description	Mean	Median	High	Low
IMF credit (millions of constant dollars)	Average IMF credit 1970–89 (World Bank, various years)	462.0	93.5	9,370.0	0
Total debt service (percent of GNI)	Average debt service 1990–99 (World Bank, various years)	5.3	4.2	0.3	20.3
Capital formation (percent of GDP)	Gross fixed capital formation 1990–99 (World Bank, various years)	22.3	21.0	6.9	64.8

Note: Figures are calculated over all observations for which at least one dependent variable was available.

variables). A test of whether $\beta_{wb} = \beta_{nonwb}$ indicates whether adjustment loans had a beneficial impact on financial sector development. To the extent that the growth rates for the control countries were the same as (or greater than) those of countries that received World Bank assistance, the value of that assistance could be questioned. All regressions also include α_i, a country-specific fixed effect. Results should be interpreted as changes relative to the country-specific mean for the indicator in question. (More direct methods for addressing potential selection problems are presented later.)

First loan measures the number of years since a country received its first loan with financial sector conditions. It is included because improvements in financial indicators were more likely to have materialized in countries that received loans early in the period.[10] Including the *first financial sector loan* variable offers a more precise test of whether improvements in financial indicators occurred after the receipt of loans. For example, if β_{wb} is positive and significant but the coefficient for the time since first loan variable is insignificant, it would suggest that as a group borrowing countries were more likely to improve their financial indicators regardless of when they received loans from the World Bank. By contrast, if the *first loan* variable is significant while the simple borrower dummy variable is not, it would suggest that improvement in indicators occurred after the receipt of World Bank loans.

10. For the base regressions, the fairest tests of whether World Bank lending contributed to financial development should include country-specific fixed effects; specification tests confirm that they should be included. Therefore, the dummy variable *received Bank adjustment loans* is set equal to one throughout the period, regardless of whether the country received its first loan in the first year or the twelfth year. The dummy for *no Bank adjustment loans* is set equal to one throughout the period for nonborrowers. Had the variables not been coded in this way, all countries that received no loans would have been lost from the observation set because of the country fixed effects; only countries whose borrowing status changed during the period would be used to examine the effects of Bank lending. Such models would have offered comparisons for borrowing countries before and after receiving a loan, but they would not have facilitated comparisons between borrowers and nonborrowers, the focus of this article.

Some specifications include *adj*, the cumulative number of adjustment loans. Some countries received as many as six adjustment loans with financial sector reform components between 1992 and 2003. Repeated structural adjustment lending from the World Bank or the IMF failed to produce improvement on multiple macroeconomic outcomes, including growth (Easterly 2005).[11] Models with *adj* therefore test whether similar results hold for the financial sector. As with the macroeconomic and institutional variables, all policy reform variables are lagged one year in the regressions.

Ref is a vector of variables summarizing reform areas covered under adjustment loans (bank privatization; bank regulation and supervision; banking reform not focused on privatization, regulation, or supervision; auditing and accounting reform; capital market development; reform of nonbank financial institutions; general financial sector reform; rural finance; and microfinance).[12] Because the data set is a country-level panel of financial sector outcomes, the project-level data must be aggregated into country-year reform packages. The cumulative number of loans that had conditions in the policy areas in question are explanatory variables in the regressions that follow.[13]

X is a vector of macroeconomic and institutional controls, including inflation, real growth, and M2/GDP.[14] All of the macroeconomic and institutional controls are lagged one year in the panel regressions that follow to mitigate problems arising from the simultaneous determination of the controls and the dependent variables. Inflation should slow financial development if it makes loan contracting over extended periods more difficult. Real growth will accelerate financial development, because it is likely to stimulate demand for financial services. Because World Bank lending to all sectors could spur growth and growth could spur financial development, this is an important control for isolating the effect of financial sector loans on indicators of financial development.

11. Easterly notes that the repeated extension of loans to a country is itself a sign that lending was not effective, "One might expect that it would take more than one loan to accomplish 'adjustment,' but it is hard to see why it would take such a large number" (2005, p. 6).

12. The intention was to specify the policy areas that had the greatest chance of improving financial indicators, which are largely bank based. Adjustment loans devoted solely to small- and medium-size enterprise finance or pensions were therefore excluded from the database (very few loans focused only on these areas).

13. Similar qualitative results hold when the number of loans in a given year covering that policy area, simple dummies indicating that a policy area was covered, or dummies indicating that the policy area was covered at some point during the sample period are used.

14. Government budget deficits were included in initial specifications, but they tended to be insignificant. Since inclusion of that variable reduced the sample size by almost half, it was eliminated from the final specifications. Its inclusion does not greatly alter the comparison between borrowers and nonborrowers.

The base model includes M2/GDP as a general measure of the level of financial development. It is not clear a priori whether the level of financial development should have a positive or negative effect on subsequent financial development. On the one hand, a high level of M2/GDP could signal a high level of future development. In that case, lagged M2/GDP can be viewed as a proxy for a country's willingness and ability to pursue financial sector reform. On the other hand, a low level of M2/GDP could signal greater potential for improvement.

The Country Policy and Institutional Assessment (CPIA) index is included as a broad measure of institutional development. The World Bank conducts this assessment annually to assess the quality of a country's policy and institutional framework. The index is based on 20 criteria, grouped into four clusters: economic management, structural policies, policies for social inclusion and equity, and public sector management and institutions. The CPIA is available for a large sample of countries for the whole period. It incorporates information about the conduciveness of a country's policy framework for reform. Including it reduces concerns that the borrower variable might be picking up a country's general ability to achieve reform. Until 2005, this variable was not available outside the World Bank, and details of its construction were not well known. In the robustness checks, therefore, CPIA is replaced with proxies for institutional development that are more readily available and (arguably) less endogenous.

One could view the basic model as a one-lag vector autoregression in four variables (CPIA score, inflation, real growth, and M2/GDP). There is no guarantee, however, that this is the correct reduced-form model. A series of models tested for the appropriate included variables and lag lengths by adding lags for each of the explanatory variables until the last lag added was not significant. This measure was taken in order to ensure that the underlying model of the indicators of financial development is as complete as possible before adding the treatment variables. Including the additional lags reinforces the conclusions about the relative performance of borrowers and nonborrowers. Indeed, differences between borrowers and nonborrowers are larger in the specifications with multiple lags. To reduce clutter in the specifications and for ease of exposition, the analysis uses the one-lag models as the base specifications (results from the multiple-lag specifications are also discussed below).

III. RESULTS

In the base specifications, percentage changes in the indicators of financial development are measured by taking their logs (table 2).[15] Two of the simplest

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15. Taking logs also helps reduce the influence of outliers in the estimated coefficients.

TABLE 2. Base Results: Fixed-Effects Panel Regression

	Log(M2/GDP)					Log(private credit/GDP)				
	2.1 (2.1)	2.2 (2.2)	2.3	2.4	2.5 (2.3)	2.6 (9.4)	2.7 (9.5)	2.8	2.9	2.10 (9.6)
Received World Bank adjustment loan	0.036***	0.017***	−0.009	−0.007	−0.008	0.029***	0.011*	0.006	0.009	0.022
	(0.004)	(0.003)	(0.007)	(0.007)	(0.007)	(0.005)	(0.006)	(0.015)	(0.015)	(0.015)
Did not receive World Bank adjustment loan	0.014***	0.002	0.003	0.002	0.003	0.037***	0.022***	0.022***	0.022***	0.022***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)
H_0: $\beta_{wb} = \beta_{nonwb}$ rejected? (P =0.05)	Yes	Yes	No	No	No	No	No	No	No	No
Years since first adjustment loan			0.034***	0.037***	0.047***			0.006	0.011	0.018
			(0.009)	(0.009)	(0.009)			(0.018)	(0.018)	(0.018)
H_0: $\beta_{wb} = \beta_{yrs\ since1st}$ rejected?			Yes	Yes	Yes			No	No	No
H_0: $\beta_{yrs\ since1st} = \beta_{nonwb}$ rejected?			Yes	Yes	Yes			No	No	No
Macroeconomic and institutional controls										
CPIA score$_{t−1}$		0.004	−0.007	−0.004	0.001		0.016	0.014	0.019	0.033
		(0.017)	(0.017)	(0.017)	(0.016)		(0.033)	(0.034)	(0.034)	(0.034)
GDP growth$_{t−1}$		0.003**	0.003**	0.003**	0.003***		0.005**	0.005**	0.005**	0.004*
		(0.001)	(0.001)	(0.001)	(0.001)		(0.002)	(0.002)	(0.002)	(0.002)
Inflation$_{t−1}$		−0.000001	−0.00003	−0.0001	0.0002		−0.00016	−0.00017	−0.0002	0.0002
		(0.0001)	(0.0001)	(0.0001)	(0.0001)		(0.0003)	(0.0003)	(0.0003)	(0.0003)
M2/GDP$_{t−1}$		0.015***	0.015***	0.015***	0.014***		0.009***	0.009***	0.009***	0.008***
		(0.001)	(0.001)	(0.001)	(0.001)		(0.002)	(0.002)	(0.002)	(0.002)
Policy variables										
Cumulative adjustment loans				−0.019	−0.047***				−0.031	−0.042
				(0.013)	(0.016)				(0.028)	(0.032)
Number of loans for bank privatization					0.041*					0.018
					(0.022)					(0.046)
Number of loans for regulation/ supervision					0.042					−0.014
					(0.030)					(0.061)
Number of loans for other reforms					−0.047*					−0.156
					(0.025)					(0.053)
Number of loans for auditing/ accounting					0.040					0.319***
					(0.041)					(0.086)
Number of loans for capital market					0.083***					0.215***
					(0.029)					(0.061)
Number of loans for general financial					−0.015**					−0.019
					(0.025)					(0.052)
Rural finance					0.199**					0.233**
					(0.053)					(0.110)
Microfinance					−0.059					−0.247*
					(0.069)					(0.142)
Nonbank financial sector institutions					−0.199***					−0.143
					(0.044)					(0.092)
Constant	3.13***	2.71***	2.81***	2.80***	2.80***	2.63***	2.37***	2.39***	2.37***	2.30***
	(0.021)	(0.062)	(0.066)	(0.067)	(0.066)	(0.032)	(0.125)	(0.136)	(0.137)	(0.137)
Number of observations	866	611	611	611	611	899	610	610	610	610
Number of countries	90	89	89	89	89	94	89	89	89	89
R-squared (within)	0.13	0.42	0.43	0.44	0.49	0.06	0.09	0.09	0.10	0.17

	Log(cash/M2)					Log(interest spread)				
	2.11 (9.7)	2.12 (9.8)	2.13	2.14	2.15 (9.9)	2.16 (9.10)	2.17 (9.11)	2.18	2.19	2.20 (9.12)
Received World Bank adjustment loan	−0.028***	−0.034***	−0.007	−0.017	−0.024*	−0.005	−0.011	0.073***	0.076***	0.072***
	(0.003)	(0.005)	(0.013)	(0.013)	(0.014)	(0.007)	(0.009)	(0.021)	(0.022)	(0.022)

(Continued)

TABLE 2. Continued

	Log(cash/M2)					Log(interest spread)				
	2.11 (9.7)	2.12 (9.8)	2.13	2.14	2.15 (9.9)	2.16 (9.10)	2.17 (9.11)	2.18	2.19	2.20 (9.12)
Did not receive World Bank adjustment loan	−0.017*** (0.004)	0.001 (0.006)	0.0001 (0.006)	0.001 (0.006)	0.0005 (0.006)	0.015 (0.010)	0.027** (0.012)	0.024** (0.011)	0.024** (0.011)	0.024** (0.011)
$H_0: \beta_{wb} = \beta_{nonwb}$ rejected? (P =0.05)	Yes	Yes	No	No	No	No	Yes	Yes	Yes	No
Years since first adjustment loan			−0.034** (0.016)	−0.042*** (0.016)	−0.045*** (0.016)			−0.116*** (0.026)	−0.113*** (0.027)	−0.111*** (0.027)
$H_0: \beta_{wb} = \beta_{yrs\ since1st}$ rejected?			No	No	No			Yes	Yes	Yes
$H_0: \beta_{yrs\ since1st} = \beta_{nonwb}$ rejected?			Yes	Yes	Yes			Yes	Yes	Yes
Macroeconomic and institutional controls										
CPIA score$_{t-1}$		−0.025 (0.030)	−0.014 (0.030)	−0.030 (0.030)	−0.030 (0.030)		0.014 (0.050)	0.048 (0.049)	0.054 (0.050)	0.046 (0.050)
GDP growth$_{t-1}$		0.001 (0.002)	0.0003 (0.002)	0.0001 (0.002)	0.001 (0.002)		−0.005 (0.004)	−0.006 (0.004)	−0.006 (0.004)	−0.007* (0.004)
Inflation $_{t-1}$		−0.0004* (0.0002)	−0.0004 (0.00024)	−0.0003 (0.0002)	−0.0006 (0.0003)		0.001* (0.0003)	0.001** (0.0003)	0.001** (0.0003)	0.0005 (0.0004)
M2/GDP$_{t-1}$		−0.008*** (0.002)	−0.008*** (0.002)	−0.008*** (0.002)	−0.007*** (0.002)		0.008*** (0.003)	0.010*** (0.003)	0.010** (0.003)	0.009*** (0.003)
Policy variables										
Cumulative adjustment loans				0.086*** (0.023)	0.105*** (0.027)				−0.025 (0.038)	0.022 (0.050)
Number of loans for bank privatization					0.037 (0.038)					0.069 (0.073)
Number of loans for regulation/ supervision					0.041 (0.052)					0.099 (0.111)
Number of loans for other reforms					0.030 (0.047)					−0.130 (0.087)
Number of loans for auditing/ accounting					−0.206*** (0.074)					0.170 (0.133)
Number of loans for capital market					−0.163*** (0.052)					−0.349*** (0.114)
Number of loans for general financial					0.010 (0.045)					0.053 (0.092)
Rural finance					−0.235** (0.090)					−0.012 (0.134)
Microfinance					0.121 (0.101)					−0.107 (0.228)
Nonbank financial sector institutions					0.025 (0.085)					0.112 (0.161)
Constant	3.03*** (0.017)	3.39*** (0.109)	3.29*** (0.118)	3.35*** (0.117)	3.38*** (0.118)	2.10*** (0.044)	1.77*** (0.185)	1.42*** (0.196)	1.40*** (0.199)	1.50*** (0.205)
Number of observations	1119	671	671	671	671	532	366	366	366	366
Number of countries	98	87	87	87	87	60	57	57	57	57
R-squared (within)	0.09	0.15	0.16	0.18	0.22	0.01	0.07	0.12	0.13	0.16

*Significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level.

Note: All models include country fixed effects. All macroeconomic and institutional control variables are lagged one year. Standard errors appear in parentheses.

Source: Authors' analysis based on data sources described in the text and in table 1.

regressions (2.1 and 2.11) indicate that borrowers had significantly more rapid growth in M2/GDP and more rapid declines in cash/M2, both signs of better financial development. This pattern holds when macro/institutional controls

are included in the regressions (models 2.2 and 2.12).[16] Interest spreads tended to widen for nonborrowers and decline for borrowers, though neither coefficient is significant in model 2.16. When the macroeconomic and institutional controls are included in model 2.17, the nonborrower coefficient is positive and significant, and the borrower coefficient remains negative and insignificant. Borrowers thus tended to outperform nonborrowers in terms of spreads.

The pattern of results is different for private credit, which grew faster in nonborrowing than in borrowing countries, though the difference is not significant in either the simplest regression (2.6) or the regression that includes controls (2.7). In addition, private credit growth was positive and significant for borrowers in both specifications, which might come as a surprise given the number of borrowers that suffered financial crises during the period (see table A-1 for a list of borrowers).

If World Bank loans are designed to spur financial development, borrowers should enjoy significantly faster credit growth than nonborrowers. One possible explanation for the fact that they did not is that the nonborrower growth rates are "too high." Private credit growth rates are more than twice as large as M2/GDP growth rates for nonborrowers in the simplest specification, and the nonborrower coefficient does not achieve significance in the M2/GDP specification when the controls are introduced. Such a pattern may be possible over a short period; over longer periods, it is likely to be destabilizing and unsustainable. Indeed, several articles indicate that rapid growth in indicators of financial depth, particularly those related to credit, can be so destabilizing that they lead to crisis (Demirgüç-Kunt and Detragiache 1998; Kaminsky and Reinhart 1999; Honohan 2004; Loayza and Ranciere 2004).[17] By contrast, the growth rates for borrowers seem more reasonable (1–3 percent for private credit/GDP and 2–4 percent for M2/GDP).

Improvements were largest for indicators that are (arguably) better suited to capturing short- and medium-term financial sector development (cash/M2, spreads, and M2/GDP). Therefore, it could be argued that sufficient time had not elapsed to see the full effects of reform on private credit for borrowers. This does not explain why borrowers would perform worse than nonborrowers over this period, however. Tests described below indicate that selection could be driving the results in table 2: borrowers came to the World Bank partly because they were less likely than nonborrowers to generate private credit

16. These results and those that follow also hold when additional lags for the macroeconomic and institutional control variables are included. In the base specification for M2/GDP, for example, the borrower coefficient is 0.017, which is significant at the 1 percent level, while the nonborrower coefficient is 0.002, which is insignificant. For the multilag specification, both the borrower coefficient (0.032) and the nonborrower coefficient (0.017) are significant at the 1 percent level. In both the base and the full-lag specifications, the hypothesis that the borrower and nonborrower coefficients are equal is rejected at the 1 percent level. The full-lag specifications are available from the authors upon request.

17. Loayza and Ranciere (2004) show that a positive long-run relation between financial depth and growth coexists with a largely negative short-run relation.

growth on their own. In the third specification for each indicator in table 2 (models 2.3, 2.8, 2.13, and 2.18), the number of years since first adjustment loan variable is introduced. With the exception of the private credit specifications the *years since first* variable is significantly associated with improved financial development, as expected. This is consistent with the notion that financial reform being a gradual process, countries that received loans earlier in the period experienced greater improvements.

Perhaps more important, when the *years since first* variable enters the regression, the borrower variable is no longer significant. This provides a strong indication that improvements in financial indicators occurred after the receipt of World Bank loans. It, therefore, seems unlikely that borrowing countries were more likely than nonborrowers to improve their financial development indicators regardless of whether they received loans. The coefficient for the *years since first loan* variable (for borrowers) is also statistically distinguishable from that of the nonborrower variable for all indicators except private credit. These patterns also hold when the cumulative number of adjustment loans is included (in models 2.4, 2.9, 2.14, and 2.19). The cumulative loan variable is either insignificant or associated with less financial development across specifications. This result is consistent with findings on repeated structural adjustment lending (Easterly 2005).

In the private credit specifications, *years since first loan* is always positive, though never significant. The borrower variable is also positive and insignificant in all specifications. When the two coefficients are jointly evaluated, the null hypothesis that their sum is equal to zero is rejected at the 5 percent level or better in specifications 2.9 and 2.10. Thus there is some statistical support for the idea that private credit grew in borrowing countries and that the improvements occurred after the receipt of Bank loans. However, the null hypothesis that the difference between the coefficients for borrowers and nonborrowers is zero cannot be rejected. Borrowers did not outperform nonborrowers in private credit growth in any of the specifications in table 2.

The final specification for each indicator (models 2.5, 2.10, 2.15, and 2.20) includes variables that summarize the policy reform areas covered under World Bank loans. Their inclusion does not alter the comparisons between borrowers and nonborrowers, but the interpretation of the results changes slightly: the coefficient on the borrower variable now indicates the impact of participation if there were no conditions attached to loans in any of the policy areas that are controlled for. With the exception of the capital markets development and rural finance variables, the policy variables tend not to be significant across indicators, and the borrower coefficient is similar to that when policy variables are not included in the specification.

While one could come up with explanations for the patterns of the policy coefficients in table 2, it is best not to invest too much effort in this direction. The policy variables are the best that have been put together to study the

effects of reform on financial development, but they have some limitations. First, not all loans that covered a policy area did so in the same way. Some loans may have devoted substantial resources to the policy area, while others may not have done so. Second, because the classifications are based in part on the objectives stated in the documents describing the loans, these measures summarize ex ante indications of planned reform rather than actual ex post reforms. Therefore, the policy variables are a set of coarse controls, included to examine whether the primary results on borrowers versus nonborrowers hold up. The focus is on the simplest decisions—that is, whether or not to borrow and how many loans to take out—rather than on a painstaking qualification of the nature of the reforms to produce variables that are unlikely to explain variation in country-level aggregate financial indicators.

Finally, the control variables that are significant tend to be associated with the financial indicators in the ways one would expect (higher inflation and slower growth retard financial development, for example).[18] CPIA scores are not significant, perhaps because of collinearity with M2/GDP, which is associated with improved financial development for all indicators except interest spreads.[19] The M2/GDP coefficients suggest that the variable could be viewed as a proxy for a country's willingness and ability to undertake financial sector reform.

IV. Selection Effects

The sample of borrowers is unlikely to be random. Selection bias could work in either direction. Countries with the greatest potential for financial development might prefer to pursue reform on their own rather than incur World Bank debt and have to negotiate and adhere to conditions. Alternatively, countries that are ill prepared to achieve financial reform may find themselves ineligible for Bank adjustment loans on mutually acceptable terms.

Nonrandom selection of borrowers can be dealt with in at least two ways. One possibility is to use treatment-effects regressions, which consider the effect of an endogenously chosen binary treatment (in this case, the choice to borrow) on another endogenous continuous variable (in this case, indicators of financial development), conditional on two sets of independent variables. The first set of independent variables is used to estimate a selection equation that describes the participation choice. Information from the selection equation is then used in the financial development regression. The key

18. For robustness year dummy variables were also included in the base regressions to control for global factors that might have affected financial development in all countries. These dummy variables were significant only in the interest rate spread regressions; the qualitative comparisons between borrowers and nonborrowers were similar to those for the base regressions.

19. The CPIA variable becomes positive and significant when M2/GDP is dropped from the private credit specifications.

difficulty is finding an appropriate set of exogenous variables for use in the selection equation.

A second option for facilitating fairer comparisons between borrowers and nonborrowers is propensity-score matching. The intuition underlying this method is that certain country types (for example, the most institutionally sound) are more apt to respond favorably to the treatment than others. To the extent that the control group is more (or less) heavily weighted toward types that are less likely to respond favorably, comparisons with the treatment group can be misleading. The propensity-matching technique therefore matches treatment and control observations based on relevant observable characteristics: apples are compared with apples and oranges with oranges. However, it can be difficult to judge a good match when treatment and control group observations can be compared on multiple observable dimensions. Propensity-score matching can reduce that dimensionality by summarizing the impact of observables in a single equation. A standard probability model (logit or probit) is used to estimate the conditional probability of receiving the treatment (in this case adjustment loans) given a set of covariates. Because the equation is used only to reduce the dimensionality of the conditioning, no behavioral assumptions are attached to it. Thus, unlike in the treatment-effects regressions, the exogeneity of the covariates is not a concern. Contemporaneous variables can be used, and higher-order transformations of those variables are typical.

Applications of these techniques usually involve matching a relatively small set of treatment observations to a subset of a relatively large pool of nontreatment observations. In this case, the set of nontreatment observations is limited, because there are only 38 nonborrowers in the sample (see table A-1).[20] Treatment-effects regressions are, therefore, relied on. Propensity-matching techniques were also applied to these data (the results are presented and discussed in supplemental appendix S-1, available at http://wber.oxfordjournals. org/). In general, propensity matching yields results that favor borrowers a bit more than the base results do.

In many Heckman-type selection models, the dependent variable is observable only for individuals (or households or countries) that received the treatment. In this analysis, indicators of financial development are observable for borrowers and nonborrowers alike. Treatment-effects models are, therefore, estimated in which

$$(2) \qquad\qquad Y_i = \alpha + \beta \mathbf{X}_i + \delta Z_i + \varepsilon_i$$

20. In principle, it would be possible to increase the number of observations by going back to the panel data set. However, the nearest matching control group observations would almost certainly be from borrowing countries in years when no adjustment loan was in place. As in a fixed-effects regression with a dummy variable for current borrowing status, this would provide information only about those countries that changed their borrowing status during the period. Because the goal here is to compare countries that borrowed with those that did not, applying propensity matching to the panel data set was not appropriate.

where Y is an indicator of financial development; $\mathbf{X}$ is the vector of macroeconomic, institutional, and policy control variables; and Z is the endogenous treatment variable indicating whether or not country i borrowed.[21] As is typical in this literature, the decision to borrow is modeled as the outcome of an unobserved latent variable Z^*, which is a function of exogenous covariates W and a random component u:

$$(3) \qquad\qquad Z_i^* = \gamma W_i + u_i$$

The researcher observes that

$$(4) \qquad\qquad Z_i = 1, \text{if } Z_i^* > 0 \quad Z_i = 0 \text{ otherwise.}$$

Because there is an element of self-selection in borrowing from the World Bank and the error term of the model that summarizes this choice (equation 3) could be correlated with the error term in the regression of interest (equation 2), a valid set of instruments is needed. These instruments should be highly correlated with the endogenous regressor (the borrowing dummy variable) but contemporaneously uncorrelated with the error term in equation 2 (that is, truly exogenous).

It is difficult to find exogenous variables for use in the selection equation. It is very likely, for example, that proxies for borrowing needs, as reflected in measures of countries' fiscal health and indebtedness, are themselves endogenous.

Appropriate instruments are found by turning to the literature on the political economy of international financial institutions' lending to test whether strong or weak potential reformers are more likely to receive Bank adjustment loans to promote financial sector development.

Vreeland (2004) offers the following propositions regarding IMF lending. The head of the executive branch in a developing country is more likely to enter into a lending arrangement with the IMF when the governmental structure dictates that the executive face a large number of veto players. And the IMF is more likely to lend to countries that have fewer veto players.

The intuition underlying the first proposition is that reform-minded executives in developing countries use IMF support to help overcome opposition to potentially unpopular policies. The idea is that after the executive reaches an agreement with the IMF, failure to achieve reform is more costly, because rejection of those policies is also seen as a rejection of the IMF, which all domestic

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21. As a robustness check, the total number of loans was also treated as endogenous in specifications that are not presented. The total number of adjustment loans was used to create a dummy variable for "high participation," defined as more than five loans. The high-participation dummy variable was then corrected for selection bias using a treatment-effects regression. These results, which are similar to those for the simple borrower/nonborrower dummy variable, are available upon request from the authors.

politicians and interest groups may recognize as costly.[22] The likelihood that a head of government uses IMF agreements in this way depends on the checks and balances the executive faces. Leaders facing no veto players (that is, dictators) would have no need for IMF support. Leaders facing too many veto players are unlikely to be able to overcome opposition despite IMF support.

Because the IMF prefers to finance successful reform projects, it is likely to be unwilling to enter into agreements with executives who face a large number of veto players. The combination of these two effects should result in a nonlinear relation between the number of veto players and the probability of a loan. In some intermediate range, IMF agreements should be most prevalent, because they are more likely to achieve the desired objective of overcoming the opposition of veto players. World Bank adjustment loans could serve a similar purpose.

These concepts are operationalized using data on the number of checks and balances stipulated in country constitutions (Beck and others 2001). The number of checks and the squared number of checks are included in the selection equations that follow to test whether Vreeland's hypotheses are valid for this data set. If they are, the coefficient for the checks variable should be positive and the checks-squared variable negative in the selection equation. Thus, the likelihood of receiving a World Bank loan for financial sector development would first increase as countries move away from dictatorship (as a result of self-selection by the country) and then decrease when the number of veto players passed some threshold value (as a result of the Bank's selection criteria).

A country's borrowing needs may also affect the likelihood of receiving World Bank adjustment loans. World Bank lending commitments are positively related to an increase in debt service payments and negatively related to the level of international reserves of the borrower (Ratha 2005). As noted, however, contemporaneous measures of countries' fiscal health and indebtedness are likely to be endogenous. Information on fiscal health and indebtedness from 1970 to 1989 is therefore included in the selection equation, which is by definition not contemporaneously correlated with the error term in the financial development regressions (which use data from 1992 to 2003).

It is also conceivable that developing countries—particularly countries with a relatively large stock of World Bank debt—use the proceeds of new Bank loans to repay old loans (evergreening). Beyond some point, however, debt accumulation becomes problematic, making future agreements less attractive, especially from the Bank's point of view. For countries with little past borrowing, predictions about future borrowing are difficult to make. If the lack of borrowing reflects a preference for self-reliance, one would expect little future borrowing. If demand for loans is cyclical, lending would decline during up cycles and increase during down cycles.

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22. According to Vreeland (2004, p. 2), "The IMF may restrict access to loans, it may preclude debt rescheduling with creditors who require an IMF arrangement to be in good standing, and decreased investment may result if investors take cues from the IMF."

A variety of variables was used to measure countries' past and current indebtedness and overall fiscal health to test these hypotheses. Squared terms enter the selection equation to capture any nonlinearities between past indebtedness and the likelihood of receiving a World Bank loan.

Using historical data to predict whether countries borrowed for financial sector development makes it impossible to estimate a selection effect that varies by year for each country. The likelihood of receiving at least one adjustment loan since 1992 is estimated based on data from 1970 to 89. For this reason, the subscript t does not appear in equation (2). The (largely time-invariant) governmental checks variable is better suited to the cross-sectional regressions than to the panel regressions.

The coefficients from a simple probit regression that uses the borrower dummy variable as the dependent variable are as follows:

$$\text{Borrower}_i = \underset{(0.69)}{0.47} + \underset{(0.29)}{0.29 \text{Checks}_i} - \underset{(0.04)^*}{0.07 \text{Checks}_i^2} - \underset{(0.02)^*}{0.03 \text{Debt}_i}$$

$$+ \underset{(0.0002)^*}{0.0003 \text{Debt}_i^2} + \underset{(0.0008)^{**}}{0.0016 \text{IMF Credit}_i}$$

Number of observations: 79
Pseudo R-squared: 0.15
Standard errors in parentheses
*significant at the 10 percent level
**significant at the 5 percent level.

The coefficients from the probit regression and those from the selection equations in the treatment-effects models that follow provide support for the hypotheses in this section. The checks and checks-squared coefficients imply that Bank loans are most likely for an intermediate level of checks. Various measures of past fiscal health were tried, including the current account balance, tax revenues as a percentage of GDP, and the overall government budget balance. Because there are relatively few observations, only two such variables—total IMF borrowing (in millions of constant dollars) and total external debt (as a share of GDP) from 1970 to 1989—are included in the selection equations. The debt variable is negative and its square positive, implying a U-shaped relation with the probability of receiving Bank loans. Thus countries with little past borrowing were more likely to receive loans than those with intermediate levels, possibly indicating that borrowing needs are cyclical. However, heavily indebted countries from 1970 to 89 were the most likely to borrow for financial sector reform from 1992 to 2003, providing additional support for the evergreening hypothesis.[23] The positive coefficient on the IMF borrowing coefficient is also consistent with evergreening.

23. Only a linear and a quadratic term for debt are included in the selection equation, making it impossible to test whether the probability of borrowing eventually declines for extreme levels of indebtedness. The qualitative results for the financial development regressions are similar when the quadratic debt term is excluded from the selection equation.

Although the cross-sectional approach is more promising than the panel approach for handling the selection problems faced here, the approach could make it more difficult to find significant results, because standard errors are likely to be larger in regressions with few observations. Skeptics of the panel results above could argue that because the error terms from multiple observations from the same country are likely to be correlated, the number of independent observations is the same as the number of countries in the data set. Restricting the observation set to the cross-section of countries can, therefore, be viewed as an additional test of whether borrowing countries outperformed nonborrowers in terms of financial development.

For the treatment-effects regressions, growth in Y in year t is calculated as Y_t/Y_{t-1}. The average of annual growth rates over the whole period for each country is used to derive one observation per indicator per country. These country averages are used as dependent variables in the ordinary least squares (OLS) and treatment-effects regressions in table 3. The OLS results in table 3 are similar to those from the panel regressions in table 2, indicating that those results were not solely the product of multiple observations for each country. In particular, M2/GDP grew and cash/M2 declined significantly more rapidly among borrowers. Borrowers' interest spreads declined more rapidly than those of nonborrowers, but the result is not significant in the cross-sectional OLS regression, possibly because there are only 47 observations for that variable. As in the panel regression in table 2, borrowers had slower rates of private credit growth than nonborrowers, although the difference is not statistically significant.

After correction for self-selection using the treatment-effects model, the results show that borrowers outperformed nonborrowers by a wider margin.[24] The change is most pronounced for M2 growth (models 3.2 and 3.3) and private credit growth (models 3.5 and 3.6). At the risk of reading too much into these models, this suggests that the typical World Bank borrower had relatively poor prospects for financial development. Once this is accounted for econometrically, the positive effects of Bank involvement are easier to detect.

Treatment-effects regressions for cash/M2 are more volatile than those for private credit and M2/GDP. In model 3.8, which does not include control variables, the borrower dummy variable is insignificant. Multiple variables are significant in the selection equation, and the likelihood ratio test at the bottom of table 3 indicates that errors from the selection and cash/M2 equations are independent. Thus, the OLS results are valid, and there is no need to perform treatment-effects regression. In model 3.9, which includes institutional and macroeconomic controls, the borrower dummy variable is positive and

TABLE 3. Cross-sectional, OLS, and Treatment-Effect Regressions

Item	Average change in M2/GDP			Average change in private credit/GDP			Average change in cash/M2			Average change in interest rate spread		
	3.1 OLS	3.2 Treat1	3.3 Treat2	3.4 OLS	3.5 Treat1	3.6 Treat2	3.7 OLS	3.8 Treat1	3.9 Treat2	3.10 OLS	3.11 Treat1	3.12 Treat2
Received Bank adjustment loan	0.019* (0.009)	0.075*** (0.014)	0.074*** (0.014)	−0.0005 (0.019)	0.144** (0.020)	0.138*** (0.026)	−0.031*** (0.011)	−0.005 (0.036)	0.059*** (0.017)	−0.128 (0.090)	−0.159 (0.244)	−0.243 (0.183)
CPIA score	0.010 (0.010)		0.012 (0.010)	−0.0001 (0.022)		−0.008 (0.018)	−0.014 (0.012)		−0.010 (0.011)	−0.168* (0.094)		−0.165* (0.091)
Inflation	0.0001* (0.00005)		0.00005 (0.0001)	−0.0001 (0.0001)		−0.00016 (0.00012)	0.00002 (0.0001)		0.00001 (0.00004)	0.0001 (0.001)		0.0002 (0.0005)
Real growth	0.005* (0.003)		0.004 (0.003)	0.015*** (0.006)		0.011*** (0.004)	−0.005 (0.003)		−0.006** (0.003)	0.006 (0.025)		0.008 (0.025)
M2/GDP	−0.0001 (0.0002)		−0.0002 (0.0002)	−0.00005 (0.0005)			0.0001 (0.0003)			0.001 (0.002)		0.002 (0.002)
Constant	0.971*** (0.032)	0.987*** (0.010)	0.939*** (0.031)	0.988*** (0.066)	0.953*** (0.018)	0.950*** (0.055)	1.06*** (0.036)	0.984*** (0.021)	1.00*** (0.035)	1.54*** (0.287)	1.08*** (0.141)	1.59*** (0.283)
Selection equation												
External debt 1970–89 (percent of GDP)		−0.034* (0.018)	−0.029* (0.017)		−0.018 (0.011)	−0.005 (0.005)		−0.035 (0.022)	−0.018 (0.017)		−0.019 (0.035)	−0.011 (0.034)
External debt squared		0.0003** (0.0001)	0.0003* (0.0001)		0.0001 (0.00008)	0.00004** (0.00002)		0.0003* (0.0002)	0.0001 (0.0002)		0.0002 (0.0003)	0.0002 (0.0003)
Number of governmental checks		0.210 (0.228)	0.164 (0.227)		0.234 (0.145)	0.258 (0.170)		0.478 (0.315)	0.616* (0.357)		0.260 (0.538)	0.239 (0.483)
Number of governmental checks squared		−0.050 (0.034)	−0.044 (0.032)		−0.035* (0.020)	−0.034 (0.024)		−0.089** (0.045)	−0.097 (0.061)		−0.056 (0.081)	−0.047 (0.069)
IMF borrowing 1970–89 (constant $ millions)		0.0015** (0.0006)	0.0014** (0.0006)		0.00084* (0.00045)	0.0006 (0.0005)		0.0017** (0.0008)	0.0015** (0007)		0.0013 (0.0010)	
Constant		0.608 (0.541)	0.532 (0.534)		0.137 (0.294)	−0.233 (0.320)		0.140 (0.711)	−0.412 (0.546)		−0.061 (1.05)	−0.089 (0.960)

(Continued)

TABLE 3. Continued

Item	Average change in M2/GDP			Average change in private credit/GDP			Average change in cash/M2			Average change in interest rate spread		
	3.1 OLS	3.2 Treat1	3.3 Treat2	3.4 OLS	3.5 Treat1	3.6 Treat2	3.7 OLS	3.8 Treat1	3.9 Treat2	3.10 OLS	3.11 Treat1	3.12 Treat2
Number of countries	73	72	72	73	76	76	70	74	74	47	47	46
R-squared	0.16			0.14			0.18			0.13		
Log likelihood		94.99	98.04		47.90	53.28		82.61	89.96		−36.76	−35.54
Wald Chi squared		29.24	37.08		50.67	45.38		0.02	32.13		0.43	5.71
Prob > Chi squared		0.000	0.000		0.000	0.000		0.8995	0.000		0.5138	0.35
Likelihood ratio test of independent eqns (rho = 0)		10.85	8.92		17.79	16.70		0.39	6.36		0.01	0.34
P > Chi squared		0.001	0.003		0.000	0.000		0.5308	0.0117		0.9191	0.5591

*Significant at the 10 percent level; **significant at the 5 percent level; ***significant at the 1 percent level.

Note: All policy and control variables (CPIA, inflation, growth, deficits/GDP, M2/GDP) are averaged over 1991–2000. External debt and IMF borrowing are annual averages for 1970–89. Number of governmental checks is from Beck and others (2001). Standard errors appear in parentheses.
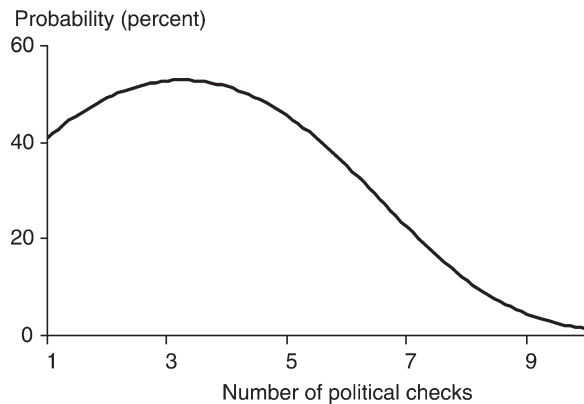
Source: Authors' analysis based on data sources described in the text and in table 1.

significant, indicating less confidence in the financial system. Although fewer variables are significant in the selection equation than in model 3.8, the likelihood ratio test indicates that errors from the selection and cash/M2 equation are not independent; the treatment-effects results are thus preferred over the OLS results. Because the cash/M2 results are highly sensitive to slight perturbations in either the selection equation or the equation of primary interest, it is difficult to draw a strong conclusion for that variable based on table 3.

In contrast, the selection equations for M2/GDP produce many significant coefficients, and the likelihood ratio test indicates that the treatment-effects model is preferred to the OLS model. In the treatment models, the borrower coefficient is nearly identical whether or not controls are included. This relatively stable pattern of results lends credibility to the conclusion that borrowing countries performed better than nonborrowers on that dimension. Significance levels in the selection equation for private credit are somewhat lower than for M2/GDP, but the coefficients are similar.

As in the simple probit discussed above, the governmental checks and checks-squared coefficients from the selection equations indicate that the probability of receiving an adjustment loan increases from one to three checks but declines thereafter (figure 1). Loans from international financial institutions are therefore most likely for intermediate levels of checks. The debt and debt-squared coefficients indicate that countries with low levels of debt in the 1970s and 1980s were more likely to be borrowers in this data set than those with moderate levels of debt (figure 2), a finding that is consistent with the hypothesis that debt levels may be cyclical. The selection equations therefore provide plausible results in many of the treatment-effects regressions.

FIGURE 1. Probability of Receiving World Bank Adjustment Loan for Financial Sector Development as a Function of Number of Political Checks

Source: Authors' calculations based on table 3, model 3.2. Data sources are as described in the text and in table 1.

FIGURE 2. Probability of Receiving World Bank Adjustment Loan for
Financial Sector Development as a Function of Level of External Debt
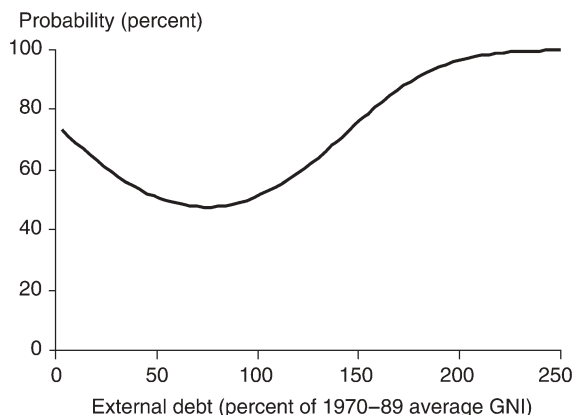
Probability (percent)

External debt (percent of 1970–89 average GNI)

Source: Authors' calculations based on table 3, model 3.2. Data sources are as described in
the text and in table 1.

These regressions reinforce conclusions about the positive association
between borrowing and financial development. For M2/GDP and private
credit/GDP borrowers outperform nonborrowers in the treatment-effects
models. Unlike some of the base models for private credit that do not control
for selection, none of the treatment-effects specifications indicates that bor-
rowers underperform nonborrowers. For interest spreads the hypothesis that
the errors from the first- and second-stage regressions are independent cannot
be rejected, in which case no correction for selection is required. The base
results in table 2 and the OLS results in table 3 are thus valid. The coefficient
for borrowers is negative in both sets of regressions, highly significant in the
base results, and nearly significant in the OLS results. For cash/M2 the
treatment-effects results are unstable; it is thus not possible to draw strong con-
clusions from them.

V. ADDITIONAL ROBUSTNESS CHECKS

A series of tests indicates that the main findings are not driven by the regional
composition of borrowers and nonborrowers and are robust to the inclusion of
variables that measure a country's readiness for and experience with reform
and to the substitution of ratings of financial sector development for quantitat-
ive measures of financial sector development. In the readiness for reform
regressions, CPIA scores are replaced with a measure of the degree to which
countries adhere to the rule of law developed by the International Country
Risk Guide (ICRG).

Several findings emerge from this analysis. First, in Latin America and the
Caribbean financial sector development was stronger in countries that

borrowed from the World Bank than in countries that did not (supplemental appendix S2). Second, the basic pattern of results holds when countries from Europe and Central Asia and Sub-Saharan Africa are dropped from the analysis (supplemental appendix S3). Countries in Europe and Central Asia might have been driving the base results, because many of them began the period of study with low indicators of financial development that improved largely as a result of macroeconomic stabilization. Countries in Sub-Saharan Africa tended to be in the nonborrowing group; the base results might have been picking up differences in financial development between them and countries from other regions. Neither of those concerns is supported by the data. Third, the main findings are robust to the inclusion of controls for whether a country was ready for reform, what other reforms it had already taken when it received financial sector adjustment loans, and what other agencies were involved in its reforms (supplemental appendix S4). Fourth, results are similar when an index of banking and financial sector freedom replaces the quantitative indicators as the dependent variable (supplemental appendix S5): countries that borrowed from the World Bank experienced greater improvement on the index than those that did not.

VI. Conclusions

Evidence based on analysis of a new data set on Bank adjustment loans that supported financial sector reform from 1992 to 2003 indicates that borrowing countries performed better than nonborrowers on multiple measures of banking sector development, including M2/GDP, interest spreads, and cash/M2. They performed worse than nonborrowers on private credit/GDP in OLS regressions. Improvements in financial indicators occurred after the inception of adjustment lending, even after controlling for the adverse selection effects associated with repeated lending to the same country. The main findings hold both in panel regressions that incorporate fixed-country effects and in cross-sectional regressions that use average growth in financial indicators over the full period for each country as dependent variables. The cross-sectional regressions indicate that the panel results are not driven by multiple observations from the same country, which can artificially reduce standard errors.

   A series of models accounts for potential selection effects. Nonlinear selection equations capture concepts from the political economy literature on the relations between international financial institutions and developing countries. This approach, therefore, distinguishes countries that prefer not to borrow from these institutions, because they are relatively self-sufficient from those that international financial institutions prefer not to deal with because reform is unlikely to succeed. Addressing nonrandom selection using treatment-effects regressions reveals that the rate of growth of private credit and M2 was significantly larger for borrowers than for nonborrowers. For interest rate spreads test statistics indicate that the errors from the selection and financial

development regressions are independent, obviating the need to correct for nonrandom selection. For cash/M2 the treatment-effects results are highly sensitive to small perturbations in the specification, but some models indicate that no correction for selection effects is necessary.

Robustness checks indicate that the results are not driven by the regional composition of borrowers and nonborrowers and are robust to the inclusion of proxies for countries' readiness and ability to reform. Taken in their entirety, these results suggest that the World Bank adjustment loans studied here had some positive effects on financial sector outcomes.

APPENDIX A-1. Countries That Did and Did Not Receive World Bank Adjustment Loans for Financial Sector Reform between 1992 and 2003

Countries that received World Bank adjustment loans	Countries that did not receive World Bank adjustment loans
Albania	Angola
Algeria	Benin
Argentina	Banngladesh
Armenia	Belarus
Azerbaijan	Botswana
Bolivia	Cambodia
Bosnia and Herzogovina	Chile
Brazil	China
Bulgaria	Congo, Dem. Rep.
Burkina Faso	Costa Rica
Cameroon	Côte d'Ivoire
Cape Verde	Czech Republic
Central African Rep.	Dominican Republic
Chad	Egypt, Arab Rep. of
Colombia	Estonia
Croatia	Ethiopia
Ecuador	Gabon
El Salvador	Gambia, The
Georgia	India
Ghana	Iran
Guatemala	Kenya
Guinea	Lebanon
Guyana	Lesotho
Honduras	Mali
Hungary	Mauritius
Indonesia	Nepal
Jamaica	Nigeria
Jordan	Panama
Kazakhstan	Papua New Guinea
Korea, Rep. of	Paraguay
Kyrgyz Rep.	Senegal
Lao, PDR	South Africa

(Continued)

APPENDIX A-1. Continued

Countries that received World Bank adjustment loans	Countries that did not receive World Bank adjustment loans
Latvia	Sri Lanka
Lithuania	Swaziland
Macedonia	Togo
Madagascar	Trinidad and Tobago
Malawi	Venezuela, R. B. de
Malaysia	Zimbabwe
Mauritania	
Mexico	
Moldova	
Mongolia	
Morocco	
Mozambique	
Nicaragua	
Niger	
Pakistan	
Peru	
Philippines	
Poland	
Romania	
Russia	
Rwanda	
Sierra Leone	
Slovak Republic	
Slovenia	
Tajikistan	
Tanzania	
Thailand	
Tunisia	
Turkey	
Uganda	
Ukraine	
Uruguay	
Uzbekistan	
Vietnam	
Yemen	
Zambia	

Note: The 106 countries in this table are those that appear in at least one regression. The maximum number of countries in any regression is 98.

Source: Independent Evaluation Group database of World Bank loans for financial sector reform.

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