Banking Reform and the Financing of Firm Investment: An Empirical Analysis of the Chilean Experience, 1983–92

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This article investigates whether the Chilean banking reforms of the 1980s have contributed to reducing market imperfections in Chilean financial markets in the late 1980 and early 1990s. To analyse this issue, patterns of investment and its finance for different types of firms are studied, based on balance sheet information of a panel of 70 firms. The most important conclusion is that those specific reforms, aimed at reducing intra-conglomerate lending, seem to have been successful, since access of non-conglomerate firms has increased, indicating a reduction of existing market imperfections for such firms.

In recent years, a large body of empirical literature has investigated the impact of information problems in financial markets on investment decisions of firms in developed countries [*Fazzari, Hubbard and Petersen, 1988*; *Devereux and Schiantarelli, 1990*; *Hoshi, Kashyap and Scharfstein, 1991*; *Whited, 1992*; *Van Ees and Garretsen, 1994*; *Chirinko and Schaller, 1995*]. The empirical studies have approached this issue by analysing the importance of internal funds as an explanatory variable of annual investment outlays. In particular, they divide firms into groups for which it might be expected that information problems are more severe as compared to other groups of firms. Next, they compare the importance of internal funds as a determinant of investment between these different groups of firms to see whether there is evidence for the hypothesis that measures of

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internal funds are less important as determinants of investment of firms for which banks may hold more information.

This type of analysis has been scarcely applied to investment finance in developing countries (see, however, Atiyas [*1992*]; Harris, Schiantarelli and Siregar [*1994*]; and Jaramillo, Schiantarelli and Weiss [*1996*] for examples of empirical studies of developing countries). This is a serious omission in the literature since information problems in financial markets are expected to be particularly important in developing countries (see, for example, Stiglitz [*1989*]). The present study extends the existing literature by examining whether or not the banking reforms of the 1980s in Chile have changed the impact of financial market imperfections on investment behaviour and its finance. In particular, the article investigates the impact of financial reforms related to strengthening the regulation of the banking system in Chile, on financial decision making of firms during the 1980s and early 1990s.

The hypothesis is that if these reforms have had the expected outcomes, then market imperfections in the financial sector should have been reduced, at least from 1987 onwards, when all major reforms had been implemented. This is based on the idea that before the reforms banks were less able to screen and monitor the projects with the highest expected rate of return, due to externalities related to the screening and monitoring of borrowers by these banks, and based on the high cost of gathering information. Consequently, they restricted their lending activities to particular groups of borrowers and rationed other groups, due to asymmetric information. After the reforms, monitoring and screening is expected to have been improved and problems of asymmetric information to have been reduced, which may be seen through decreased segmentation of access to loans of different categories of firms. By considering changes in the relationship between investment and internal financial sources of firms in the 1983–92 period, indirect evidence may be provided with respect to whether or not the expected effects did take place.[1]

The article is organised as follows. Section I describes the banking reforms during the 1980s and early 1990s. Section II describes the data used in the econometric analysis. Section III presents the results of the econometric investigation of the impact of the financial reform programme on investment and its finance of different groups of firms. Section IV provides a summary and conclusion.

I. DESCRIPTION OF THE BANKING REFORMS OF THE 1980s

During the early 1980s Chile experienced the most severe recession since the 1930s. The economy contracted by 15 per cent during 1982–83, and the

unemployment rate rose to 20 per cent in 1982 [*Corbo and Fischer, 1994: 32–3*]. The crisis of 1982–83 was caused by the conjunction of domestic policies implemented during the 1970s and the adverse external developments of the early 1980s. On the one hand, external factors – such as falling terms of trade, world wide economic crisis, rising international interest rates and the sudden fall in external finance after the Mexican debt moratorium of August 1982 – had an important adverse impact on the Chilean economy. On the other hand, domestic policy failures, such as the fixed exchange rate policy, wage indexation, and weak financial regulation were also important.[2]

The years 1982–83 were especially critical for the financial sector. Due to the very weak position of firms several banks met with considerable financial problems. Most observers now agree that the combination of weak prudential regulation and the dominance of business conglomerates in the Chilean economy was an important factor behind the domestic financial instability during the early 1980s [*Edwards and Cox-Edwards, 1991*; *Velasco, 1991*; *Hermes, 1995*].[3] The central bank had to intervene in order to prevent a complete financial breakdown. In early 1983 the central bank decided to intervene by taking over non-performing debts of banks with severe financial problems and by liquidating insolvent institutions. Together with earlier interventions in the financial system during 1981, the central bank intervened in 13 banks and six *financieras*. The loan portfolio of the intervened institutions represented 60 per cent of all loans issued by the financial system [*Larrain, 1989: 1–2*]. Moreover, to reduce the crisis of confidence, the government issued an explicit deposit insurance on deposits held with insolvent intermediaries.

Additionally, the government decided to strengthen the regulatory system with the aim of preventing the financial sector from collapsing in the future and improving the process of domestic resource mobilisation and the efficiency of resource allocation.[4] In the early years of the 1980s, the Chilean government implemented new measures that basically aimed at reducing the possibilities of intra-conglomerate lending. This kind of lending was held responsible, at least to a large extent, for the growing financial instability during the early 1980s. The new measures prohibited banks from being the financial heart of these conglomerates, a position they had attained in the course of the 1970s. The measures included restrictions on the amount of lending to individual borrowers and to related parties, introduction of a loan-risk classification system, and strengthening of capital requirements.

Moreover, in 1986 the monetary authorities introduced a new banking law. This new law contained measures to improve disclosure of information on banks to the public; it explicitly defined the contents and limitations of

deposit insurance; and it defined new mechanisms for dealing with solvency problems of banks.[5] The new Chilean banking law of 1986 explicitly aimed at improving financial intermediation by increasing the confidence of the public in the system as well as by improving the quality of bank management. In general terms, the newly developed regulatory system obliged banks to act risk-aversely, whereas at the same time the public was stimulated to closely monitor bank behaviour with only minor government involvement. The basic idea was that by improving financial market regulation, information-based market imperfections would be reduced by stimulating both deposit holders and banks to increase their monitoring and screening activities. Increasing public confidence by improving prudential regulation and by providing deposit holders with clear incentives and possibilities to privately monitor and screen banking operations would contribute to a safer and more efficient banking system, which would enhance resource mobilisation. This would increase the volume of resources available for investment. Moreover, better monitoring and screening by the management of the banks would improve the quality of investment financed by banks. Increased production of information with respect to activities related to financial markets by creditors of the banks, as well as the banks themselves, would contribute to reducing market segmentation and high-risk lending operations.

II. DATA DESCRIPTION

To analyse the impact of financial reforms on information problems in financial markets in Chile, firm level financial data have been used, provided by the *Superintendencia de Valores y Seguros (SVS)*. This is a government agency to which limited companies have to report their activities. The data-set consists of information on balance sheets, income statements and uses and sources of funds of firms from different sectors of the economy. The SVS data-base is the Chilean counterpart of COMPUSTAT, the corporate data base of the United States [*Walker and Hernández, 1992: 14*]. This may indicate that the accounting practices in Chile are comparable to those of the United States. Moreover, since all firms present their information in a pre-specified format, one might expect the Chilean accounts to be fairly accurate. Data for the 1981–92 period have been used. For every year between 1981 and 1992 some 250 to 300 firms have reported information to the SVS.

The following criteria have been adopted to construct the data set that has been used in the empirical part of this article. First, firms have been selected that presented full information for all relevant variables during the 1981–92 period in order to acquire a balanced data-set. Second, firms have

been eliminated from the data-set when they were operating within the financial, public administration or social sectors. In other words, the firms in the data-set are engaged in the agricultural, mining, manufacturing, construction, or services sector. Third, firms were eliminated when they reported that they were in a state of liquidation, or when the data appeared to be unacceptable or inconsistent.[6] After using these criteria the data-set consisted of 70 firms.

Firms have been divided into sub-samples based on criteria which may be useful to identify firms that have different degrees of problems with communicating private information to financial intermediaries, that is, banks. The criteria that have been used in this context are the *size* of firms, the *age* of firms, and whether or not a firm belongs to a business conglomerate, or *Grupo*.

First, with respect to the size criterion, it is clear that banks have less difficulty in screening and monitoring the behaviour of large firms, since the monitoring and screening costs related to lending to such firms are lower per unit of capital. This is due to the fixed cost nature of information and due to the fact that the volume of lending to these firms will generally be larger in absolute terms. Moreover, large firms are better able to provide collateral as compared to small firms.

Second, with respect to the age criterion, it can be stated that old firms have less difficulty in communicating private information, since banks will have had more time to obtain information on their creditworthiness. Moreover, old firms have been shown to be creditworthy and willing to pay back their obligations in the past.

Finally, firms related to a Grupo have less difficulties in communicating information to banks. The Chilean Grupos are characterised by the fact that close relationships exist between firms and banks within these conglomerates [*Hermes and Lensink, 1998*]. The existence of such close financial networks can be found in many developing countries and can be explained on the grounds of existing market failures, which appear to be prevalent in these countries [*Stiglitz*, 1989]. Close relationships between banks and firms mitigate information problems. Banks are much better informed about the creditworthiness and the expected profitability of investment of Grupo related firms. This improves the access of these firms to bank loans.

Based on the above discussion of the criteria, it is hypothesised that small firms, young firms, and firms not belonging to Grupos have more problems in communicating information to banks. Banks have more difficulties in monitoring and screening the activities of these firms. The result is that they face higher costs of external finance, and may even be rationed out of credit markets. Thus, they are more likely to be faced by financial constraints.

For each of the three above mentioned criteria two sub-samples of firms have been created: small versus large firms, young versus old firms and Grupo versus non-Grupo firms. The size sub-samples have been obtained by dividing the total sample of firms in two groups containing an equal number of firms, based on average total assets during 1983–92. The age sub-samples have been obtained by classifying firms born less than 21 years ago as being young, whereas firms of 21 years or older have been classified as old. One may question whether this really divides informationally disadvantaged younger firms from better known older firms.[7] Nevertheless, when using this criterion firms are divided into 50 old and 20 young ones. Finally, the division of firms into Grupo and non-Grupo firms is based on information provided by the SVS data. Among the information in the data set is also a reference to whether or not a firm belongs to a Grupo. If this reference is applied, 38 firms are classified as non-Grupo related firms, whereas 32 firms are classified as Grupo related firms.

TABLE 1
SUMMARY STATISTICS OF DIFFERENT SUB-SAMPLES OF FIRMS, 1983–92

	No. of firms	Total assets	Fixed assets	Invest-ment	Profit	Sales	Internal sources
SMALL	35						
mean		2,519	948	0.121	0.049	0.978	0.431
median		2,041	580	0.082	0.056	0.632	0.184
LARGE	35						
mean		38,004	19,856	0.117	0.083	0.567	0.267
median		15,377	6,652	0.089	0.084	0.509	0.207
YOUNG	20						
mean		13,116	6,804	0.124	0.079	0.527	0.567
median		5,548	1,768	0.083	0.126	0.519	0.174
OLD	50						
mean		23,830	12,220	0.117	0.062	0.862	0.258
median		5,977	2,241	0.087	0.143	0.586	0.204
NON-GRUPOS	38						
mean		5,702	2,579	0.117	0.051	0.989	0.393
median		2,876	731	0.077	0.058	0.747	0.188
GRUPOS	32						
mean		38,660	20,283	0.122	0.085	0.503	0.291
median		12,935	4,575	0.093	0.086	0.457	0.207

Note: Total and fixed assets are in millions of 1985 pesos; investment and internal sources are divided by the capital stock; profit and sales are divided by total assets.

Table 1 provides basic information on the characteristics of the sub-samples of firms. In general, the summary statistics presented in the table do show that the sub-samples of firms differ in a number of ways. First, large firms are much larger than small firms. Based on median values of total assets, large firms are seven times larger than small firms. Based on median values of fixed assets this difference is even greater. Note that Grupo related firms are also much larger than non-Grupo related firms, although the differences between both these sub-samples are less striking than for the sub-samples based on size. In terms of total assets, the median value of Grupo related firms is four and a half times that of non-Grupo related firms. For the stock of fixed assets this is more than six times. The difference in size between young and old firms is less pronounced. Although mean values of both total and fixed assets of old firms are roughly two times larger than that of young firms, median values do not differ substantially.

Second, differences with respect to investment activity are not very large between sub-samples. Mean values of investment to capital ratios for all sub-samples vary around a level of 0.12. Third, small firms as well as non-Grupo firms are less profitable than large and Grupo firms, respectively. For sub-samples based on age, it appears to be more difficult to determine which class of firms has been more profitable. Mean values of profit to total asset ratios are higher for young firms. Yet, mean values seem to be rather volatile over the 1983–92 period (measured by its standard deviation). Therefore, median values may be a better representation of the centre of both sub-samples. When looking at median values, it appears that old firms are more profitable. Fourth, with respect to sales to asset rates, small firms, old firms and non-Grupo firms have substantially higher mean and median values.

Finally, small firms, young firms and non-Grupo firms seem to have higher internal sources (divided by the capital stock) available. Yet, the annual amount of these internal sources appears to be rather volatile for all sub-samples (again measured by its standard deviation). Therefore, taking median values as a better representation of the centre of sub-samples, the table shows that these values for large, old and Grupo firms are above those for small, young and non-Grupo firms.

These summary statistics reveal interesting differences between sub-samples of firms for a number of variables of interest for the issue discussed in this article. Yet, econometric analysis is needed to really investigate whether the relationship between investment and the availability of internal sources differs between groups of firms.

III. ECONOMETRIC INVESTIGATION

The Strategy of Econometric Investigation

In order to investigate whether particular classes of firms are confronted with information problems in financial markets[8] an investment function has to be specified in which proxies for internal sources are incorporated, next to other variables explaining investment behaviour. If size, age or relatedness to a Grupo reduces information imperfections, this should expose itself by the fact that the coefficient for the internal sources variable in the investment equation is lower for large, old and Grupo firms than the coefficient for the small, young and non-Grupo firms. Such an investigation is the first step in the process of analysing the central hypothesis of this article, that is, did the financial reforms in Chile in the 1980s contribute to reduce existing market imperfections based on information problems in financial markets?

The second step establishes the effect of the reforms on existing market imperfections. To investigate whether there is evidence for the hypothesis that financial reforms succeeded in reducing these imperfections, the same investment equation is estimated for sub-samples and sub-periods. In the estimations a pre-reform and post-reform period are distinguished. The dividing line for determining the pre- and post-reform periods has been set at the year 1987. The rationale for choosing 1987 is based on the following considerations. First, the major reforms were carried out during the 1981–86 period. Second, these reforms need at least one year to materialise and to have the desired effects on the behaviour of participants in the financial markets. Both banks and firms need time to adjust their financial and real decisions to the new conditions created by the institutional reforms.

The hypothesis specified above is supported if the coefficient for the internal funds variable in the investment equations for the small firms, young firms and non-Grupo firms – that is, those confronted with more severe financial constraints, at least before the reforms – is higher for the pre-reform than for the post-reform period. This would suggest that the reforms have contributed to reducing information problems in financial markets, since those firms identified as being confronted with more severe financial constraints before the reforms would show reduced importance of internal sources to explain investment, that is, financial constraints have been reduced.

The econometric analysis is carried out as follows. An investment equation is estimated for the 1983–92 period. The dependent variable is gross investment, that is, net investment plus depreciation in each year. Net investment has been measured as total additions to the capital stock as reported in the income statements of firms. The estimation procedure is

based on pooled regressions of individual firm data, using the least squares technique. All variables (dependent as well as independent) in the regressions presented below have been scaled by total capital stock one period lagged and have then been transformed into logs.[9] In order to be able to pool the information of individual firms, the *fixed effects technique* has been used. To carry out fixed-effect estimations, the original data have been transformed. For each variable, the means of individual firm observations have been subtracted from the original observations. The least-squares method is then applied to the transformed data [*Hsiao, 1986: 29–41*]. In the estimation procedure, outliers have been dropped based on extreme values of the residuals of the individual equations.[10]

Specification of the Investment Equations

In the estimations an *accelerator-type investment model* has been used as the basic model for specification of the investment equations. This model is fairly standard in the investment literature and has been used in many comparable studies on the effects of information problems on investment decisions of firms in developed countries. It incorporates changes in total sales (Δ SAL) as the basic regressor which may explain investment behaviour. The idea is that investment decisions are based on observed patterns of past demand for final output. Therefore, a positive relationship is expected to be found between investment and the sales variable. Other regressors which have been added to the basic model are the debt to capital (or leverage) ratio (DEBT), investment one period lagged (GINV), internal funds (IFUND), and Tobin's Q (TOBQ). The debt to capital ratio has been included to account for the effects of the cost of debt on investment. Investment outlays will be negatively affected by this ratio, since the higher the leverage, the higher will be the costs of financing investment with debt. This is due to the fact that creditors will increase the marginal price of loans when a debtor already has a high level of debt to capital [*Harris, Schiantarelli and Siregar, 1994: 38*]. One should expect to find a negative relationship between investment and the debt indicator. Investment one period lagged is included to account for the stock adjustment process. It is hypothesised that the relationship between investment and investment one period lagged is positive.

Next, internal funds measured as net profit after taxes plus depreciation have been added as a variable in the equation. This is standard in the empirical literature related to the issue of this article. Based on the discussion in section II, one should expect to find a positive relationship between investment and internal funds. However, the coefficient of the internal funds variable should be lower for firms for which the information problem in financial markets is assumed to be smaller, that is, large firms, old firms and Grupo firms.

Finally, Tobin's Q has been added, since standard criticism of analysing the relationship between investment and measures of internal sources has pointed out that these measures may also proxy for the profitability of investment. According to this criticism, one should expect a positive relationship between internal sources and investment, since firms having more liquidity are doing well and thus have better possibilities to invest [*Hoshi, Kashyap and Scharfstein, 1991: 43*]. This may pose problems when one wants to interpret the internal funds coefficients in terms of representing financial market imperfections. Therefore, one can use Tobin's Q (TOBQ) – a frequently used proxy measure for expected profitability of the firm – , to account for the effect of the expected future profitability of investment on investment decisions.[11] There are several ways of measuring this variable. Tobin's Q is defined here as the market value of equity plus the book value of (short plus long-term) debt divided by the book value of total assets. The relationship between investment and Tobin's Q is expected to be positive.

The exact specification of investment behaviour can be found in Table 2, equations (1)–(4). All equations include changes in total sales of the present period. All other variables are included with a lag of one period.[12] The internal funds variable is added one period lagged, based on the idea that in general a firm will finance investment in period t, using the internal funds generated one period earlier – that is, which is available at the beginning of period t. In equations (2)–(4) two internal funds variables are included for sub-samples based on size, age and relatedness to a Grupo. For example, in equation (2) one internal funds variable is obtained by multiplying one period lagged internal funds with a dummy variable, which is one when observations refer to small firms and zero when they refer to large firms (IFUNDSML). The other variable is obtained by multiplying one period lagged internal funds with a dummy variable, which is one when observations refer to large firms and zero when they refer to small firms (IFUNDLRG). The same procedure has been applied to create internal funds variables for sub-samples based on age (IFUNDYNG and IFUNDOLD, respectively) and relatedness to a Grupo (IFUNDG and IFUNDNG). All equations have been estimated including year dummies to capture the impact of macroeconomic changes during the 1983–92 period.

Discussion of the Results

The estimation results of the investment equations for the entire 1983–92 period are presented in table 2. Equation (1) presents the outcomes for the total sample of firms. Equations (2) to (4) present the outcomes for the sub-samples of firms based on size, age and relatedness to a Grupo, respectively. For all equations the results are similar with respect to all regressors included except for internal funds. First, the results show that the sales

TABLE 2
ECONOMETRIC RESULTS OF THE INVESTMENT EQUATIONS

	(1)	(2)	(3)	(4)
IFUND (–1)	0.131 (4.65)			
IFUNDLRG (–1)		0.144 (3.69)		
IFUNDSML (–1)		0.121 (3.38)		
IFUNDOLD (–1)			0.107 (3.28)	
IFUNDYNG (–1)			0.206 (4.05)	
IFUNDG (–1)				0.119 (3.23)
IFUNDNG (–1)				0.144 (3.79)
TOBQ (–1)	0.059 (2.02)	0.057 (1.95)	0.061 (2.16)	0.058 (1.98)
DEBT (–1)	–0.043 (–1.52)	–0.043 (–1.52)	–0.045 (–1.16)	–0.043 (–1.52)
Δ SAL	0.212 (3.69)	0.213 (4.46)	0.219 (4.05)	0.214 (3.72)
GINV (–1)	0.306 (6.41)	0.307 (6.43)	0.300 (6.30)	0.303 (6.35)
R^2	0.28	0.28	0.28	0.28
adj. R^2	0.14	0.14	0.14	0.14
N	472	472	472	472

Notes:
The independent variable is gross investment. For explanation of the abbreviations used, see the main text. All equations have been estimated with year dummies. Only dummies for 1988 and 1992 appeared to be significant. The estimations shown in the table include only these two dummies. They have been omitted from the table for presentation purposes. Estimations including all year dummies do not differ substantially from those presented in the table.

t-statistics and R2 have been corrected for the loss of degrees of freedom due to the inclusion of firm specific dummies. Adjusted t-values (between parentheses) and R^2 are presented in the table.

Estimations have been tested on the condition of normally distributed residuals, using the Jarque-Bera test statistic (JB). This test is chi-squared distributed with two degrees of freedom and should always be lower than 5.99 to be significant at the five per cent level. For all regressions presented in this table the test results show that the hypothesis of normally distributed residuals can be accepted at the five per cent level of significance. The White test is applied to test for problems of heteroscedasticity of residuals. In almost all cases the hypothesis of no problems of heteroscedasticity could be excepted at the one per cent level of significance. This indicates that there might still remain some minor problems with respect to heteroscedasticity.

variable, investment one period lagged and Tobin's Q appear with a strongly significant positive coefficient in all equations. Second, the debt to capital ratio appears not to be statistically significantly related to investment in any of the equations.

Turning to internal funds the table shows that the internal funds variables for all firms, as well as for different sub-samples of firms appear with the expected sign in the investment equations and are strongly significant. The outcomes for the different sub-samples are as follows. For the sub-samples based on size, the coefficient for internal funds of large

firms is higher than that for small firms (0.145 against 0.12), but the difference is not statistically significant. The internal funds coefficient of young firms is significantly higher than that of old firms (0.21 against 0.11), suggesting that young firms are confronted with more severe financial constraints due to information problems in financial markets. Finally, the coefficient of the non-Grupo firms is higher than that for Grupo firms (0.145 and 0.12, respectively), but the difference is not statistically significant.

The outcomes of the estimations for the entire 1983–92 period are of less importance to the present study; the financial reforms of the first half of the 1980s are hypothesised to have had a significant impact on investment behaviour and its finance for different groups of firms during the second half of the 1980s and the early 1990s. To test this hypothesis the investment equations in Table 2 are re-estimated and presented in Table 3. Each of the equations (2) to (4) in Table 3 now includes four, instead of two internal funds variables. Taking equation (2) as an example, there are two internal funds variables for small firms and two for large firms. The internal funds variable for small firms is multiplied with a dummy variable, which is one when observations refer to the 1983–87 period and zero when they refer to the 1988–92 period (IFUNDSML PRE). Moreover, the internal funds variable for small firms is multiplied with a dummy variable, which is one when observations refer to the 1988-1992 period and zero when they refer to the 1983–87 period (IFUNDSML POST). The same procedure has been followed to construct the two internal funds variables for large firms (IFUNDLRG PRE and IFUNDLRG POST, respectively), as well as for the other sub-samples (IFUNDYNG PRE and POST, IFUNDOLD PRE and POST, IFUNDG PRE and POST, and IFUNDNG PRE and POST, respectively).

The outcomes of the estimations reveal the following results. First, for the sub-samples based on size it appears that the internal funds coefficient for both large and small are not significantly different from each other in the two sub-periods. Moreover, the coefficients for the internal funds variables do not significantly change after the implementation of the reforms. These outcomes do not lend support to the hypothesis that the financial reforms contributed to reducing market imperfections.

Second, for the sub-samples based on age the outcomes show that before the reforms internal funds were a significantly more important determinant of investment for young firms (coefficient is 0.20) than for old firms (coefficient is 0.12). After the reforms, this outcome remains unchanged; the difference between the internal funds coefficients appears to become even somewhat larger (0.09 and 0.21, respectively). This suggests that, contrary to what is hypothesised, the reforms do not seem to have had the expected impact on reducing market imperfections for the informationally disadvantaged young firms.

TABLE 3
ECONOMETRIC RESULTS OF THE INVESTMENT EQUATIONS:
PRE- AND POST REFORM

	(1)	(2)	(3)	(4)
all firms:				
IFUND (–1) PRE	0.136 (3.58)			
IFUND (–1) POST	0.126 (3.22)			
large firms:				
IFUNDLRG (–1) PRE		0.143 (2.80)		
IFUNDLRG (–1) POST		0.144 (2.60)		
small firms:				
IFUNDSML (–1) PRE		0.130 (2.39)		
IFUNDSML (–1) POST		0.115 (2.58)		
old firms:				
IFUNDOLD (–1) PRE			0.120 (2.91)	
IFUNDOLD (–1) POST			0.093 (2.20)	
young firms:				
IFUNDYNG (–1) PRE			0.197 (2.39)	
IFUNDYNG (–1) POST			0.211 (3.24)	
Grupo firms:				
IFUNDG (–1) PRE				0.109 (2.33)
IFUNDG (–1) POST				0.133 (2.45)
non-Grupo firms:				
IFUNDNG (–1) PRE				0.186 (3.00)
IFUNDNG (–1) POST				0.123 (2.69)
TOBQ (–1)	0.059 (2.01)	0.057 (1.94)	0.062 (2.12)	0.059 (2.07)
DEBT (–1)	–0.043 (–1.58)	–0.043 (–1.52)	–0.045 (–1.60)	–0.042 (–1.49)
Δ SAL	0.211 (3.67)	0.212 (3.90)	0.062 (3.83)	0.213 (3.70)
GINV (–1	0.306 (6.41)	0.307 (6.41)	0.301 (6.31)	0.301 (6.57)
R^2	0.28	0.28	0.28	0.26
adj. R^2	0.14	0.13	0.14	0.12
N	472	472	472	472

Notes: see Table 2.

The outcomes with respect to the sub-samples based on size and age might be explained by the fact that the data set used here is not necessarily representative of the corporate sector in Chile. It may consist of a rather small sample of relatively larger (and older) firms. Therefore, the firms in this panel may have better access to financial markets than the average Chilean firm.

Finally, when looking at sub-samples based on the relatedness to a Grupo the estimation outcomes suggest the following. Before the reforms, internal sources of finance were a more important determinant of investment for non-Grupo firms as compared to Grupo firms (coefficients are 0.19 and 0.11, respectively). However, after the reforms there appears to be no significant difference between coefficients of internal funds (0.13 and 0.12, respectively), that is, internal sources are equally important in determining investment of both Grupo and non-Grupo firms. This result suggests that, based on the criterion of whether or not firms have relationships to Grupos, informationally disadvantaged firms (that is, firms without Grupo relations) were indeed confronted with more severe financial constraints based on existing information problems in financial markets, whereas after the reforms were implemented this was no longer the case. This may support the hypothesis that the financial reforms have been effective in reducing market imperfections in financial markets related to information problems.

The latter result may be interpreted as follows. As has been discussed elsewhere [*Hermes and Lensink, 1998*], one of the specific characteristics of the changes in regulation during the early 1980s was directed towards reducing the possibilities of intra-Grupo lending. This change of regulation may be part of the explanation for the results found and presented in table 3, equation (4). The new regulation adversely affected the opportunities for banks to be the financial heart of the Grupos. This may have also reduced the information advantages they had with respect to lending to Grupo firms as compared to non-Grupo firms before the restrictions on intra-Grupo lending were effected. Indeed, this regulatory change may have reduced the mitigating effect of conglomerate structures on the information problems in financial markets. Stated somewhat differently, it may have helped to reduce the existing market segmentation in these markets based on such structures. The conclusions based on firm's Grupo-relatedness seem to be of value. Grupo-relatedness does divide firms into those for which banks have sufficient information, and those for which information is lacking, that is before the reforms were implemented.

IV. SUMMARY AND CONCLUSIONS

This article has investigated whether the financial reforms, that were implemented in Chile during the first half of the 1980s contributed to reducing market imperfections in financial markets in the late 1980s and early 1990s. Initially, the outcomes of the econometric analysis seem to indicate that the supportive evidence for this hypothesis is not very strong. The outcomes of estimations based on two out of three criteria for dividing firms according to the difficulties they have in communicating information to banks (that is, the size and age criteria) do not show the expected fall of the coefficient of internal funds for informationally disadvantaged firms after the reforms had been implemented.

Yet, dividing firms according to their relatedness to a Grupo does indeed reveal useful insights with respect to the impact of the reforms on existing financial market imperfections. The internal funds coefficient in the investment equation of non-Grupo firms falls, and the coefficients of Grupo and non-Grupo firms appear to converge after the implementation of the reforms. The importance of networks between firms and banks in determining banks' lending decisions appears to have diminished after the implementation of the reforms. Or, in other words, the apparent market segmentation in financial markets based on the relatedness to a Grupo has decreased in the second half of the 1980s. This lends support to the idea that those changes in regulation, which were introduced in Chile to reduce the dominant role of Grupos in financial markets – and implemented mainly during 1981–82 – appear to have been effective.

Further research should aim at acquiring data for a larger panel of firms. It is acknowledged that the data-set used here is not necessarily representative of the corporate sector in Chile, since it consists of a rather small sample of on average relatively larger (and older) firms. The firms in this panel may have better access to financial markets than the average Chilean firm. The results of our analysis must therefore be appreciated as indicative only.

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NOTES

1. We acknowledge that there may be alternative ways to analyse the extent to which firms differ with respect to their access to external resources. One interesting possibility is to closely examine the terms – and especially the margins, fees and security demanded – on which bank debt has been extended to different (groups of) firms. We have not taken this approach, however, since the available data do not give detailed information on these items.
2. Useful descriptions of the economic liberalisation programme implemented in Chile during

the 1970s and early 1980s, as well as analyses of its consequences and failures can be found in, among others, Edwards and Cox Edwards [*1991*], Moran [*1989*] and Ramos [*1986*].

3. The details of the events related to this issue are beyond the scope of this article. See De la Cuadra and Valdés [*1992a*] and Hermes [*1995*] for more in-depth analyses of the facts that led to the financial instability in the early 1980.
4. The financial reforms described below only refer to new regulation to enforce the system of supervision. Note, however, that during the 1980s the Chilean government also introduced other major reforms with respect to the financial system. In particular, it privatised the pension fund system in 1981, which was an important stimulus to increased domestic savings and of trading in new securities markets. The issue of the privatisation of the pension funds and its effects on financial sector development is beyond the scope of this article, however. See Diamond and Valdés [*1994*] for a review of the development of the pension fund system in the 1980s.
5. For more details on these reforms, see Ramírez and Rosende [*1992*], and De la Cuadra and Valdés [*1992b*].
6. That is, reporting zero sales, and unacceptable large changes in fixed and total assets.
7. Yet, since only few firms were really young, that is, for instance less than ten years old, the cut-off point has been set at 20 years to obtain a sufficient number of firms within the sample of young firms.
8. In this section financial markets refer to the banking sector.
9. Note that this introduces a minor bias in the data, since this leaves out observations having zero or negative values.
10. Only a few observations have been deleted from the data based on this procedure.
11. Several studies have followed this procedure. See, among others, Atiyas [*1992*]; Fazzari, Hubbard and Petersen [*1988*]; and Devereux and Schiantarelli [*1990*].
12. The results for the cash flow variables presented in the tables below remained unchanged when using the debt to capital ratio and/or Tobin's Q of the current period, instead of lagged variables. These results were also not affected when equations were estimated incorporating only the sales variable or Tobin's Q, next to the debt to capital ratio, investment one period lagged and the cash flow variables.

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