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Taxes and Growth in a Financially Underdeveloped Country: Evidence from the Chilean Investment Boom

The performance of the Chilean economy since the mid-1980s has been extraordinary: Chile's per capita gross domestic product (GDP) grew at an average rate of 4.5 percent per year in the decade following 1983. While not as impressive as the growth miracles of the Asian developing economies in the postwar period, Chile's strong economic performance is unique among the developing economies in the Western Hemisphere. An important component of Chile's impressive growth was a saving and investment boom on the order of 10 percent of GDP. In this paper, we present evidence that a main cause of this investment and growth boom was a corporate tax reform that cut the tax rate on retained profits from nearly 50 percent to 10 percent over the period 1984–86.

This reform could have large effects. When firms face credit constraints, taxation of retained profits is more distortionary than taxation of dividends or household capital gains. By definition, the return to the marginal investment of a constrained firm is (weakly) greater than the after-tax real interest rate. Taxation of retained profits reduces precisely this potentially highly productive investment, since it draws down internal funds and therefore lowers the invest-

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ment of constrained firms by the amount of the tax. Unconstrained firms can largely avoid retaining profits and are able to fund investment through other means. Taxing retained earnings is thus potentially quite harmful in an economy with poorly developed financial markets, but otherwise favorable macroeconomic policies and conditions, such as Chile in the mid-1980s.[1] The 1984 tax reform, by reducing the tax rate on retained earnings, increased the internal funds of many credit-constrained firms and so may have been responsible for the increase in aggregate investment.

We present three types of evidence to assess our theory. First, we show that the timing and composition of the aggregate saving and investment boom are both consistent with the idea that the reduction in the taxation of retained profits was a major cause of the investment boom. Investment increased by 4.5 percent of GDP in the first year of the reform and had grown by over 10 percent of GDP five years after the reform, reaching 25 percent of GDP. The tax reform occurred at the beginning of the investment boom, whereas other reforms such as trade liberalization and the privatization of the public pension system significantly predate the boom. More importantly, the increase in investment was entirely funded by business saving, that is, by retained profits. Private saving and public saving remained largely unchanged.

Second, the cross-industry pattern of investment is also consistent with our theory. Using an annual survey that covers all Chilean manufacturing plants with more than ten employees, we show that investment rates rose after the reform primarily in industries that are heavily dependent on external finance. Industries classified by Rajan and Zingales as dependent on external finance had larger increases in investment in 1985, 1986, and 1987, although not in the first year of the reform, 1984.[2]

Finally, since we do not have clean measures of financial constraints at the firm level, we compare the investment rates of plants that are plausibly constrained to those that are plausibly unconstrained using the measures we do have. That is, we divide plants into those that are owned by firms that are more and less likely to face financing constraints and compare the investment behavior of plants owned by these different types of firms after the tax reform. Here, the evidence on our theory is weaker and more mixed. We find that the plants owned by firms that exhibited a high correlation of cash flow and investment before the reform increased their investment significantly more

1. These favorable macroeconomic policies represent other important causes of growth, which we discuss subsequently.

2. Rajan and Zingales (1998).

during the reform and to some extent following the reform compared with similar plants that had low prior correlations of cash flow and investment. We also find some evidence that plants owned by firms that previously had low short-term reserves increased their investment more during and to some extent following the reforms. However, we find no evidence that plants owned either by firms that pay rent or by smaller firms benefited disproportionately from the reform, although the distinction between small and large firms is less likely to measure the degree of financial constraints facing a firm in Chile than in the United States.

This paper is primarily related to two literatures. First, our analysis adds to the literature on the impact of tax policies on investment and the importance of financial constraints for investment.[3] Two papers are closely related to our current study. Calomiris and Hubbard use a firm's reaction to the retained profits tax of 1936–37 in the United States to identify liquidity-constrained firms and study their subsequent investment behavior.[4] We reverse this process. Rajan and Zingales examine the growth pattern of industries with differing needs for external financing in countries with different levels of financial development.[5] We compare the response of investment to Chile's 1984 tax reform across industries with differing needs for external financing.

Second, we contribute to the literature on the causes of economic development, particularly work focusing on the so-called Chilean miracle. Chilean observers frequently mention the 1984 tax reform as being potentially important in explaining the subsequent investment boom.[6] Previous research, however, focuses on other reforms undertaken by Chile, including the liberalization of the trade regime, the liberalization and deepening of financial markets, bankruptcy reform, and the privatization of the public pension system, rather than exploring the corporate tax reform as the underlying cause of Chile's growth performance.[7] To be clear, our argument is not that these other reforms are irrelevant for growth in general. Some of these reforms probably did raise

3. See Hubbard (1998); Bernanke and Gertler (1995); Bernanke, Gertler, and Gilchrist (1999); Hassett and Hubbard (2002), for reviews. Cummins, Hassett, and Hubbard (1996) discuss the difficulties inherent in cross-country estimation of the impact of taxes on investment; they present evidence that investment responds to tax incentives in general.

4. Calomiris and Hubbard (1995).

5. Rajan and Zingales (1998).

6. See Agosín (2001); Agosín, Crespi, and Letelier (1997); Budnevich and Jara (1997); Bustos, Engel, and Galetovic (1998); Larroulet (1987); Marfan and Bosworth (1994), for brief discussions of the 1984 tax reform.

7. See Bergoeing and others (2002); Edwards (1996); Gallego and Loayza (2000); Morandé (1998); Pavcnik (2002).

Chile's steady-state level of output per person, although we do not evaluate this claim. We provide evidence that the reduction in the tax on retained profits increased the accumulation of capital, and our preferred interpretation of this finding is that the tax reform led to rapid, rather than slow, convergence toward the steady state. In applying this lesson to financially underdeveloped economies more broadly, it is important to note that taxing retained earnings is highly distortionary only when there are productive investment opportunities.

The outline of the paper is as follows. The next section models the effect of taxes on retained profits when some firms are constrained from borrowing as much as they would like to invest at market interest rates. The paper then describes the 1984 tax reform in Chile and presents aggregate evidence that the corporate tax reform was a significant cause of Chile's rapid growth. A subsequent section details our use of the annual plant-level data from the Chilean manufacturing census, which we later use to test the industry- and plant-level predictions of our theory. We also discuss alternative explanations for Chile's investment boom, to provide a broad description of the Chilean experience. A final section concludes.

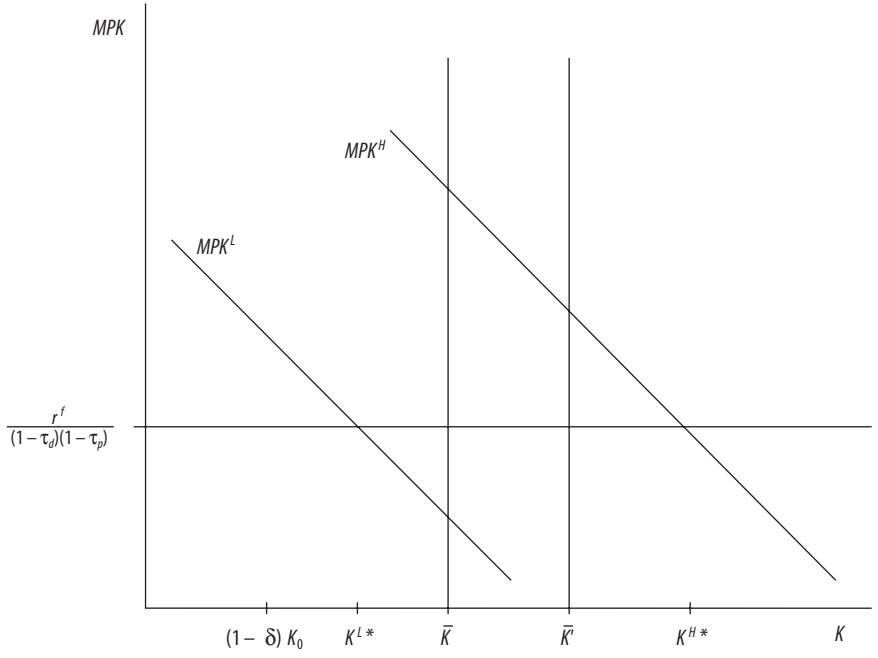
Investment and Taxes on Retained Earnings

This section explores how a tax on retained profits alters investment and productivity. To this end, we consider the investment decision of a household that owns a profitable firm and is unable to borrow to finance investment.[8] Firms and households face credit constraints and firms with highly productive investment opportunities are constrained from borrowing to invest at the optimal rate. We consider an economy like Chile's, in which there are three taxes levied on capital income: profits tax (τ_p), retained profits tax (τ_r), and dividend income tax (τ_d). The retained profits and dividend income tax rates are defined as the tax rate net of the profits tax. We assume that the economy is small and open so that the after-tax real interest rate is fixed at r^f.

Consider two firms that have the same initial capital stock (K_0) and profits (π), but differ in the productivity of the investment opportunities available to them. Firm H has a highly productive investment opportunity, while firm L does not. Figure 1 shows the marginal product of capital in the future for each

8. See appendix A of the working paper (Hsieh and Parker 2006) for additional formal exposition of the arguments in this section.

FIGURE 1. Investment and Credit Constraints



firm, with MPK^H lying above MPK^L. In a world with perfect capital markets, each firm would set the pretax marginal product of capital equal to the required pretax rate of return to investment, which is equal to the after-tax rate of return adjusted for the tax rates. The first-best levels of capital chosen would thus be K^{H*} and K^{L*}, and gross investment would equal $K^{H*} + K^{L*} - 2(1-\delta)K_0$, where δ is the depreciation rate of old capital.

However, if we assume that these firms, and their owners, do not have access to external funds (debt or equity) to finance further investment, then their new investment is limited by their after-tax retained profits or $(1-\tau_p)(1-\tau_r)\pi$. Both the profits tax and the tax on retained profits decrease the funds available for investment. This bound on investment limits the future capital stock to

$$\bar{K} = (1-\delta)K_0 + (1-\tau_p)(1-\tau_r)\pi.$$

Thus, firm *H,* with a highly productive investment opportunity, is unable to take full advantage of this opportunity ($\bar{K} < K^{H*}$).

Consider now a cut in the tax rate on retained profits to τ_r'. The new maximum level of the capital stock is

$$\bar{K}' = (1-\delta)K_0 + (1-\tau_p)(1-\tau_r')\pi > \bar{K}.$$

This tax cut has two important features. First, it affects firms differently. For the constrained firm (H), every peso decrease in tax revenue leads to a peso increase in its capital stock: $\Delta K = (1 - \tau_p)\pi\Delta\tau_r = \Delta\text{Revenue}$. For the unconstrained firm, the decrease in tax paid does not lead to a corresponding increase in its capital stock.

Second, new investment caused by this policy occurs for projects whose productivity exceeds the marginal product of a peso of outside capital or external funds. It is precisely those firms with the most productive investment opportunities that have the greatest need for funds for capital and so benefit the most from an increase in available internal funds. The policy change thus leads to an increase in productivity. The increase in output from the increase in capital is

$$\Delta Y = \frac{MPK^H(\bar{K}) + MPK^H(\bar{K}')}{2}\Delta K \geq \frac{r^f}{(1-\tau_p)(1-\tau_d)}\Delta K.$$

Comparatively, a cut in the dividend tax rate increases the incentive to invest by all firms, but highly profitable firms that are not paying dividends and are cash constrained are unable to raise their investment rates in response to such a tax cut. The marginal product of new investment generated from such a tax cut has the social marginal value of capital since it changes the investment rates of firms that are setting their capital stocks so as to equalize marginal products and interest rates. Alternatively, a cut in the profits tax rate increases the incentive to invest by all firms and allows further investment by cash-constrained firms, but it does not target the tax cut at highly productive investment opportunities. Similarly, a cut in the household tax on capital gains increases the frictionless demand for capital, but it does not increase the capital demand of constrained firms at the margin.

This graphical exposition is stylized in three ways. First, it is unlikely that any firms are truly constrained. Most, if not all, firms probably have access to funds at some price. For many firms, however, the costs of monitoring and enforcement may be extremely high, so that these firms face interest rates far above official rates. Such transaction costs associated with making loans act

similarly to credit constraints.[9] Second, we have not been explicit about product markets. The size of unconstrained firms needs to be limited either by economies of scope, to generate diminishing returns in $F(.)$, or by demand, such as through monopolistic competition. Thus, the profit opportunities available to one firm are not available to all firms. If they were, the distribution of internal funds and credit constraints would be irrelevant for aggregate investment. Finally, in a multi-period world, a tax on retained profits reduces optimal investment for an unconstrained firm. Only for a firm without new investment (in excess of depreciation allowances) is there no tax benefit or government revenue lost and no change in incentives or value. However, the impact on the unconstrained firm remains significantly less than on the investment behavior of a constrained firm because the retained profits tax affects the marginal return to investment from the optimal level rather than from the tightening of a binding constraint.[10]

Given these arguments, how large an increase in capital stock do we expect from a cut in the tax on retained profits? These aggregate effects depend on whether a significant number of firms are credit constrained, so as a rough benchmark, we suppose that half of the firms (weighted by their capital stock) in Chile are credit constrained and are investing all their internal funds. The share of profits (before taxes) to value added can be approximated by the capital share of national income net of debt payments and depreciation, which we conservatively estimate to be 20 percent for Chile.[11] If the tax on retained profits falls from 50 percent to 10 percent, as happened in Chile, then the cash flow available to a firm increases from 10 percent to 18 percent of value added. If only credit-constrained firms invest the additional cash flow, then a lower bound on the effect of this tax policy change is a 4 percentage point increase in the investment share of GDP (8×0.5), which is slightly less than half of the increase in the investment share of GDP in Chile since the mid-1980s.

In sum, taxes on retained earnings remove cash from inside credit-constrained firms, where it is most valuable.

9. In 1984 the Chilean banking sector was still suffering from the aftereffects of the debt crisis. A number of banks had gone bankrupt, and a number had been taken over by the government. Thus, at this time, the sector that monitors loans and enforces legal debt contracts was small and probably had low technology, leading to high costs of external finance.

10. Although we do not study firm creation, the retained profits tax significantly changes the value of a new firm, and firm creation did increase following the reform.

11. From 1985 to 1998, the average capital share was 51 percent, and the average capital income net of depreciation was 41.2 percent of GDP (Central Bank of Chile 1999, table 1.57). Given that this number is larger than the capital share for a typical country and that interest payments typically account for a third of the capital share, 20 percent is a conservative estimate of the quantity of interest.

The 1984–86 Tax Reform

The Chilean tax system before 1984 was based on the principle that households and firms should be treated similarly in the tax code. This principle was implemented by setting the tax rate applied to firms' retained profits equal to that applied to dividends or distributed earnings. That is, the personal and corporate tax codes were structured so that whether profits were paid to the owner or to the firm was irrelevant for tax revenue collected.

More specifically, the tax treatment of capital income in Chile in the period before 1984 can be summarized in four points: profits were taxed at a 10 percent rate; retained profits (net of the corporate profits tax) were taxed at either the personal income tax rate of the owners (from 0 to 58 percent) for limited-liability corporations or a 40 percent rate for publicly traded companies; dividends (net of the corporate profits tax) were taxed at the personal income tax rate (ranging up to 58 percent); and realized capital gains were taxed as dividends if owned by an individual or as corporate profits if owned by a firm.[12] These taxes cumulate to a high effective tax rate on retained profits. Retained profits of publicly traded companies were first taxed at 10 percent (the corporate profits tax) and the residual net of the 10 percent tax was then taxed at 40 percent, for an effective tax rate of 46 percent on retained profits. The tax treatment of retained profits of limited liability corporations was similar, except that the residual net of the 10 percent corporate profits tax was taxed at the marginal income rate of the owner of the firm. This yields an effective tax rate on retained profits of $0.1 + 0.9\tau$ (where τ is the marginal income tax rate of the owner of the firm) for limited liability corporations. In 1980, the average marginal income tax rate of individuals who paid taxes on dividends and retained profits was 43 percent, which translates into a typical effective tax rate of almost 50 percent on retained profits.[13]

The Chilean government enacted a significant tax reform in January 1984. While the reform altered both the personal and corporate tax codes, the largest

12. Capital gains on assets held for less than a year were not taxed before 1984. The dividend tax rate indicated (up to 58 percent) was the rate on dividends of limited liability firms. The dividends tax for shareholders of publicly traded companies was slightly more complicated, involving two taxes: first, dividends were taxed at 40 percent; second, dividends net of the 40 percent tax were taxed at the personal income tax rate minus 0.4. The tax rate on dividends (net of the corporate profits tax) was therefore $0.6*\tau + 0.16$, where τ is the personal income tax rate. If the personal income tax rate was 40 percent, the dividends tax rate was equal to the personal income tax rate (and equal to the dividend tax rate for limited liability corporations).

13. Calculated from Servicio de Impuestos Internos (1980, p. 44).

TABLE 1. Personal Income Tax Rates in Chile before and after the Reform[a]

Tax bracket (1983–85)	*Marginal tax rate*			*Tax bracket (1986)*	*Marginal tax rate (1986)*
	1983	*1984*	*1985*		
0–32,140	0.00	0.00	0.00	0–32,140	0.00
32,140–80,350	0.08	0.07	0.06	32,140–96,420	0.05
80,350–128,560	0.13	0.12	0.11	96,420–160,700	0.10
128,560–176,770	0.18	0.17	0.16	160,700–224,980	0.15
176,770–224,980	0.28	0.27	0.26	224,980–289,260	0.25
224,980–273,190	0.38	0.37	0.36	289,260–385,680	0.35
273,190–321,400	0.48	0.47	0.46	385,680–482,100	0.45
Over 321,400	0.58	0.57	0.56	Over 482,100	0.50

a. The tax brackets are in pesos per month and are indexed for inflation. The 1986 tax bracket is quoted in January 1984 pesos per month.

change was the near-elimination of the tax on retained profits that had paralleled the tax on dividends. The effective tax on retained profits was lowered to 10 percent, effective immediately for limited liability corporations but phased in over three years for publicly traded companies.[14] The tax reform did not alter the tax on corporate profits (10 percent), and it left the tax treatment of capital gains largely unchanged.[15] With respect to dividend taxation, the tax reform widened personal income tax brackets and lowered marginal income tax rates slightly. Table 1 describes the personal income tax rates before and after the tax reform. In addition to the cut in income tax rates, the tax reform also provided a credit for corporate taxes paid that reduced the basis for the payment of the dividend tax. Table 2 summarizes the effective tax rate on dividends and retained profits before and after the tax reform.

Two additional features of the tax system had important effects on firms' finances. First, firms paid (and still pay) estimated taxes on retained earnings monthly. The change in the tax rate on retained profits thus had an immediate impact on cash flows. Second, the corporate tax code was stable from 1986 to 1988, but the tax on retained profits was eliminated entirely for the tax year 1989. The retained profits tax was then increased to 15 percent in 1990, and it remained at that level throughout the 1990s. We focus our analysis of firms on the period 1980–90.

Cuts in personal tax rates have two main effects on incentives. First, to the extent that the cuts in marginal tax rates on labor income are perceived as

14. The retained profits tax rate for publicly traded companies was lowered to 30 percent in 1984, 15 percent in 1985, and zero thereafter.

15. The 1984 tax reform removed the tax exemption on capital gains held for less than a year, but otherwise did not change the tax treatment of capital gains.

TABLE 2. Tax Rates on Corporate Profits and Dividends in Chile before and after the Reform[a]

	Publicly traded companies		*Limited-liability companies*	
Period	*Retained profits*	*Distributed profits*	*Retained profits*	*Distributed profits*
Pre-1984	0.460	$0.244 + 0.540\tau$	$0.100 + 0.900\tau$	$0.100 + 0.900\tau$
1984	0.370	$0.118 + 0.630\tau$	0.100	τ
1985	0.235	$0.04375 + 0.765\tau$	0.100	τ
Post-1985	0.100	τ	0.100	τ

a. τ is the marginal personal income tax rate.

highly persistent (as they turned out to be in Chile), then changes in tax rates provide no incentive to substitute labor intertemporally. Nevertheless, persistent tax cuts cause wealth effects that reduce labor supply and substitution effects from leisure to consumption that increase labor supply. The evidence on wage levels and hours of work across countries and over time suggests that these effects are of similar magnitude, but that the wealth effect dominates, so the Chilean reforms would have reduced labor supply. Given the small size of the rate changes, the labor income tax changes seem unlikely to have had a major role in causing the Chilean investment boom.[16]

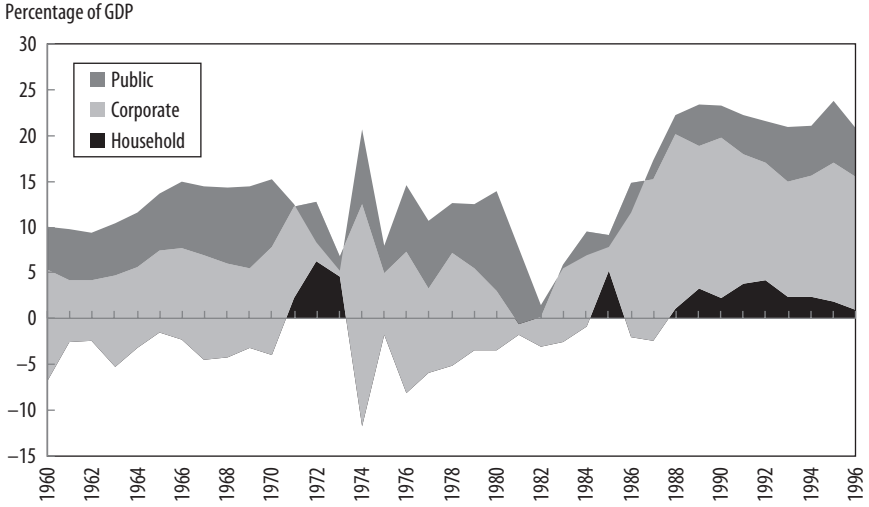
Second, a reduction in the taxation of dividend income increases the incentive to save and accumulate capital. This aspect of the Chilean reform is unlikely to have played a large role in the observed economic boom, however, since Chile experienced an investment boom at the time of the reform, while saving rose only slowly. Chile borrowed significantly from abroad until 1988, when saving roughly equaled investment. Given the weak observed link between capital income taxation and economic growth across countries and the small changes that Chile actually implemented at this time, the changes in personal tax rates are unlikely to have significantly contributed to the Chilean economic boom.

Aggregate Evidence

The behavior of national saving and investment suggests that the reduction in the taxation of retained profits caused at least part of the rapid growth in Chile. Both saving and investment rose following the reform, from an average rate

16. The one caveat to this argument is that lower tax rates on labor income also increase the incentive to accumulate human capital. It is at least possible that the investment boom occurred to take advantage of the higher expected future human capital levels.

FIGURE 2. Sources of Saving in Chile



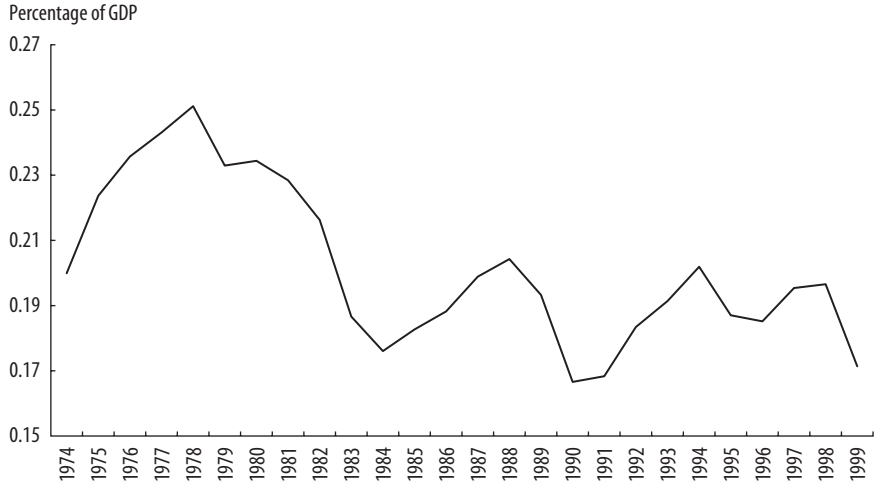
Source: Bennett, Schmidt-Hebbel, and Soto (1999).

of 15 percent from 1960 to 1983 to an average rate of 25 percent in the first half of the 1990s.

Figure 2 shows that both the level and composition of saving underwent a striking change at the time of the tax reform. Business saving increased after the reform period of 1984–86, while household saving and public saving rose much less and with a longer lag. Our theory predicts that saving should rise as firms respond to the reduction in the tax on retained profits by retaining more profits, and that households should not decrease active saving to offset this change.[17] With respect to investment, the timing of the investment boom also supports our theory. Investment increased by 4.5 percent of GDP in the first year of the reform and by over 10 percent of GDP over five years, reaching 25 percent of GDP in 1989. The tax reform occurred at the beginning of the investment boom, while other reforms such as trade liberalization and the privatization of the public pension system significantly predate the boom.

17. This is consistent with cash-constrained firms' being owned by liquidity-constrained households. If liquidity constraints and cash constraints were not important, a reduction in the retained profits tax rate might merely result in a shift in the composition of savings from household to corporate savings, with no effect on aggregate savings.

FIGURE 3. Investment to GDP in Latin America[a]



Source: International Monetary Fund, *International Financial Statistics*.
a. Includes Argentina, Brazil, Colombia, Mexico, and Venezuela.

Chile also experienced an investment boom from 1976 to 1981, financed by large current account deficits, but this lending boom and subsequent collapse were common to many countries in Latin America.[18] As shown in Figure 3, only the later investment boom is particular to Chile, since the rest of Latin America stagnated in the 1980s following the debt crisis.[19]

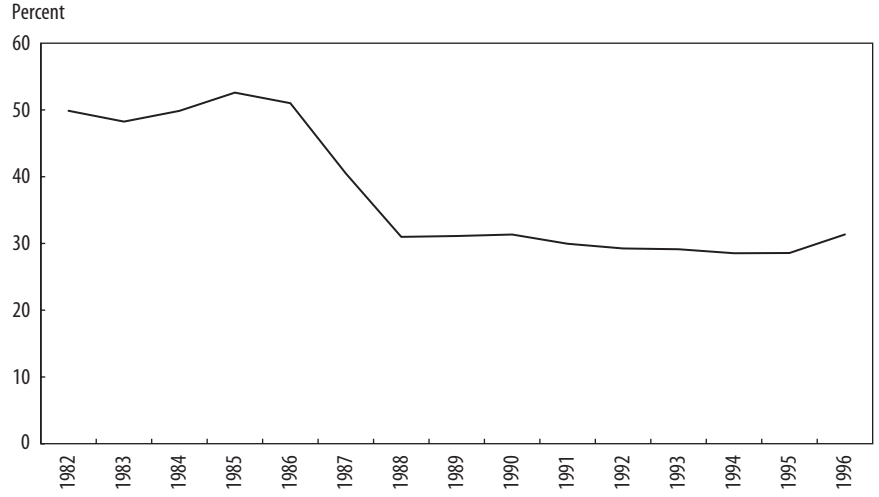
Other aggregate evidence includes the change in the debt-to-asset ratio for firms during this period. In terms of theory, an unconstrained firm should increase its profit retention relative to dividend payments in response to the change in incentives associated with the reduction in the tax on retained earnings.[20] A constrained firm should increase its after-tax retained earnings and increase its investment. The national data cover only publicly traded companies, which by definition have some access to capital. The national data on debt ratios thus reflect the behavior of more unconstrained firms than the

18. The consensus view of these booms is that they were unsustainable lending booms driven by some combination of poorly regulated financial liberalization and a surge in capital inflows driven by external factors. See, for example, Díaz-Alejandro (1985).

19. The countries in our Latin American sample are Argentina, Brazil, Colombia, Mexico, and Venezuela.

20. The tax rate on dividends also fell slightly. In a frictionless world, the investment decision of an extant firm that pays dividends is undistorted by dividend taxation (Bradford 1981).

FIGURE 4. Debt to Total Assets of Publicly Traded Companies



Source: Eyzaguirre and Lefort (1999).

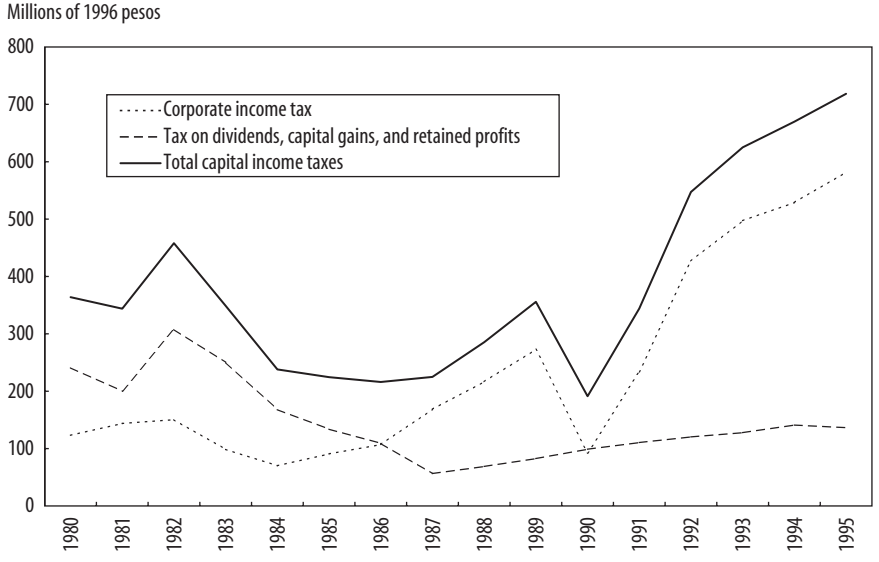
national average. As figure 4 illustrates, publicly traded firms reduced their debt after the reforms, but only after a significant lag.[21]

Figure 5 shows the impact of the tax reform and investment boom on real tax revenues collected on capital income, from both the personal income tax and the corporate profits tax. The tax revenues from the category that includes retained profits declined from 250 million 1996 pesos in 1984 to less than 100 million 1996 pesos in 1987. At the same time, the revenues collected from the corporate income tax (the 10 percent tax on all firm profits) rose starting in 1984 as firms invested and grew. From 1989 on, with the exception of 1990, when the retained profits tax was set to zero for a year, the increase in taxes collected through the general profits tax more than replaced the lost revenues on retained profits. Figure 5 suggests that Chile was able to reduce the tax on retained earnings and increase tax revenues.

Having presented the basic aggregate facts, we next describe the data on firms and plants that we use to construct industry-level data, categorize plants

21. As in the United States, firms maintain fairly high levels of debt despite the favorable tax treatment of retained versus distributed profits. Bustos, Engel, and Galetovic (1998) report that from 1985 to 1995, publicly traded firms in Chile still carried so much debt that their profits net of interest payments (and depreciation allowances) were, on average, effectively zero (or slightly negative).

FIGURE 5. Tax Revenues from Capital Income[a]



Source: *Ley de Presupuestos del Sector Público* (Budget Office, various years).
a. The figure displays taxes collected during a year, rather than taxes collected on activity during a year.

by constrained status, and test whether constrained plants indeed invested more following the reform.

The Chilean Manufacturing Census

The data for our analysis of industry and firm investment behavior are drawn from the Chilean manufacturing census (Encuesta Nacional Industrial Anual) conducted annually by the Chilean government's statistical office (Instituto Nacional de Estadística). The survey covers all manufacturing plants in Chile with more than ten employees and has been run annually since 1979. In addition to working with the raw data files, we also use data from an extract from this survey, compiled by the World Bank under the direction of James Tybout. Finally, the Chilean statistical agency also provided us with information on which plants were owned by the same firm. Thus, while we analyze plants, we are able to use the financial situation and behavior of firms to categorize plants as likely or unlikely to be credit constrained.

The advantages of the Chilean manufacturing census for our purposes are its near universal coverage, annual frequency, and the wealth of information contained about each plant. We combine the information available in the annual surveys from 1979 to 1990 with the World Bank extract, which covers only 1979 to 1986. The survey contains information on a wide variety of plant characteristics such as industry (four-digit International Standard Industrial Classification, or ISIC), factor inputs, energy use, days of production, and sales. Plants annually report investment, employment, and production. The book value of fixed assets is collected in 1980 and 1981. The census data for year t are collected in surveys conducted at the beginning of year $t + 1$. The data contain the value of flow variables over the entire year t and the value of stock variables as of the end of year t.

The census contains information on five types of investment: purchases of new capital, purchases of used capital, production of capital for own use, improvements in own capital by third parties, and sales of capital. Our measure of investment, to which our capital measure corresponds, is the sum of all five types of investment in machinery, equipment, and vehicles. That is, we exclude investment in land and buildings. Investment can be negative owing to sales of capital, and we treat negative reported investment as legitimate. A large number of plants report zero investment from purchases, production, improvements, and sales for all varieties of capital goods. Our primary database sets investment to missing only when the World Bank extract considers it missing. This treats the vast majority of zero investment reports as legitimate zeros and treats all such reports after 1986 (the last year of the World Bank extract) as legitimate. To check that this assumption is not driving our results, we create an alternative database that sets investment (and thus subsequent capital stocks) to missing if there is zero reported investment in all categories and types for two consecutive years. Our baseline results thus use data consistent with those used in previous research, while our alternative data set checks the robustness of our main results along this dimension. Our baseline results are generally robust, and we note any places where our results differ.

Our definition of capital corresponds to our definition of investment; it includes machinery, equipment, and vehicles and excludes buildings. We take our main measures of capital stock from the World Bank extract, which constructs the book value of capital stock in 1980 and 1981 using an inflation adjustment and a depreciation adjustment. To check that our results do not depend on these adjustments, we also construct a separate data extract based on the reported book value of capital as reported in the raw survey data. As with the alternative treatment of investment, our findings are generally robust

to this alternative, and we note results for which inference depends on our baseline assumption.

A plant's capital stock in years other than 1980 and 1981 is calculated by iterating forward using investment and the capital accumulation equation,

$$K_{j,t} = \left(1 - \delta_j\right) K_{j,t-1} + I_{j,t}, \tag{1}$$

where j indexes either machinery and equipment or vehicles and the timing follows from the fact that investment in year t adds the capital reported at the end of year $t - 1$ to capital stock at the end of year t. We use the following depreciation rates: 10 percent for machinery and equipment and 20 percent for vehicles. These are the same rates used in the World Bank extract. In this procedure, we keep capital stocks positive, and we omit depreciation for plants that are missing from the survey for a year and drop plants missing for more than one year.

We use the machinery price index to deflate both investment and capital stock. We discard plants that die before the experiment that we seek to study (that is, any plant that does not exist after 1983). We drop all plants owned or run by the government. We consider investment to capital ratios greater than three or less than minus one to be miscoded or misreported and so treat them as missing observations. Finally, there is significant attrition of plants: one-quarter of plants attrit between 1984 and 1990 in our baseline sample.[22]

Evidence from Chilean Industries

This section presents our main results. We test whether, at the time of the tax reform, investment increases were concentrated in industries for which external finance is important. Rajan and Zingales construct measures of an industry's reliance on external finance by examining the use of external finance by U.S. companies.[23] They show that in countries with poorly developed financial markets, industries that are more reliant on external finance grow more slowly relative to the typical growth for that industry and for that country in aggregate. We take a similar tack to identify the impact of the tax cut on retained profits. If capital markets in Chile were poorly developed in the 1980s and if the 1984 tax cut disproportionately benefited credit-constrained plants, then investment rates

22. See the appendixes in the working paper (Hsieh and Parker 2006) for additional details, including a further description of the data construction.

23. Rajan and Zingales (1998).

should rise disproportionately in industries that are particularly reliant on external finance, relative to the typical rate for that industry and for Chile in that year.

We thus measure the extent to which industries that are more dependent on external finance have larger increases in investment rates after the reform, relative to their typical investment rates and to the average investment rate in that year. At the same time, we control for the fact that if the industry is capital intensive, it may increase its investment more in response to the tax reform. That is, we estimate the following equation:

$$(2) \qquad \frac{I_{n,t}}{K_{n,t}} = \alpha_n + \gamma_t + E_n \mathbf{D}_t \boldsymbol{\beta}_E + F_n \mathbf{D}_t \boldsymbol{\beta}_D + \xi_{i,t},$$

where $I_{n,t}$ and $K_{n,t}$ are the total investment and capital stock, respectively, for industry n in year t; α_n measures the average investment to capital ratio for industry n; γ_t measures the average investment to capital ratio in year t; E_n denotes dependence on external finance for industry n, as measured by Rajan and Zingales; $\mathbf{D}_t$ is a row vector of indicator variables for years after the tax reform begins; $\boldsymbol{\beta}_E$ is the coefficient vector of interest, measuring the amount by which $I_{n,t} / K_{n,t}$ is higher for industries that are highly dependent on external finance in each year after the reform; F_n are control variables; and $\xi_{i,t}$ denotes the error term. The control variables address the concern that the heterogeneity in post-1984 growth and investment is at least partly driven by factors other than external financial dependence and that these factors might be correlated with external financial dependence. If this were the case and we omitted the year interactions with F_n from our regressions, the estimated $\boldsymbol{\beta}_E$ would confound these factors with the importance of increased access to external funds. We consider two control variables, described subsequently.

Since we estimate this equation on industry-level data from 1982 to 1990, the typical growth rate of an industry is measured by its performance in 1982 and 1983. We also measure typical performance by 1982, 1983, 1989, and 1990, by dropping the last two years of interactions between external dependence and the time indicators and between capital intensity and the time indicators. The first two years have the advantage of being before the reform, but the disadvantage of including the 1982 recession, such that the pattern of growth across industries may be affected by the severity of the recession, even after we control for year effects. The last two years have the advantage of being years of healthy growth in Chile, but the disadvantage of being after the reform and after a significant growth boom, when capital markets are beginning to develop more generally.

We first run equation 2 including capital intensity as F_n. Since the economy boomed after 1984 and since capital-intensive industries tend to be cyclical, we would expect industries that are more capital intensive to grow more rapidly after 1984. Moreover, if capital intensity is correlated with dependence on external finance, as seems likely, then omitting this term would bias us in favor of finding that industries that are highly dependent on external finance grew more—as our theory predicts, but for a spurious reason. We measure capital intensity before the boom as the average of the 1981 and 1982 log of the ratio of the capital stock in industry *n* to the total wages in industry *n.* Thus, in this first set of regressions, the vector $\boldsymbol{\beta}_D$ measures the extent to which investment-to-capital ratios are larger for industries that are more capital intensive in each year after the reform, and the vector $\boldsymbol{\beta}_E$ captures the effect of dependence on external finance, controlling for capital intensity.

Table 3 shows the results of estimating equation 2 using weighted least squares, with the number of plants in an industry as weights, and making inference allowing for arbitrary cross-industry correlations.[24] Industries are defined according to the three-digit ISIC.[25] The first set of results examines the impact of the reform through 1990; the second set treats 1989 and 1990 as additional control years. The coefficients of interest, $\boldsymbol{\beta}_{E,t}$, are negative and insignificant in 1984, positive in 1985, and positive and significant in both sets of results in 1986 and 1987. The last column of the table quantifies the relative impact of the reform across industries that differ in their degree of financial dependence. An industry one standard deviation above the average level of dependence on external finance is predicted to have increased its capital 6 percent according to the first set of results and 12 percent according to the second by the end of 1987 relative to a comparable industry one standard deviation below the average. Industries that are more dependent on external finance grew more rapidly than usual at the time of the reform.[26]

24. Here we use the degree of external dependence as a continuous variable, rather than using it to split the sample as we do subsequently with indicators of possibly constrained status in the plant-level analysis. We chose this functional form to better control for capital intensity. That said, the results are substantively similar if we instead split plants into thirds by the Rajan and Zingales (1998) measures and also include indicator variables for high, medium, or low capital intensity.

25. The exceptions are food processing and manufacture of fabricated metal, where large numbers of plants allow finer detail, and six industries with few plants that are grouped into three categories. See Hsieh and Parker (2006).

26. Results are similar across samples, similar if we omit the control for capital intensity, and similar if we compare the three groups: high, medium, and low dependence on external finance. Capital-intensive industries tend to have no consistent pattern of investment rates in 1984 or 1985, statistically insignificant higher investment rates in 1986, and lower investment rates in 1987 and 1988.

TABLE 3. Industry Investment Rates as a Function of Dependence on External Finance[a]

Interaction of dependence on external finance and year	*Coefficient*	*Standard error*	*Effect of 1 standard deviation increase in external finance dependency*
Control years: 1982 and 1983			
1984	−0.003	0.004	−0.001
1985	0.039	0.004	0.016
1986	0.055	0.004	0.022
1987	0.067	0.004	0.027
1988	−0.011	0.004	−0.004
1989	0.056	0.004	0.023
1990	0.037	0.004	0.015
Cumulative	0.240		0.098
Control years: 1982, 1983, 1989, and 1990			
1984	−0.024	0.015	−0.010
1985	0.019	0.015	0.008
1986	0.035	0.014	0.014
1987	0.046	0.015	0.019
1988	−0.032	0.015	−0.013
Cumulative	0.045		0.018
No. of observations	306		

a. Regressions include industry and year effects and capital-labor ratio interacted with year effects. Standard errors are calculated allowing for arbitrary heteroskedasticity and cross-industry correlations within each year. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for further details.

Table 4 shows the results of adding a control for whether the industry exports, imports, or has little trade exposure.[27] That is, F_n includes both a measure of capital intensity and a measure of trade exposure. The real exchange rate declined over the 1980s, representing a boom for exporting industries. If exporting industries were more likely also to be reliant on external finance, then this correlation could be biasing the results in table 3. The results in table 4 are slightly weaker than those in table 3, suggesting some correlation, but the net impact, measured with some level of uncertainty, is still that industries that rely more on external finance saw larger increases in their investment rates after the tax reform than those that rely less on external finance.

These results provide some support for our thesis that many plants were having difficulty raising external funds in 1983, that plants in industries strongly dependent on external finance were the most hurt by these constraints, and that these plants made the largest increases in their investment in 1985–87. We now turn directly to plant-level evidence, comparing the investment behavior

27. We thank Nina Pavcnik for providing these data. Construction of the variable is described in Hsieh and Parker (2006).

TABLE 4. Industry Investment Rates and Dependence on External Finance, Controlling for Exporting Status of Industry[a]

Interaction of dependence on external finance and year	*Coefficient*	*Standard error*	*Effect of 1 standard deviation increase in external finance dependency*
Control years: 1982 and 1983			
1984	–0.009	0.002	–0.004
1985	0.033	0.003	0.013
1986	0.046	0.002	0.019
1987	0.059	0.002	0.024
1988	–0.033	0.002	–0.013
1989	0.039	0.002	0.016
1990	0.031	0.002	0.012
Cumulative	0.166		0.068
Control years: 1982, 1983, 1989, and 1990			
1984	–0.024	0.010	–0.010
1985	0.018	0.010	0.007
1986	0.031	0.010	0.013
1987	0.044	0.010	0.018
1988	–0.048	0.011	–0.020
Cumulative	0.021		0.009
No. of observations	270		

a. Regressions include industry and year effects and average net exports status interacted with year effects. Standard errors are calculated allowing for arbitrary heteroskedasticity and cross-industry correlations within each year. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for further details.

of plants that are likely and unlikely to be cash constrained and controlling for the typical industry investment levels to see if this dimension of the data also supports our theory.

Evidence from Chilean Plants

This section presents comparisons of the investment behavior of plants that are likely and unlikely to be having trouble raising external funds for productive investment. We measure the likelihood of being constrained based on the correlation of profits and investment before the reform, the amount of short-term capital held by the firm before the reform, whether a firm pays rent, and the size of the firm. When firms are split by investment-profit correlation, we find a significant effect of the reform, as predicted by our theory. We also find some evidence from the sample split by short-term assets. However, there is no detectable postreform investment boom of plants owned by small

firms relative to those owned by large firms or of plants owned by firms that pay rent relative to those owned by firms that do not.

Our key dependent variable is investment in year t divided by capital at the start of the year (the end of the previous year):

$$\left(\frac{I}{K}\right)_{i,t} \equiv \frac{\sum_j I_{j,t}}{\sum_j K_{j,t-1}},$$

where j indexes types of capital. Table 5 provides a set of statistics on the number of plants and the mean, standard deviation, and median of investment-to-capital ratios by year. To characterize plants as likely or unlikely to have restricted access to capital, we merge plants owned by the same firm together into observations on firms. All firms and their associated plants are categorized into more and less likely to be liquidity constrained on the basis of observed firm characteristics before 1984. Most plants are themselves firms; approximately 350 plants are associated with multi-plant firms in the years of the reform.

We first measure the likelihood of a plant's being credit constrained by the correlation of cash flow and investment for the entire firm during the period before the reforms.[28] The argument for this measure is standard. Credit-constrained plants rely more heavily on internal funds to finance operations and so are unable to maintain investment when cash flow drops significantly. The size of the correlation of cash flow and investment therefore provides a good measure of the degree to which a plant relies on internal funds to finance investment. While standard, this measure of constrained status is, at best, error ridden. Several recent papers show that standard theoretical models of firm behavior can imply a significant correlation between cash flow and profits for unconstrained firms, possibly even greater than for constrained firms (depending on the stochastic processes of the price of output and the constraint).[29] Hence, the other approaches of this paper.

28. Our identification strategy is the reverse of that used by Calomiris and Hubbard (1995), who identify firms as credit constrained or not based on their response to a 1937 surtax imposed on retained earnings. Firms that retain profits despite paying between 7 and 27 percent additional taxes on such retained profits are called *credit constrained*. Constrained plants are found to display a higher correlation between investment and cash flow than firms that do not retain profits in the face of this tax. In contrast, we identify credit constraints by sensitivity to cash flow before the tax change, and we then examine whether constrained plants display a greater response to the tax change.

29. Gomes (2001); Cooper and Ejarque (2003).

TABLE 5. Number of Plants and Investment Capital Ratios, by Year and Sample[a]

Sample and year	*No. of observations*	*Mean I/K*	*Standard deviation I/K*	*Median I/K*
Baseline sample				
1981	3,283	0.115	0.303	0.000
1982	3,321	0.058	0.209	0.000
1983	3,209	0.059	0.213	0.000
1984	3,209	0.071	0.219	0.000
1985	3,013	0.068	0.212	0.000
1986	2,767	0.079	0.233	0.000
1987	2,635	0.103	0.251	0.009
1988	2,517	0.113	0.266	0.019
1989	2,433	0.139	0.289	0.029
1990	2,375	0.112	0.258	0.017
Alternative initial capital stock				
1981	3,286	0.111	0.266	0.000
1982	3,354	0.056	0.197	0.000
1983	3,235	0.057	0.199	0.000
1984	3,233	0.065	0.194	0.000
1985	3,028	0.065	0.204	0.000
1986	2,784	0.075	0.223	0.000
1987	2,653	0.102	0.252	0.009
1988	2,533	0.116	0.278	0.020
1989	2,434	0.134	0.275	0.027
1990	2,378	0.112	0.255	0.017
Alternative investment series				
1981	1,907	0.2005734	0.3781525	0.0788183
1982	1,757	0.1066308	0.2803740	0.0306863
1983	1,449	0.1037540	0.2584918	0.0302968
1984	1,309	0.1307663	0.2723599	0.0499551
1985	1,184	0.1205192	0.2390222	0.0457503
1986	982	0.1422860	0.2620428	0.0643813
1987	831	0.1469315	0.2320091	0.0764872
1988	791	0.1503537	0.2451368	0.0902295
1989	762	0.1831413	0.2607033	0.1085611
1990	727	0.1631771	0.2540562	0.0911481
Alternative capital stock and investment series				
1981	1,907	0.2041381	0.3452066	0.0847551
1982	1,783	0.1036753	0.2554344	0.0305476
1983	1,464	0.0945425	0.2267038	0.0277332
1984	1,321	0.1177184	0.2378064	0.0465582
1985	1,186	0.1001863	0.1807689	0.0409718
1986	986	0.1254738	0.2290787	0.0575351
1987	834	0.1308618	0.2008967	0.0660726
1988	794	0.1383945	0.2204166	0.0792377
1989	763	0.1688204	0.2344262	0.0992237
1990	730	0.1535068	0.2518668	0.0807679

a. The samples are defined as follows. In the baseline sample, the capital stock is initialized from the World Bank extract, and investment is set to missing following the World Bank extract. In the sample using the alternative capital stock, the capital stock is initialized as the reported book value, and investment is set to missing following the World Bank extract. In the sample using the alternative investment series, the capital stock is initialized from the World Bank extract, and investment is set to missing if it is zero in two consecutive years. In the sample using the alternative capital stock and the alternative investment series, the capital stock is initialized as the reported book value, and investment is set to missing if it is zero in two consecutive years.

Our exact measure is the correlation between the ratio of net profits to capital and the ratio of gross investment to capital over the period 1980–82, where we use the 1980 capital stock in place of the unavailable 1979 stock. While we choose this period because of our limited sample, we suspect that this is a good time period for observing which plants are credit constrained, since 1982 was a large, temporary downturn. Plants able to maintain some investment or avoid selling off capital in this deep recession are the most likely to have had owners with deep pockets, access to borrowing, or significant internal funds.

We divide our sample of plants into thirds based on our measure of the correlation of profits and investment. We expect the group with the highest correlations to be the most likely to be credit constrained and to benefit the most from the reduction in the tax on retained profits. We call these plants constrained, the middle third possibly constrained, and the lowest third unconstrained, although these terms do not imply that we believe this split to be perfect. Given this crude measure, some constrained plants have surely been classified in the unconstrained sample and vice versa. This should lead any estimates of the impact of the tax reform to be biased toward zero. Following these results, we present evidence from several alternative or complementary divisions of plants.

We begin by running the following regression:

$$\ln\left(\frac{I}{K}\right)_{i,t} = \alpha_i + \gamma_t + C_i \mathbf{D}_t \boldsymbol{\beta}_C + PC_i \mathbf{D}_t \boldsymbol{\beta}_{PC} + \varepsilon_{i,t}, \tag{3}$$

where α_i is a plant-specific fixed effect, γ_t is a year-specific fixed effect, C_i is an indicator of whether a plant is deemed constrained, PC_i is an indicator variable for whether a plant is possibly constrained, $\mathbf{D}_t$ is a row vector of indicator variables for years after the tax reform begins, and $\varepsilon_{i,t}$ captures other factors that affect a plant's investment choices, as well as measurement error in K and I. The elements of the column vectors $\boldsymbol{\beta}_C$ and $\boldsymbol{\beta}_{PC}$ measure the differential investment activity of plants during and after the tax reform relative to their previous investment rates and relative to the contemporaneous investment choices of plants deemed unlikely to be constrained. We use all available data on plants from 1982 to 1990 and, as before, vary whether 1989 and 1990 are used as control years by varying whether indicator variables for 1989 and 1990 are included in the vector $\mathbf{D}_t$.

Table 6 presents the estimates from equation 3 in the first and second columns of results. Plants with a high correlation of investment and profits

TABLE 6. Investment to Capital as a Function of Profit-Investment Correlations and Year[a]

	Plant and year effects		*Industry x year effects*	
Type of plant and year	*(1)*	*(2)*	*(3)*	*(4)*
High-correlation indicator			–0.021	–0.039
			(0.006)	(0.008)
High-correlation plants				
1984	0.049	0.063	0.044	0.063
	(0.012)	(0.013)	(0.013)	(0.014)
1985	0.032	0.046	0.031	0.049
	(0.012)	(0.013)	(0.013)	(0.014)
1986	0.024	0.038	0.024	0.042
	(0.013)	(0.014)	(0.013)	(0.014)
1987	0.008	0.023	0.008	0.026
	(0.013)	(0.014)	(0.014)	(0.015)
1988	0.031	0.046	0.033	0.051
	(0.013)	(0.014)	(0.014)	(0.015)
1989		0.039		0.045
		(0.014)		(0.015)
1990		0.024		0.036
		(0.014)		(0.015)
Medium-correlation indicator			–0.039	–0.058
			(0.006)	(0.008)
Medium-correlation plants				
1984	0.024	0.041	0.023	0.042
	(0.012)	(0.013)	(0.012)	(0.013)
1985	0.016	0.034	0.017	0.036
	(0.012)	(0.013)	(0.013)	(0.013)
1986	0.011	0.029	0.013	0.033
	(0.012)	(0.013)	(0.013)	(0.014)
1987	0.023	0.042	0.023	0.042
	(0.013)	(0.014)	(0.013)	(0.014)
1988	0.031	0.051	0.034	0.053
	(0.013)	(0.014)	(0.013)	(0.014)
1989		0.038		0.038
		(0.014)		(0.014)
1990		0.046		0.051
		(0.014)		(0.015)
No. of observations	24,590	24,590	24,590	24,590

a. Correlation categorizations are based on the three observations of investment-to-capital ratios and net-profit-to-capital ratios in 1980, 1981, and 1982. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for details. Standard errors are in parentheses.

through the boom-bust period of 1980–82 show rapid and large increases in investment rates following the tax cuts. Constrained plants, on average, raised their investment rates by 3 to 4 percentage points during the three years of the reform. These estimates control for the average investment rate of a given plant and for the average investment rate in each year. We find similar results if we use our alternative series for capital and investment. The effect of the reform seems to be persistent. The exercise provides little evidence that investment rates slowed even several years after the reform, although we find slightly more evidence for our alternative capital and investment series. The plants with medium correlations of profits and investment, which we consider possibly constrained, present a significant though smaller investment boom, again after we control for both time and plant effects.

Our plant-level results so far rely on the assumption that the differences in the correlation of profits and investment across plants are driven by differences in access to capital rather than differences in technologies and product-specific demands. This assumption might fail if our results are largely comparing plants in different industries. That is, one might be concerned that some industries use technologies that happen to produce a high correlation between profits and investment and also happened to boom after 1983. We address this alternative by controlling for the investment rate of each plant's industry in each year that we study and then turning to alternative identification strategies.

We first compare the investment behavior of differentially constrained firms relative to the average investment in that industry in that year. That is, we drop the firm and time effects in equation 3 and instead include a set of thirty-three three-digit industry-level dummies interacted with a complete set of time dummy variables. Denoting an industry-time dummy as α_{jt}, we write the estimating equation as

$$(4) \qquad \ln\left(\frac{I}{K}\right)_{i,t} = \alpha_{j,t} + \gamma_C C_i + \gamma_{PC} PC_i + C_i \mathbf{D}_t \boldsymbol{\beta}_C + PC_i \mathbf{D}_t \boldsymbol{\beta}_{PC} + \xi_{i,t}.$$

The coefficients γ_C and γ_{LC} capture the average investment rates of constrained and possibly constrained plants, and the coefficient vectors $\boldsymbol{\beta}_C$ and $\boldsymbol{\beta}_{LC}$ measure the higher investment-to-capital rates for constrained and possibly constrained plants in each year relative to the average in that industry in that year. The last two columns of results in table 6 show that our conclusions are robust to this alternative specification. The relative investment rates of constrained and possibly constrained plants rose significantly during the reform. The coefficients on the indicator variables for constrained and possibly constrained firms

are both negative, indicating that constrained firms invested at lower rates than unconstrained firms, as one might expect.

Nevertheless, we still treat a firm as constrained if its correlation is in the top third for all firms rather than relative to the typical correlation in its own industry. Thus we next divide plants by their investment-profits correlations relative to the average rate in their industry. We consider a plant to be constrained if it is among the top third of the plants in its four-digit industry in terms of the correlation between net profits and investment before the reform. The results of this exercise are substantively identical to the results in table 6, so we do not report them here. Plants we deem likely to be constrained experienced larger investment booms. The remainder of the results all classify the constrained status of plants relative to the average values in their industry.

Having established that plants with higher correlations of profits and investment benefited more from the reform, we now investigate alternative assumptions for identifying constrained and unconstrained plants. We consider three other measures of the degree to which a plant is short on internal funds: the ratio of short-term reserves to capital, the ratio of rental payments to capital, and the size of the firm. All of the splits are based on numbers in 1980 and 1981, when book values are reported and well before the tax experiment we are considering. On balance, the results of these alternative splits do not clearly support or refute our main hypothesis.

Table 7 shows the relative investment-to-capital ratios of plants deemed constrained by their holdings of short-term reserves in 1980 and 1981. Results are quite similar across the construction of the capital stock series. They are robust to whether the 1989 and 1990 years are treated as control years, but they differ with respect to the construction of the investment series. Table 7 thus presents results from the two different constructions of the investment series. The first two sets of results are derived from the baseline series and show no significant differential effect of the reform on plants with low short-term asset ratios in 1980 and 1981. The second two sets of results show some increase in investment following the reform, particularly when we control for the typical growth in each industry in each year, although the evidence is statistically weak.

One possible explanation for the lack of relative investment boom in this split of the data is that financially constrained firms may hold more liquid assets to avoid bankruptcy than plants that can borrow freely. Thus, plants with credit lines maintain low levels of short-term assets without bankruptcy risk and contaminate this variable as an indicator of constrained status. Another possibility is that the high inflation rate leads to a pattern of reserves that is

TABLE 7. Investment to Capital as a Function of the Ratio of Short-Term Assets to Capital[a]

Type of plant and year	*Baseline series*		*Alternative investment series*	
	Plant and year effects	*Industry x year effects*	*Plant and year effects*	*Industry x year effects*
	(1)	*(2)*	*(3)*	*(4)*
Low-asset indicator		−0.019		−0.016
		(0.006)		(0.010)
Low-asset plants				
1984	−0.005	−0.002	−0.001	0.031
	(0.011)	(0.012)	(0.020)	(0.022)
1985	0.012	0.013	0.020	0.035
	(0.011)	(0.012)	(0.021)	(0.023)
1986	0.008	0.010	0.020	0.035
	(0.012)	(0.013)	(0.023)	(0.025)
1987	−0.001	0.010	0.003	0.010
	(0.012)	(0.013)	(0.025)	(0.027)
1988	0.007	0.017	0.005	0.011
	(0.012)	(0.013)	(0.026)	(0.028)
Medium-asset indicator		−0.041		−0.049
		(0.006)		(0.009)
Medium-asset plants				
1984	−0.006	−0.004	−0.016	−0.003
	(0.011)	(0.012)	(0.019)	(0.020)
1985	0.013	0.016	0.006	0.019
	(0.012)	(0.012)	(0.020)	(0.021)
1986	0.007	0.006	0.003	−0.002
	(0.012)	(0.013)	(0.021)	(0.022)
1987	0.021	0.022	0.027	0.020
	(0.012)	(0.013)	(0.022)	(0.024)
1988	0.003	0.003	−0.008	−0.022
	(0.012)	(0.013)	(0.023)	(0.025)
No. of observations	24,666	24,666	9,404	9,404

a. All regressions include year and plant indicator variables. Categorizations are based on the ratio of short-term assets to capital in 1980 and 1981 relative to the industry average. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for details. Standard errors are in parentheses.

more dependent on monetary factors than real factors. In sum, we conclude that we find some weak support for our hypothesis and no evidence to reject it when we identify plants as constrained by comparing their level of short-term reserves to their industry's average level.

Our second alternative identification strategy is to assume that plants that are financially constrained and have highly productive investment opportunities may be able to rent physical capital to partially loosen the financial constraint.

TABLE 8. Investment to Capital as a Function of Whether a Firm Pays Rent[a]

Type of plant and year	Baseline series		Alternative capital and investment series	
	Plant and year effects	Industry x year effects	Plant and year effects	Industry x year effects
	(1)	(2)	(3)	(4)
Rent-paying-plant indicator		0.024		0.027
		(0.005)		(0.008)
Rent-paying plants				
1984	–0.007	–0.009	0.010	–0.003
	(0.010)	(0.010)	(0.014)	(0.018)
1985	–0.018	–0.020	0.016	0.006
	(0.010)	(0.011)	(0.015)	(0.019)
1986	–0.003	–0.005	0.014	0.008
	(0.010)	(0.011)	(0.016)	(0.020)
1987	–0.015	–0.023	–0.003	–0.019
	(0.011)	(0.011)	(0.018)	(0.022)
1988	–0.017	–0.026	0.011	0.009
	(0.011)	(0.012)	(0.018)	(0.023)
No. of observations	24,666	24,666	9,618	9,618

a. Plants are categorized as rent payers based on 1980 and 1981 data. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for details. Standard errors are in parentheses.

That is, a financially constrained firm is more likely to rent than own the building in which it operates. In table 8 we investigate whether plants that report paying rental payments benefited more during the years of the reforms. Since most plants report paying no rent, we simply study those that do relative to those that do not. We find no evidence that plants that pay rent invested more following the reform. Our findings are similar whether or not we include 1989 and 1990 as control years, but they differ by capital and investment series, with the results with only one alternative series lying between the reported pairs of results.

Our final alternative identification strategy is to assume that small plants are more likely to be constrained. This is standard practice in the literature on credit-constrained plants in the United States, in which small plants are seen as having significantly lower access to credit markets. In Chile, however, four issues arise. First, previous studies typically measure the size of a plant by its capital stock, so we could use capital stocks in 1980 and 1981 to create a split. Only book capital is available, however, and the initial capital stock is subject to significant mismeasurement. This would create a bias toward small plants having high investment-to-capital ratios early in the sample. This bias, in turn,

would create the incorrect illusion that small plants grew faster than large plants before the tax reform and potentially that their growth slowed relative to large plants as the tax reform was instituted. We provide a partial solution to this problem by splitting plants by the average number of employees in 1980 and 1981 rather than by the initial capital stock.

The second problem with using size as a proxy for financial constraints is that many of the smallest firms in Chile do not pay taxes at all or pay minimal taxes because the owners have low incomes. As table 2 shows, a firm owned by an individual with a low enough income to have a zero personal tax rate had the same 10 percent tax rate on profits before and after the reform.[30] Third, many small manufacturing plants in Chile are family-run businesses that are perhaps limited in size by economies of scope. The most notable example of this is that 14 percent of our sample comprises plants in ISIC 3117—namely, bakeries. In the United States, "small" firms in investment studies are usually small public firms, whereas in Chile less than one percent of plants were even public in 1980 and 1981. Thus, we are really comparing small plants with small plants. Finally, Chile's financial markets are currently significantly less developed than those in the United States, and the difference was even more marked in the early 1980s. Many relatively large plants in Chile do not have access to capital in the same way that relatively large companies in the United States do. In short, size is much less an indicator of access to capital in Chile and more an indicator of industry, for example. We provide a partial solution to these problems by splitting firms relative to the average size in their industry, as discussed previously.

Table 9 presents the results from dividing plants by size. To reemphasize how different this exercise is from previous studies of U.S. data, we note that in the typical industry in Chile, small plants are defined as averaging nineteen employees or fewer, while large plants are defined as averaging forty-four employees or more. Table 9 reports no evidence that the investment rates of small plants rose (or fell) disproportionately at the time of the tax reform.[31]

In sum, plants that had a high correlation between cash flow (net profits) and investment before the reform had the largest increases in investment rates after the reform. This finding is quite robust, although alternative measures of which firms are likely to be constrained do not support our main thesis.

30. All of our reported results are similar whether or not we exclude firms that paid no profits tax in the years before and including 1982.

31. Results are similar for the alternative definition of capital and for regressions that include 1989 and 1990 as postreform years.

TABLE 9. Investment to Capital as a Function of Plant Size and Year[a]

Type of plant and year	Baseline series		Alternative investment series	
	Plant and year effects	Industry x year effects	Plant and year effects	Industry x year effects
	(1)	(2)	(3)	(4)
Small-plant indicator		−0.021		0.026
		(0.006)		(0.010)
Small plants				
1984	0.008	−0.005	0.038	0.019
	(0.011)	(0.013)	(0.020)	(0.021)
1985	−0.004	−0.019	0.016	0.008
	(0.011)	(0.013)	(0.020)	(0.022)
1986	−0.004	−0.015	−0.042	−0.031
	(0.012)	(0.013)	(0.022)	(0.024)
1987	0.038	0.031	−0.019	−0.003
	(0.012)	(0.014)	(0.024)	(0.026)
1988	0.020	0.008	−0.006	0.024
	(0.012)	(0.014)	(0.024)	(0.026)
Medium-sized-plant indicator		−0.009		−0.007
		(0.005)		(0.009)
Medium-sized plants				
1984	0.008	0.005	0.024	0.024
	(0.011)	(0.012)	(0.019)	(0.020)
1985	0.006	0.006	−0.001	0.008
	(0.011)	(0.012)	(0.020)	(0.020)
1986	−0.002	−0.003	0.032	0.031
	(0.012)	(0.012)	(0.021)	(0.022)
1987	0.008	0.004	0.016	0.014
	(0.012)	(0.012)	(0.023)	(0.024)
1988	0.023	0.022	0.033	0.042
	(0.012)	(0.013)	(0.023)	(0.024)
No. of observations	25,479	25,479	9,792	9,792

a. Size categorizations are based on the percent difference in firm employment from the industry average in 1980 and 1981. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for details. Results using the alternative capital series and including 1989 and 1990 interactions yield similar results. Standard errors are in parentheses.

Other Policy Reforms

This paper argues that in a country with undeveloped financial markets, investment is constrained by the lack of access to credit. By increasing the internal funds available to profitable firms, the 1984 corporate tax reform in Chile played a large role in unleashing the subsequent rise in Chile's investment and economic growth. An alternative hypothesis is that most firms were not

credit constrained and that the documented patterns of increases in investment and saving were due to other reforms implemented by Chile's military regime over this time period.

This section describes the major reforms that occurred in Chile in the decade leading up to the period of rapid growth: the semi-privatization of the public pension system, the liberalization and development of financial markets, and the opening to trade and capital flows.[32] Each subsection describes the major policy changes in one of these areas and makes the case that the reforms in question are, based on theory and evidence, unlikely to alter the inferences drawn so far in this paper.

To be clear, we are not arguing that these reforms did not benefit Chilean economic growth. Rather, we suspect that each of these reforms played a role by affecting Chile's steady-state levels of output and capital per worker. Convergence to these levels is a slow process for most countries and states, but in Chile, the corporate tax reform caused an investment boom and a decade of rapid convergence.

Privatization of the Public Pension System

Before 1981 Chile had an unfunded, pay-as-you-go, public pension system much like the U.S. social security system.[33] The average payroll tax rate varied significantly across firms, but was around 30 percent of wages.[34] In 1981, the Chilean government cut and standardized the payroll tax and created a new system that mandated contributions to heavily regulated but privately managed accounts. All new entrants to the labor force selected a private account into which to deposit their payments (20 percent of wages, less administrative fees and a share for disability and health insurance equivalent to 10 percent of wages), and they opted to invest these funds in one of several regulated mutual funds.[35] Those employed at the time of the reform had the option of switching into the new system or remaining in the old. The new system was immediately popular: 70 percent of private employment switched in the first year.[36]

32. See Bosworth, Dornbusch, and Laban (1994); Perry and Leipziger (1999), for detailed descriptions of the reforms implemented by the Chilean government.

33. For more complete descriptions, see Edwards (1996); Diamond (1993).

34. Exact estimates differ. See Coronado (1998); Gruber (1995); Edwards and Cox Edwards (2000). The rates were significantly higher early in the 1970s.

35. The health insurance share of the tax could be used by the payee to purchase health insurace from private providers, subject to strict regulation. Among new entrants, the participation of the self-employed was optional, and this has led to a significant problem of households' gaming some of the redistributive nature of the system by moving in and out of self-employment.

36. Coronado (1998).

Elderly workers tended to remain with the old system, and 20 percent of the self-employed opted to participate.

The new system was fully funded, with the exception that all plans were guaranteed by the government. To pay the unfunded liabilities of the old system, the government issued a large amount of new debt, termed recognition bonds, which were bought by households and slowly paid off by the government. The fiscal costs of payments for these unfunded liabilities averaged 4.7 percent of GDP in 1981–88.[37]

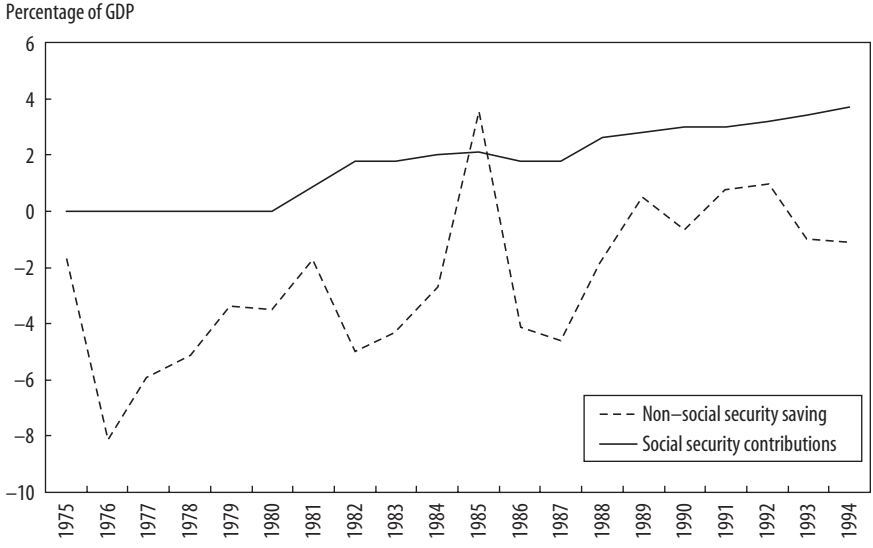
How might this reform be responsible for the saving and investment boom? First, as long as households do not alter their consumption behavior and government spending does not change, such a reform has no effect on aggregate national saving. In such a Ricardian world, measured household saving increases by definition, because contributions into private accounts are counted as private saving, and this increase is mirrored by the increased public spending necessary to pay the unfunded liabilities of the old system. The reform thus has no net effect on aggregate saving.

Ricardian equivalence, however, seems like a poor assumption to apply to Chile in the early 1980s. Chile had poorly developed financial markets, and it seems likely that many households and small businesses were financially constrained. Nonetheless, the impact of this reform will be exactly the same as in a Ricardian world if households cannot access or borrow against their private pension accounts. Constrained households do not change their consumption and investment, since the privatization merely replaces a government promise with a particular account that the government funds by issuing a government promise. One caveat to this argument is that this reform might alter factor prices, but this will not occur if rates of return are set by the world capital market. That is, the privatization of the pension system will not alter saving and investment if the domestic and international capital markets absorb the additional government bonds without altering the domestic real interest rate.

In practice, the privatization seems to have simply recategorized public pension contributions as private instead of public saving. Figure 6 decomposes household saving into contributions to the privatized social security system and into non–social security saving. A significant part of the trend increase in household saving (from –3.8 percent of GDP in 1975–83 to 1.7 percent of GDP in 1984–94) is due to contributions into the privatized social security accounts. The increase in measured household saving stemming from these contributions

37. Ortuzar (1988), quoted in Edwards (1996, table 5).

FIGURE 6. Household Savings



Source: Bennett, Schmidt-Hebbel, and Soto (1999).

is mirrored by lower public saving as a result of the costs of the unfunded liabilities of the old pension system (as shown in figure 2).

Our discussion so far assumes that taxes are nondistortionary, but if private saving incentives were affected by the reform, then the privatization of social security could be partially responsible for the saving boom. For example, if payroll taxes were high and not related to benefits before the reform, then the privatization of social security would increase the incentives to earn by giving households greater benefits for greater taxes paid. An increase in labor supply could lead to an investment boom. Gruber provides evidence on this point, reporting that the incidence of payroll taxes in Chile fell fully on wages, with no effect on employment.[38] According to this evidence, payroll taxes under the old system did not create significant labor market distortions.

Another alternative channel through which privatized pension funds may have driven the investment boom is the deepening of financial markets, which could have increased both the incentives for households to save and the ease of firm access to financial capital. There is some evidence that non–social security saving increased over the relevant time period (see figure 6), but the

38. Gruber (1995).

magnitude of the increase—slightly over 3 percent of GDP from 1975–83 to 1984–94—is small relative to the increase in the aggregate saving rate. We discuss financial market development in the next section. Here we reiterate the well-known theoretical result that even if the reform increased saving, in theory this does not lead to an investment boom in a small open economy like Chile. Many economists are skeptical of this theoretical argument on empirical grounds: saving and investment rates are highly correlated across countries. But if high saving led to high investment in Chile, we would expect to see Chile exporting at least a small amount of capital. In fact, after the reform and through much of the 1980s, Chile ran significant current account deficits, importing capital. This fact strongly suggests that high saving did not directly cause high investment and, more importantly, that the role of the reform of the public pension system in the investment boom is minimal.

A final piece of evidence comes from the experiences of the set of countries that reformed their public pension systems. Samwick studies seven pension reforms in Latin America, seven reforms in Africa, two reforms in Asia, and four reforms in developed economies.[39] He finds no evidence that countries that privatized their social security systems experienced an increase in saving rates, with one exception: Chile.[40] It seems unlikely that Chile was the one exception in which the reform of a public pension system caused a large increase in saving and investment. Rather, the increase in saving in Chile is probably due to forces other than social security privatization.

Liberalization and Development of Financial Markets

The role of bank credit and publicly traded equity has expanded significantly in Chile's financial markets over the last twenty-five years.[41] Most of this financial market deepening occurred in the 1970s and 1990s, however, and the increase in financial intermediation of the 1990s seems a direct result of growth rather than the other way around.

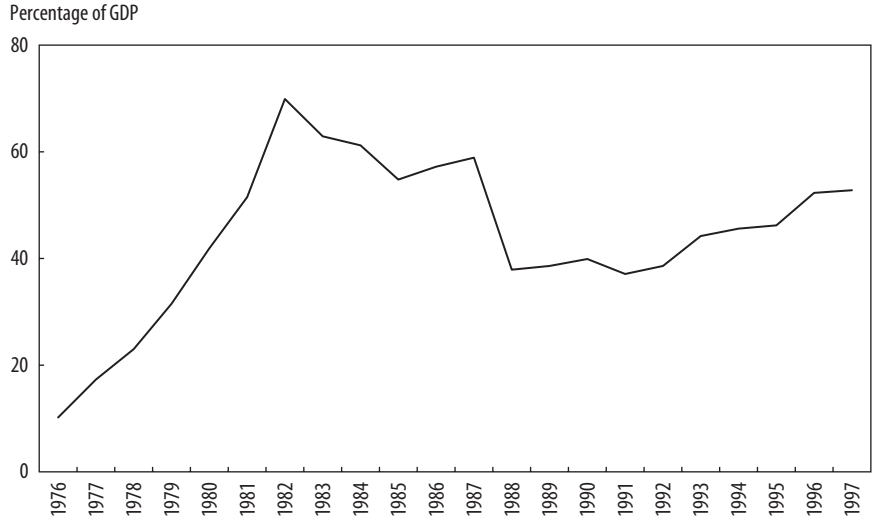
In the first few years of the military regime, Chile focused its efforts on liberalizing the banking sector. From 1974–81, the government lifted interest rate controls, eliminated entry barriers to the banking industry, lowered liquidity

39. Samwick (2000).

40. Samwick (2000, p. 272) concludes that "no country other than Chile that moved to a system based more on defined contributions during the sample period experienced an increase in the trend saving rates after reform."

41. For additional details, see Gallego and Loayza (2000); Barandiarán and Hernández (1999).

FIGURE 7. Bank Credit

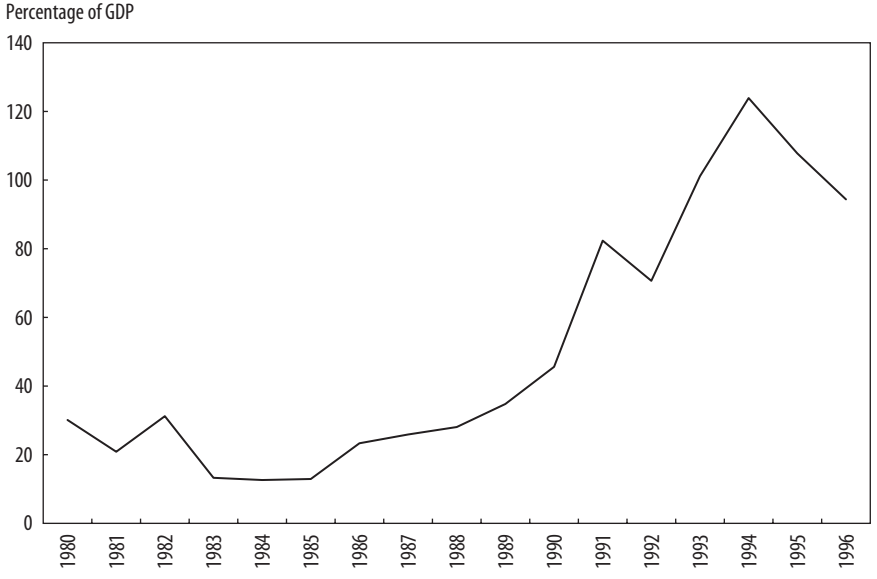


Source: Eyzaguirre and Lefort (1999, table 3.6).

requirements for banks, eliminated quantitative controls on credit, and privatized state-owned banks. As shown in figure 7, the result was a large expansion in bank credit, which grew from 10 percent of GDP in the early 1970s to almost 60 percent of GDP by the early 1980s. This development halted with the advent of the debt crisis and the recession of 1982. After the banking crisis of 1982, the government took over most of the country's banks and undertook the process of either liquidating or recapitalizing and privatizing them, a process that took many years. Bank credit declined significantly in 1982 and continued falling during the beginning of the investment boom. Bank credit reached its low of 40 percent of GDP in 1985–86. A new banking law in 1986 established limits on the leverage positions of the banks, increased reserve requirements, and generally increased the supervisory capacity of the Central Bank over the banking sector. These restrictions kept bank credit roughly constant at 40 percent of GDP until the early 1990s. Thus, bank credit was falling as the investment boom began and did not rise as a share of output until investment and saving rates stopped growing.

The stock market played an even more minor role in Chile's financial system in the 1980s, when the market value of publicly traded equity in Chile was 30 percent of GDP. As shown in Figure 8, the Chilean stock market did not grow rapidly until the 1990s. The market value of publicly traded stocks

FIGURE 8. Market Value of Publicly Traded Stocks



Source: Eyzaguirre and Lefort (1999).

in Chile (relative to GDP) roughly tripled from 35 percent of GDP in 1989 to 94 percent in 1996.[42] Since the growth of bank credit was limited in the 1990s, the deepening of Chile's capital markets during this decade was disproportionately due to the expansion of the stock market.

These changes in Chile's financial structure could explain the investment boom if firms that were previously credit constrained were able to obtain financing for their investments as a result of the deepening of Chile's financial markets. However, the aggregate evidence indicates that the investment boom was financed not by external credit, but by retained earnings. In addition, the timing of the lending boom and the stock market boom in Chile does not support the hypothesis that the investment boom resulted from developments in Chile's financial market. The investment boom in Chile took place from 1984 to 1989, but aggregate bank credit did not increase over this period. Similarly, Chile's equity market did not increase significantly until the 1990s,

42. This increase is only partially due to an increase in the price of Chilean equity. The quantity of Chilean equity, computed by dividing the market value of Chilean stock by its price, increased by 70 percent from 1990 to 1996 (Eyzaguirre and Lefort 1999, table 3-1 and figure 3-2).

after the investment boom. The evidence suggests that the investment boom caused the development of Chile's equity market rather than the reverse.[43]

Finally, we check that our main result does not stem from the fact that credit-constrained firms increased borrowing starting in 1984. Recall that we find that the investment of likely constrained firms (measured as firms with a high correlation of investment and cash flow) increased after 1984 relative to the investment of firms that were likely unconstrained. If this boom was due to an increased access to credit, then we would expect the ratio of interest payments to capital to rise for our constrained firms relative to our unconstrained firms. To test this hypothesis, we estimate equations 3 and 4 with the ratio of interest payments to capital as the dependent variable. We find little evidence of this effect. Table 10, which presents the results that match those in table 6, contains no evidence that the constrained plants borrowed more when their investment boomed. Results using the alternative capital stock series or the alternative investment series also show, if anything, decreases in interest payments by constrained plants. However, the alternative capital and investment series together suggest statistically insignificant but economically significant increases in interest payments by these plants. The balance of the evidence is consistent not with a general increase in available debt instruments and increased access to credit for constrained plants, but rather with increased funds available from internal sources allowing plants with profitable investment opportunities to invest substantially more.

Trade Liberalization

Another major reform pursued by Chile in the late 1970s and early 1980s was the liberalization of its trade regime.[44] Chile, like many developing economies, pursued policies of import substitution in the 1960s and 1970s. By 1973, the average tariff rate exceeded 100 percent, in addition to multiple official exchange rates and quantitative restrictions on imports. One of the economic reforms pursued by the Pinochet government was international economic openness. By 1979, the average tariff rate had fallen to 12 percent, and many of the regulatory restrictions on importing and exporting had been removed.

43. If the investment boom was driven by the development of Chile's financial markets, then a firm's investment should become less sensitive to cash flow, not more sensitive to cash flow. Gallego and Loayza (2000) find some evidence that the investment of publicly traded companies was less sensitive to cash flow, but only after the investment boom, that is, in the 1990s relative to the 1980s.

44. See Tybout (1996); Pavcnik (2002).

TABLE 10. Interest Payments to Capital as a Function of Profit-Investment Correlations and Year[a]

	Plant and year effects		*Industry x year effects*	
Type of plant and year	*(1)*	*(2)*	*(3)*	*(4)*
High-correlation indicator			0.131	0.196
			(0.051)	(0.068)
High-correlation plants				
1984	−0.052	−0.138	−0.024	−0.090
	(0.086)	(0.093)	(0.109)	(0.118)
1985	−0.090	−0.180	−0.141	−0.206
	(0.088)	(0.095)	(0.111)	(0.120)
1986	−0.140	−0.232	−0.183	−0.249
	(0.090)	(0.097)	(0.114)	(0.123)
1987	−0.194	−0.288	−0.125	−0.190
	(0.092)	(0.099)	(0.116)	(0.125)
1988	0.002	−0.094	0.035	−0.031
	(0.093)	(0.101)	(0.118)	(0.126)
1989		−0.206		−0.141
		(0.102)		(0.128)
1990		−0.222		−0.166
		(0.103)		(0.129)
Medium-correlation indicator			−0.030	−0.072
			(0.050)	(0.066)
Medium-correlation plants				
1984	−0.003	0.035	0.009	0.051
	(0.083)	(0.089)	(0.106)	(0.115)
1985	0.030	0.070	0.006	0.048
	(0.085)	(0.091)	(0.109)	(0.117)
1986	−0.020	0.022	−0.028	0.014
	(0.088)	(0.094)	(0.112)	(0.120)
1987	−0.007	0.036	0.006	0.048
	(0.089)	(0.096)	(0.115)	(0.123)
1988	0.048	0.092	0.054	0.096
	(0.091)	(0.098)	(0.117)	(0.125)
1989		0.096		0.098
		(0.099)		(0.126)
1990		0.116		0.111
		(0.100)		(0.127)
No. of observations	24,631	24,631	24,631	24,631

a. Correlation categorizations are based on the three observations of investment-to-capital ratios and net-profit-to-capital ratios in 1980, 1981, and 1982. Regressions are run on data from 1982 to 1990 and include only plants that survive until at least 1984. See text for details. Standard errors are in parentheses.

From 1976 to 1981, Chilean manufacturing production grew by 25 percent, but at the same time, the balance of trade worsened and the real exchange rate appreciated significantly.

While the liberalization would seem like a boon to growth and possibly a direct cause of high investment rates, policy reversed direction during the debt crisis and the deep 1982 recession. By 1984, when the investment boom began, tariffs had been raised to an average of 36 percent, suggesting little role for tariff policy in the investment boom. Indeed, tariffs returned to an average of 15 percent only in 1988. Kasahara estimates a structural model of investment on the Chilean manufacturing census data and argues that the higher tariff rates from 1983 to 1987 actually significantly lowered investment over this period.[45]

To summarize, low tariffs lag economic growth and do not lead it. The investment boom began in 1984, when tariffs rates peaked. Openness may have been an important foundation for growth, but probably was not the precipitating factor for the investment boom and growth of the 1980s.

Conclusion

In 1984, Chile had a poorly developed financial system, with many banks under public control or poorly capitalized. Average tariff rates were double the rates of five years earlier. The semi-privatization of the public pension system had made a large amount of implicit government debt explicit. Unlike the other Latin American economies, however, Chile was experiencing the beginning of a large and persistent rise in investment and economic growth.

This paper measures the contribution of a corporate tax reform that lowered the tax on retained profits to this boom. We find that the aggregate and industry-level evidence provides clear support for the hypothesis that the reduction in the taxation of retained earnings allowed financially constrained firms to take advantage of profitable investment activities. The increase in saving associated with the investment boom was almost entirely an increase in business saving. Moreover, investment rates rose the most in industries that were the most reliant on external finance.

The plant-level evidence is less clear, however. In support of our hypothesis, we find that plants that exhibited a high correlation of investment and cash flow before the tax reform increased their investment rates the most during

45. Kasahara (2004).

and to some extent after the reform. In contrast, other sample splits do not reject the null hypothesis of no effect of the reform. In particular, we find no evidence that smaller plants experienced a larger increase in investment after the tax reform.

Our more general point, which is supported by the evidence from Chile's tax reform, is that in countries with poorly developed financial markets, taxation of retained profits may have a significant effect on corporate saving and can therefore be particularly harmful for growth. By taxing retained profits, the government removes internal funds from some firms in which the value of these resources exceeds the real interest rate. This argument relies on a country's having otherwise favorable macroeconomic policies and conditions. In an economy with high levels of corruption or taxation, poor property rights, poor infrastructure, and so forth, the reduction of a tax on retained profits is likely to accomplish little since the low level of investment reflects limited opportunities for profit, rather than poor financial markets. However, in developing economies with strong growth prospects, underdeveloped financial markets may be a significant factor retarding economic growth. Corporate saving is an important source of productive investment, and the Chilean experience shows that policies that increase the internal funds available to firms can have disproportionately large growth effects.