

Capital Controls, Liberalizations, and Foreign Direct Investment

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This article evaluates the impact of capital controls and their liberalization on the activities of US multinational firms. These firms attempt to circumvent capital controls by reducing reported local profitability and increasing the frequency of dividend repatriations. As a result, the reported profit impact of local capital controls is comparable with the effect of 27% higher corporate tax rates, and affiliates located in countries imposing capital controls are 9.8% more likely than other affiliates to remit dividends to parent companies. Multinational affiliates located in countries with capital controls face 5.25% higher interest rates on local borrowing than do affiliates of the same parent borrowing locally in countries without capital controls. Capital control liberalizations are associated with significant increases in multinational activity—property, plant, and equipment grow at 6.9% faster annual rates following liberalizations. The combination of the costliness of avoidance and higher interest rates discourages investment in countries with capital controls, and this effect is reversed upon liberalization of controls. (*JEL* F21, F23, F36, F42, G15, G32, G34)

Countries that fear the economic disruptions that may accompany capital flows are often tempted to impose controls on international capital movements. These controls can take many forms, and their effect on economic growth and firm performance is hotly debated. The same countries are also typically eager to attract foreign direct investment (FDI) because of the presumed salutary effects of such investment. The potential inconsistency of the desire to control capital movements and the desire to attract inbound FDI has heretofore received limited attention, despite its obvious relevance to policy makers and multinational firms.

The authors thank various seminar and conference participants, Campbell Harvey, and an anonymous referee for helpful comments on earlier drafts of this article. Desai and Foley thank the Division of Research at Harvard Business School for generous funding. Address correspondence to M. A. Desai, Baker 265, Harvard Business School, Boston, MA 02163, or email: mdesai@hbs.edu.

This article offers evidence of the effects of capital controls on multinational firms, in the process addressing several related questions: What is the effect of capital controls on the cost of capital for foreign investors? Do multinational firms employ their internal product and capital markets to circumvent capital controls, and how do such efforts compare to actions triggered by income taxes? Are the effects of capital controls reversed when countries liberalize their capital account restrictions? And do capital controls reduce the volatility of multinational performance and growth?

The results indicate that local borrowing rates are considerably higher in countries imposing capital controls; that multinational firms distort their reported profitability and their dividend repatriations to mitigate the impact of capital controls; and that liberalizations of controls are associated with considerable increases in the activity they conduct through their affiliates. Borrowing rates are 5.25 percentage points higher in countries imposing capital controls than they are elsewhere for affiliates of the *same* multinational parents. The distortions to reported profitability are comparable with those occasioned by 27% differences in corporate tax rates, and dividend repatriations are regularized to facilitate the extraction of profits from countries imposing capital controls. Affiliates expand following liberalizations; they experience 6.9% faster annual growth of property, plant, and equipment investment, indicating that the higher interest rates and the costliness of capital control avoidance together impose significant burdens on foreign investors. There is no apparent evidence that the imposition or removal of capital controls is associated with changes in the volatility of affiliate profitability or growth rates.

These findings emerge from an analysis of how foreign affiliates of US multinational firms respond to capital controls and their removal. The use of confidential affiliate-level data makes it possible to distinguish the behavior of foreign affiliates of the *same* parent companies operating in markets with and without capital controls. As a result, it is possible to obtain estimates of the impact of capital controls, while implicitly controlling for considerations that are common to all affiliates of the same company. The sample, which varies depending on the analysis, covers the activities of all the US multinational firms from 1982 to 1997.

Any analysis of firm-level responses to capital controls is complicated by two important considerations: capital controls are not randomly distributed among nations and available indexes measure capital controls imprecisely. This article attempts to overcome these difficulties by focusing on subtler predictions regarding firm behavior, by employing a measure tailored to capture the aspects of capital controls relevant for multinational firms, by controlling for observable country characteristics including the quality of political institutions and contemporaneous economic reforms, and by employing firm-fixed effects to study the effects of

liberalization. These subtler predictions include altered repatriation policies and patterns of profitability in response to capital controls. The evidence indicates that multinational affiliates in countries that control remittances are significantly more likely than other affiliates to remit dividends to their American parents, despite the associated tax and resource allocation costs. The same affiliates have 5.2% lower reported profit rates than do comparable affiliates in countries without capital controls, reflecting, in part, trade and financing practices that allocate income away from affiliates in countries restricting capital flows, a pattern characteristic of affiliates located in countries with high tax rates. These results persist when additional macroeconomic and political variables are included in the regressions, and these patterns in behavior reverse when liberalizations occur. Although it is impossible to rule out the confounding effects of the nonrandom assignment of capital controls, the evidence suggests that the overall results do not merely reflect the conditions that give rise to the desire to impose capital controls.

Studies of capital controls and capital account liberalizations are commonly hampered by the imprecise measurement of capital controls. As noted in Edison et al. (2002), measures employed in empirical work on capital controls typically are blunt. To address this problem, the empirical work in this article employs a measure of capital account restrictions that is specifically associated with the activities of multinational firms, comparing the results to those obtained using a widely-adopted measure of capital account restrictions developed by the International Monetary Fund (IMF). This analysis of firm responses to capital account restrictions offers the advantage of being closely tied to the restrictions that firms actually face. As it happens, results obtained using the two control measures are consistent, although stronger when using the measure of capital controls tailored for situations facing multinational firms.

In Section 1 of the article, we review the empirical literature on the impact of capital account restrictions and liberalizations and tie the article's results to the open questions in the literature; in the section, we conclude with a model of multinational investment used to motivate subsequent tests. In Section 2, we offer an overview of the available data and describe basic patterns of multinational activity and capital account regulations. In Section 3, we present empirical evidence of the effects of capital account restrictions on local interest rates, profit extraction, and investment levels. First, previous work has conjectured that interest rates are influenced by the presence of capital controls, and the analysis of Table 3 employs multinational borrowing rates to test this hypothesis. Second, the model generates testable predictions on avoidance of capital controls through altered dividend repatriation and profit relocation that are examined in Tables 4 and 5. The combination of higher interest rates and the avoidance activities of multinational firms leaves open the

question of the extent to which capital controls deter investment, and analysis of this question is presented in Tables 6 and 7. Finally, many observers have speculated about the relationship between capital controls and economic volatility, and this relationship is explored in Table 8. Section 4 is the conclusion.

1. Capital Controls, Liberalizations, and Economic Growth

In this section, we review the sizable macroeconomic and finance literature analyzing the effect of capital account restrictions on aggregate investment and the growing literature on the distributional consequences of capital account restrictions. Evidence of the effects of capital account restrictions on the behavior of multinational firms is complementary to these research streams. In this section, we also examine the likely effects of capital controls on multinationals firms.

1.1 Investment responses to capital controls and liberalizations

Eichengreen (2001) provides an overview of the large literature on the aggregate effects of capital account liberalizations, concluding with the observation that liberalization “remains one of the most controversial and least understood policies of our day.” Although few definitive conclusions have emerged, two important viewpoints can be distinguished. The skeptical view of capital account liberalization is most often associated with Rodrik (1998) and related work. Using the IMF classification of capital controls, Rodrik finds no significant statistical association between capital account openness and growth. This evidence is used to bolster a more general skepticism regarding the virtues of financial openness in the world of the second-best, as in Bhagwati (1998). The more optimistic view of capital account liberalization is advanced by Fischer (1998) and supported by evidence provided in Quinn (1997). Using an index subsequently adopted by many authors, Quinn reports a significant positive correlation between changes in his measure of capital account openness and subsequent economic growth.

The salience of these issues for policy makers has motivated work attempting to disentangle the reasons for these contradictory findings. In particular, researchers have focused on the distinctive nature of the IMF and Quinn measures [as in Edwards (2001)], the possibility that capital liberalization operates differently for countries of different income levels [as in Alesina, Grilli, and Milesi-Ferretti (1994), which can be compared to Grilli and Milesi-Ferretti (1995)], the role of pre-existing policies and the role of sequencing in determining the effects of capital control liberalizations [as in Arteta, Eichengreen, and Wyplosz (2003) and Chinn and Ito (2002)], and the role of political institutions in dictating outcomes associated with capital account liberalizations [as in Quinn,

Inclan, and Toyoda (2001)]. The effect of capital account liberalizations in stimulating economic growth and investment remains an open question.

Finance scholars have emphasized the effects of stock market liberalizations on investment using firm-level data. Following the intuition of Stulz (1995, 1999), Henry (2000), Bekaert and Harvey (2000), and Bekaert, Harvey, and Lundblad (2005) find that stock market liberalizations in a set of emerging market countries are followed by significant increases in investment by local firms listed on equity markets. Chari and Henry (2002) confirmed the investment effects of stock market liberalizations but find no evidence that the distribution of investment subsequent to liberalizations follows the predictions associated with the repricing of systematic risk. As such, investment expansions may be more closely associated with reductions in the risk-free interest rate than with repricing of equity risk. Multinational responses to capital controls and the removal of controls illuminate the sources of investment responses to stock market liberalizations both by identifying the responsiveness of investment to capital restrictions and by offering evidence of the extent to which borrowing costs are associated with capital controls.

1.2 The distributional consequences of capital controls

In addition to the aggregate effects described above, it is possible that capital controls distort the composition of investment and firm activity. Morck, Strangeland, and Yeung (2000) and Rajan and Zingales (2003) both characterized capital controls as one example of a financial regulation that can have important distributional consequences across firms within the same country. Specifically, they argue that capital controls can favor entrenched firms and that these firms then lobby for their preservation. Johnson and Mitton (2003) demonstrated the nature of these distributional consequences by examining how political connections are linked to firm performance under capital controls in Malaysia.

The distributional consequences of capital account policies need not arise from political connections alone. Forbes (2003) showed how smaller firms suffered during the Chilean *encaje*, suggesting that the consequences of these regulations may be quite heterogeneous across firms because of access to capital markets. Similarly, Auguste et al. (forthcoming) consider the use of American Depositary Receipts (ADRs) to facilitate capital flight during a period of capital controls, indicating that the impact of capital controls may depend on differential access to avoidance tactics.

Access to internal capital markets facilitates the circumvention of capital controls by multinational firms. Desai, Foley, and Hines (2004b) documented the extent to which internal capital markets permit multinational firms to substitute parent-provided debt for local borrowing in countries with underdeveloped capital markets. Similarly, Desai,

Foley, and Forbes (2004) showed that multinationals outperform local firms during severe currency crises by accessing internal capital markets, as they pursue investment opportunities created by depreciations.¹ Because multinationals may circumvent capital controls through the use of their internal markets and these internal markets are not available to all firms, capital controls could have significant distributional consequences. Given the overall importance of FDI to economic growth, as suggested by the findings of Aitken and Harrison (1999), understanding the effect of capital controls on the behavior of multinational firms is valuable in assessing the economic impact of capital account policies.

1.3 Capital controls, capital costs, and foreign direct investment

The influence of capital controls—and their liberalization—on foreign direct investment depends on how controls affect the cost of capital for multinational firms. Capital controls are commonly thought to increase the cost of local borrowing, as in Dooley and Isard (1980), given that these controls, or the expectation of their imposition, prevent international capital flows from equalizing interest rates. Because a considerable fraction of the funding for local affiliates of multinational investors typically comes from local loans, higher interest rates increase the cost of capital and should be expected to discourage investment. By comparing the borrowing costs of affiliates of the same parent in countries with and without capital controls, it is possible to identify the degree to which interest rates respond to capital controls in a manner that is not confounded by differences in credit quality or other firm characteristics. In Section 3.1, we present regressions (in Table 3) that estimate the impact of capital controls while controlling for a variety of other factors that influence interest rates.

In addition to these differences in interest costs, profit repatriation restrictions that accompany capital controls can reduce effective returns to foreign investment by preventing multinational investors from repatriating their profits to the extent that they would do so in the absence of restrictions. It is useful to consider a simple formalization of this point and then to consider the testable predictions that arise from this formalization.

For firms investing in countries with capital controls, the value of an investment can be expressed as $V(K)$, in which K is the stock of capital held by the local affiliate. Higher interest rates in countries with capital controls generally imply that $V(K)$ is less than the value of a comparable

¹ In a similar vein, Johnson et al. (2000) and Mitton (2002) analyzed stock price movements during currency crises, finding that the sharpest negative price reactions are associated with countries and firms exhibiting poor quality of corporate governance.

investment in a country without capital controls, but that is not the only impact of capital controls, as controls also constrain the repatriation behavior of such affiliates. Following a period in which an affiliate earns profits of π , and putting tax considerations aside for simplicity, the affiliate has the choice of reinvesting its profits, remitting them as dividends or using financial or other means to relocate the profits to other affiliates or the parent company in nondividend form, possibly by adjusting the prices at which intracompany transactions are booked.

In the absence of capital controls, dividend repatriation policies would be governed by tax considerations and the need to use dividends to control cash flows and incentives within multinational firms.² Let d^* denote the firm's desired level of dividend remittance, and d represent dividends actually paid; the affiliate is assumed to incur a cost equal to $\alpha(d^* - d)^2$, with $\alpha > 0$, reflecting tax and organizational costs from imperfectly tailored dividend policies. The effect of capital controls on dividend levels is to impose that dividends satisfy $d \leq \bar{d}$, in which $\bar{d}$ is the affiliate's maximum permitted repatriation. Firms also have the ability to use various devices to relocate profits outside of affiliates in countries with capital controls, although these devices are likewise costly. Let δ denote the volume of profits earned by the affiliate in a capital control country but reported to be earned outside; the associated cost is given by $\mu\delta^2$, with $\mu > 0$.

The problem facing the multinational affiliate with previous period capitalization of K_{-1} is then to choose d and δ to maximize

$$\begin{aligned} & \max_{d, \delta} [V(K) + d + \delta] \\ \text{s.t. : } & K = K_{-1} + \pi - [d + \alpha(d^* - d)^2] - \delta(1 + \mu\delta) \\ & d \leq \bar{d} \end{aligned} \quad (1)$$

The first-order conditions corresponding to this maximization are

$$V'(K) = \frac{1}{1 + 2\mu\delta} \quad (2)$$

$$V'(K) = \frac{1 - \lambda}{1 + 2\alpha(d^* - d)}, \quad (3)$$

in which the shadow value associated with the constraint that $d \leq \bar{d}$ is given by $\lambda \geq 0$.

² For a discussion of the tax and agency motivations for dividend repatriation policies, see Desai, Foley and Hines (2001, forthcoming).

Important features of the multinational firm's reactions to capital controls are evident from examination of conditions (2) and (3). If the repatriation restriction does not bind, then $\lambda = 0$, $d = d^*$, and $\delta = 0$, so $V'(K) = 1$, and all of the effects of capital controls on discouraging local investment come from the associated higher interest rates. In the more realistic case that repatriation restrictions bind, then $\lambda > 0$, $d = \bar{d} < d^*$, and $V'(K) = (1 - \lambda) / [1 + 2\alpha(d^* - \bar{d})] < 1$, so $\delta > 0$. When repatriations restrictions bind, dividend remittances are insensitive to changes in desired dividends, and investors relocate some of their profits to other jurisdictions. In Sections 3.2.1 and 3.2.2, we present results of tests of the effects of capital controls and their liberalization on profit location and dividend repatriation that analyze patterns in after-tax affiliate-reported profits and the propensity of affiliates to pay dividends.

Costs associated with higher local interest rates and regulatory impediments to profit repatriations reduce the desirability of investing in countries with capital controls, thereby affecting the $V(K)$ function in a way that reduces the value of $V(K)$ at any given level of K . Firms initially capitalize affiliates to the point that $V'(K) = 1$, but given the costs associated with capital controls, the level of K at which $V'(K) = 1$ is smaller if a country has capital controls. The fact that $V'(K) < 1$ for affiliates facing binding repatriation restrictions implies that such affiliates have more capital than investors desire, since a fraction of profits is effectively trapped in the foreign country. It does not, however, follow that these affiliates will grow more quickly than affiliates located in countries without capital controls, because firms can moderate growth rates with dividend repatriations and profit reallocations and are loathe to commit additional resources to affiliates in countries with capital controls. Any subsequent removal of capital controls then changes the $V(K)$ function and the incentives to accumulate capital. In Section 3.3, we present regressions analyzing the effects of capital control liberalizations on subsequent levels and growth of investment by American firms.

Advocates maintain that capital controls stabilize macroeconomic conditions in economies experiencing capital flight. Aizenman (2003) examined the conditions under which macroeconomic volatility can discourage certain types of FDI, raising the possibility that capital controls might steady the economy and thereby stimulate greater investment. Bekaert, Harvey, and Lundblad (forthcoming) analyze the effects of capital controls on real consumption growth volatility and find that, in fact, liberalizations are associated with reduced volatility. The analysis presented in Section 3.4 below provides additional evidence of the effects of capital controls on volatility by measuring the extent to which capital controls change the volatility of affiliate profitability and growth rates.

2. Data and Descriptive Statistics³

The empirical work presented in Section 3 is based on the most comprehensive available data on the activities of American multinational firms. The Bureau of Economic Analysis (BEA) annual survey of the US Direct Investment Abroad from 1982 through 1997 provides a panel of reliable data on the financial and operating characteristics of the US firms operating abroad.⁴ The foreign affiliate survey forms that the US multinational enterprises are required to complete vary depending on the year, the size of the affiliate, and the US parent's percentage of ownership of an affiliate. The most extensive data for the period examined in this study are available for 1982, 1989, and 1994, when the BEA conducted Benchmark Surveys. In these years, all affiliates with sales, assets, or net income in excess of \$3 million in absolute value and their parents were required to file extensive reports. In nonbenchmark years between 1982 and 1997, exemption levels were higher, and less information was collected.⁵ Although majority owned affiliates report many accounting items and information concerning operations each year, minority owned affiliates need only file information about sales, net income, assets, employment, employment compensation and trade with the United States in nonbenchmark years. Majority owned affiliates are foreign affiliates in which the combined direct and indirect ownership of the US persons exceeds 50%. BEA collects identifiers linking affiliates through time, thereby permitting the creation of a panel.

The top panel of Table 1 displays basic information on numbers and sizes of affiliates in the three benchmark years—1982, 1989, and 1994. In 1994, 20,898 entities are covered, with median sales and assets of approximately \$14 million. The bottom panel of Table 1 provides descriptive statistics for the variables employed in the statistical analysis presented in Section 3. The top half of this panel provides summary statistics for the relevant variables for the multinational affiliates, whereas the bottom half provides summary statistics for country characteristics, including the measures of capital controls.

³ This description of the data is drawn from Desai, Foley, and Hines (forthcoming).

⁴ The International Investment and Trade in Services Survey Act governs the collection of the data, and the Act ensures that "use of an individual company's data for tax, investigative, or regulatory purposes is prohibited." Willful noncompliance with the Act can result in penalties of up to \$10,000 or a prison term of one year. As a result of these assurances and penalties, the BEA believes that coverage is close to complete, and levels of accuracy are high.

⁵ From 1983 to 1988, all affiliates with an absolute value of sales, assets, or net income less than \$10 million were exempt from reporting requirements, and this cutoff increased to \$15 million from 1990 to 1993 and \$20 million from 1995 to 1997. The BEA uses reported data to estimate universe totals when surveys cover only larger affiliates or when only certain affiliates provide information on particular survey forms. Estimated data are unlikely to have a significant impact on the BEA's published data at the industry or country level, as data based on actual reports exceed 90% of the estimated totals of assets and sales in each of the years between 1982 and 1997. To avoid working with estimated data, only affiliates required to provide all the information associated with a particular analysis are considered.

Table 1
Descriptive statistics of the US multinational affiliates

	Benchmark years		
	1982	1989	1994
Number of affiliates	18,579	18,899	20,898
Median sales	10,875	12,788	14,079
Median assets	9,823	13,120	14,385
Median employees	79	64	68
	Mean	Median	SD
Descriptive Statistics			
Interest rate on external borrowing	0.0493	0.0163	0.0922
Interest rate on non-trade account borrowing	0.0765	0.0299	0.1322
Share of debt from non-parent sources	0.8148	0.9705	0.2796
Net income/owners' equity	0.1662	0.1455	0.2636
Dividend dummy	0.2946	0.0000	0.4559
Return on assets	0.0565	0.0519	0.1985
Log of assets	10.2636	10.1420	1.5631
Log of sales	10.0379	10.1960	2.1624
Log of net PPE	8.0092	8.1585	2.2980
Affiliate sales growth	0.0589	0.0574	1.0319
Affiliate asset growth	0.0404	0.0503	0.5490
Affiliate net PPE growth	0.0464	0.0136	0.6845
Country characteristics			
IMF capital control dummy	0.3441	0.0000	0.4751
Shatz capital control dummy	0.0845	0.0000	0.2781
Country tax rate	0.3367	0.3487	0.1266
Private credit	0.7927	0.7945	0.4478
Quality of institutions	22.4122	24.0000	3.9346
Rate of inflation	0.3853	0.0448	2.4452
Openness to trade	59.0840	48.0695	47.7991
Log of median annual compensation per employee	3.2395	3.3526	0.6276
Log of host country GDP	26.3681	26.5958	1.5391
GGO measure of growth opportunities	2.9375	2.9974	0.2153

The top panel provides the number count, median sales, median assets, and median employees for all affiliates of the US multinationals in the sample for 1982, 1989, and 1994. The bottom panel reports descriptive statistics for the variables employed in the regression analysis. The Interest rate on external borrowing is the ratio of the affiliate interest payments to nonparents to current liabilities and long-term debt borrowed from nonparent sources. The Interest rate on non-trade account borrowing is the ratio of total affiliate interest payments to current liabilities and long-term debt, excluding trade accounts and trade notes payable. Share of debt from non-parent sources is the share of affiliate current liabilities and long-term debt owed to lenders other than the affiliate's parent. Net income, owners' equity, assets, sales, and net property, plant, and equipment (PPE) are all measured in thousands of nominal US dollars. The mean and standard deviation of net income/owners' equity are calculated using analytical weights where weights are set equal to owners' equity. Dividend dummy is equal to one if an affiliate pays a dividend in a particular year and zero otherwise. Return on assets is the ratio of net income to assets. Growth rates are computed by taking the difference of end and beginning of period log values. The IMF capital control dummy and the Shatz capital control dummy are dummies equal to one if a country imposes capital controls and zero otherwise. Private credit is the ratio of private credit lent by deposit money banks to GDP, as provided in Beck, Demirguc-Kunt, and Levine (2000). Country tax rate is the median tax rate in an affiliate's host country. The quality of institutions is the sum of the ICRG corruption, rule of law, and bureaucratic quality subcomponents. Rate of inflation is the contemporaneous percentage change in the GDP deflator of an affiliate's host country. Openness to trade is taken from Heston, Summers and Aten (2002), and it is equal to the ratio of the sum of export and imports to gross domestic product. The GGO measure of growth opportunities is drawn from Bekaert, Harvey, Lundblad, and Siegel (2005).

Although most of the variables measuring multinational affiliate performance are self-explanatory, the interest rate variables particularly merit elaboration. The BEA data contain information on the interest expense associated with affiliate debt, and it is possible to use this information to calculate average interest rates affiliates pay each year. Because the BEA data do not contain detailed information on interest rates charged on individual loans, or information on the extent to which firms pay annual interest on different types of liabilities, the analysis uses two estimates of interest rates. The first measure is the Interest rate on external borrowing, which is calculated by dividing affiliate interest payments to nonparents by current liabilities and long-term debt borrowed from nonparent sources. This variable has a mean of 4.9%. One of the reasons that this average interest rate appears low is that the broad measure of debt used in this calculation includes trade credit which is often noninterest bearing.⁶ The second interest rate is the Interest rate on non-trade account borrowing, which is the ratio of total interest paid to a measure of current liabilities and long-term debt that excludes trade accounts and trade notes payable. This alternative interest rate variable has a mean of 7.9%. This ratio includes interest payments to parents and external sources in the numerator and total debt in the denominator. The share of debt from non-parent sources is the share of affiliate current liabilities and long-term debt owed to lenders other than the affiliate's parent, and it has a mean of 81%. Net income is after-tax income reported in US dollars, and the return on assets is the ratio of net income to the book value (in US dollars) of gross assets. The dividend dummy equals one if an affiliate pays a dividend and is zero otherwise. Measures of affiliate sales, assets, and net property, plant and equipment (PPE) are measured in thousands of nominal US dollars.

The analysis employs two measures of capital controls, the IMF capital control dummy and the Shatz capital control dummy, that are summarized in the bottom half of the bottom panel of Table 1 and, by country, in Table 2.⁷ The IMF measure is the one most commonly used in the literature and, as documented in Table 2, is one that classifies many countries as having capital controls during the 1980s and the 1990s. The IMF capital control classification is a yes–no measure collected through 1995 that is designed to capture restrictions on capital account transactions. As many observers have noted, this measure may be crude and, in this setting, may

⁶ Interest rates are based on current interest payments and are recorded in US dollars. The currency denomination of debt may be important to financial decision making within a multinational firm, but it is impossible to tell from the BEA data in which currency debt is formally denominated. See Kedia and Mozumdar (2003) and Allayannis, Brown, and Klapper (2003) for analyses of the determinants of the currency denomination of debt.

⁷ Table 2 summarizes countries for which the Shatz measure is available (other than Taiwan, for which there are no IMF data), representing the home countries of the vast majority of outbound US foreign direct investment.

Table 2
Descriptive statistics of capital control measures, for those countries measured by Shatz

	Capital control measure			Capital control measure	
	IMF measure (covers 1982–1995)	Shatz measure (covers 1982–1995)		IMF measure (covers 1982–1995)	Shatz measure (covers 1982–1995)
Argentina	1982–1992	1982–1989	Italy	1982–1989	
Australia	1982–1984		Jamaica	1982–1995	
Austria	1982–1990		Japan		
Bahamas	1982–1995		Korea	1982–1995	
Barbados	1982–1995		Malaysia		
Belgium-Luxembourg			Mexico	1982–1995	
Brazil	1982–1995	1982–1991	Netherlands		
Canada			Netherlands Antilles	1982–1995	
Chile	1982–1995	1982–1991	New Zealand	1982–1983	
China	1982–1995	1982–1995	Nigeria	1982–1995	1982–1995
Colombia	1982–1995	1982–1991	Norway	1982–1994	
Costa Rica	1982–1994		Panama		
Denmark	1982–1987		Peru	1984–1992	1982–1992
Dominican Republic	1982–1995	1982–1995	Philippines	1982–1995	1982–1991
Ecuador	1986–1987, 1993–1994	1982–1992	Portugal	1982–1992	
Egypt	1982–1995	1982–1991	Saudi Arabia		
Finland	1982–1990		Singapore		
France	1982–1989		South Africa	1982–1995	
Germany			Spain	1982–1993	
Greece	1982–1995	1982–1986	Sweden	1982–1992	
Guatemala	1982–1988		Switzerland	None in 1992–1995, other years NA	
Honduras	1982–1992		Thailand	1982–1995	
Hong Kong			Trinidad and Tobago	1982–1993	
India	1982–1995	1982–1995	Turkey	1982–1995	
Indonesia			United Arab Emirates		
Ireland	1982–1991		United Kingdom		
Israel	1982–1995		Venezuela	1984–1995	1982–1989

The table provides the years for which the IMF and Shatz characterize countries as having capital controls, as discussed in the text, for those countries studied by Shatz, other than Taiwan, for which there are no IMF data. According to Shatz, Taiwan employed controls from 1982 to 1987.

not be entirely relevant to multinational firms.⁸ Accordingly, it is useful to consider an alternative to the IMF classification that emphasizes restrictions that are important to foreign investors; fortunately, Shatz (2000) provided one such measure. Shatz (2000) detailed measures of openness to FDI for a sample of 57 countries along a number of dimensions.⁹ Two of these are restrictions on capital repatriation and restrictions on profit remittance. Capital account restrictions obtained from these data are coded as a dummy variable equal to one if either of the restrictions is rated two or less, indicating policies that impose strict time or quantity limits on the ability of affiliates to move funds out of the host country. A comparison of the measures summarized in Table 2 reveals noteworthy patterns. Any country classified as being free of capital controls by the IMF measure is likewise classified as being free of capital controls by the Shatz measure. However, numerous countries classified by the IMF as having capital controls are not classified by Shatz as having capital controls. In 1990, the correlation between the Shatz measure and the IMF measure was 0.30.¹⁰

Finally, several country characteristics are employed in the regressions. To compare the effects of capital controls to taxes, we calculate country tax rates from BEA data. These rates are calculated by taking the ratio of foreign income taxes paid to foreign pretax income for each affiliate and using the medians of these rates as country-level observations for each country and year.¹¹ Mean and median country tax rates are equal to approximately 34% over the sample period. Additionally, several measures of the macroeconomic and political environment are also employed to help ensure that observable country characteristics are controlled for in these regressions.¹² Private Credit is the ratio of private credit lent by deposit

⁸ Deficiencies in the IMF measure, along with a revised measure, are considered in Eichengreen (2001).

⁹ The IMF dummy is available for the 1982–1995 period, and Shatz reports values of his capital control restriction measures for 1985–1995. Using the tables and text in Shatz (2000), it is possible to extend the Shatz measure to include the years 1982–1984, and the statistical analysis reported in Section 3 uses the IMF and this extended Shatz measures over 1982–1995. The Shatz data can also be used to extend the Shatz measure forward to include 1996 and 1997, and the analysis of capital account liberalizations, reported in Tables 6 and 7 and columns 6 and 7 of Tables 4 and 5, uses these extended data.

¹⁰ The so-called Quinn index, originally employed in Quinn (1997), is not used in this study, as it is available for only two of the years—1982 and 1988—included in the sample.

¹¹ Affiliates with negative net income are excluded for the purposes of calculating country tax rates. For a more comprehensive description of the calculation of affiliate tax rates, see Desai, Foley, and Hines (2001). In particular, these income tax rates do not include withholding taxes on cross-border interest payments to related parties, because such taxes are endogenous to interest payments and in any case immediately creditable against home-country tax liabilities. Desai and Hines (1999) reported that adjusting country tax rates for withholding taxes does not affect the estimated impact of taxation on affiliate borrowing, because of the combination of creditability and low withholding tax rates on related-party interest payments.

¹² The approach taken in these regressions is to control for other observable country-level factors, as in Bekaert, Harvey and Lundblad (forthcoming), in response to the concern that the results might reflect other factors that would give rise to interest rate differences. In contrast, Gupta and Yuan (2004) used measures of the political environment as instruments for capital account restrictions. Such an instrumental variables approach is likely more problematic in a setting where multinational firms may directly respond to these political changes for other reasons unrelated to the presence of capital account restrictions.

money banks to GDP, as provided in Beck, Demircuc-Kunt, and Levine (2000). Quality of Institutions reflects the legal environment facing business, with higher values corresponding to better environments; the variable is the sum of measures of corruption, law and order, and bureaucratic quality drawn from the International Country Risk Guide.¹³ The Rate of Inflation is the contemporaneous percentage change in a host country's GDP deflator. Openness to trade is the ratio of national exports plus imports divided by GDP.

3. Capital Account Restrictions and FDI

To isolate the impact of capital controls on the performance of American multinational firms, we begin this section by considering the local borrowing environment. The structure of the BEA data makes it possible to measure differences in borrowing costs for the same investor in countries with and without capital controls. This analysis of interest rates is followed by an examination of the degree to which multinational firms circumvent capital controls through profit reallocation and dividend repatriations. The net effect of capital controls is then evaluated by estimating the impact of capital account liberalization on investment levels. Finally, the data offer evidence of the effects of capital controls on the volatility of the returns and growth rates of multinational firms. The samples and controls vary in the tests that follow depending on data constraints. Specifically, the interest rate analysis is only feasible for benchmark years, whereas the rest of the analysis uses the fuller panel data. Additionally, parent, industry, year, GDP, and wage controls are typically employed in the analysis of capital controls, whereas the liberalization analysis employs affiliate and region/year fixed effects.

3.1 Interest rates

Table 3 presents estimated coefficients from regressions analyzing the determinants of interest rates. The dependent variable in the regressions reported in the first four columns is the interest rate paid on loans from unrelated parties. Interest costs are collected only in benchmark years, so the sample includes observations from 1982, 1989, and 1994. Columns 1 and 2 offer simple specifications, the independent variables including capital control indicators, dummy variables for parent companies, affiliate industries, and years, three powers of host country log GDP, and median total annual compensation per employee paid by American

¹³ The Quality of Institutions variable is widely used to control for differences in political institutions; see, for example, Bekaert, Harvey, and Lundblad (2005, forthcoming) and Bekaert, Harvey, Lundblad, and Siegel (forthcoming). Because Quality of Institutions data for 1982 and 1983 are unavailable, 1984 values are used in their place.

Table 3
Capital controls and local borrowing rates

Dependent variable	Interest rate on external borrowing				Interest rate on nontrade account borrowing (from all sources)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	3.5830 (3.2431)	12.2232 (5.3339)	-1.4755 (4.8198)	6.5217 (7.4295)	6.8498 (5.2906)	15.5735 (8.1445)	6.1896 (5.3571)	14.5480 (8.1066)
Country tax rate			-0.0942 (0.0688)	-0.0548 (0.0535)	-0.0852 (0.0601)	-0.0353 (0.0464)	-0.0889 (0.0616)	-0.0400 (0.0478)
Private credit			-0.0072 (0.0084)	-0.0075 (0.0083)	-0.0031 (0.0100)	-0.0042 (0.0102)	-0.0037 (0.0098)	-0.0052 (0.0099)
Quality of institutions			-0.0038 (0.0015)	-0.0016 (0.0017)	-0.0053 (0.0017)	-0.0036 (0.0017)	-0.0058 (0.0017)	-0.0038 (0.0017)
Rate of inflation			0.0051 (0.0017)	0.0047 (0.0014)	0.0044 (0.0016)	0.0041 (0.0015)	0.0043 (0.0016)	0.0039 (0.0015)
Openness to trade			-0.0001 (0.0001)	-0.0001 (0.0000)	-0.0001 (0.0001)	-0.0001 (0.0000)	-0.0001 (0.0001)	-0.0001 (0.0000)
IMF capital control dummy	0.0229 (0.0076)		0.0083 (0.0061)		0.0129 (0.0069)		-0.0180 (0.0084)	
Shatz capital control dummy		0.0785(0.0227)		0.0525 (0.0226)		0.0512 (0.0212)		0.0059 (0.0162)
Share of debt from nonparent sources							-0.0043 (0.0048)	0.0027 (0.0052)
Share of debt from non-parent sources interacted with IMF capital control dummy							0.0366 (0.0106)	
Share of debt from non-parent sources interacted with Shatz capital control dummy								0.0593 (0.0291)
Parent, industry, and year fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
GDP and wage controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	20,378	20,357	18,041	18,211	18,073	18,368	17,623	17,927
R-squared	0.2053	0.2382	0.2576	0.2704	0.2708	0.2733	0.2737	0.2767

The dependent variable in columns 1–4 is the ratio of the value of affiliate interest payments to nonparents to current liabilities and long-term debt borrowed from nonparent sources; in columns 5–8, the dependent variable is the ratio of total affiliate interest payments to current liabilities and long-term debt, excluding trade accounts and trade notes payable. All regressions are estimated by ordinary least squares and include parent, industry, and year fixed effects as well as three powers of log GDP and the log of the median annual compensation per employee paid by affiliates in a particular country and year. Country tax rate is the median tax rate in an affiliate's host country. Private credit is the ratio of private credit lent by deposit money banks to GDP, as provided in Beck, Demirguc-Kunt, and Levine (2000). The quality of institutions is the sum of the ICRG Corruption, Rule of Law, and Bureaucratic Quality subcomponents. Rate of inflation is the contemporaneous percentage change in the imports to gross domestic product. The IMF capital control dummy and the Shatz capital control dummy are dummies equal to one if a country imposes capital controls and zero otherwise. Standard errors that correct for clustering of errors across observations in country/year cells are presented in parentheses.

multinationals in country-year cells.¹⁴ The use of capital controls as measured by the IMF is associated with 2.3% higher interest rates; the use of capital controls as measured by Shatz is associated with 7.9% higher interest rates.¹⁵ Because the sample mean interest rate is just 4.9%, these are sizable differences. Moreover, as documented in Desai, Foley and Hines (2004b), debt from local sources comprises 64.6% of total affiliate debt, indicating that these measured effects have the potential to have important consequences for multinational investment.

The regressions reported in columns 3–8 of Table 3 add independent variables to control for observable country attributes that might contribute to interest rate differences. In the regressions reported in columns 3 and 4, lenders in countries with better-developed financial sectors, as measured by the extent of private credit, charge lower interest rates. Lower quality political institutions and higher rates of local inflation are both associated with higher (dollar-denominated) interest rates, in both cases interpretable as reflecting the impact of greater uncertainty over the likelihood, and level, of ultimate repayment. After controlling for these additional variables, capital controls as measured by the IMF are associated with 0.8% higher interest rates, whereas capital controls as measured by Shatz are associated with 5.25% higher interest rates.

The regressions presented in columns 1–4 of Table 3 indicate that interest rates are higher in countries with capital controls. It is noteworthy that, because parent company fixed effects are included as independent variables, these interest rate effects appear between affiliates of the same companies. This evidence is, however, subject to the limitation that the denominator of the interest rate variable is total liabilities, including trade credits on which explicit interest is seldom paid. As a result, measured interest rates are somewhat low and may vary between countries because of trade financing practices.

Columns 5 and 6 of Table 3 report estimated coefficients from regressions designed to address this issue. The dependent variable is again the interest rate, in this case constructed as the ratio of total affiliate interest payments to other current liabilities and long-term debt, excluding trade

¹⁴ Studies such as Eichengreen and Mody (2000, 2004) examine the determinants of corporate borrowing spreads across countries and the impact of differing legal regimes on sovereign borrowing costs. The alternative of analyzing interest rates paid by multinational firms implicitly controls for a host of unobservable factors by comparing interest rates faced by the same company in different institutional environments. The absence of detailed data on affiliate borrowing makes it infeasible, however, to incorporate term structure considerations emphasized in articles such as Duffee (2002). The results summarized in Table 3 are insignificantly affected by the inclusion of three powers of log GDP per capita as measures of affluence, which reflects that log GDP and local wage rates, alone or together with other explanatory variables, adequately control for local affluence.

¹⁵ All standard errors presented in the tables control for clustering at the country-year level. In supplemental regressions (not reported), the ratio of affiliate interest expense to total affiliate sales is also positively associated with the use of capital controls. This pattern is consistent with the interest rate effects presented in Table 3 and also with the incentive to finance affiliates with debt in anticipation of subsequent trapped equity effects reflected in equations (2) and (3).

accounts. The estimated capital market effects obtained using this dependent variable, reported in columns 5 and 6, have signs and magnitudes similar to those obtained using the first interest rate variable and reported in columns 3 and 4.

Data limitations make it impossible to measure average interest rates paid to external sources when the denominator of the calculated interest rate excludes trade account debt. It is nonetheless possible to evaluate circuitously the difference between interest rates on parent loans and local loans and the effect of capital controls on this difference, using a measure of interest rates that does not include trade account debt. Columns 7 and 8 of Table 3 present estimated coefficients from regressions in which the dependent variable is the same as that in the regressions reported in columns 5 and 6 but adds two independent variables: the share of debt from non-parent sources¹⁶ and the interaction between this share and measures of capital controls. If borrowing from local sources is more costly in countries imposing capital controls, then the coefficient on the interaction between the share of debt from local sources and the capital control measures should be positive, reflecting the extent of the difference.

The results indicate that greater borrowing from nonparent sources is associated with higher interest rates in countries imposing capital controls. The 0.0366 coefficient on the interaction of the IMF capital control measure and the share of debt borrowed from nonparent sources, reported in column 7, implies that interest rates on external debt (measured exclusive of trade credit) are 3.7% higher in countries with capital controls. The 0.0593 coefficient reported in column 8 implies that interest rates are 5.9% higher in countries with capital controls as measured by Shatz. Because the mean interest rate on nontrade account borrowing is 7.7%, these are sizable effects and consistent with the earlier analysis.

3.2 Profit extraction

Multinational firms whose affiliates are located in countries with capital controls have incentives to find creative ways to extract profits for deployment elsewhere. Profits can be relocated by changing the locations to which they are attributed and by changing patterns of profit remittances. The effects of capital controls on financial policies related to transfer pricing and dividend repatriations can be usefully compared to estimates of the effects of taxes.

3.2.1 Profit location. It is possible for multinational firms to sidestep repatriation restrictions by reducing the reported profitability of affiliates

¹⁶ The share of debt from nonparent sources equals one minus the ratio of current liabilities and long-term debt owed to the parent to total current liabilities and long-term debt.

in countries imposing capital controls. This can be accomplished by financing affiliates with as much related-party debt as possible and by manipulating the prices at which foreign affiliates trade products and services with their American parent companies, specifically by overinvoicing exports to affiliates or underinvoicing imports from affiliates. The same methods are commonly used to relocate taxable income from high-tax to low-tax jurisdictions. Governments typically insist that firms use arm's length prices in trade with other members of a controlled group, but such regulations are notoriously difficult to enforce, particularly when (as is often the case for multinational firms) traded goods have unique characteristics that make them difficult to compare with those sold by other firms. As a result, affiliates located in countries with high tax rates or binding repatriation controls are likely to run larger trade deficits (or smaller trade surpluses) with their parent companies than would otherwise be the case, because firms have incentives to structure and record such trades in ways that relocate as many profits as possible.¹⁷ There is an extensive literature that analyzes the reported profitability patterns of American multinational firms, finding that affiliates located in high-tax countries tend to report lower profit rates than do those located in low-tax countries.¹⁸

Table 4 summarizes results of specifications similar to those used to study the impact of high tax rates, in which the dependent variable is the rate of return on affiliate equity. The sample covers all years from 1982 to 1995. In a smoothly functioning competitive market, the expected rate of return should be the same everywhere, but in a setting in which firms systematically understate profits earned in high-tax countries and in countries with capital controls, there should be a negative association between profit rates and tax rates or the use of capital controls.

The -0.2134 coefficient reported in column 1 of Table 4 implies that 10% higher tax rates are associated with 2.1% lower profit rates, controlling for parent company, affiliate industry, year, three powers of log GDP, and median employee compensation paid by US multinationals.¹⁹

The magnitude of this effect is similar to that reported elsewhere in the transfer-pricing literature and reflects the impact of commonly observed avoidance methods. The regression reported in column 2 indicates that capital controls as measured by the IMF have insignificant effects on

¹⁷ Clausing (2001) provides evidence that American-owned foreign affiliates located in high-tax countries run reported trade deficits with related parties, whereas foreign affiliates located in low-tax countries run trade surpluses, a pattern consistent with tax-motivated income reallocation.

¹⁸ See, for example, Grubert and Mutti (1991), Hines and Rice (1994), and the literature surveyed by Hines (1999).

¹⁹ The results summarized in Table 4 are insignificantly affected by the inclusion of additional variables that measure affiliate ages and the affluence of host countries. The age variables include a dummy equal to one for affiliates present at the start of the sample (1982), and a separate variable equal to the ages of affiliates first appearing after 1982. The affluence variables are three powers of log GDP per capita, intended to pick up any aspects of affluence not already captured by three powers of log GDP and local wage rates.

Table 4
Capital controls and reported profitability

Dependent variable	Net income/owners' equity						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Constant	-26.7018 (7.9039)	-13.8132 (7.3545)	-38.0177 (10.2159)	-33.4589 (13.7001)	-45.8187 (14.1059)	0.1462 (0.0563)	-67.3805 (28.9582)
Country tax rate	-0.2134 (0.0432)	-0.1478 (0.0430)	-0.1954 (0.0470)	-0.1745 (0.0474)	-0.2044 (0.0482)	-0.1051 (0.0495)	-0.1720 (0.0683)
Quality of institutions				0.0010 (0.0024)	-0.0011 (0.0025)		-0.0039 (0.0035)
Rate of inflation				-0.0003 (0.0011)	0.0000 (0.0010)		-0.0017 (0.0009)
Openness to trade				0.0000 (0.0001)	0.0000 (0.0001)		0.0007 (0.0005)
IMF capital control dummy		0.0024 (0.0120)		0.0067 (0.0146)			
Shatz capital control dummy			-0.0519 (0.0198)		-0.0565 (0.0235)		
Post liberalization dummy							0.0600 (0.0270)
Parent, industry, and year fixed effects?	Yes	Yes	Yes	Yes	Yes	No	No
GDP and wage controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Affiliate and region/year fixed effects?	No	No	No	No	No	Yes	Yes
Number of observations	127,422	108,145	107,894	100,257	100,697	129,655	115,851
R-squared	0.2416	0.2247	0.2280	0.2285	0.2295	0.5805	0.5847

The dependent variable in each specification is the ratio of net income to owners' equity. The analysis uses analytic weights equal to owners equity to transform the specifications in a way that is equivalent to multiplying through by owners' equity. Country tax rate is the median tax rate in an affiliate's host country. The quality of institutions is the sum of the ICRG Corruption, Rule of Law, and Bureaucratic Quality subcomponents. Rate of inflation is the contemporaneous percentage change in the GDP deflator of an affiliate's host country. Openness to trade is taken from Heston, Summers and Aten (2002), and it is equal to the ratio of the sum of export and imports to gross domestic product. The IMF capital control dummy and the Shatz capital control dummy are dummies equal to one if a country imposes capital controls and zero otherwise. Specifications (1)–(5) include parent, industry, and year fixed effects and specifications (6) and (7) include affiliate and region/year fixed effects. All specifications include three powers of log GDP and the log of the median annual compensation per employee paid by affiliates in a particular country and year. The post liberalization dummy is equal to one in the year of and each of the years following liberalizations for liberalizing countries, and it is equal to zero for countries that do not change their capital control policies. Heteroskedasticity-consistent standard errors that correct for clustering across country/year cells are presented in parentheses.

reported profits, whereas the -0.0519 coefficient in the regression reported in column 3 indicates that affiliates located in countries with capital controls as measured by Shatz have 5.2% lower reported profit rates. Together with the estimated -0.1954 coefficient on local tax rates, the capital control coefficient implies that the imposition of capital controls has the same (negative) effect on reported profits as would a 26.6% higher tax rate. Columns 4 and 5 of Table 4 report the results of regressions that add variables intended to control for local economic and political conditions; the results are very similar to those obtained without the controls and reported in columns 2 and 3.²⁰

Columns 6 and 7 of Table 4 report estimated coefficients from regressions that add fixed effects for each affiliate and which thereby identify the impact of capital controls only from their removal in countries that liberalize their capital accounts. To control for effects of regional events such as regional crises, these specifications also include region-specific year effects for each of the regions identified by BEA.²¹ The post liberalization dummy variable takes the value one following the removal of capital controls (as measured by Shatz) for affiliates located in countries that previously imposed controls, and it is zero otherwise.²² The estimated tax effects—which, because of the introduction of affiliate fixed effects, are likewise estimated based on changes—are comparable in sign and magnitude to those appearing in other regressions. The 0.0600 coefficient on the post-liberalization dummy variable in the regression reported in column 7 implies that the removal of capital controls is associated with 6.0% higher reported affiliate profit rates, an effect attributable to liberalizations, and one that is slightly larger than those estimated without affiliate-fixed effects in the regressions reported elsewhere in Table 4.

3.2.2 Dividend repatriations. Firms that are restricted in their ability to remit dividends commonly find that the shadow value of local retained earnings is less than the value of capital deployed elsewhere, so they have incentives to relocate profits if possible. Capital controls typically include repatriation restrictions that operate on annual bases, thereby indirectly encouraging affiliates to remit dividends to their parent companies every year, lest low-cost repatriation opportunities otherwise be lost. For example, Brazilian affiliates in the 1980s were subject to 40% or higher tax rates

²⁰ An earlier version of this article, Desai, Foley and Hines (2004a), noted that American parent companies run larger trade surpluses with their foreign affiliates located in countries imposing capital controls than they do with other affiliates, which is consistent with the more direct evidence of profit relocation provided here.

²¹ The regions are Canada, Europe, Africa, the Middle East, Asia, and Latin American and Other Western Hemisphere.

²² Liberalizing countries include Argentina (1990), Brazil (1992), Chile (1992), Colombia (1992), Ecuador (1993), Egypt (1992), Greece (1987), Peru (1993), Philippines (1992), Taiwan (1988), and Venezuela (1990). As noted in fn. 9, tests of the effects of liberalizations employ data from 1982 to 1997 to allow for a fuller consideration of post-liberalization behavior.

on repatriations averaging more than 13% of registered investment over any three-year period.²³ To investigate the extent to which firms respond to this incentive, the regressions reported in Table 5 are conditional logit specifications in which the dependent variable is a dummy equal to one if an affiliate pays a dividend to its parent in a particular year and zero otherwise. The sample again covers the 1982–1995 period. Country tax rates are included as independent variables (because higher tax rates generally reduce the cost of paying dividends to American parent companies), as are parent and year fixed effects, three powers of log GDP and median employee compensation paid by US multinationals.

The regression reported in column 1 of Table 5 indicates that higher country tax rates and higher affiliate return on assets are associated with a significantly greater likelihood of paying dividends. The regressions reported in columns 2–3 of Table 5 indicate that the chances of paying a dividend are significantly higher in countries with capital controls as measured by both the IMF and the Shatz. The 0.3589 estimated coefficient on the capital control dummy in column 3 suggests that the imposition of capital controls (as measured by Shatz) has the same effect on the likelihood of paying dividends as does a 7.7% higher return on assets or a 35% higher local tax rate. The estimated coefficients imply that an affiliate with mean values of the other independent variables is 9.8% more likely to pay a dividend if it is located in a country imposing capital controls than it would be if located in a country that does not control capital flows.²⁴ The inclusion of additional controls for the quality of political institutions, inflation, and openness to international trade changes estimated capital control effects only slightly, as reflected in the regressions reported in columns 4 and 5.

Columns 6 and 7 of Table 5 report estimated coefficients from regressions that include affiliate fixed effects and region-year dummy variables, as well as a dummy variable that takes the value one in years following capital account liberalizations. The –0.5319 coefficient reported in column 7 indicates that the removal of capital controls is associated with significantly reduced likelihood of remitting dividends to parent companies. This evidence is quite consistent with the effects evident in the pooled sample reported in columns 2–5 and with the incentives that firms have to exploit all available opportunities to mitigate the burdens of capital controls.

²³ See Bentley (1985) for further details.

²⁴ This implied marginal effect of capital controls is estimated from a model that includes among its independent variables only one power of GDP, because the inclusion of two additional powers of GDP creates such multicollinearity that marginal effects become very difficult to estimate. This measured effect is reassuringly not dissimilar from the raw difference in propensity of paying dividends if one just compares country-year observations with and without capital controls.

Table 5
Capital controls and the propensity to pay dividends

Dependent Variable	Dummy equal to one if dividend payment made						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Country tax rate	0.9505 (0.0817)	1.1526 (0.0898)	1.0245 (0.0940)	1.3627 (0.0996)	1.1305 (0.1007)	1.1777 (0.1884)	1.1068 (0.2324)
Quality of institutions				-0.0167 (0.0038)	-0.0063 (0.0043)		-0.0077 (0.0106)
Rate of inflation				0.0015 (0.0033)	-0.0018 (0.0035)		0.0018 (0.0051)
Openness to trade				-0.0004 (0.0003)	-0.0009 (0.0002)		0.0027 (0.0013)
IMF capital control dummy		0.0890 (0.0196)		0.0834 (0.0225)			
Shatz capital control dummy			0.3589 (0.0323)		0.3014 (0.0387)		
Post liberalization dummy							-0.5319 (0.0897)
Return on assets	4.5648 (0.0641)	4.5676 (0.0676)	4.6543 (0.0686)	4.5985 (0.0714)	4.6390 (0.0717)	3.3093 (0.0892)	3.4041 (0.0965)
Parent/year fixed effects?	Yes	Yes	Yes	Yes	Yes	No	No
GDP and wage controls?	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Affiliate and region/year fixed effects?	No	No	No	No	No	Yes	Yes
Number of observations	97,061	86,458	85,985	78,487	78,695	67,137	59,717
Log likelihood	-43,235	-38,390	-38,022	-34,347	-34,361	-26,364	-23,378

The dependent variable in each specification is a dummy that is equal to one if an affiliate makes a dividend payment in a particular year and zero if it does not. Country tax rate is the median tax rate in an affiliate's host country. The quality of institutions is the sum of the ICRG Corruption, Rule of Law, and Bureaucratic Quality subcomponents. Rate of inflation is the contemporaneous percentage change in the GDP deflator of an affiliate's host country. Openness to trade is taken from Heston, Summers and Aten (2002), and it is equal to the ratio of the sum of export and imports to gross domestic product. The IMF capital control dummy and the Shatz capital control dummy are dummies equal to one if a country imposes capital controls and zero otherwise. Return on assets is the ratio of affiliate net income to assets. All specifications are conditional logits; specifications (1)–(5) include parent/year fixed effects, and specifications (6) and (7) include affiliate and region/year fixed effects. All specifications include three powers of log GDP and the log of the median annual compensation per employee paid by affiliates in a particular country and year. The post-liberalization is equal to one in the year of and each of the years following liberalizations for liberalizing countries, and it is equal to zero for countries that do not change their capital control policies. Standard errors are presented in parentheses.

3.3 Investment

If local borrowing rates were unaffected by capital controls and firms could avoid repatriation controls at little or no cost, then there would be no reason for capital controls to affect local investment by multinational firms. The evidence, however, suggests that capital controls are accompanied by high interest rates and that firms respond to capital controls by distorting profit reports and dividend repatriation policies, in the process incurring substantial organizational and regulatory costs. It follows that capital controls are likely to discourage investment by American multinational firms. Because there may be cross-country differences in initial comparative advantage in certain industries that are difficult to control for and that are not related to capital controls, tests of the effects of controls on levels of American multinational activity focus on liberalizations.

The regressions presented in Table 6 trace the investment effects of removing capital controls. The dependent variables include three measures of affiliate size: the log of assets, the log of sales, and the log of net PPE. The independent variables in these regressions are the same as those used in the regressions reported in columns 6 and 7 of Tables 4 and 5. Because affiliate fixed effects are included among the regressors, estimated coefficients on the post liberalization dummy variable capture the average size effects associated with removal of capital controls. The estimated 0.0864 coefficient reported in column 2 implies that affiliates have 8.64% greater sales following the removal of capital controls, although the estimated sale effect is not statistically significant. Similarly, the 0.0975 coefficient in column 4 implies that affiliates accumulate 9.75% greater assets once capital controls are removed, and the 0.1026 coefficient in column 4 implies that net PPE is 10.26% larger following capital account liberalization.

The results presented in Table 6 suggest that affiliates located in countries with capital controls are smaller than they would be in the absence of controls.²⁵ This is consistent with other evidence presented in Tables 3, 4, and 5 and with a sensible reluctance to commit any more investment funds than necessary to countries from which it is difficult to extract profits. It is noteworthy that the combination of incentives to limit initial investments and the ability of investors to sidestep repatriation controls (albeit at nontrivial cost) produces an outcome in which limits on repatriation have the paradoxical effect of reducing, rather than increasing, the supply of capital to host countries imposing the controls.

²⁵ Desai, Foley, and Hines (2004a) consider additional measures of the impact of capital controls on the sizes of American-owned affiliates, including evidence that the initial asset levels of affiliates located in countries with capital controls are smaller than the initial assets levels of affiliates located elsewhere.

Table 6
Liberalizations and affiliate activity

Dependent variable	Log of sales		Log of assets		Log of net PPE	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	10.1647 (0.3430)	9.2608 (0.6033)	11.2759 (0.7234)	9.9508 (0.2934)	7.6335 (0.9744)	7.8703 (0.4950)
Country tax rate	0.4143 (0.1618)	0.4747 (0.1396)	0.2446 (0.1160)	0.2701 (0.0982)	0.1920 (0.1167)	0.1625 (0.1280)
Quality of institutions		0.0515 (0.0070)		0.0268 (0.0040)		0.0253 (0.0057)
Rate of inflation		-0.0059 (0.0029)		-0.0087 (0.0022)		-0.0004 (0.0020)
Openness to trade		0.0008 (0.0009)		0.0017 (0.0006)		0.0012 (0.0009)
Post liberalization dummy	0.2800 (0.0609)	0.0864 (0.0576)	0.1944 (0.0451)	0.0975 (0.0418)	0.1726 (0.0513)	0.1026 (0.0494)
Affiliate and region/year fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	171,976	159,194	181,136	167,518	136,114	127,398
R-squared	0.8057	0.8116	0.8937	0.8998	0.9102	0.9115

The dependent variable in columns (1) and (2) is the log of affiliate sales; in columns (3) and (4) is the log of affiliate assets, and in columns (5) and (6) is the log of affiliate net property, plant, and equipment (PPE). Country tax rate is the median tax rate in an affiliate's host country. The quality of institutions is the sum of the ICRG Corruption, Rule of Law, and Bureaucratic Quality subcomponents. Rate of inflation is the contemporaneous percentage change in the GDP deflator of an affiliate's host country. Openness to trade is taken from Heston, Summers and Aten (2002), and it is equal to the ratio of the sum of export and imports to gross domestic product. All specifications include affiliate and region/year fixed effects. The post-liberalization dummy is equal to one in the year of and each of the years following liberalizations for liberalizing countries, and it is equal to zero for countries that do not change their capital control policies. Heteroskedasticity-consistent standard errors that correct for clustering across country/year cells are presented in parentheses.

An alternative approach to studying the effects of capital controls on the scale of affiliate activity is to analyze annual changes in the dependent variables used in Table 6. Such an approach produces estimates of the extent to which the growth rates of multinational operations change following liberalizations. Because growth that is a consequence of liberalization is likely to occur soon after liberalization, the liberalization dummy used in this analysis is set equal to one only in the year of the liberalization and the two subsequent years. By focusing on growth, this approach has the advantage of allowing for the inclusion of the “global growth opportunities” (GGO) measure that is described in Bekaert, Harvey, Lundblad, and Siegel (forthcoming).²⁶ Table 7 summarizes estimated coefficients from regressions in which the dependent variables are annual changes in log values of sales, assets, and net PPE, which can be interpreted as annual growth rates; independent variables include those used in the regressions presented in Table 6, augmented by the GGO measure of growth opportunities.

Estimated coefficients on the liberalization dummy variable in the regressions reported in Table 7 are uniformly positive and significant for all three measures of affiliate activity. The 0.1064 liberalization dummy coefficient in column 2 indicates that sales grow 10.6% more rapidly in the year that the capital account is liberalized, and in the two following years, than they do at other times. Corresponding coefficients reported in columns 4 and 6 indicate that assets grow at 8.5% faster annual rates following liberalizations and that PPE grows 6.9% faster. Hence, liberalizations of capital controls appear to initiate periods of considerably faster growth of the local activities of multinational firms.

3.4 Volatility

The removal of capital controls appears to improve significantly the conditions for foreign investors by reducing local borrowing costs and permitting investors to reallocate funds from foreign affiliates without incurring costs associated with distorting reported incomes and profit repatriations. From the standpoint of a foreign investor, these considerations may need to be weighed against the potential benefits of capital controls in stabilizing the local economic environment and thereby providing returns to investors that are less volatile than they would be in the absence of controls. Although it is very difficult to evaluate the net impact of capital controls on the portion of economic volatility relevant to foreign investors, suggestive evidence of the impact of capital controls on volatility is available from the experience of American firms.

²⁶ In short, these measures of “global growth opportunities” are country-level measures of investment opportunities equal to weighted averages of price-earnings ratios of global industry portfolios where the weights correspond to the industry shares in an economy. We thank the creators of this measure for providing these data.

Table 7
Liberalizations and growth rates of affiliate activity

Dependent Variable	Sales Growth		Asset Growth		Net PPE Growth	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	4.2777 (0.9773)	-1.4308 (0.8121)	-0.2851 (0.6700)	-0.4348 (0.6952)	-0.2235 (0.1584)	-0.5894 (0.1757)
Country tax rate	-0.0690 (0.0988)	-0.0637 (0.1036)	-0.0410 (0.0661)	-0.0419 (0.0677)	0.0321 (0.0776)	0.0133 (0.0806)
GGO measure of growth opportunities	0.2097 (0.0790)	0.2020 (0.0771)	0.0254 (0.0610)	0.0082 (0.0610)	0.0482 (0.0521)	0.0267 (0.0535)
Quality of institutions		0.0101 (0.0045)		0.0129 (0.0029)		0.0144 (0.0032)
Rate of inflation		-0.0007 (0.0022)		-0.0005 (0.0017)		-0.0009 (0.0011)
Openness to trade		-0.0009 (0.0007)		0.0002 (0.0005)		0.0010 (0.0006)
Liberalization dummy	0.1154 (0.0398)	0.1064 (0.0394)	0.0970 (0.0269)	0.0851 (0.0247)	0.0838 (0.0254)	0.0687 (0.0239)
Affiliate and region/year fixed effects?	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	112,651	107,300	118,405	112,856	86,449	81,833
R-squared	0.3007	0.3037	0.2921	0.2958	0.2519	0.2564

The dependent variable in columns (1) and (2) is the growth rate of affiliate sales; in columns (3) and (4) is the growth rate of affiliate assets, and in columns (5) and (6) is the growth rate of affiliate net property, plant, and equipment (PPE). Growth rates are computed by taking the difference between the end and the beginning of period log values. The GGO measure of growth opportunities is drawn from Bekaert, Harvey, Lundblad, and Siegel (2005). Country tax rate is the median tax rate in an affiliate's host country. The quality of institutions is the sum of the ICRG Corruption, Rule of Law, and Bureaucratic Quality subcomponents. Rate of inflation is the contemporaneous percentage change in the GDP deflator of an affiliate's host country. Openness to trade is taken from Heston, Summers and Aten (2002), and it is equal to the ratio of the sum of export and imports to gross domestic product. All specifications include affiliate and region/year fixed effects. The liberalization dummy is equal to one in the year of the liberalization and the two subsequent years for liberalizing countries, and it is equal to zero otherwise and for countries that do not change their capital control policies. Heteroskedasticity-consistent standard errors that correct for clustering across country/year cells are presented in parentheses.

The regressions summarized in Table 4 explain differences in rates of return on the basis of observable variables including characteristics of affiliates and their host countries. These equations do not fit the data perfectly, and one indicator of the variability of the environment facing multinational investors is the magnitude of the errors in these equations. If capital controls stabilize economies and thereby foster more predictable economic environments for foreign investors, then the residuals in these equations should be expected to have smaller variances for observations of countries and years in which capital controls operate than they do for other observations.

The top panel of Table 8 reports estimated standard deviations of residuals in three of the equations explaining return on equity and presented in Table 4. The first line of the top panel of Table 8 reports estimated standard deviations from the equation presented in column 4 of Table 4; the second line of the top panel of Table 8 reports estimated standard deviations from the equation presented in column 5 of Table 4; and the third line of the top panel of Table 8 reports estimated standard deviations from the equation presented in column 7 of Table 4.

Table 8
The impact of capital controls on the variability of affiliate returns and growth rates

		With capital controls	Without capital controls
ROE variability			
Capital controls measured by	IMF capital control dummy	0.2279	0.2393
	Shatz capital control dummy	0.2401	0.2350
	Post liberalization dummy	0.1644	0.1034
Affiliate sales growth rate variability			
Capital controls measured by	IMF capital control dummy	0.8654	0.9587
	Shatz capital control dummy	0.9626	0.9297
	Post liberalization dummy	0.7557	0.8039
Affiliate asset growth rate variability			
Capital controls measured by	IMF capital control dummy	0.4724	0.5141
	Shatz capital control dummy	0.5146	0.5006
	Post liberalization dummy	0.4552	0.4446
Affiliate net PPE growth rate variability			
Capital controls measured by	IMF capital control dummy	0.6131	0.6733
	Shatz capital control dummy	0.6930	0.6553
	Post liberalization dummy	0.5512	0.4754

The measures of variability displayed are standard deviations of samples of residuals from specifications summarized in Table 4. The top panel depicts return on equity (ROE) variability, and the three rows display the standard deviation of residuals from regressions based on specifications (4), (5), and (7) in Table 4. The samples employed to compute variability with and without controls as measured by the IMF dummy and the Shatz dummy include all affiliate years for which data are available, and the analysis based on liberalizations only includes observations from liberalizing countries. The first and second column respectively contain measures of variability for observations drawn from country/years in which capital controls are and are not imposed. The bottom three panels display results of using the same analysis to measure variability of affiliate sales growth rates, affiliate asset growth rates, and affiliate net property, plant, and equipment (PPE) growth rates. Growth rates are computed by taking the difference between the end and beginning of period log values.

Observations are grouped according to whether or not they correspond to country/year cells in which capital controls are operative. The first column of Table 8 reports estimated standard deviations of residuals from observations in country/year cells with capital controls, whereas the second column of Table 8 reports estimated standard deviations from observations in country/year cells without capital controls.

The figures reported in Table 8 indicate that there is little difference between the standard deviations of returns in countries with and without capital controls. The 0.2279 estimated standard deviation of returns in countries with capital controls (as classified by the IMF), reported in the first row of Table 8, is slightly smaller than the 0.2393 estimate for countries without capital controls. The Shatz classification of capital controls produces a similar, albeit reversed, pattern, with returns in countries with capital controls exhibiting slightly higher (0.2401) standard deviations than returns in countries without capital controls (0.2350). The estimates reported in the third row of Table 8 indicate that the standard deviation of returns falls substantially when countries liberalize their capital accounts.

The second, third, and fourth panels of Table 8 present estimated standard deviations of residuals from running the same specifications from Table 4 described above, but growth rates (calculated as first differences of log values) of affiliate sales, assets, and net PPE are used as dependent variables. There is no consistent pattern in the relative magnitude of volatilities across observations for which capital controls are operative and those for which they are not, and the variability of affiliate growth is similar across these sets of observations.²⁷ The cross sectional evidence (reported in the first two rows of each panel) indicates that growth rates of affiliates located in countries with capital controls exhibit somewhat greater variance than do growth rates of affiliates in countries without capital controls. Countries that liberalize their capital accounts appear to introduce more variability in the growth rates of local affiliates, based on the evidence reported in the third row of each panel, although this may largely reflect the higher growth rates that accompany liberalization.

The estimates presented in Table 8 give no indication that affiliates in countries with capital controls face more stable environments than do affiliates located in countries without capital controls. In the absence of greater stability, the combined effect of higher interest rates and more costly profit extraction is likely to discourage investment, a conclusion that the data appear to support.

²⁷ Performing the same comparison using residuals from the regressions reported in columns 2, 4, and 6 of Table 7 produces similar results.

4. Conclusion

This article offers evidence that the foreign affiliates of American multinational firms circumvent capital controls by regularizing dividend remittances and relocating profits. Avoiding capital controls in this way is costly, given the tax and other business considerations that would otherwise guide dividend repatriations and trade between related parties. Countries imposing capital controls have significantly higher interest rates than do otherwise-similar countries without capital controls. Multinational firms contemplating new investments in countries with capital controls therefore face high costs of local borrowing and significant costs associated with the actions necessary to avoid the impact of capital controls, and as a result, their incentives to invest are significantly reduced. Capital account liberalizations are associated with reduced levels of profit relocation, a lower propensity to pay dividends, and increased multinational activity, including greater investment. Although this article evaluates the activities of existing foreign affiliates of American multinational firms, the costs associated with capital controls undoubtedly discourage many potential investors from establishing affiliates in the first place.

Because countries imposing capital controls differ in many ways from those that do not, it is infeasible to control for all the relevant differences in evaluating the impact of capital controls. As a result, the rapid growth of American affiliates following the removal of capital controls might reflect either the impact of the capital controls themselves or the change in economic conditions that motivated governments to remove the controls. Details of the behavior of multinational firms offer the prospect of distinguishing these interpretations, because some aspects of this behavior are unlikely to be a function of the factors that motivate governments to remove the controls. Evidence of the effects of capital controls on profit reallocation and dividend repatriation implies that firms behave in a manner that is consistent with higher local costs of capital, suggesting that the observed effects on affiliate size and investment reflect the impact of policies and not merely the conditions responsible for the policies.

In addition to documenting the effects of capital controls on investment and profit extraction by foreign investors, the evidence is consistent with the possibility that capital controls affect local firms differently than they do foreign investors. Although previous articles suggest that capital controls could impact local firms differentially, based on their sizes or political connections, the evidence that local interest rates are significantly elevated in the presence of capital controls implies that borrowers without access to foreign supplies of capital are apt to be very hard-hit by local economic conditions associated with capital controls. Moreover, multinational firms appear to be able to circumvent capital account

restrictions, albeit at significant cost, whereas others may not be able to do so at all. If local firms must rely on domestic sources of capital, then capital controls not only raise the costs of capital for small and medium-sized domestic firms but also may disadvantage them relative to the multinational firms against which they compete. Further analysis could usefully consider the degree to which capital controls affect the composition of ownership of local assets.

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