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**Article**

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## Program Report

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### Corporate Finance

Raghuram G. Rajan\*

The NBER's Corporate Finance Program was established in 1991 with Robert W. Vishny as its first director; I became Program Director in 1998. Corporate finance, narrowly interpreted, is the study of the investment and financing policies of corporations. But since firms are at the center of economic activity—and since almost any topic economists are concerned with, from incentives and risksharing to currency crises, affect corporate financing and investment—it is increasingly hard to draw precise boundaries around the field. Reflecting this, Jeremy C. Stein and Luigi G. Zingales organized an NBER/Universities Research Conference in December 1999 on the "Macroeconomic Effects of Corporate Finance." In fact, I think some of the most interesting work in corporate finance is now being done at its interface with other areas. I describe some of that work in this report.

### Law and Financial Development

It is fitting to start with Andrei Shleifer's recent path-breaking work on the links between law and finance, since he won the John Bates Clark Medal in 1999. In a series of papers, Rafael La Porta, Florencio Lopez-de-Silanes, Shleifer, and Vishny describe links between the origin of a country's legal system and the extent to which the system protects investors. They find, among other things, that countries with a legal code based on common law protect investors better than countries with a legal code based on civil law.<sup>1</sup>

Legal systems also seem to directly affect the development of external capital markets. It turns out that stock markets and debt markets have developed less in countries with a French civil law origin than in countries with a common law origin.<sup>2</sup> Legal origin also appears to be related to corporate

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ownership, dividend policies, and valuations.<sup>3</sup> This body of work has inspired a whole new literature on law and finance.

However, while specific laws may plausibly affect the nature of corporate ownership and finance, there is still no theory of why legal origin should affect finance, if in fact it does. Some economists, myself included, believe that other forces correlated with common law origins may be responsible for the relationships that La Porta, Lopez-de-Silanes, Shleifer, and Vishny find in the data. But debates of this kind are what make corporate finance such a fertile area of inquiry today.

## Corporate Investment

While there has been much attention paid to corporate financing, we know very little about corporate investment, other than through acquisitions, largely because of the paucity of large sample data. We now have some data on the investment practices of diversified firms, and researchers have begun to test theories of the beneficial effects of these firms. Diversified firms create internal capital markets, which then finance good projects that the market ignores.<sup>4</sup> However, the notion that diversified firms make efficient investments is not consistent with the growing evidence that they trade at a discount relative to focused firms. Recently, researchers have tried to link the discount that diversified firms trade at to distortions in the allocations of capital budgets among divisions.<sup>5</sup> Others have attempted to show that some of the evidence of the diversification discount, or of the misallocation, may be spurious or overstated.<sup>6</sup> Clearly, this debate will go on for some time.

## Innovation

There has been increasing interest in the sources of innovation and the

financial structures that promote it. Samuel S. Kortum and Josh Lerner<sup>7</sup> ask whether venture capital spurs innovation. In a study of 20 different industries over three decades, they find a positive association between the presence of venture capital and the rate of patenting. Of course, such a study raises issues of reverse causality: that is, it could be that industries that innovate a lot attract venture capital. They address this possibility.

In another study, Randall K. Morck, David A. Strangeland, and Bernard Yeung<sup>8</sup> show that countries in which there is a lot of inherited wealth relative to GDP spend less on innovation. In particular, Canadian firms that are controlled by heirs tend to do less R and D than otherwise similar firms. The authors conclude that inherited corporate wealth impedes growth.

## Banking

The recent financial crises in different countries have refocused attention on our understanding of banks. Bengt R. Holmstrom and Jean Tirole have developed a theory of financial intermediation and liquidity based on the collateral value of assets. They extend this approach to the determination of the liquidity premiums associated with different assets.<sup>9</sup> This work is important in that it brings insights from corporate finance to the pricing of financial assets.

Douglas W. Diamond and I<sup>10</sup> build a theory of banks that explains why financial fragility may be essential to the process of creating liquidity and credit. Our work attempts to explicitly model the links between the bank's asset side (illiquid loans) and its liability side (demandable deposits). Anil K. Kashyap, Stein, and I<sup>11</sup> did a similar study showing that there is a synergy between demand deposits and loan commitments. The implication is that banks can be

made perfectly safe only by destroying their very function.

Jun-Koo Kang and Rene M. Stulz<sup>12</sup> also address the critical role of banks in the economy. They show that, relative to independent firms, Japanese firms with links to banks lost more value and had to reduce investment by more than other firms when their banks experienced difficulty. These findings are not attributable to reverse causality (that is, that the banks experienced difficulty because their client firms were in trouble).

Takeo Hoshi and Kashyap<sup>13</sup> provide a detailed analysis of the origins of the Japanese banking crisis and its likely consequences. Finally, Edward J. Kane<sup>14</sup> portrays the banking crises that have roiled world markets in recent years as information-producing events that identify and discredit inefficient strategies for regulating banking markets.

According to theory, the importance of banks stems in large part from their ability to monitor and lend to firms the market will not touch. Randall S. Kroszner and Philip E. Strahan<sup>15</sup> ask what leads bankers to become board members of firms; that is, does this indicate a monitoring role for the banks? They find that banks in the United States appear to fear involvement in management because of concerns about equitable subordination and lender liability. As a result, they tend to be represented primarily on the boards of large, stable firms with tangible assets and little reliance on short-term debt. Thus, at least in the United States, bankers are not represented on the boards of firms that require the most monitoring.

## Theory of the Firm

Our members also have been trying to develop a better understanding of the boundaries of the corporation. Oliver D. Hart and John Moore<sup>16</sup> model hierarchies based on the allocation of authority. Corporate

owners have the ultimate authority, but limited time to exercise it, so they delegate. Hart and Moore have some results already on the optimal degree of decentralization and the boundaries of the firm. But is the incomplete contract approach espoused by Hart and Moore legitimate? They respond to their critics by providing some conditions—primarily the inability to commit—under which the incomplete contract approach does hold.<sup>17</sup>

Krishna B. Kumar, Zingales, and I<sup>18</sup> examine whether theories of the boundaries of the firm can explain firm size across both industries and countries. We find that industries that use a lot of physical capital have larger firms, as do countries with greater judicial efficiency. Industries that use a lot of capital are relatively smaller in countries with greater judicial efficiency; we argue that this is consistent with recent theories of the firm.

## Ownership Structures

Corporate ownership has always been an important subject of research for our group. Clifford G. Holderness, Kroszner, and Dennis P. Sheehan<sup>19</sup> find that, contrary to prior research suggesting that managers have very little exposure to equity today as compared to the past, ownership by officers and directors of publicly traded firms on average is higher today than it was earlier in the century. Managerial ownership rises from 13 percent for the universe of exchange-listed corporations in 1935, the earliest year for which such data exist, to 21 percent in 1995. This work recently won the first Brattle Prize for the best paper on corporate finance published by the *Journal of Finance*.

Work by Shleifer<sup>20</sup> looks at the effects of state versus private ownership. He concludes that private ownership generally is preferable to

public ownership when the incentives to innovate and to contain costs must be strong. He argues that too many economists in the past focused on the role of prices under socialism and capitalism, ignoring the enormous importance of ownership as the source of capitalist incentives to innovate.

Our members also have done some work on business groups. Lucian A. Bebchuk, Reinier Kraakman, and George Triantis<sup>21</sup> examine common arrangements for separating control from cash flow rights typically used in business groups: stock pyramids, cross-ownership structures, and dual class equity structures. They conclude that these have the potential to create very large agency costs. Tarun Khanna and Krishna Palepu<sup>22</sup> examine business groups in India and conclude that they are difficult to monitor. Also, group affiliation tends to reduce foreign institutional investment, even though foreign institutional investors tend to be better monitors than domestic institutions.

## Managerial Incentives

An extraordinary paper by Holmstrom on managerial incentives is now available in the NBER Working Paper series.<sup>23</sup> In some more recent work, George P. Baker and Brian J. Hall<sup>24</sup> suggest that there is confusion among academics and practitioners about how to measure the strength of CEO incentives and how to reconcile the enormous differences in pay sensitivities between executives in large and small firms. They show that while one measure of CEO incentives (the dollar change in CEO wealth per dollar change in firm value) falls by a factor of ten between firms in the smallest and largest deciles in their sample, another measure of CEO incentives (the value of CEO equity stakes) increases by roughly the same magnitude. Baker and Hall dis-

cuss the situations under which each measure is most applicable.

Data on managerial compensation also can be used to test theories of optimal contracting and compensation. Rajesh K. Aggarwal and Andrew A. Samwick<sup>25</sup> argue that executives who have more precise signals of their effort than firm performance will receive compensation that is less sensitive to the overall performance of the firm than other executives. Consistent with this, the authors find that CEOs' pay-performance incentives are higher by \$5.85 per \$1,000 increase in shareholder wealth than the pay-performance incentives of executives with only divisional responsibility.

## Debt and Equity

We have fairly good models of outside debt, but no good theory of outside equity. Stewart C. Myers<sup>26</sup> explores the necessary conditions for outside equity financing when insiders—that is, managers or entrepreneurs—are self-interested and cash flows are not verifiable. He contrasts two control mechanisms: a partnership, in which outside investors can commit assets for a specified period; and a corporation, in which assets are committed for an indefinite period but insiders can be ejected at any time.

Finally, Roger H. Gordon and Young Lee<sup>27</sup> revisit the old but still controversial issue of whether taxes affect corporate debt policy. They find that taxes have had a strong and statistically significant effect on levels of debt. In particular, the difference in corporate tax rates currently faced by the largest versus the smallest firms (35 percent versus 15 percent) is predicted to induce larger firms to finance 8 percent more of their assets with debt than the smaller firms do.

## Summary

It is not possible, given space limitations, to do justice to the range of

issues our members are working on. I hope this sampling gives you a taste for more. You can access the full array of NBER Working Papers by the Corporate Finance Program at our web site ([www.nber.org](http://www.nber.org)).

<sup>1</sup> R. La Porta, F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny, "Law and Finance," NBER Working Paper No. 5661, July 1996.

<sup>2</sup> R. La Porta, F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny, "Legal Determinants of External Finance," NBER Working Paper No. 5879, January 1997.

<sup>3</sup> R. La Porta, F. Lopez-de-Silanes, and A. Shleifer, "Corporate Ownership around the World," NBER Working Paper No. 6625, June 1998; R. La Porta, F. Lopez-de-Silanes, A. Shleifer, and R. W. Vishny, "Agency Problems and Dividend Policies around the World," NBER Working Paper No. 6594, June 1998, and "Investor Protection and Corporate Valuation," NBER Working Paper No. 7403, October 1999.

<sup>4</sup> See, for example, R. G. Hubbard and D. Palia, "A Re-Examination of the Conglomerate Merger Wave in the 1960s: An Internal Capital Markets View," NBER Working Paper No. 6539, April 1998.

<sup>5</sup> D. S. Scharfstein and J. C. Stein, "The Dark Side of Internal Capital Markets: Divisional Rent-Seeking and Inefficient Investment," NBER Working Paper No. 5969, March 1997; D. S. Scharfstein, "The Dark Side of Internal Capital Markets II: Evidence from Diversified Conglomerates," NBER Working Paper No. 6352, January 1998; R. G. Rajan, H. Servaes, and L. G. Zingales, "The Cost of Diversity: The Diversification Discount and Inefficient Investment," NBER Working Paper No. 6368, January 1998; F. P. Schlingemann, R. M. Stulz, and R. A. Walking, "Corporate Focusing and Internal Capital Markets," NBER Working Paper No. 7175, June 1999.

<sup>6</sup> O. Lamont and C. Polk, "The Diversification Discount: Cash Flows versus Returns," NBER Working Paper No. 7396, October 1999.

<sup>7</sup> S. S. Kortum and J. Lerner, "Does Venture Capital Spur Innovation?" NBER Working Paper No. 6846, December 1998.

<sup>8</sup> R. K. Morck, D. A. Strangeland, and B. Yeung, "Inherited Wealth, Corporate Control, and Economic Growth: The Canadian Disease," NBER Working Paper No. 6814, November 1998.

<sup>9</sup> B. R. Holmstrom and J. Tirole, "LAPM: A Liquidity-Based Asset Pricing Model," NBER Working Paper No. 6673, August 1998.

<sup>10</sup> D. W. Diamond and R. G. Rajan, "Liquidity Risk, Liquidity Creation, and Financial Fragility: A Theory of Banking," NBER Working Paper No. 7430, and "A Theory of Bank Capital," NBER Working Paper No. 7431, December 1999.

<sup>11</sup> A. K. Kashyap, R. G. Rajan, and J. C. Stein, "Banks as Liquidity Providers: An Explanation for the Co-existence of Lending and Deposit-Taking," NBER Working Paper No. 6962, February 1999.

<sup>12</sup> J. K. Kang and R. M. Stulz, "Is Bank-Centered Corporate Governance Worth It? A Cross-Sectional Analysis of the Performance of Japanese Firms during the Asset Price Deflation," NBER Working Paper No. 6238, October 1997.

<sup>13</sup> T. Hosbi and A. K. Kashyap, "The Japanese Banking Crisis: Where Did It Come From and How Will It End?" NBER Working Paper No. 7250, July 1999.

<sup>14</sup> E. J. Kane, "How Offshore Financial Competition Disciplines Exit Resistance by Incentive-Conflicted Bank Regulators," NBER Working Paper No. 7156, June 1999.

<sup>15</sup> R. S. Kroszner and P. E. Straban, "Bankers on Boards: Monitoring, Conflicts of Interest, and Lender Liability," NBER Working Paper No. 7319, August 1999.

<sup>16</sup> O. D. Hart and J. Moore, "On the Design of Hierarchies: Coordination versus Specialization," NBER Working Paper No. 7388, October 1999.

<sup>17</sup> O. D. Hart and J. Moore, "Foundations of Incomplete Contracts," NBER Working Paper No. 6726, September 1998.

<sup>18</sup> K. B. Kumar, R. G. Rajan, and L. G. Zingales, "What Determines Firm Size?" NBER Working Paper No. 7208, July 1999.

<sup>19</sup> C. G. Holderness, R. S. Kroszner, and D. P. Sheehan, "Were the Good Old Days That Good? Changes in Managerial Stock Ownership since the Great Depression," NBER Working Paper No. 6550, May 1998.

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<sup>22</sup> T. Khanna and K. Palepu, "Emerging Market Business Groups, Foreign Investors, and Corporate Governance," NBER Working Paper No. 6955, February 1999.

<sup>23</sup> B. R. Holmstrom, "Managerial Incentive Problems—A Dynamic Perspective," NBER Working Paper No. 6875, January 1999.

<sup>24</sup> G. P. Baker and B. J. Hall, "CEO Incentives and Firm Size," NBER Working Paper No. 6868, December 1998.

<sup>25</sup> R. K. Aggarwal and A. A. Samwick, "Performance Incentives within Firms: The Effect of Managerial Responsibility," NBER Working Paper No. 7334, September 1999.

<sup>26</sup> S. C. Myers, "Outside Equity Financing," NBER Working Paper No. 6561, May 1998.

<sup>27</sup> R. H. Gordon and Y. Lee, "Do Taxes Affect Corporate Debt Policy? Evidence from U.S. Corporate Tax Return Data," NBER Working Paper No. 7433, December 1999.

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## Research Summaries

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### Economic Impacts of Environmental Policies

Lawrence H. Goulder\*

Over the last three decades in the United States and other nations, there has been a significant increase in the use of economic analysis to guide the design and evaluation of environmental policies. Economic analysis has played a key role in the evaluation of "green tax reform"—the re-

orienting of the tax system to concentrate taxes more on "bads" like pollution and less on "goods" like labor effort or capital formation (saving and investment). Economic analysis also has guided the design of innovative new approaches to environmental regulation that hold the promise of achieving environmental goals at lower cost than is possible under conventional regulations. And, it has been used to map out how the impacts of environmental policies are distributed across industries and household groups—a

consideration that is highly relevant to the political feasibility of environmental initiatives.

Much of my research focuses on these sorts of environmental policy issues. I often use a general equilibrium framework, an approach that considers how environmental policies affect not only the targeted firms or industries but the rest of the economy as well. General equilibrium analysis yields dramatically different results from what one would obtain from partial equilibrium, or sector-specific, analyses. In realistic, "sec-

\*Lawrence H. Goulder is an NBER Research Associate in the Program on Public Economics and an associate professor of economics at Stanford University. His "Profile" appears later in this issue.