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Path Dependence or Convergence?

The Evolution of Corporate Ownership Around the World

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Abstract

We offer a theory that sheds light on the current debate over whether the form of corporate ownership converges to the Berle-Means image. Our analytical results are threefold. First, legal rules and firm-specific protective arrangements are complementary. Secondly, corporate ownership patterns can be convergent or path dependent depending on the relative importance of these protective arrangements. We predict, for example, diffuse stock ownership in countries that impose legal limits on blockholders' power to expropriate minority investor rights. Thirdly, we find that convergence toward diffuse share ownership is a movement towards the social optimum. Our empirical results suggest a case for the co-existence of path dependence and functional convergence (convergence to the diffuse form of share ownership through cross-listings on U.S. stock exchanges that impose more stringent disclosure and listing requirements). These results have implications for the design of executive compensation, the case for institutional investor activism and the proposal to increase shareholder power.

We offer a theory that sheds light on the current debate over whether the form of corporate ownership converges to the Berle-Means image. Our analytical results are threefold. Firstly, legal rules and firm-specific protective arrangements are complementary. Secondly, corporate ownership patterns can be convergent or path dependent depending on the relative importance of these protective arrangements. More precisely, our model predicts a) diffuse stock ownership in countries that impose legal limits on blockholders' power to expropriate minority investor rights, and b) concentrated stock ownership in countries that rely on asset specificity as a form of protection. Lastly, we find that convergence toward diffuse share ownership is a movement towards the social optimum.

An examination of the data shows that corporate ownership concentration has persisted over 1994-2003. But this result does not preclude the possibility of 'functional convergence' – convergence to the diffuse form of share ownership through cross-listings on U.S. stock exchanges that impose more stringent disclosure and listing requirements. Our results suggest a case for the co-existence of path dependence and functional convergence. These results have implications for the design of executive pay, the case for institutional activism, and the proposal to increase shareholder power.

Some scholars question the relevance of the convergence debate. This attack consists of two aspects. The first aspect concerns the fact that states – unlike producers in a competitive market – may not operate like price takers. States can often use their de facto authority to determine the legal terrain on which competition takes place.[1] If most states aim to search for corporate tax revenue[2], these states can choose to 'go nuclear', say, by subsidizing local firms, to retain control of the existing onshore arrangements that may not be optimal. Hence, states may have the clout to create legal hurdles to block functional convergence. In this view, convergence to any one-size-fits-all solution is a surrender of self-regulation to bureaucrats who politicize corporate law. Political debate has its own costs and in turn makes any convergence process inefficient. In that light, the convergence issue that we explore in this study is neither a race to the top nor a race to the bottom. This concern seems to suggest that the convergence story is not inevitable and thus lacks implications for policy.

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1   Daniel J.H. Greenwood, Democracy and Delaware: The Mysterious Race to the Top/Bottom, Yale Law and Policy Review, forthcoming (2005).

2   The seminal accounts framing the debate over the race to the top or the bottom: William Cary, Federalism and Corporate Law, 83 Yale Law Journal 663 (1974) (discussing the race to the bottom); Ralph Winter, State Law, Shareholder Protection and the Theory of the Corporation, 6 Journal of Legal Studies 271 (1977) (discussing the race to the top). For recent discussions on the 'race' debate, see also Lucian A. Bebchuk, Federalism and the Corporation: The Desirable Limits on State Competition in Corporate Law, 105 Harvard Law Review 1437 (1992) (suggesting that state competition may lead to the adoption of undesirable corporate law rules – or a race to the bottom – in the presence of managerial opportunism and externalities, but that several factors often result in the failure of state competition); Roberta Romano, The Genius of American Corporate Law 21 (1993) (discussing the event studies in support of the view that the U.S. corporate law regime is not a product of state competition); Lucian Bebchuk, Alma Cohen, and Allen Ferrell, Does the Evidence Favor State Competition in Corporate Law, 90 California Law Review 1775 (2002) (suggesting that the empirical results do not support the case for state competition); Lucian Bebchuk and Assaf Hamdani, Vigorous Race or Leisurely Walk: Reconsidering the Competition over Corporate Charters, 112 Yale Law Journal 553 (2002) (arguing a case for some form of federal intervention to allow shareholders to initiate and approve reincorporations). It is important to note that we use the phrase – 'the race to the top or to the bottom' – as the race for *all* market participants to improve or downgrade the existing body of corporate law rules and securities regulations. These participants encompass companies, executives, directors, shareholders, and regulators. The recent discussions on the race debate suggest that state competition may not be the key determinant of rules governing corporate matters. Our treatment entails a more holistic view; we focus on whether cross-listings facilitate the race to the top from a global perspective. In contrast, the discussions as cited above focus on the effect of state competition (in the U.S.) on the quality of governance.

We accept the view that states exert influence over the legal conditions for corporate power-sharing and ownership schemes. However, this view overlooks one of the key roles of government: to build a sustainable, facilitative legal system that permits market competition to take place. Today's global economy is a double-tiered market. The first tier consists of companies that have international reach. In contrast, the second tier consists of companies that concentrate their local exposures. Even in the case where states operate to attract corporate taxes, it may be plausible to design a double-tiered legal framework as a response. Companies that concentrate onshore exposures adhere to the rules and norms in a given country. For companies that operate across national borders, compliance with a set of stricter governance standards signals better quality. In consequence, an improvement in the quality of governance promotes better outcomes. In the long run, states and investors benefit from the success of these companies for two reasons: greater corporate tax revenue and a propensity for the first tier to emulate the most effective and efficient structures. In essence, state control should not totally preclude the case for (partial) convergence.

The second aspect of the attack concerns ownership patterns around the world. Recent studies show that common-law regimes seem to outperform civil-law regimes in establishing an environment in which securities markets can prosper.[3] For instance, common-law countries have an average ratio of publicly held stock to Gross National Product of 60 percent, whereas, the same ratio is only 21 percent for French civil-law countries and 45 percent for German civil-law countries. Similarly, the U.K. has 36 listed firms per million citizens and the U.S. has 30, whereas, France, Germany, and Italy have only 8, 4, and 5 respectively. In short, law *does* matter. If the U.S. and the U.K., Japan and other countries with Berle-Means firms contain most of the value of the global share market, why is it relevant to assess ownership patterns in the other countries? In response, this study focuses on cross-country ownership patterns, and – more generally – the evolution of corporate power-sharing schemes. This examination permits us to explain why differences in corporate ownership and governance may persist or weaken. More importantly, this study explains why ownership structures may affect the tilt of corporate power and the quality of corporate governance, *and* why certain governance practices enhances outcomes.

The rest of the paper has the following structure. Section I frames the debate over whether the form of stock ownership becomes diffuse over time. Section II discusses a model that synthesizes the path-dependence and convergence theories. We deduce testable predictions from this model. In turn, these predictions underpin the subsequent empirical tests. Section III discusses the test results. Based on these results, Section IV discusses the implications for policy. Section V concludes this paper.

I.   The Convergence Debate

I.A   The neoclassical convergence hypothesis

In the neoclassical view, the Berle-Means image of the modern corporation has survived to date as this form of ownership and governance best balances the problems of managerial control, risk-sharing, and capital needs. In a Darwinian evolution, the public corporation is expected to mitigate agency problems with a board of directors and with incentive-based pay schemes. Further, the threat of proxy

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3   For a series of 'law and finance' research, see also Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, Legal Determinants of External Finance, 52 Journal of Finance 1131 (1997); Asli Demirguc-Kunt and Vosislav Maksimovic, Law, Finance and Firm Growth, 53 Journal of Finance, 2107, 2134 (1998) (finding that firms in countries with active stock markets and sound legal systems are able to get more funds to finance growth); Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, Law and Finance, 106 Journal of Political Economy 1113 (1998); Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, Corporate Ownership Around the World, 54 Journal of Finance 471 (1999); Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, Investor Protection and Corporate Valuation, 57 Journal of Finance 1147 (2002).

contests, hostile takeovers, or social norms disciplines managers. The large public corporation adapts to these competitive pressures via fractional shares.

I.A.1 Alternative control mechanisms propel convergence in corporate structures

No rational investors would invest in corporations in the first place should these investors believe that managers have too much discretion. Effective directorship imposes limits on self-interested managers' attempts to expropriate minority shareholders. This alternative control mechanism allows investors to rely on directors' judgment in monitoring management. In turn, this close alignment of shareholder and director interests helps reduce agency costs and maximize shareholder value. An extant literature discusses alternative control mechanisms that empower shareholders to deter director deviance.[4] Such control mechanisms include: independent directors; fiduciary duties of care and loyalty; the market for corporate control; the markets for products, executive labor, and capital; the design of executive pay; shareholders' power to oust directors; and social norms of good conduct.

These alternative control mechanisms can be metaphorically seen as 'the invisible hand' that drives managers to act as if they had shareholders' interests at heart. For similar reasons to why the founders of a firm have incentives to use state-of-the-art technology or efficient means of production, managers and directors have incentives to build the kind of ownership and governance structure that investors prefer. In this view, managers must act in the best interests of shareholders most of the time to receive better prices for corporate securities. Competitive forces and market dynamics lead to the 'natural selection' of corporate structures. This dynamic characterization suggests the possibility that ownership and governance structures converge to the most efficient form.

Several examples support this neoclassical view. Empirical studies suggest that the U.S. states institute laws that promote investor welfare to attract incorporations.[5] The majority of the Fortune 500 companies that change their state of incorporation move to Delaware, which has achieved this success due to its enabling statue, its large body of precedents and sophisticated corporate bar, and its credible commitment to be receptive to corporate needs.[6] This 'race to the top' suggests that corporate law reform could improve corporate governance practices. Other examples that shed light on convergence to the corporate form include the separate legal 'personality' of a public company, limited liability for owners and managers, the prevalence of equity ownership, and delegated management under a board structure.[7] Since investors provide capital to companies and delegate managerial power to corporate executives and directors, insofar as there are sound legal institutions that effectively protect minority shareholder rights, investors' key role is to provide liquidity to public companies and other investors. By holding small shares, investors inject capital into more firms and in turn reap risk-sharing benefits.[8]

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4   Harold Demsetz, The Structure of Ownership and the Theory of the Firm, 26 Journal of Law and Economics 375 (1983); Eugene F. Fama, Agency Problems and the Theory of the Firm, 88 Journal of Political Economy 288; Frank H. Easterbrook and Daniel R. Fischel, The Economic Structure of Corporate Law (1991).

5   Easterbrook and Fischel, supra note 4, at 212-218 (1991) (suggesting that competition induces convergence in U.S. state rules, especially in the area of antitakeover laws).

6   Easterbrook and Fischel, supra note 4, at 212-213 (1991); Peter Dodd and Richard Leftwich, The Market for Corporate Charters: 'Unhealthy Competition' versus Federal Regulation, 53 Journal of Business 59 (1980); Roberta Romano, Law as a Product: Some Pieces of the Incorporation Puzzle, 1 Journal of Law and Economics and Organization 225, 273 (1985); Lucian A. Bebchuk and Alma Cohen, Firms' Decisions Where to Incorporate, 10 Journal of Law and Economics 383 (2003).

7   Henry Hansmann and Reinier Kraakman, The End of History for Corporate Law, in Jeffrey N. Gordon and Mark J. Roe eds., Convergence and Persistence in Corporate Governance, 33-68 (2004).

8   Eugene F. Fama and Michael C. Jensen, Separation of Ownership and Control, 26 Journal of Law and Economics 301, 304-305, 307-309 (1983) (arguing that investors mainly spread their

Because shareholders can discipline managers via alternative control mechanisms as aforementioned, this stock market-oriented model is likely to survive the test of time.

I.A.2 The rise of fractional corporate ownership

The stock market-oriented model poses a positive externality to investors and companies. Companies can be viewed as a nexus of contracts.[9] Investors who spread their shareholdings across a number of industries reap diversification benefits. Corporations use equity and other sources of funds to finance investment projects. Both parties are better off; in turn, both parties experience a Pareto improvement. Further, there is an inexorable trade-off between liquidity and control.[10] Investors may choose to forego their control over management and in turn retain the option to liquidate diffuse shares. Should investors raise their 'voice' in corporate matters by acquiring concentrated voting shares, these active investors might find it hard to 'exit' the market. Insofar as investors hold well-diversified portfolios, a firm-specific loss can be offset by higher returns to firms that perform well. Thus, investors' preference for liquidity leaves the monitoring role to directors. In turn, this preference for liquidity leads to the rise of dispersed holdings of stock.[11] Because investors and firms experience a Pareto improvement, dispersed shares could be viewed as the efficient form of ownership.

I.A.3 Globalization and systemic adaptability

The increasing globalization of capital markets is often viewed as another competitive force that drives convergence to the Berle-Means image of the modern corporation. Multinational firms seek to attain global scale to opt into high-quality securities regulatory regimes. The U.S. and U.K. markets are examples of such regimes that enhance transparency and fiduciary protection.[12] A key feature of the stock market-oriented model is its adaptability to systemic changes. Deep and liquid stock markets that emphasize shareholder interests facilitate quick responses in times of stress.[13] These strong capital markets serve as an external monitor. For instance, market analysts track firms' stock performance on a daily basis. Price signals embed firm-specific information in an efficient fashion. Perhaps one of the most influential factors can be cross-border mergers and acquisitions (M&As).[14] Cross-border M&As often result in an influx of new shareholders. These M&As often involve U.S. institutions' purchase of blocks of stock in European firms. Specifically, common stock is usually the ubiquitous currency used

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residual claims across many companies to diversify their risk exposures); Eugene F. Fama and Michael C. Jensen, Agency Problems and Residual Claims, 26 Journal of Law and Economics 327, 331-332 (1983) (same).

9   See also Michael C. Jensen and William Meckling, Theory of the firm: managerial behavior, agency costs, and ownership structure, 3 Journal of Financial Economics 305 (1976) (arguing that stock-based compensation helps resolve the conflict of interest between shareholders and managers); Michael C. Jensen, Agency costs of free cash flow, corporate finance, and takeovers, 76 American Economic Review 323 (1986) (same).

10   John C. Coffee, Jr., Liquidity versus Control: The Institutional Investor as Corporate Monitor, 91 Columbia Law Review 1277, 1281, 1284-1290 (1991); Ernst Maug, Large Shareholders as Monitors: Is There a Trade-Off between Liquidity and Control? 53 Journal of Finance 1 (1998).

11   John C. Coffee, Jr., The Rise of Dispersed Ownership: The Role of Law in the Separation of Ownership and Control, 111 Yale Law Journal 1, 2-4 (2001).

12   John C. Coffee, Jr., The Future as History: The Prospect for Global Convergence in Corporate Governance and Its Implications, 93 Northwestern Law Review 641 (1999); John C. Coffee, Jr. Racing Towards the Top: The Impact of Cross-Listings and Stock Market Competition on International Corporate Governance, 102 Columbia Law Review 1757 (2002).

13   Lawrence A. Cunningham, Commonalities and Prescriptions in the Vertical Dimension of Global Corporate Governance, 84 Cornell Law Review, 1133, 1143-1146 (1999).

14   Jeffrey N. Gordon, Pathways to Corporate Convergence? Two Steps on the Road to Shareholder Capitalism in Germany, 5 Columbia Journal of European Law, 219, 219-220 (1999).

for financing these M&As. Examples include the recent privatization of Deutsche Telekom and the DaimlerBenz-Chrysler merger.[15] In pursuing scale economies, acquirers tend to demand more diffuse stock ownership. Further, M&A initiators complement dispersed stock ownership with the concept of shareholder primacy to reinforce their cross-border reach. Thus, cross-border M&As represent another route for convergence towards fractional stock ownership.

I.A.4   International emulation

Many see global competitive forces as a form of 'self-regulation'. Corporate insiders often find it worthwhile to organize fair and efficient ownership and governance structures. In particular, Anglo-American systems take the lead in shaping liquid stock markets and dispersed stock ownership.[16] This approach to corporate governance has been more confrontational, relying on competition and division of responsibility to drive performance.[17] In consequence, self-regulatory forces result from a desire to 'emulate' a set of best practices in corporate governance. A number of organizations have been closely involved in the adoption of general principles of corporate governance.[18] These initiatives contribute to the prevalence of the key idea that adherence to the shareholder-market model promotes better economic outcomes.[19] Why is it important to adopt the common principles of corporate governance? The clearest answer relates to the observation that many developed countries have performed well as compared to the principal East Asian and continental European countries, most of which deviate from the shareholder-market model.[20] Thus, the self-regulatory mechanism provides flexible responses to market conditions. Outside international pressure might more strongly induce the import of Anglo-American ownership and governance structures. This trend tends to prevail in countries where stock owners hold illiquid, concentrated shares. Hence, this emulation effect reinforces convergence toward a stock-market, diffuse ownership structure.

I.B   The path dependence story

Unlike proponents of the convergence story, others suggest several barriers to convergence toward the Berle-Means firm that is diffuse in stock ownership. In this section, we discuss reasons why corporate arrangements might persist. Here, our goal is to explore solely the possibility of path-dependent

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15   Gordon, supra note 12, 220-222 (1999).

16   Mary E. Kissane, Global Gadflies: Applications and Implications of U.S.-Style Corporate Governance Abroad, 17 New York Law School Journal of International and Competition Law 621, 626-633 (1997); Coffee, supra note 10, at 1280-1281, 1284-1290 (1991).

17   See also Kissane, supra note 16 (1997); Coffee, supra note 12 (1999).

18   Karel Lannoo and Arman Khachaturyan, Reform of Corporate Governance in the European Union, CEPS Policy Brief No. 38 (October 2003).

19   Hansmann and Kraakman, supra note 7, at 67-68 (2004); Kissane, supra note 13, at 626 (1997).

20   La Porta et al., supra note 3, at 480-491 (1999) (discussing a number of examples of corporate ownership patterns around the world: Microsoft (U.S.A.), Barrick Gold (Canada), Hutchison Whampoa Ltd. (Hong Kong), Toyoto Motor (Japan), Samsung Electronics (South Korea), Allianz Holding (Germany), Daimler Benz (Germany), ABB AB (Sweden), Fiat Spa (Italy), and Electrabel SA (Belgium)); Stijn Claessens, Simeon Djankov, and Larry H.P. Lang, The separation of ownership and control in East Asian corporations, 58 Journal of Financial Economics 81, 82-84, 94-99 (2000); Meghana Ayyagari, Does Cross-Listing Lead to Functional Convergence? Empirical Evidence, World Bank Policy Research Working Paper No.3264, available at <http://ssrn.com/abstract=610305> (last accessed at August 20, 2005).

corporate structures.[21] Potential reasons include politics, rent-protection behaviors, complementarities, sunk costs, and social norms of trust.

I.B.1 The political theory of corporate finance

Some contend that politics confines the terrain on which the large enterprise may evolve.[22] In turn, this confinement subsequently shapes the efficient form of ownership to which the large enterprise adapts. Also, this confinement gives rise to specific power-sharing arrangements. For instance, U.S. populism suggests that no institution should have significant financial power.[23] This general belief could be the cause of antibank sentiment in the U.S. Some see this mistrust of financial power as an unequivocal case for laws that limit financial institutions' stock ownership.[24] To meet the large corporation's capital needs, fractional shares arise as a solution. That fragmentation of equity stakes promotes a shift in corporate power from financial institutions to managers.[25] This schematic process – in which political forces shape the ownership and power-sharing schemes[26] – suggests that the separation of ownership and control is a 'natural' reality in the U.S.

In contrast, Germany and Japan lack the U.S.-style populism and operate a bank-oriented model. Most German and Japanese companies centralize decisionmaking and rely on banks or other financial intermediaries for financing investment projects.[27] In Germany and Japan, investors are more

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21   This analysis rests upon the assumption that the two competing theories – the convergence theory and the path dependence theory – to be mutually exclusive. Section II synthesizes these two theories and provides a case for reaching the middle ground.

22   Mark J. Roe, A Political Theory of American Corporate Finance, 91 Columbia Law Review 10, at 11-13 (1991); Mark J. Roe, Political Preconditions to Separating Ownership from Corporate Control, Columbia Law School Working Paper No. 155 (January 2000).

23   Daron Acemoglu, James Robinson, and Simon Johnson, The Colonial Origins of Comparative Development: An Empirical Investigation, 91 American Economic Review 1369, at 1369-1370 (2001) (discussing that "Countries with better '*institutions'*, more secure property rights, and less dictionary policies will invest more in physical and human capital, and will use these factors more efficiently to achieve a greater level of income"); Seymour M. Lipset and William Schneider, The Confidence Gap: Business, Labor and Government in the Public Mind, 5-6 (1987); Mark J. Roe, supra note 22, at 31-32 (1991).

24   Section I.D of this paper provides a brief summary of the U.S. legal rules that restrict banks and non-bank financial institutions' share ownership. See also Bernard S. Black, Shareholder Passivity Reexamined, 89 Michigan Law Review 520 (1990); Mark, J. Roe, supra note 19 (arguing that the McFadden Act, the Bank Holding Companies Act of 1956, and the Glass-Steagal Act, impose limits on American banks' involvement in securities and stocktrading businesses); John J. C., Jr., supra note 10-12.

25   Mark J. Roe, Some Differences in Corporate Structure in Germany, Japan, and the United States, 102 Yale Law Journal 8, at 1933-1936 (1993) (stating that "[small] holders distant from the enterprise lacked the information, skill, and incentive to monitor managers, who became relatively free from shareholder oversight); Mark J. Roe, Strong Managers, Weak Owners: The Political Roots of American Corporate Finance (1994).

26   Mark J. Roe, Backlash, 98 Columbia Law Review 217, 241 (1998) (viewing some U.S. statutes, including small farm subsidies, Robinson-Patman-style antitrust laws, and the Glass-Steagall Act as not just 'policy mistakes or interest group rent-seeking', but as 'efficiency interacting with backlash' where backlash refers to the act of strategically tempering otherwise efficient rules and institutions).

27   Mark J. Roe, supra note 25, at 1936 (1993) ("Stock in large German and Japanese firms is held in big voting blocks. […]Despite significant legal differences between Germany and Japan, both nations have ownership structures that provide for a sharing of power so that no person or institution has complete control").

tolerant of financial institutions' involvement in corporate matters. Most of these financial institutions hold concentrated blocks of stock and exert influence over management. Moreover, authority appears to be shared among senior managers and large shareholders in German and Japanese firms.[28] German codetermination[29] allows employees and shareholders – members of the supervisory board – to exert influence. Although labor can raise its voice, banker-shareholders usually dominate in this power-sharing scheme. Banker-shareholders have incentives to hold blocks of stock to acquire a super-majority vote. This super-majority vote grants banker-shareholders the discretion to send directions to the managerial board, bypassing the supervisory board.[30] Blockholders can thus balance up the promanager tilt of power in Germany. For this reason, concentrated stock ownership is likely to persist in Germany.

Japanese corporations have a similar mechanism for blockholder influence. This mechanism is quite informal in nature: banker-shareholders interact with managers in keiretsu meetings, which can be viewed as the Japanese equivalent of the German supervisory board. No votes are taken at these meetings and participants do not direct one another. But senior managers feel somewhat constrained by the consensus opinions of the steering council of which members control much of the stock in the firm. Thus, Japanese senior managers often need to consult with institutional owners of large blocks of the firm's stock and debt. This mechanism grants blockholders partial influence over management in Japan. For this reason, concentrated stock ownership may persist in Japan.

This political theory of corporate finance suggests a schematic process. Politics sets the limits of financial institutions' reach in stock ownership. In turn, these limits impart the preconditions for the separation of ownership and control. Thus, political forces shape stock ownership and power-sharing arrangements. Insofar as political forces persist, complete global convergence in corporate structures is not likely to come to reality.

I.B.2   The rent-protection theory of corporate ownership and control

The size of private benefits of control plays a role in the determination of ownership structure. Private benefits of control are often referred to as 'benefits that accrue to managers or [blockholders] that have control of the corporation but not to minority shareholders'.[31] Examples include business connections, large office suites, corporate jets, managers' retreat, and other perquisites. Some scholars suggest that leaving corporate control up for grabs may attract attempts to acquire the firm by rivals who seek to capture private benefits of control.[32] This phenomenon is more pronounced when private benefits of control are large. In these circumstances, corporate founders tend to keep a lock on control and choose concentrated shares.[33] This concentrated ownership structure serves as an antidote to takeover bids or market purchases. An initial setting of a dispersed ownership structure cannot be a stable equilibrium. This initial setting is expected to revert to a concentrated ownership structure after the acquisition of a block by a rival owner-manager, or in a defensive move to avoid such an acquisition by the incumbent

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28   Mark J. Roe, supra note 25, at 1941-1946 (1993).

29   Under the German corporations code (Aktiengesetz), employees must represent at least half of the seats on the supervisory board. Mark J. Roe suggests that "codetermination induces shareholder representatives to want the supervisory board to supervise less than it otherwise would, because a powerful supervisory board would enhance the authority of labor representatives on the board" (see also Mark J. Roe, supra note 25, at 1942 (1993).

30   Mark J. Roe, supra note 25, at 1942 (1993); Paul Windolf, Codetermination and the Market for Corporate Control in the European Community, 22 Economics and Society 137, 140-141 (1993).

31   Evangelos Benos and Michael S. Weisbach, Private benefits and cross-listings in the United States, 5 Emerging Markets Review 217, at 219 (2004).

32   Lucian A. Bebchuk, A Rent Protection Theory of Corporate Ownership and Control, NBER Working Paper No. 7203 (1999).

33   Lucian A. Bebchuk, supra note 32, at 1 (1999).

owner-manager.[34] Concentrated ownership is thus likely to prevail in countries where private benefits of control are large. Such countries, for instance, Italy and Brazil, appear to lack legal institutions that deter rent protection. In contrast, concentrated ownership is expected to wane in countries that have robust legal rules in place to curtail private benefits of control.[35] This rent-protection story implies that cross-country ownership structures are likely to persist over time.

Several studies suggest that private benefits of control are higher in firms that do not cross-list their securities abroad.[36] If private benefits of control are large, corporate insiders face incentives not to subject the firm to cross-list and be subject to strict disclosure and other listing rules. More precisely, corporate insiders tend to retain a lock on control should the expected gain in the net present value of cross-listing fall short of the expected loss in private benefits.

In an intuitive sense, the price per share that an acquirer pays for a controlling block reflects the cash-flow and private benefits from the controlling position in the firm. In contrast, the market price of a share that results from a change in control reflects only the cash-flow benefits that minority owners expect to receive ex post. Hence, the difference between the acquirer's bid price and the market price after the announcement of a change in control denotes the amount of private benefits of control.[37] This method allows one to investigate the relation between private benefits of control and stock ownership. In a sample of 412 control transactions during 1990-2000, a one standard-deviation increase in the size of private benefits of control correlates with a 6 percent decrease in non-controlling stock.[38] This finding suggests that investors tend to acquire controlling blocks of stock to reap private benefits of control.

East Asian corporations provide another example of rent protection. Pyramid structures, dual-class shares, and cross-holdings enhance minority shareholders' grip of corporate control.[39] More than two-thirds of East Asian corporations are under a single shareholder's direction, and this dominant shareholder is usually a family group.[40] Also, older firms are more likely to be family-controlled. This finding affirms the rent-protection story that ownership concentration persists over time.[41] Thus, rent protection has the potential to impede institutional reform. In turn, wealth concentration persists.

I.B.3   A nexus of 'firm-specific investments', not a nexus of 'contracts'

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34   Lucian A. Bebchuk, supra note 32, at 2 (1999).

35   Lucian A. Bebchuk, supra note 32, at 3-4, 37 (1999).

36   Craig Doidge, U.S. cross-listings, private benefits of control, and ownership structure, Ph.D. Dissertation, Ohio State University (2002); Benos and Weisbach, supra note 31, at 234-38 (2004); Craig Doidge, U.S. cross-listings and the private benefits of control: evidence from dual-class firms, 71 Journal of Financial Economics 3 (2004); Craig Doidge, G. Andrew Karolyi, Karl V. Lins, Darius P. Miller, and Rene M. Stulz, Private Benefits of Control, Ownership, and the Cross-Listing Decision, NBER Working Paper No. 11162 (2005).

37   Michael J. Barclay and Clifford Holderness, Private Benefits of Control of Public Corporations, 25 Journal of Financial Economics 371.

38   Alexander Dyck and Luigi Zingales, Private benefits of control: an international comparison, 59 Journal of Finance 537 (2004).

39   These corporate arrangements allow minority shareholders to acquire control of the firm. For a detailed discussion on these arrangements, see also Lucian A. Bebchuk, Reinier Kraakman, and George Triantis, Stock Pyramids, Cross-Ownership and Dual Class Equity: The Mechanisms and Agency Costs of Separating Control From Cash Flow Rights, Harvard Law School Olin Discussion Paper No. 249 (1999). As published in Randall K. Morck, Concentrated Corporate Ownership, 445-460 (2000); Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, Corporate Ownership Around the World, 54 Journal of Finance 471 (1999).

40   Claessens, Djankov, and Lang, supra note 20, at 82-84, 94, 110 (2000).

41   Claessens, Djankov, and Lang, supra note 20, at 82, 101, 110 (2000).

Some scholars reject the classical view that a company is simply a nexus of 'contracts'. These scholars argue that a public company can instead be viewed as a nexus of 'firm-specific investments'.[42] Each team member devotes specialized, irrevocable efforts to corporate activities. Employees carry out day-to-day operational tasks. Executives organize and oversee employee performance. Creditors and stock owners inject funds to support the firm's investment projects. Perhaps most importantly, the board of directors serves as a 'mediating hierarchy' that integrates all these efforts.[43] In a sense, team members supply their expertise to make the whole bigger than the sum of the parts. This observation is due to fact that each member's efforts are 'specific' to the firm. More precisely, each team member's investment has little or no value outside the joint enterprise. Also, no one can leave the enterprise and realize the value of the investment in full.

In this mechanism, team members face incentives to shirk and free-ride on others because it is impossible to specify who is responsible for what portion of the final output. Explicit contracting thus has its limits.[44] In general, the status quo serves as one of multiple optima. If there are large switching costs required to move to an alternative optimum, continuance is often efficient.[45] Also, the exclusion of one member's effort may result in a large decrease in the overall effectiveness of team production. Institutions and professional communities facilitate the working of a country's corporate structures. A change in corporate ownership or governance may result in inconsistencies between the new structure and the remaining elements of team production.[46] Often times the existing ownership and governance patterns are only second-best options. For instance, Russian investors may prefer government control of large enterprises because few legal rules protect investor rights. Thus, government control serves as an alternative form of protection in Russia.[47] In this case, government control is the second-best option. If a change to first-best structures – say, less government control– requires large switching costs and in

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42   Margaret M. Blair and Lynn A. Stout, A Team Production Theory of Corporate Law, 85 Virginia Law Review 247, 275 (1999) (contending that companies are normally structured to promote stakeholder value as opposed to shareholder wealth).

43   Raghuram G. Rajan and Luigi Zingales, Power in the Theory of a Firm, 113 Quarterly Journal of Economics 387 (1998) (identifying the regulation of access to resources as the mechanism by which participants in a joint production process acquire power over other participants who make specific investments).

44   Bengt Holmstrom, Moral Hazard in Teams, 13 Bell Journal of Economics 324 (1982) (arguing that arm's-length bargaining does not take into account all future contingencies); Blair and Stout, supra note 42, 265-266, 268-270 (1999) (suggesting that it is difficult to assess corporate insider's contribution to the team production process).

45   Lucian A. Bebchuk and Mark J. Roe, A Theory of Path Dependence in Corporate Ownership and Governance, 52 Stanford Law Review 127, 139-142 (1999) (suggesting that sunk adaptive costs, complementarities, network externalities, endowment effects, and multiple optima etc. could lead to 'structure-driven' path dependence in corporate ownership and governance).

46   For instance, Section 301 of the Sarbanes-Oxley Act requires stock exchanges to bar listing securities of an issuer that lacks a 'wholly independent' audit committee that is responsible for hiring and oversight of auditors. This rule poses a challenge to the vast majority of non-U.S. firms that are controlled by one or a few blockholders. If it turns out that the audit committee is by any means an 'affiliated person' of the blockholder(s), an affiliation that is harmless in the firm's home jurisdiction could result in non-compliance. This example shows that non-U.S. corporations may have a unique set of corporate structures – concentrated shares and stakeholder power-sharing etc. – that are complementary and perhaps equally efficient. In response to this outrage, the U.S. SEC has been applying Section 301 rules flexibly to non-U.S. issuers.

47   See also the seminal work by Andrei Shleifer and his colleagues. Timothy Frye and Andrei Shleifer, The Invisible Hand the Grabbing Hand, 87 American Economic Review 354 (1997); Andrei Shleifer and Robert W. Vishny, The Grabbing Hand: Government Pathologies and Their Cures (2002).

turn leads to third-best outcomes, it may be best to maintain the status quo. Hence, complementary corporate structures are expected to persist over time.

I.B.4 Social norms of fairness and trust

Economists focus on how external sanctions may help resolve the agency problem. Others argue that internal motivations are also important.[48] In particular, an extant literature suggests that social norms of fairness and trust help shape the path of corporate structures.[49] In the context of corporate governance, the rules of the game often depend on what is perceived to be fair. Stakeholders see a mix of corporate wealth and power as 'unfair' if this mix departs substantially from the terms of a 'reference transaction', which is a transaction that defines the benchmark for corporate interactions.[50] Due to cultural differences, the reference transaction may vary from country to country. For instance, American culture generally resists hierarchy and centralized authority more than French culture.[51] Codetermination reflects the need for a fair go for employees in Germany.[52] In East Asian 'dragon' economies, many large enterprises find it necessary to bribe government officials to seek protection.[53] Most Italian firms see family involvement as an indispensable value driver. If such cultural differences persist, corporate structures are most likely to stay close to their initial conditions.

Why are fairness norms important? The answer is rather straightforward: fairness norms set the informal reference transactions or rules of the game. Such informal rules in turn create certainty for stakeholder interactions. Moreover, some observe that firm-specific fairness norms promote the firm's efficiency due to more cooperation and less opportunism among its stakeholders.[54] An example of an 'unfair' corporate practice is the prevalence of performance-insensitive pay packets for company executives such as fixed bonuses or industry-specific pay windfalls. The weak correlation between the amount of these executive pay contracts and firm performance may cause outrage in the public. As a result, these pay contracts depart substantially from the reference transaction – performance-sensitive pay arrangements – and thus may be viewed as 'unfair'.

Firm-specific fairness norms are important when stakeholders care about their own reputation. Stakeholders prefer to build and maintain their reputation and in turn promote the prospects of future business relationships. Firm-specific fairness norms are internalized in the firm and made known to

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48   For a general discussion on the effect of social norms and cultural values, see Margaret M. Blair and Lynn A. Stout, Trust, Trustworthiness, and the Behavioral Foundations of Corporate Law, 149 University of Pennsylvania Law Review 1735, 1807-1810 (2001); John C. Coffee, Do Norms Matter? A Cross-Country Examination of the Private Benefits of Control, Columbia Law School Law and Economics Working Paper No. 183 (January 2001), available at <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=257613> (last accessed at August 20, 2005); Amir N. Licht, The Mother of All Path Dependencies: Toward a Cross-Cultural Theory of Corporate Governance Systems, 26 Delaware Journal of Corporate Law 147 (2001).

49   See also the studies cited in supra note 48.

50   Christine Jolls, Cass R. Sunstein, and Richard Thaler, A Behavioral Approach to Law and Economics, 50 Stanford Law Review 1471, at 1493-1497 (1998).

51   Bebchuk and Roe, supra note 45, 168-169 (1999).

52   Roe, supra note 25, at 1942-1943 (1993).

53   Claessens, Djankov, and Lang, supra note 20, at 83 (2000) ("…the dominance of most [East Asian] business groups lies in the privileges that they solicit from the government: exclusive exporting or importing rights, protection from foreign competition for extensive periods of time, granting of monopoly power in the local market, procurement of large government contracts, etc.").

54   See also Robert Cooter and Melvin Eisenberg, Fairness, Character, and Efficiency in Firms, 149 University of Pennsylvania Law Review 1717 (2000).

various stakeholders via the media.[55] This internalization of fairness norms incentivizes stakeholders to trust one another.[56] How willing stakeholders are to trust others helps shapes the initial ownership and power-sharing patterns.[57]

Nevertheless, trust per se does not facilitate convergence in corporate structures. Because firm heterogeneity comes into play, it is not clear if what is viewed as fair in Hong Kong is equally fair in France. Similarly, German codetermination may not be a suitable solution to the agency problem that U.S. companies face. In this view, the norms for stakeholder interaction may differ across countries. Hence, different norms may promote different outcomes in the corporate setting. In brief, social norms of fairness and trust could be another reason why corporate structures may persist over time.

I.B.5   A cautionary note

We have just framed the convergence debate. The convergence and path-dependence stories both have their own merits and thus need not be viewed as mutually exclusive. In particular, the path dependence theory suggests that the level of ownership concentration at any point in time depends on the initial condition. This static relation, however, does not constitute the complete picture. In contrast, the convergence theory better describes the most dynamic part of the picture: cross-listings on U.S. stock exchanges allow non-U.S. firms to bond themselves to higher standards of corporate governance and in turn facilitate convergence towards the Berle-Means company. It is thus reasonable to integrate the competing stories to depict a fuller picture.

In the next section, we derive a model that captures both the static and dynamic components of ownership concentration. Our analysis provides several predictions. For instance, we find that legal institutions and firm-specific arrangements are complementary in protecting investor rights. Also, the level of ownership concentration can be decomposed into a) the initial condition, and b) the relative importance of legal and firm-specific protective mechanisms. These analytical results provide testable hypotheses and have implications for policy.

II.   A Unified Theory

II.A   The model

In this section, we derive a model to characterize the relation between legal arrangements that protect investor rights and at least two firm-specific mechanisms, namely, inside equity ownership and asset endowment. High stock ownership exposes insiders to more idiosyncratic risks. In response, insiders can commit to lower rates of value diversion by holding a large fraction of equity in the firm.[58] On this basis, equity ownership reflects a tradeoff between bonding incentives and diversification benefits for

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55   Simeon Djankov, Caralee McLiesch, Tatiana Nenova, and Andrei Shleifer, Who Owns the Media, 46 Journal of Law and Economics 341, 2003; Alexander Dyck and Luigi Zingales, The Corporate Governance Role of the Media, in Roumeen Islam, Simeon Djankov, and Caralee McLeish, eds., The Right to Tell: The Role of Mass Media in Economic Development, 107-140, World Bank Development Studies, 2002.

56   Blair and Stout, supra note 48, 1807-1810 (2001).

57   Rafael La Porta, Florencio Lopez-de-Silanes, Andrei Shleifer, and Robert Vishny, Trust in Large Organizations, 87 American Economic Review 333 (1997).

58   Charles Himmelberg, Glenn Hubbard, and Inessa Love, Investor Protection, Ownership, and Investment, World Bank Policy Research Working Paper No. 2834 (2002), available at <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=303969> (last accessed at June 20, 2005).

insiders. In turn, this tradeoff determines the severity of agency costs.[59] Legal rules that protect private rights to corporate papers are thus likely to affect the level of ownership dispersion.

Asset endowment also plays a role in setting the equilibrium level of ownership concentration. Highly specific assets such as research labs, plant, property and equipment, and factories require large sums of finance and are thus hard to steal. In that light, highly specific assets provide a built-in degree of investor protection. In contrast, assets like insiders' know-how and on-the-job experience are easier to expropriate if these employees can leave to start their own firms.[60] Other than rules of law, firm characteristics are thereby important in approximating the degree of investor protection.

Our model rests on several studies that examine the relation between corporate structures and firm-specific asset endowments. In particular, highly specific assets produce opportunities for private benefits of control. The separation of ownership and control propagates information asymmetries. In general, information asymmetries could be due to the fact that managers know more about the value of start-ups or endowed assets. As a result, such information asymmetries lead corporations to choose ownership and governance schemes that provide a suboptimal degree of investor protection.[61] Recent studies show that there are substantial differences in corporate ownership and governance structures worldwide.[62] While some scholars suggest that the forces of globalization put ineluctable pressures on corporate structures to converge towards the most efficient form,[63] others argue that endowments and rent-protection behaviors could result in the persistence of corporate structures.[64]

The ensuing derivation builds on the discussions above. The equilibrium level of inside share ownership concentration at any point in time can be expressed as a function of a) the initial ownership pattern, b) 'asset protection' of investor rights, and c) 'legal protection' that inhibits value diversion. Our model further suggests that legal rules and firm-specific assets are 'complementary' in protecting investor rights. Perhaps more important is the result that the relative importance of legal and asset protections sets the particular trajectory on which ownership patterns evolve. Given the relative weights attached to legal and firm-specific protections, our model predicts whether corporate ownership structures converge over time. Appendix 1 provides the full step-by-step derivation.

II.B   Derivation

Let f(t) be the degree of investor protection owing to asset endowments with various levels of specificity at time t. Further, let x(t) be the degree of investor protection owing to legal remedies that govern institutional activities at time t. For simplicity, we dub f(t) and x(t) 'asset protection' and 'legal protection' respectively. Summing these terms with the respective relative weights, α and β, yields $F(f(t),x(t))=\alpha f(t)+ \beta x(t)$ where $F(f(t),x(t))$ denotes the full degree of investor protection for a given set of firm-specific and legal governance structures. The weights, α and β, depict the relative importance of the asset-specific and legal conditions under which the economy operates. For instance, the U.S., the U.K., and other Anglo-Saxon countries emphasize legal protection of investor rights. Thereby, these countries can be viewed as economies where α is smaller than β. More precisely, these countries attach a greater weight to legal protection than to asset protection. In contrast, investors in countries such as

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59   See also the references cited in supra note 8.

60   See also La Porta et al's law-and-finance studies, supra note 3; Himmelberg, Hubbard and Love, supra note 58 (2002).

61   See also Lucian Bebchuk, Asymmetric Information and the Choice of Corporate Governance Arrangements, Harvard Law and Economics Discussion Paper No. 398 (2002), available at <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=327842> (last accessed at August 20, 2005).

62   See also La Porta et al. (1998), supra note 3.

63   Easterbrook and Fischel, supra note 4, at 212-213 (1991).

64   Bebchuk and Roe's path dependence theory (1999, supra note 45) provides a comprehensive summary of factors that contribute to the persistence of corporate ownership patterns.

Germany, Japan, and the so-called 'social democracies' in Continental Europe, largely rely upon asset protection of investor rights. These countries can be described as economies in which α is larger then β. Further, we assume that insiders benefit from positive stock ownership of the firm ($0<\phi<1$). We scale this term by F/f, or (αf+βx)/f, to measure the combined degree of legal and asset protections. Thus, the expression [ϕ·(αf+βx)/f] denotes the benefits of legal and asset protections that are due to 'full' stock ownership. We can extend this expression to capture the benefits of legal and asset protections that are due to any partial stock ownership: [ϕ·(αf+βx)/f]·dϕ where dϕ denotes a marginal change in share ownership.

Because diffuse ownership spreads the benefits of legal and asset protections to more owners, an economy's general dispersion of corporate ownership creates a network externality to corporations. Hence, investor protection – that results from both legal and asset remedies – goes hand in hand with ownership concentration at the margin. Note that this assumption does not imply La Porta et al.'s evidence of a negative association between ownership concentration and legal protection of minority shareholder rights. Rather, this assumption suggests that a marginal change in full protection, dF, can be expressed as a function of a marginal change in the full benefits of legal and asset protections that are due to partial inside stock ownership, [ϕ·(αf+βx)/f]·dϕ. In this case, dF and dϕ move in opposite directions due to the spread effect of ownership dispersion.

We assume that changes in the degree of full investor protection arising from either legal or asset provisions are proportional to changes in the full benefits of legal and asset protections arising from inside share ownership for a given company. This characterization leads to the following:

(Eq 1) $$dF\big(f(t), x(t)\big) = (-) \cdot \frac{1}{k} \cdot \phi(x(t)) \cdot \left(\frac{\alpha f(t) + \beta x(t)}{f(t)} \right) \cdot d\phi(x(t))$$

where   F(f(t),x(t))= αf(t)+ βx(t) represents the degree of investor protection arising from legal and asset provisions at time t,
k represents a proportionality scalar,
ϕ(x(t)) denotes the positive percentage of the firm's equity owned by insiders at time t,
α and β denote the relative importance of f(t) and x(t) at time t respectively,
the scalar (αf+βx)/f is required to denominate inside equity ownership in terms of full investor protection that could result from legal and firm-specific arrangements, and
the negative sign on the right-hand side of (Eq 1) keeps intact the assumption that dispersed ownership allows the benefits of investor protection to spread to more owners.

We assume the level of inside ownership concentration to depend on the degree of legal protection at any point in time. One might notice that this characterization does not account for the degree of asset specificity. More precisely, why is ϕ(x(t)) a function of x(t) only but not a function of both f(t) and x(t)? Our response to this question is twofold. Firstly, empirical studies support our characterization.[65] We can view the level of ownership concentration as a response to the degree of legal protection. As will be shown below, the solution to (Eq 1) sheds light on the nature of association between ϕ(x(t)) and x(t). Secondly, we view the value of property rights as the value of legal rules that enforce these property rights, not the value of the underlying assets. Specific assets[66] only have a good value if there are laws that protect the use of these assets. Examples of such laws include land laws and patent laws. Strong and robust legal institutions that protect rights to corporate securities pose incentives for investors to acquire blocks of stock. This line of reasoning suggests that legal protection serves as the precondition for holding diffuse shares.

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65   See also the references cited in supra note 3.
66   Specific assets are referred to as assets for which it is hard to find substitutes. A good example can be 100 percent humanization mouse technology used in various biotech experiments. This particular kind of mouse technology differs from the 80-90 percent humanization alternatives in its robustness in many drug experiments.

Rearranging (Eq 1) with the substitution of $dF/d\phi = (dF/dx)(dx/d\phi) = \beta dx/d\phi$ yields:

(Eq 2) $$\phi(x(t))\, d\phi(x(t)) = (-)k\left(\frac{\beta f(t)}{\alpha f(t) + \beta x(t)}\right) dx(t)$$

Next, we integrate both sides of (Eq 2) to solve for $\phi(x(t))$:

(Eq 3) $$\phi(x(t)) = \sqrt{c - 2kf(t)\ln(\alpha f(t) + \beta x(t))}$$

where c is an arbitrary constant. By definition, $\phi(x(t))$ is strictly positive and therefore (Eq 3) holds for plausible values of k, α, and β. Let the initial condition be $\phi(x(0)) = \phi(0) = \phi_0$, we obtain $c = \phi_0^2 + 2kf(t) \ln(\alpha f(t))$. Substituting this result into (Eq 3) yields the following:

(Eq 4) $$\phi(x(t))\Big|_{\phi(0)=\phi(x(0))=\phi_0} = \sqrt{\phi_0^2 + 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)}\right)}$$

We define $\theta(f(t), x(t))$ as follows:

(Eq 5) $$\theta(f(t), x(t)) = 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)}\right)$$

Then (Eq 4) becomes the following:

(Eq 6) $$\phi(x(t))\Big|_{\phi(0)=\phi(x(0))=\phi_0} = \sqrt{\phi_0^2 + \theta(f(t), x(t))}$$

where $\theta(f(t), x(t))$ is named the 'convergence determinant'. This convergence determinant sets the pre-conditions for stock ownership to converge to the Berle-Means form. If θ turns out to be substantially close to zero, then $\phi(x(t))$ stays close to ϕ_0 or is path dependent over time. If θ is consistently negative over time, $\phi(x(t))$ converges to nil because $\phi(x(t))$ is bounded below by zero as defined in (Eq 1). Also, (Eq 4) shows that the level of inside stock ownership for a given degree of total protection at time t, $\phi(x(t))$, is either equal to or less than the initial level of inside equity ownership, ϕ_0, since the term inside the natural logarithm cannot be greater than unity. Subsection II.C discusses the convergence determinant in detail, with reference to recent comparative studies of ownership structure in the two polar cases: Anglo-Saxon countries and social democracies.

(Eq 4) suggests at least two propositions. First, the optimal level of ownership concentration is negatively related to the degree of legal protection of investor rights (ceteris paribus). Our model finds that this relationship is nonlinear. But this finding is largely consistent with the law and finance thesis: "ownership concentration serves as a substitute for poor investor protection"[67]. Nevertheless, we note that (Eq 4) does not insinuate the same sort of association between ownership concentration, $\phi(x(t))$, and asset protection, f(t). Our analytical solution suggests that there is an ambiguous relation between ownership concentration and asset protection. Endowed assets can be viewed as a 'natural' product of the geographic environment in the era of colonial settlement and/or extractioin. Hence, it is reasonable to conjecture that most firm-specific protections are exogenous due to historical contingencies such as colonization.[68] In essence, the effect of asset protection, f(t), on corporate ownership is not so clear-cut.

[67]   La Porta et al., supra note 3, at 473-474. 497 (1999) ("A comparison of countries with good and poor shareholder protection shows that widely held firms [are] more common in the former… the latter countries have relatively more firms with ultimate owners in almost all categories: family, the State, and financial institutions…").

[68]   See also Acemoglu, Robinson, and Johnson, supra note 23 (2001) (finding that environmental factors might have affected the feasibility of colonial settlements, and that colonial institutions persisted even after independence); Thorsten Beck, Asli Demirguc-Kunt, and Ross Levine, Law, Endowments, and Finance, 70 Journal of Financial Economics 137 (2003).

Secondly, (Eq 4) shows the path-dependence of corporate ownership: "a country's pattern of corporate ownership structures at any point in time depends partly on the patterns it had at earlier times"[69]. This prediction sheds light on the firm's ownership structure that persists due to network externalities, institutional complementarities, sunk adaptive costs, and multiple optima for corporate ownership and governance structures. In addition to these forces, rent-seeking behaviors accentuate the persistence of corporate structures.[70] More precisely, those parties who intervene in corporate decisions under an existing structure might have the incentive and power to hinder changes that would otherwise be socially efficient. Thus, the persistence of corporate ownership and governance structures could be a 'natural' outcome due to interest groups' attempts to retain their private benefits of corporate control.

II.C   Institutional complementarities

Our next goal is to examine the presence or absence of institutional complementarities. This issue is important because complementarities could define the terrain on which corporate structures may or may not converge over time. Our motivation comes from the belief that investors seek legal and asset protections by holding shares and ownership rights. On the one hand, investors hold more stock as a response to poor investor protection arising from a lack of legal and firm-specific arrangements. On the other hand, blocks of stock may exclude other investors from legal and asset protections. In turn, this exclusion implies that legal rules and asset endowments may exhibit weak complementarities. In sum, share ownership poses an implicit link between legal protection and asset protection, albeit this link is theoretically ambiguous.

We would like to know if an increase in the effectiveness of one mechanism (say, 'legal rules') induces an increase in the effectiveness of the other mechanism ('asset protection') and vice versa. To this end, we work out first-order derivatives and then use these derivatives and other measures to examine if legal and asset protections reinforce each other. In microeconomic terms, we aim to derive the (positive) elasticity of legal protection with respect to asset protection: (dx/x)/(df/f). Please consult Appendix 2 for the complete proof.

By the chain rule, we work out the first-order derivatives, $d\phi/d\alpha$ and $d\phi/d\beta$:

(Eq 7) $$\frac{d\phi}{d\alpha} = (-)\cdot\left(\frac{k\,f(t)^2}{\left(\alpha\,f(t)+\beta\,x(t)\right)\cdot\sqrt{\phi_0^{\,2}+2\,kf(t)\ln\left(\frac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}}\right)$$

(Eq 8) $$\frac{d\phi}{d\beta} = \left(\frac{k\,\beta\,x(t)}{\alpha\cdot\left(\alpha\,f(t)+\beta\,x(t)\right)\cdot\sqrt{\phi_0^{\,2}+2\,kf(t)\ln\left(\frac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}}\right)$$

The sum of the relative weights, $\alpha+\beta=1$, suggests that $d\beta/d\alpha=-1$. We then use this result and the first-order derivatives as derived in (Eq 7) and (Eq 8) to solve for α and β:

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69   Bebchuk and Roe, supra note 45, at 129 (1999).

70   Bebchuk, supra note 32, at 14-17 (1999) (showing that when fear of a control grab may lead the owner to maintain a lock on control and choose a concentrated share structure when private benefits of control are large).

$$\textbf{(Eq 9)} \qquad \alpha \quad = \left(\frac{x(t)}{f(t)^2 + x(t)} \right)$$

$$\textbf{(Eq 10)} \qquad \beta \quad = \left(\frac{f(t)^2}{f(t)^2 + x(t)} \right)$$

The next step is to work out the respective first-order derivatives, dx/dϕ and dϕ/df:

$$\textbf{(Eq 11)} \qquad \frac{dx}{d\phi} \quad = (-) \left[\frac{ (\alpha f(t) + \beta x(t)) \cdot \sqrt{ {\phi_0}^2 + 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)} \right) } }{ \beta k f(t) } \right]$$

$$\textbf{(Eq 12)} \qquad \frac{d\phi}{df} \quad = \left(\frac{ -\alpha k f(t) }{ (\alpha f(t) + \beta x(t)) \cdot \sqrt{ {\phi_0}^2 + 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)} \right) } } \right)$$

The final step is to solve for dx/df = (dx/dϕ) (dϕ/df), using both (Eq 18) and (Eq 19):

$$\frac{dx}{df} \quad = \frac{dx}{d\phi} \cdot \frac{d\phi}{df}$$

$$= \left(\frac{\alpha}{\beta} \right)$$

$$\textbf{(Eq 13)} \qquad \frac{dx}{df} \quad = \left(\frac{x(t)}{f(t)^2} \right) \; > 0$$

(Eq 13) suggests that legal and asset protections are indeed complementary mechanisms. Alternatively, we derive the elasticity of legal protection with respect to asset protection: (dx/x)/(df/f) = 1/f(t) >0. This result implies that the effectiveness of legal protection is likely to increase by 1/f(t) percent in response to a one-percent increase in the effectiveness of asset protection. Hence, legal and asset protections are complementary. A case could be made for enhancing one of these protective arrangements to increase investor welfare for the society as a whole. This line of reasoning implies that complementary schemes may reinforce the path dependence of corporate structures.

II.D   Is convergence in corporate ownership possible? Is such convergence desirable?

II.D.1   A positive conjecture: is convergence in corporate ownership possible?

We now investigate how a change in the relative weights, α and β, affects the property of ownership concentration. Consider a 'social democracy', say, Russia, in which cultural norms and political back-lashes emphasize asset protection more than legal protection of investor rights. In this case, α is larger than β, rendering $\theta(f(t),x(t))$ close to nil. Given the initial condition ϕ_0, it is not hard to see that $\phi(x(t))$ is likely to persist at ϕ_0, or the initial level of ownership concentration. In other words, concentrated

ownership is likely to persist in social democracies where asset endowments are viewed as more important than legal remedies.

Now consider the Berle-Means economy where diffuse share ownership reflects good legal protection of investor rights. This observation can be due to a variety of reasons, including relentless political backlashes, social norms of trust, and legal barriers that prohibit financial institutions' control over corporations. In this case, α is smaller than β. Given any initial condition ϕ_0, $\phi(x(t))$ is likely to converge to an insignificant size over time, ceteris paribus. We arrive at this result because a) $\phi(x(t))$ is bounded below by zero, and b) $\theta(f(t),x(t))$ is consistently negative and so drives $\phi(x(t))$ to a relatively trivial term. Hence, it is likely for diffuse ownership structures to become more diffuse in economies that emphasize legal protection of investor rights.

II.D.2   The midpoint between absolute convergence and path dependence

The two scenarios as discussed above underpin the case for 'regional convergence' or convergence in corporate ownership for a similar group of countries. Our next step is to explore the possibility of 'global convergence', or convergence that could result from a) contractual arrangements between U.S. institutional investors and non-U.S. constituencies, and/or b) non-U.S. listings on U.S. stock exchanges.

It is possible to reach the midpoint between full convergence and path dependence.[71] Some argue a case for a third kind of convergence: functional convergence. Functional convergence is a situation where the costs of changing the existing institutions make formal convergence difficult and where the existing institutions lack flexibility to attain convergence. This form of convergence occurs when countries exhibit similar performance attributes in the absence of corporate law reform. At least two possibilities can be viewed as variants of functional convergence: a) security design that entails U.S. institutional investor activity, and b) non-U.S. listings on U.S. stock exchanges. U.S. large pension funds, for instance, CalPERS, and other institutional investors, now own large shares in European and Asian corporations. U.S. institutional investors have recently begun to urge non-U.S. companies to instigate changes in their ownership and governance systems to resemble U.S.-style counterparts. This occurrence does not require any corporate law reform or other formal change in a given country. But it has induced non-U.S. firms to comply with the more stringent U.S. rules. Informal mechanisms, especially the media, can also play a role in inducing large non-U.S. enterprises to adhere to U.S. governance standards.[72]

In dovetailing functional convergence into the current governance system, this security-design channel is not as convincing as the alternative channel, which involves non-U.S. firms' listings on U.S. stock exchanges. The former stresses the link between U.S. institutional investors and the media, while the latter emphasizes the disclosure burden on non-U.S. firms that list their shares or ADRs on U.S. stock exchanges.

Non-U.S. firms list their securities on U.S. stock exchanges to increase sources of funds. Also, these listings help promote these non-U.S. firms' reputation. In turn, these non-U.S. firms are subject to an explicit contract. This contract comprises a listing agreement and U.S. corporate and securities laws. The extraterritorial reach of U.S. rules makes non-U.S. firms that list their securities on U.S. stock exchanges subject to a strict condition of registration. This condition, if challenged, could result in involuntary exit. Non-U.S. firms that opt for listing on a U.S. stock exchange face a substantial burden to 'prove themselves' under the scrutiny of international analysts. Such non-U.S. firms credibly signal that they conform to higher governance standards.

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71   Ronald Gilson, Globalizing Corporate Governance: Convergence of Form or Function, 49 American Journal of Comparative Law 329 (2001). Reprinted in Mark Roe and Jeffrey Gordon, eds., Convergence and Persistence in Corporate Governance (2004).

72   Alexander Dyck and Luigi Zingales, The Corporate Governance Role of the Media, NBER Working Paper No. 9309 (November 2002), available at <http://www.nber.org/papers/W9309> (last accessed at August 22, 2005).

The security-design channel (SDC) allows U.S. institutional investors to preach the importance of effective governance. In that light, the SDC encourages non-U.S. firms to voluntarily meet U.S. standards of corporate governance. In contrast, the stock-exchange listing channel (SELC) requires non-U.S. firms that list securities on U.S. stock exchanges to enter into a legally binding contract. Thus, the SELC poses a potential threat to deviant non-U.S. firms that may need to exit the U.S. markets.

Integrating the SDC and SELC yields a proposal to arrive at the midpoint between absolute convergence and persistence. This proposal concerns partial convergence. Whilst concentrated and dispersed ownership structures may follow the trajectories discussed in Section II.C.1, it is possible for the relative importance of legal and asset protections to change due to the combined influences of U.S. institutional investor activity and non-U.S. firms' listings on U.S. stock exchanges. More precisely, contractual initiatives may alter the relative importance of legal and asset protections. In turn, such initiatives may result in changes in α and β as defined in (Eq 1). Specifically, American institutional investors' call for U.S. style governance standards to be ingrained in non-U.S. firms implies a decrease in α, or equivalently, a commensurate increase in β. Thus, U.S. institutional investors' power may lead to a mild change in large non-U.S. enterprises' focus from asset protection of investor rights to U.S.-based legal protection. Also, non-U.S. firms' listings in U.S. securities markets can have an analogous effect on the relative importance of asset and legal protections. For instance, a French technology start-up that lists on Nasdaq signals to both the U.S. and French securities markets that it now self-selects to adhere to U.S. securities regulations. By listing on Nasdaq, this French firm could also signal to, say, the Italian securities markets that its Italian subsidiary is likely to follow suit in the next few quarters or so. Perhaps a stronger signal is sent to the French firm's competitors – who may or may not operate in the same regulatory regimes – that adherence to somewhat more stringent rules generates a lower cost of capital worldwide.

Over the long run, a domino effect is expected to occur. This chain of events is mainly due to the increasing prevalence of large non-U.S. firms' listings on U.S. stock exchanges. In terms of the relative weights, this domino effect is likely to be reflected in a decrease in α, or an increase in β, such that even non-U.S. firms with concentrated ownership structures could converge to the Berle-Means corporation that is diffuse in stock ownership.

II.D.3   A normative conjecture: is convergence in corporate ownership socially desirable?

We find that convergence and path dependence are valid theoretical possibilities for the evolution of corporate ownership structure. The next question concerns the 'social desirability' of convergence towards diffuse stock ownership. We first investigate the conditions under which such convergence closes the gap between the status quo and the social optimum. We then examine whether convergence towards diffuse stock ownership is socially desirable. As a starting point, we rearrange (Eq 4) to yield a function of legal protection of investor rights at time t, x(t):

$$\textbf{(Eq 14)} \qquad x(t) = \left(\frac{\alpha}{\beta}\right) f(t) \left(e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}} - 1 \right)$$

We assume that blockholders acquire a percentage of equity in the firm, $\phi^*(t)$, as a response to the socially optimal degree of legal protection of minority shareholder rights, $x^*(t)$, which is defined as $x^*(t) = \max\{x(t); t \in \{1,2,3\ldots\}\}$. In mathematical terms, $x^*(t)$ can be expressed as follows:

$$\textbf{(Eq 15)} \qquad x^*(t) = \left(\frac{\alpha}{\beta}\right) f(t) \left(e^{\frac{\phi_0^2 - \phi^*(t)^2}{2kf(t)}} - 1 \right)$$

Now we find the equivalent expressions for the degree of full protection of investor rights, F(f(t),x(t)), and the socially desirable degree of full investor protection, F(f*(t), x*(t)):

(Eq 16) $$F\big(f(t), x(t)\big) = \alpha\, f(t)\, e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}}$$

(Eq 17) $$F\big(f*(t), x*(t)\big) = \alpha\left(f*(t) + f(t)\left(e^{\frac{\phi_0^2 - \phi*(t)^2}{2kf(t)}} - 1 \right) \right)$$

where the socially desirable degree of asset protection of minority shareholder rights, f*(t), is defined as f*(t)=max{f(t); t∈{1,2,3…}}. Suppose ξ(t) denotes the gap between the socially desirable degree of full investor protection and the privately efficient counterpart at any point in time:

(Eq 18) $$\xi(t) \quad = F\big(f*(t), x*(t)\big) - F\big(f(t), x(t)\big)$$

$$= \alpha\, f*(t) + \alpha\, f(t)\left(e^{\frac{\phi_0^2 - \phi*(t)^2}{2kf(t)}} - e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}} - 1 \right)$$

The socially desirable outcome arises from the scenario where ξ(t)=0. Hence, the optimization problem is to minimize ξ(t) with respect to the prevailing level of inside equity ownership for a given degree of legal protection x at time t, ϕ(x(t)):

(Eq 19) $$\min_{\phi(x(t))}\ \xi(t) = \frac{d\xi}{d\phi} = \left(\frac{\alpha}{k}\right) e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}}\ \phi(x(t))$$

(Eq 18) allows us to examine the property of inside equity ownership around its socially optimal level. In theory, one observes the social optimum at which dξ/dϕ is sufficiently close to zero. As discussed in Subsection II.B, (Eq 4) suggests that the level of inside stock ownership for a given degree of legal protection x at time t, ϕ(x(t)), is expected to be equal to or less than the initial level of inside ownership. More precisely, the exponential term cannot be less than e[0] or unity. It is thus reasonable to view this term as a constant that exceeds unity at time t. (Eq 12) can then be simplified to the following:

(Eq 20) $$\min_{\phi(x(t))}\ \xi(t) = \frac{d\xi}{d\phi} = k(t)\alpha\ \phi(x(t))$$

where $k(t) = k\, e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}}$ is an arbitrary constant at time t.

Given the fact that the corporation operates near the socially optimal level of inside stock ownership if dξ/dϕ≈0, it is not hard to see the scenarios under which the level of inside stock ownership prevails in the neighborhood of its social optimum: 1) α≈0, and 2) ϕ(x(t))≈0. The first scenario suggests that nearly exclusive emphasis on legal protection of investor rights helps close the gap between the status quo and the social optimum. Similarly, the second scenario suggests that dispersed inside ownership also brings the firm closer to the social optimum. But this latter scenario is less favorable than the former because ϕ(x(t))≈0 renders k(t) larger so that the deviation from the social optimum persists should the marginal increase in k(t) be commensurate with the marginal decrease in ϕ(x(t)).

If these scenarios co-exist, the firm operates in the neighborhood of the social optimum. In that light, it is socially desirable to converge to the diffuse form of stock ownership. This result suggests that securities regulations and related legal rules play a vital role here. Legal protection of minority shareholder rights serves as a 'helping hand' to correct market failures that could result from the collective-action problem: shareholder activism in corporate decisionmaking creates a positive externality that cannot be internalized by apathetic shareholders. In turn, this externality poses an incentive for shareholders to free-ride on those who opt for voicing their case against deviant directors

and executives. Our analytical solution rejects the thesis that "even if market forces are pushing us toward convergence [in corporate ownership and governance structures], these force are not necessarily for the best... and even if we converge to the current best system, convergence may not be desirable"[73]. Instead, we find that it is socially desirable to converge towards an economy where dispersed ownership prevails and legal protection dominates asset protection.

II.E   The extraterritorial reach of U.S. legal rules

Section II.C opens a new avenue for convergence in corporate ownership: functional convergence as discussed in Section II.C. This section discusses the extraterritorial reach of U.S. securities regulations and related laws that prohibit concentrated stock ownership. This discussion is important because the association between legal protection and ownership dispersion serves as a prerequisite of functional convergence. In brief, this section suggests that cross-listings on U.S. stock exchanges subject non-U.S. firms to U.S. securities regulations and related laws, and that U.S. legal rules could affect the prevalent form of corporate ownership in other jurisdictions.[74]

II.E.1   Disclosure under Section 13(d) of the U.S. Securities Exchange Act

Section 13(d) of the Securities Exchange Act requires any person or 'group' that beneficially owns more than 5 percent of a listed company's stock to file a Schedule 13D containing disclosure about his or her stock ownership, investment and voting plans with respect to the company, and other related matters. In particular, a proponent's plans for a voting initiative must be disclosed in a Schedule 13D when it is formed; this disclosure is normally required before the proxy campaign has begun. The related 13(d) rules impose a disclosure obligation with attendant cost and create legal risk. The company's managers can sue claiming misdisclosure of one sort or another that the shareholder has concealed his or her true intent.[75] Mere allegation of a concealed intent is usually enough to warrant court-ordered discovery. More precisely, the managers do not have to show material harm from the alleged misdisclosure under the 13(d) rules.[76]

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73   Brett H. McDonnell, Convergence in Corporate Governance – Possible But Not Desirable, 47 Villanova Law Review 341, 342, 384 (2002).

74   Several studies underpin this lengthy discussion, see Ayyagari, supra note 20; Black, supra note 24; Coffee, supra note 10; Oren Fuerst, A Theoretical Analysis of the Investor Protection Regulation Argument for Global Listing of Stocks, Working Paper (1998), also available at http://ssrn.com/abstract=139599; Larry E. Ribstein, International Implications of Sarbanes-Oxley: Raising the Rent on U.S. Law, 3 Journal of Corporate Law Studies 299, 300-302 (2003) (arguing that the U.S. Sarbanes-Oxley Act mandates stringent disclosure rules on executive pay, auditor independence, and corporate lawyer's 'gate-keeping' duties etc.); Michael S. Weisbach and William A. Reese, Jr., Protection of minority shareholder interests, cross-listings in the United States, and subsequent equity offerings, 66 Journal of Financial Economics 65, 66-68 (2002) (demonstrating that non-U.S. firms can benefit from cross-listing on U.S. stock exchanges and that these firms issue more subsequent equities); See also Roe, supra note 22 (1991), supra note 25 (1993).

75   See also Jonathan R. Macey and Jeffrey M. Netter, Regulation 13D and the Regulatory Process, 65 Washington University Law Quarterly 131 (1987)..

76   The SEC views a shareholder consortium formed to influence company policy through the voting process as a 13(d) 'group'. A 13(d) group includes 'two or more persons who agree to act together for the purpose of acquiring, holding, voting, or disposing of equity securities'. The courts have allowed this concept of a 13(d) group to include a shareholder group that is formed informally, without written documentation, and its existence can be proved by circumstantial evidence. See also Black, supra note 24 (1990); Coffee, supra note 10 (1991).

The 13(d) rules thus create a double bind for shareholders who own modest individual stakes. Such shareholders are unlikely to succeed should they choose not to organize among themselves. Collective action also allows cost sharing, which reduces the incentives for shareholder passivity arising from fractional ownership. Should shareholders choose to organize, they form a 13(d) group and face disclosure requirements and litigation risk. Thus, there is an inexorable trade-off between shareholder passivity and legal risk under the 13(d) rules. This trade-off sheds skeptical light on the viability and consistency of any voting proposal by a loose group. The members of a loose group cannot effectively identify one another's investment purposes, nor when other members trade shares. Under the 13(d) rules, each member can file a separate Schedule 13D, but each filing must disclose all information about other filers that 'the filing person knows or has reason to know'. This collective-action dilemma makes the 13(d) rules burdensome, particular for institutional investors.[77] In effect, these disclosure rules pose legal risks that deter large stock ownership and investor activism

II.E.2   Insider trading reporting and liability

Section 16 of the Securities Exchange Act requires officers, directors, and 10 percent beneficial owners of public companies to report trades to the SEC and to forfeit any 'short-swing' profits. Also, Section 10(b) of the Securities Exchange Act prohibits anyone from share trading while the person has material nonpublic information that he or she has a duty not to disclose or trade on. In particular, a 10 percent shareholder must report his or her purchases and sales on a semi-annual basis. Any profits from selling shares purchases within six months, or repurchasing shares sold within six months, must be forfeited to the company. Strict enforcement of the related 10(b) rules can result in forfeiture from a series of trades that produce no profit for a given horizon. Thus, the reporting burden is substantial and the forfeiture rules restrain a shareholder's liquidity. In effect, these rules pose a disincentive for a large institution or sophisticated investor to cross the 10 percent threshold.

Special factors make certain institutions view the 10 percent threshold as a hot potato. Open-end mutual funds must redeem shares on each trading day and so need liquidity for their portfolios.[78] Pension funds tend to dislike a large illiquid position that could be viewed as a breach of fiduciary duty. Also, pension funds and some fixed-income vehicles have to hold onto a passive portfolio strategy to remain free to move capital from one asset type to another. Thus, these fund groups cannot easily hold concentrated shares of a listed company.

II.E.3   Liability of controlling persons

Active shareholders face additional legal obstacles should such shareholders exercise control over corporations. First, a shareholder that controls a listed company can sell his or her shares only through a registered offering or the 'dribble-out' provisions of the Securities Act ('Rule 144'). Registration involves delay, expense, strict liability for material misstatements, and no assurance that registration is possible, as the company's assistance is required and may not be forthcoming. Second, the controlling shareholder is liable for the company's securities law violations. The Securities Act provides an

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77   Institutions who acquire a 5 percent stake without 'the purpose…[or] effect of changing or influencing the control of the issuer' can file Schedule 13G, as opposed to Schedule 13D. Schedule 13G does not require as much information as Schedule 13D and does not need to be filed as promptly or amended as often. However, the Schedule 13G option offers scant comfort due to the fact that the SEC provides at best vague guidance on what the elastic concept of 'influencing control' means. Much of what shareholders might intend to do, including any effort to nominate and elect directors, could arguably bar use of Schedule 13G. Taken together, shareholders choose to remain apathetic and hold small shares partly because of the potential legal burden of the 13(d) disclosure rules. See also Black, supra note 24 (1990); Coffee, supra note 10 (1991).

78   See also Coffee, supra note 10 (1991)

exemption from liability if the shareholder 'had no knowledge of or reasonable ground to believe in the existence of the facts which create liability', and the Securities Exchange Act provides an exemption if the shareholder 'acted in good faith and did not directly or indirectly induce the …violation'. But these exemptions offer scant comfort. Both exemptions are highly context specific, and the courts judge the shareholder's prior knowledge or good faith almost always in hindsight (after a violation has taken place). The possibility that the controlling shareholder may be held liable for securities law violations creates an additional impediment to concentrated equity stakes.

Shareholders who are also creditors (banks, insurers, pension funds, investment banks etc.) face additional risks should they arguably control a debtor company. These shareholders' debt claims can be subordinated in bankruptcy, or the debtor can sue claiming improper influence over the business.[79] A claim of control usually rests upon the vague concept of 'holding a significant equity stake in the debtor'. This vague concept normally gives rise to a bankruptcy judge's response to adopt the 10 percent or so threshold used in securities laws. In that light, shareholders who hold part of the company's debt face an additional risk of subordination. In response, creditor-shareholders have a disincentive to keep their equity stakes well below the 10 percent threshold.

II.E.4   Ownership limits

Many U.S. laws impose limits on shares owned by banks, mutual funds, investment banks, insurance companies, and pension funds.[80] These institutions are the main types of controlling investors. Fund managers generally have a fiduciary duty not to hold large shares to reap diversification benefits. Also, most institutions face rules that limit concentrated share ownership. We report these rules below.

Banks and Bank Holding Companies
Banks face stringent limits on stock ownership. Banks cannot own stock without transacting via bank trust departments. But bank holding companies can hold no more than 5 percent of the voting stock of a company. On top of these rules, savings and loans are not allowed to comprise any common stock.[81] As a result, most commercial banks own small shares in listed firms.

There is an indirect barrier to bank trust departments owning a public company's stock. Bank trust departments are not allowed to invest more than 10 percent of trust funds in the stock of a single company.[82] This barrier thus makes bank trust departments' stock portfolios widely diffuse. Because most banks are restricted from directing a public company, the stock ownership limits that banks face reduce incentives to gain control blocks.

Insurance Companies
Insurance firms lack incentives to invest in common stock. For insurance firms, common stock does not count toward required regulatory capital. Insurers can buy stock out of excess capital. But there are restrictions on the proportion of these funds that can be invested in stocks and tighter limits on how much can be invested in the stock of a single public company. These ownership limits imply that insurance companies lack incentives to hold large equity stakes.

Mutual Funds

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79   See also Daniel R. Fischel, The Economics of Lender Liability, 99 Yale Law Journal 131 (1989).

80   For a detailed discussion of these legal rules, see also Roe, supra note 7; Black, supra note 24 (1990), and Coffee, supra note 10-12.

81   U.S. Financial Institutions Reform, Recovery, and Enforcement Act of 1989, Pub. L. 101-173 § 222.

82   Roe, supra note 7, at 18 (1991).

Mutual funds face a conflict of interest should they gain control blocks or put a representative on the board of a public company. Suppose that a mutual fund, for three quarters of its assets, invests over 5 percent of total assets in the stock of a public company. This mutual fund cannot be viewed as 'well-diversified' and thus loses tax breaks. Also, open-end mutual funds 'bond' themselves to sound investment practices by disclosing their promise to redeem securities on a daily basis. Open-end funds that do not disclose such a promise in their prospectuses still have to redeem shares in within 7 days.[83] Thus, most mutual funds must stand ready to redeem share son short notice. This requirement in turn implies a desire for mutual funds to hold liquid and small shares.

Investment Banks

Unlike commercial banks, insurance companies, and mutual funds, investment banks can own large shares. But broker-dealer subsidiaries that hold most of investment banks' capital face net capital rules. These rules require a 30 percent 'haircut' from market value for common stock, a 45 percent haircut on common stock in a company that exceeds 10 percent of net capital, and a full haircut on an illiquid block.[84] These haircuts imply that highly leveraged broker-dealers cannot afford to hold large shares.

Pension Funds

Pension funds tend not to hold large shares for a different reason. Under the Employee Retirement Income Security Act (ERISA), under-diversification may constitute a breach of fiduciary duties. Broad diversification is viewed as consistent with the prudence standard, whilst concentrated ownership is perilous. The prudence standard states that 'a prudent man acting in a like capacity' should diversify 'so as to minimize the risk of large losses, unless…it is clearly prudent not to do so'.[85] But such a sole emphasis on the minimization of 'large losses' is inconsistent with modern portfolio theory: 90 percent of the value of diversification is gained by owning only 30 stocks that represent a variety of industries and 95 percent can be attained by owning 120 such stocks. Hence, ERISA does not make a distinction between 'large potential losses' and 'large risk exposures'. It is hard to measure large potential losses. But it is possible to reduce 'large risk exposures'. One could design a portfolio of assets whose returns move in different directions and result in more stable portfolio returns in any state of the world. Thus, ERISA effectively puts a ban on 'prudent' portfolio investing. This ban could be at the detriment of minority investors because a desire to avoid large losses poses disincentives for pension funds to hold control blocks. Insofar as broad diversification serves as the 'most prudent' strategy, pension funds do not have incentives to hold large shares.

II.E.5   Tainted votes

Corporate executives have discretions to affect the shareholder voting process. In many proxy contests, managers receive votes from outsiders' shares for reasons unrelated to the merits of the proposal. These votes are often referred to as 'tainted votes'. Tainted votes could be due to investors' rational apathy and in turn support for the promanager status quo. In turn, rational apathy makes it safer for investors to hold diffuse shares in public companies.

Managers can receive favorable 'tainted votes' in at least two ways. First, managers can put pressure on certain shareholder groups to vote promanager. The multistrand web of business relations

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83   U.S. Investment Company Act § 22(e), 15 U.S.C. § 80a-22(e) (1988).

84   U.S. Rule 15c3-1(c)(2)(vi)-(vii), 17 C.F.R. § 240.15c3-1(c)(2)(vi)-(vii) (1990).

85   U.S. 29 U.S.C. § § 1001-1461 (1988).

between fund managers and corporate executives create conflicts on interest.[86] In many cases, casting promanager votes is required for retaining current clients.[87] For instance, public pension funds have the pressure to vote promanager because politicians – who have the ultimate control of such funds – have an incentive to support popular causes, control how these funds vote on antitakeover measures, or use voting power for political ends such as fund-raising. Banks and non-bank financial institutions face similar conflicts of interest. Banks may not intend to have a reputation for casting antimanager votes that could hurt the other lines of business, say, commercial lending. Insurance companies, mutual funds, and investment banks are likely to vote promanager for very similar reasons. [88]

Second, managers often have access to various channels that promote promanager votes. For instance, managers can place blocks of stock – especially IPO shares – in the hands of their 'friends of Frank'[89]. A related tactic is to issue shares in the form of an employee stock ownership plan (ESOP) or voting preferred stock to corporate insiders and partners. Also, stockbrokers who hold shares for their clients usually vote promanager by default. By New York Stock Exchange (NYSE) rules, stockbrokers have this discretion to vote clients' shares on routine matters unless clients provide voting instructions at least 10 days before the meeting.[90] In sum, these channels further increase the prevalence of tainted votes.

Tainted votes spin the tilt of corporate power from shareholders to managers. Shareholders' rational response to this shift in power is likely to passive. This passivity reduces the attractiveness of control shares. Hence, tainted votes increase shareholder apathy and in turn lead to a wider spread in share ownership.

II.E.6   Sarbanes-Oxley Act of 2002

The Sarbanes-Oxley Act imposes certain mandatory disclosure requirements that may conflict with a non-U.S. firm's existing ownership and power-sharing arrangements. These requirements may make the bonding mechanisms more costly. Sarbanes-Oxley in turn discourages cross-listings on U.S. stock exchanges and slows down the pace of functional convergence. Below we focus on two elements of

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86   See also Edward B. Rock, The Logic and (Uncertain) Significance of Institutional Shareholder Activism, 79 Georgetown Law Journal 445 (1991); Coffee, supra note 10-12.

87   Joseph Lakonishok, Andrei Shleifer, and Robert W. Vishny, The Structure and Performance of the Money Management Industry, Brookings Papers: Macroeconomics 339 (1992).

88   James Brickley, Ronald Lease, and Clifford Smith, Ownership structure and voting on antitakeover amendments, 20 Journal of Financial Economics 267 (1988) (showing evidence that ownership by 'pressure-sensitive groups' like banks, insurers, and nonblank trusts correlates with promanager votes on antitakeover amendments and that ownership by 'pressure-resistant groups' such as public pension funds and mutual funds is closely related to antimanager votes).

89   See also Wall Street: The Value of Trust, The Economist, June 6, 2002 (describing the conflict of interest among managers, investment banks, and investment advisers); Face Value: Ex-Friends of Frank, The Economist, September 26, 2002 (same); Andrew Ross Sorkin, Ex-Banker Seems to Alter Earlier Denial, October 11, 2003, Section C, pp.1, Column 2 (describing that Frank P. Quattrone of Credit Suisse First Boston contradicted his earlier testimony and admitted his allocation of some IPO shares to investors); Floyd Norris, Corporate Conduct Market Place: Inside the Workings of a Money Machine, New York Times, Section C, pp.1, Column 2, October 25, 2005 (describing that the trial of Frank P. Quattrone of Credit Suisse First Boston did not produce verdict, but that this trial did shed light on the flexible ethical world of initial public offerings in the late 1990s when huge profits were available to anyone able to gain from hot deals).

90   New York Stock Exchange, Listed Company Manual, ¶ 402.06(D) (1990).

Sarbanes-Oxley – auditor selection and speedy disclosure – and discuss why these elements may deter functional convergence.[91]

<u>Audit Committees of the Board of Directors</u>

Section 301 requires the audit committee in its capacity as a committee of the board to be 'directly responsible for the appointment, compensation, and oversight of the work of any registered public accounting firm employed by that issuer……for the purpose of preparing or issuing an audit report or related work'[92]. This section poses a challenge to, for instance, German firms that cross-list in the U.S. because these firms have two-tiered boards – a 'managerial board' that consists of corporate insiders and a 'supervisory board' that has the fiduciary duty to monitor management.[93] Upon nomination and determination of the auditor's independence by the supervisory board, shareholders select the auditor at the annual general meeting. More precisely, two-tiered boards must not interfere with shareholders' power to appoint the auditor. Hence, Section 301 conflicts with this procedure for selecting the auditor. An audit committee that complies with Section 301 appears to be illegal for non-U.S. companies with two-tiered boards.[94] Furthermore, Section 301 makes ineligible anyone who 'accepts any consulting, advisory, or other compensatory fees from the issuer' or is 'an affiliated person of the issuer'.[95] In turn, this rule excludes any parties that are viewed as 'affiliated' to the issuer. An affiliated person could be a member of the managerial board of a large German firm, or a member of the family that controls an East Asian company.[96] Thus, Section 301 has the potential to increase the cost of cross-listing in the U.S.

<u>Real Time Issuer Disclosures</u>

Section 409 requires all issuers 'to disclose to the public on a rapid and current basis such additional information concerning material changes in the financial condition or operations of the issuer, in plain English' so long as such information 'is necessary or useful *for the protection o investors and in the public interest*'.[97] This rule has the potential to conflict with its purpose in at least two ways. First, time-zone or geographic differences make compliance with Section 409 difficult in practice. Second, it is usually desirable to give management some discretion to decide when to disclose or respond to market noises. The apparent goal of Section 409 is more information and thus less room for insider trading. Although more information suggests the better deployment of scarce economic resources and thus may improve allocative efficiency, more information does not imply *more reliable* information. To fully comply with Section 409, managers must rush to respond to rumors. In turn, speedy disclosure may inadvertently increase the likelihood of misrepresentation or fraud.[98] This line of reasoning suggests that Section 409 is at variance with the ultimate objective of better investor protection. Thereby, Section 409 potentially reduces the value of cross-listing in the U.S.

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91 For a comprehensive set of critiques of the Sarbanes-Oxley Act, see also the F. Hodge O'Neal Corporate and Securities Law Symposium on the new mandatory disclosure regime brought by Sarbanes-Oxley, available at <http://law.wustl.edu/WULQ/Hodge/2003> (presentations) <http://law.wustl.edu/WULQ/81-2/index.html> (symposium papers); Ribstein, supra note 74 (2003); Larry E. Ribstein, Market vs. Regulatory Responses to Corporate Fraud: A Critique of the Sarbanes-Oxley Act of 2002, 28 Journal of Corporation Law 1 (2003).

92 U.S. 15 U.S.C. 78j-1(m)(2) (2002).

93 Roe, supra note 25, at 1942 (1993).

94 Ribstein, supra note 74 (2003).

95 U.S. 15 U.S.C. 78j-1(m)(3) (2002).

96 See also Ribstein, supra note 74 (2003); Claessens, Djankov, and Lang, supra note 20 (2000).

97 U.S. 15 U.S.C. 7266 (2002) (emphasis added).

98 Jeffrey N. Gordon, Governance Failures of the Enron Board and the New Information Order of Sarbanes-Oxley, 35 University of Connecticut Law Review Symposium on 'Crisis in Confidence: Corporate Governance and Professional Ethics Post-Enron' 1125 (2003).

The Sarbanes-Oxley Act increases the cost of any bonding channel. In consequence, perhaps only large non-U.S. companies that can bear the compliance costs find it worthwhile to cross-list in the U.S. This in turn suggests that Sarbanes-Oxley has the potential to block functional convergence.

However, some scholars oppose the tentative conclusion that Sarbanes-Oxley raises the cost of bonding.[99] The alternative view suggests that Sarbanes-Oxley may reinforce the bonding effect. In this view, the demand for U.S. cross-listings is relatively inelastic because non-U.S. private issuers tend to be larger and thus better bale to bear the cost of complying with Sarbanes-Oxley rules. Non-U.S. firms can self-select to 'rent' Sarbanes-Oxley rules and signal better firm quality. While the compliance costs may result in short-term inefficiencies, the longer-term benefits can arguably be greater. These benefits include higher market values[100], lower costs of capital[101], fewer information asymmetries[102], and wider analyst coverage[103]. This counter argument suggests that it is not clear if Sarbanes-Oxley reinforces or deters functional convergence.

II.E.9   A note

In the next section, we explore whether convergence in corporate ownership occurs in reality. More precisely, this empirical investigation tests the positive and normative conjectures as aforementioned. Answers to the joint questions of a) whether convergence towards diffuse ownership can be observed in the data, and b) whether such convergence leads to desirable outcomes, have implications for policy.

III.   Empirical Evidence

We now test for the presence or absence of convergence in corporate ownership. The starting point is a simple OLS regression of the functional form: $\Phi(t) = f(\Phi_0, XLs, \text{other variables})$ where $\Phi(t)$ denotes the existing level of ownership concentration, Φ_0 denotes the initial level of ownership concentration, and XLs denotes the proxy for the effect of cross-listings on U.S. stock exchanges. Should Φ_0 be statistically significant, corporate ownership patterns tend to be path dependent. Also, the statistical significance of XLs implies a case for functional convergence occurs due to the legal consequences of cross-listings on U.S. stock exchanges. We also include other variables that describe each country's characteristics in terms of governance, political orientation, legal origin, and colonial endowment. With these variables, we explore the two questions as discussed above: Is convergence towards the Berle-Means corporation possible? Is such convergence desirable from a social planner's perspective?

III.A   New data

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99   See also, for instance, Michael Perino, American Corporate Reform Abroad: Sarbanes-Oxley and the Foreign Private Issuer, St. John's Legal Studies Research Paper (June 2005), available at <http://papers.ssrn.com/sol3/papers.cfm?abstract_id=439501>.

100   Stephen R. Foerster and G. Andrew Karolyi, The Effects of Market Segmentation and Investor Recognition on Asset Prices: Evidence from Foreign Stock Listings in the United States, 54 Journal of Finance 981, 1008 (1999); Craig G. Doidge, Andrew Karolyi, and Rene M. Stulz, Why are foreign firms listed in the U.S. worth more? 71 Journal of Finance Economics 2 (2004).

101   See also, for instance, Rene M. Stulz, Globalization, Corporate Finance, and the Cost of Capital, 12 Journal of Applied Corporate Finacne 3, 13-15 (1999).

102   Robert C. Merton, Presidential Address: A Simple Model of Capital Market Equilibrium with Incomplete Information, 42 Journal of Finance 483, 485 (1987).

103   Mark H. Lang, Karl V. Lins, and Darius P. Miller, ADRs, Analysts and Accuracy: Does Cross-Listing in the U.S. Improve a Firm's Information Environment and Increase Market Value? 41 Journal of Accounting Research 317 (2003).

We collect data from various sources. Table 1 reports the variables, descriptions, and sources:

[Insert Table 1 here]

III.B   Descriptive statistics

Table 2 reports the summary statistics and correlations for the variables that are related to ownership concentration, governance indicators, sustainability indices, political conditions, and cross-listings on U.S. stock exchanges. At first glance, we note the high correlations among the variables that fall within each of these categories (see also the shaded cells). For instance, countries in which citizens have more political clout (high scores on Voice, Politics and Law) appear to have better legal enforcement, quality of regulation, and control of corruption (high scores on GovtEff, RegQ, Law and Corru). This pattern poses an issue of multicollinearity in ordinary least squares (OLS) regressions. Multicollinearity occurs whenever two or more explanatory variables are highly correlated such that the significance of one or more of these variables swamps that of other variables. Moreover, these correlation effects may imply an issue of endogeneity bias. For instance, sustainable outcomes may arise from the broader legal and political environment that steers public policy. We do not discuss these issues until Section III.C.2 in which we check the robustness of our OLS regression results.

The remaining cells provide some preliminary results. Firstly, the existing level of ownership concentration, $\Phi(t)$, is positively correlated with the initial counterpart, Φ_0. This result accords with the view that ownership concentration tends to be path dependent (see also (Eq 4)). Secondly, we find that all of the governance indicators are negatively related to the two measures of ownership concentration, Φ_0 and $\Phi(t)$. This result is not surprising, given the prediction of (Eq 4) and the recent law-and-finance studies. Thirdly, cross-listing activity appears to be positively related to the quality of governance. All but one correlation (for CL100 and GovtEff) are insignificant. These positive correlations suggest that more facilitative governance regimes tend to encourage firms to seek capital in the U.S. Finally, the rest of Table 2 shows low correlations, suggesting that these variables may contain independent and useful information about the existing level of ownership concentration, $\Phi(t)$.

[Insert Table 2 here]

III.C   Results

III.C.1   OLS regressions

We run OLS regressions of the following form:

(Eq 21)
$$\phi(t) = \gamma_0 + \gamma_\phi \phi_0 + \sum_i \gamma_i \chi_i + \varepsilon_{\text{OLS}}$$

where $\Phi(t)$ denotes the existing level of corporate ownership concentration,
Φ_0 denotes the initial level of corporate ownership concentration,
χ_i denotes the ith control variable, such as quality of governance, cross-listings on U.S. stock exchanges, legal origin, endowment factors etc.,
γ_0, γ_Φ, and γ_i denote the respective coefficients, and
ε_{OLS} denotes the residual term.

If the effect of path dependent forces is marginal, we expect γ_Φ to be close to zero under the null. Quite the contrary, our results suggest that γ_Φ is significantly positive in all OLS regressions. Table 3 reports these regression results. In Table 3, the first row of each model entry shows the estimated coefficients and the second row shows the t-statistics. We now discuss each regression in detail.

[Insert Table 3 here]

Path Dependence, Legal Origin, and Endowment

When we regress $\Phi(t)$ on Φ_0, we find a significantly positive relation between the two variables. We interpret this result as prima facie evidence of path dependence. More precisely, the existing level of ownership concentration positively correlates with the initial counterpart (t-stat=6.571). We then add proxies for legal origin to the regression. None of these dummy variables turn out to be significant. This finding is not consistent with recent studies, which suggest that corporate ownership tends to be more widely diffuse in common-law regimes than in civil-law regimes like France, Spain, Germany, and Scandinavian countries. A potential explanation for this finding is that the explanatory power of Φ_0 overwhelms the effect of variables that reflect a given country's legal tradition.

Next, we substitute these proxies for legal origin with a set of variables that reflect the wider geographic environment: latitude, location in or out of a tropical-climate zone, and degree of receptive colonial transplants. We find that a country's location within a tropical-climate zone tends to be associated with less dispersed corporate ownership patterns (t-stat=2.068). This result accords with recent studies: the geographic environment shaped the colonizer's settlement strategy and so affected subsequent ownership and power-sharing arrangements. However, this association does not affect the explanatory power of Φ_0. In summary, corporate ownership patterns tend to be path dependent even after controlling for the effect of endowment factors.

Path Dependence, Quality of Governance, and Politics

We also add various governance indicators to a variant of (Eq 21). Once again, γ_Φ remains significantly positive (t-stat=5.567). This finding confirms the persistence of differences in ownership concentration. Moreover, we find a negative association between the prevailing level of ownership concentration and the overall quality of governance (t-stat=–2.905). This negative association accords with the prediction of (Eq 4) and recent law-and-finance studies: "ownership concentration serves as a substitute for poor investor protection"[104].

Furthermore, we replace the overall governance indicator with each of its six constituents and find similar results. After controlling for the static effect of Φ_0, each of these factors – access to political rights, political stability, government effectiveness, quality of regulation, rule of law, and control of corruption – has a negative association with the prevailing level of ownership concentration (t-stat≈–2). Hence, strong legal enforcement is quite effective in prohibiting concentrated share ownership.

We also study the effect of political orientation on the dispersion of share ownership. We find a significantly negative relationship between the prevailing level of ownership concentration and the number of years since the country's date of official independence (t-stat=–2.345). This finding suggests that populist politics takes time to develop and to expand the dispersion of share ownership. However, we find no association between the relative openness and/or closeness of political institutions and the prevailing level of ownership concentration.

Path Dependence and Functional Convergence

We next turn to the effect of cross-listings on U.S. stock exchanges. Because cross-listings on NYSE and Nasdaq subject non-U.S. firms to more stringent disclosure, accounting, and registration rules, we use two proxies to account for the difference between NYSE-Nasdaq and other cross-listings. CL100 is the number of non-U.S. firms that cross-listed their shares or ADRs on NYSE, Nasdaq, OTC or PORTAL between January 1985 and June 1999, expressed as a percentage of the number of listed companies for a given country. NNCL100 is the equivalent that includes only cross-listings on NYSE and Nasdaq.

We find partial evidence in support for functional convergence. CL100 carries a negative but insignificant coefficient (t-stat=–1.802). In contrast, NNCL100 has a significantly negative coefficient (t-

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104   See also La Porta et al., supra note 3.

stat=–2.391). In both cases, Φ_0 exerts a significantly positive effect on the prevailing level of ownership concentration (t-stat>6). In brief, our results suggest that the cases for path dependence and functional convergence need not be mutually exclusive. While the path-dependence story depicts the static part of the picture, the case for functional convergence better describes the dynamic part. Thus, both stories complement each other in explaining the variation in ownership patterns.

III.C.1   OLS regressions

We now run some additional tests to shed light on the proper determinants of the variation in ownership patterns. The following list summarizes our proposed head-on horse races[105]:

1) **Legal Protection versus Political Independence**,
2) **Legal Protection versus NYSE-Nasdaq Cross-Listings**,
3) **Political Independence versus NYSE-Nasdaq Cross-Listings**.

Horse Race 1: Legal Protection versus Political Independence

When we add the governance factor and the number of years of independence to the regression, we find that only the initial level of ownership concentration has statistical significance (t-stat=4.803). This result implies certain collinearity between legal and political conditions. Hence, the legal and political theories of corporate finance have their own merits. These two potential theories could reinforce each other to some extent.

Legal Origin and Endowment

So far we have found partial support for three explanatory variables: quality of governance, the effect of cross-listings, and the number of years of political independence. We now include proxies for legal origin and endowment to examine the robustness of these results. Our results are twofold. First, legal and political factors lose statistical significance in those regressions. Second, the effect of cross-listings on NYSE and Nasdaq persists. We view these findings as indicative of a) the potential endogeneity of governance indices as discussed in past studies[106], and b) the inexorable trend of convergence towards the Berle-Means form of ownership.

Horse Race 2: Legal Protection versus NYSE-Nasdaq Cross-Listings

When we include the governance factor, the percentage of non-U.S. firms that cross-listed on NYSE and Nasdaq, and other control variables, we find support for the bonding effect of cross-listings only (t-stat=–1.964). We also find further support for path dependence (t-stat=4.482). But the governance factor loses predictive power (t-stat=–0.910). These findings have implications for policy. The bonding effect of cross-listings appears to be more significant than the quality of governance in prohibiting control of share blocks. In this light, there is a lesser need for corporate law reform. Mechanisms that facilitate non-U.S. firms to cross-list and to be subject to higher disclosure and listing standards could be better substitutes.[107]

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105   See also Coffee, supra note 11 (2001); Gilson, supra note 71 (2004); Ayyagari, supra note 20 (2004); Reese and Weisbach, supra note 74 (2002); Roe, supra note 22 (2004).

106   Rafael La Porta, Florencio Lopez-de-Silanes, What Works in Securities Laws? Journal of Finance, forthcoming (2005).

107   See also David Goddard, Convergence in Corporations Law – Towards a Facilitative Model, 26 Victoria University of Wellington Law Review 191 (1996).

Horse Race 3: Political Independence versus NYSE-Nasdaq Cross-Listings

We now use as explanatory variables the number of years of political independence, the percentage of non-U.S. firms that cross-listed on NYSE and Nasdaq, and other control variables. Similar to the last case, the initial level of ownership concentration and the cross-listing factor have explanatory power (t-stats = +4.460 and −2.302). Thus, the bonding effect of cross-listings tends to be greater than the effect of political independence. In brief, other path-dependent forces and the bonding effect stay robust on the legal and political terrain.

III.C.2   Instrumental variables estimation

We now use instrumental-variables estimation to check the robustness of the results discussed in the previous section. The variables that describe the legal origin and geographic environment of a given country serve as exogenous instruments for the governance index ('Govern'). We run three-stage least squares (3SLS) regressions of the following form:

(Eq 22) $\text{Govern} = \sum_i \lambda_i X_i + \varepsilon_{3SLSa}$

(Eq 23) $\phi(t) = \delta_0 + \delta_\phi \phi_0 + \delta_G \text{Govern} + \delta_{NN} \text{NNCL100} + \varepsilon_{3SLSb}$

(Eq 24) $O(t) = \kappa_0 + \kappa_\phi \phi(t) + \varepsilon_{3SLSc}$

where λ_i denotes the coefficient on the exogenous variable, X_i, which serves as a proxy for the legal origin or geographic environment of a given country,
$\Phi(t)$ denotes the existing level of corporate ownership concentration,
Φ_0 denotes the initial level of corporate ownership concentration,
Govern is the explained component of the governance index as instrumented by the variables that describe the legal origin and geographic environment of a given country,
NNCL100 denotes the percentage of non-U.S. firms that cross-listed shares or ADRs on NYSE or Nasdaq between January 1985 and June 1999 as a proportion of the number of listed firms for a given country,
δ_0, δ_Φ, δ_G, and δ_{NN} denote the respective coefficients in the second-stage regression,
O(t) is the outcome variable observed at the end of or after the year 2003, including happy life expectancy, sustainability metrics, and financial ratios,
κ_0 and κ_Φ denote the respective coefficients in the third-stage regression,
ε_{3SLSa}, ε_{3SLSb} and ε_{3SLSc} are the respective the residual terms.

Because the first-stage regression results are quite similar, we only report the second- and third-stage regression results to save space. (Eq 23) tests for functional convergence, and (Eq 24) sheds light on the relation between the current level of ownership concentration and the social outcome. We measure the social outcome in terms of:

a) **Happy life expectancy**,
b) **Sustainability metrics**, covering such areas as environmental sustainability, ecosystem stress, human sustenance, institutional governance, and global stewardship,
c) **Financial characteristics** such as price-to-book, leverage, growth, and profitability etc.

We use these variables to measure the degree of social desirability of ownership concentration. Happy life expectancy describes the number of years that a typical citizen lives happily in a given country. In a sense, concentrated ownership excludes minority investors from deriving private benefits of control. Hence, we hypothesize that more diffuse ownership helps spread happiness at the societal level.

Further, we use sustainability metrics as proxies for the long-term viability of a given country. There are five major categories: environmental sustainability, ecosystem stress, human sustenance, institutional governance, and global stewardship. We take the average of these five metrics to derive a proxy for 'overall sustainability'.

Lastly, we use several financial ratios as proxies for social desirability: price-to-book, leverage, growth rates, size, and profitability. Perhaps the most important financial outcome is the price-to-book ratio. The price-to-book ratio reflects the ultimate effect of ownership concentration on firm value. All of these financial ratios describe the financial strength of the median firm in a given country.

Under the null hypothesis, there is no relation between the level of ownership concentration and the social outcome: κ_Φ equals zero. Should κ_Φ be positive, concentrated ownership better protects investors and in turn enhances the social outcome. In contrast, diffuse ownership promotes the social outcome should κ_Φ turn out to be negative. Table 4 reports the 3SLS regression results. In Table 4, the first row of each entry shows the estimated coefficients and the second row shows the t-statistics. We now discuss each regression in detail.

[Insert Table 4 here]

Functional Convergence

Table 4 reports partial evidence in support of functional convergence. All of the estimated coefficients on the proxy for the bonding effect are negative. Four of these coefficients are significantly negative – see also the 3SLS regressions of the proxies for 'overall sustainability', 'environmental sustainability', 'human sustenance', and 'price-to-book' (t-stats = –2.31, –2.38, –1.96, and –2.08 respectively). However, the bonding effect is not discernible in the other regressions. In brief, there is some partial evidence in support of functional convergence.

Path Dependence

Table 4 shows that all of the estimated coefficients on the initial level of ownership concentration are significantly positive in the 3SLS regressions (t-stats > 2.0). Also, the estimated coefficients are similar in size to those coefficient reported in OLS regressions, ranging between 0.51 and 0.648. Based on the 3SLS regression results, we suggest that the path dependence of share ownership is quite robust.

Governance

Table 4 further shows that all of the estimated coefficients on the governance index[108] are significantly negative in the 3SLS regressions (t-stats < –2.0). This evidence suggests that legal rules that make share ownership diffuse serve as a deterrent to blockholders' expropriation of smaller shareholders. Further, this evidence suggests that the negative relation between the level of ownership concentration and the quality of governance is robust. More precisely, this relation holds even after removing the exogenous component of the governance index. In brief, law matters. Legal rules do play an important role in the determination of ownership concentration.

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108   It is important to note that we use the 'explained component' of the governance index as the independent variable in the second-stage regression. More precisely, we use the proxies for the legal origin and geographic environment of a given country as instrumental variables to derive the explained component of the governance index.

Our OLS and 3SLS results suggest that functional convergence is possible. The next step is to examine the effect of ownership concentration on the social outcome. Recall that our 3SLS regressions have an exclusion restriction on the prevailing level of ownership concentration. This restriction suggests that the explanatory variables can only have an effect on the social outcome via share ownership. Although this restriction may be open to controversy, share ownership can be viewed the key channel through which owners extract private benefits of control. In turn, these private benefits induce self-interested behaviors to preclude others from seeking investor protection. The consequence is a large move from the social optimum. This line of reasoning thus underpins our exclusion restriction. Further, our third-stage regressions provide preliminary results that may be of relevance for future research.

We find that the prevailing level of ownership concentration has a significantly negative effect on 'happy life expectancy', 'overall sustainability', 'environmental sustainability', 'human sustenance', 'institutional governance', and 'price-to-book' (t-stats < –2.08). These results suggest that more diffuse share ownership is related to greater life satisfaction, more sustainable development, and more wealth creation. Hence, more diffuse share ownership enhances the social outcome. This tentative conclusion accords with our model: diffuse share ownership is a precondition for optimal investor protection.

Also, the level of ownership concentration is not closely related to the other accounting ratios. One potential explanation could be functional convergence. Should such convergence result in trivial differences in 'function', the variation in accounting ratios may not reflect differences in firm value.

III.C.3   A brief summary

We can summarize the empirical results as follows:

o   The path dependence of ownership concentration is robust.
o   Cross-listings on NYSE or Nasdaq facilitate the bonding mechanism for non-U.S. firms to be subject to U.S. rules that protect minority shareholder rights. Because these rules impose limits on share ownership, functional convergence towards the Berle-Means form of ownership is possible. We find partial evidence in support of such convergence.
o   There is a robust negative relationship between the quality of governance and the level of ownership concentration. This result accords with the thesis that investors view control blocks as a substitute for poor legal protection.
o   Functional convergence tends to promote better social outcomes –higher life satisfaction, more sustainable development, and more wealth creation.

IV.   Policy Implications

This section discusses the implications of our results for two areas of corporate governance: executive compensation and shareholder empowerment. The key element – as far as these areas are concerned – is the level of share ownership concentration. As discussed in Sections II and III, it is both possible and desirable to converge to the Berle-Means corporation that is diffuse in share ownership. This evidence underpins our discussions below.

IV.A   A cut in stock-based compensation bolsters the link between pay and performance

Financial economists suggest that stock-based compensation arrangements help align the interests of managers and shareholders.[109] Such arrangements grant partial share ownership to managers and also increase the opportunity cost of shirking. In this view, stock-based compensation thus helps optimize arm's-length bargains for executive pay.

But others argue that it is not sufficient to put in place stock-based pay schemes because such schemes do not by themselves improve managers' incentives to act in the interests of shareholders. In Berle-Means corporations, managers often have the power to influence the amount of their own pay and decouple pay from performance.[110] Moreover, managers have the desire to minimize social and economic costs that could stem from outrageous compensation packages. The critical role of outsiders' perception of executives' pay and the significance of 'outrage costs' sheds light on another element of managerial power: camouflage. More precisely, managers face a strong incentive to try to obscure and legitimize – or to camouflage – both the level and performance-insensitivity of executive pay.

In particular, managers can increase the opacity of executive pay by the design of numerous compensation practices. Such practices include pension plans, nonperformance bonuses, or employee stock option schemes. Also, stock-based compensation (say, stock options) could inadvertently allow managers and their constituents to time the market. Compensation consultants, for instance, tend to tie executive pay to market returns when these returns are persistently high, but to accounting returns when market returns are volatile.[111] In this alternative view, stock-based pay schemes tend to expand managerial power. Performance-insensitive pay schemes pose perverse incentives. Hence, executive pay does not resolve the agency issue. Rather, executive pay may be seen as an agency issue itself.[112]

What relevance do our results have for the subject of executive pay? Our results suggest that diffuse inside ownership promotes better social outcomes. In that light, we propose a case for curbing stock-based pay. A reduction in stock-based pay makes cash compensation relatively more important. Because cash compensation does not distort outsiders' perceptions, our proposed change potentially enhances the sensitivity of performance to pay.[113] Perhaps future research can proceed in this direction.

IV.B   Professional monitoring could be a substitute for shareholder activism

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109   See also Fama and Jensen, supra note 8 (1983); Jensen and Meckling, supra note 9 (1976).

110   For a detailed discussion on the managerial-power approach to executive pay, see also Kevin J. Murphy, Executive Compensation, in Handbook of Labor Economics, vol. 3, bk. 2, eds. Orley Ashenfelter and David Card, 2485-2563 (Elsevier, 1999); Lucian A. Bebchuk, Jesse M. Fried, and David I. Walker, Managerial Power and Rent Extraction in the Design of Executive Compensation, 69 University of Chicago 753 (2002); Lucian A. Bebchuk and Jesse M. Fried, Executive Compensation as an Agency Problem, 17 Journal of Economic Perspectives 72 (2003); John E. Core, Wayne Guay, and David F. Larcker, Executive Equity Compensation and Incentives: A Survey, 9 Economic Policy Review 27-50 (2003); Lucian A. Bebchuk and Jesse M. Fried, Pay Without Performance: The Unfulfilled Promise of Executive Compensation, 1-12 (Harvard University Press, 2004).

111   James B. Wade, Joseph F. Porac, and Timothy Pollock, Worth, Words, and the Justification of Executive Pay, 18 Journal of Organizational Behavior 641, 657 (1997); Joseph F. Porac, James B. Wade, and Timothy Pollock, Industry Categories and the Politics of the Comparable Firm in CEO Compensation, 44 Administrative Science Quarterly, 112, 112-144 (1999); Bebchuk, Fried, and Walker, supra note 110, at 791(2002); Bebchuk and Fried, supra note 110, at 79 (2003); Bebchuk and Fried, supra note 110, at 71 (2004).

112   Bebchuk and Fried, supra note 110 (2003).

113   A cut in stock-based pay reduces many of the risks associated with managerial power. In addition to our proposed cut in stock-based pay, it is important to scrutinize the magnitude of nonperformance pay, such as retirement benefits, golden goodbyes, bonus plans, perks and perquisites etc. See also Bebchuk and Fried, supra note 110, at 190-200 (2004).

Stock-based executive pay aims to fill the gap between ownership and control. This form of executive compensation focuses on the integration of some part of corporate control into partial ownership. As discussed above, however, stock-based executive pay may exacerbate agency costs. An alternative way of closing the gap between ownership and control is to bring owners closer to the decisionmaking process. One way of doing so is to grant more voting rights to shareholders. This case for shareholder activism keeps intact our concept that dispersed share ownership enhances social outcomes. But this proposed case broadens the extent to which shareholders exercise their voting rights. [114] In a normative view, the case for shareholder activism rests on the belief that owners should have the final say in corporate matters. For instance, the recent debate over the U.S. SEC's proposal to permit shareholders to nominate directors is one mild step to this end. Should it be difficult for investors to acquire control blocks, shareholder activism may be a route that leads to shareholder value maximization. In this light, the question –of whether a case for increasing shareholder power is good – answers itself. More voting rights offer a means by which shareholders curb director deviance and indirectly discipline managers. In turn, agency cost savings lead to greater shareholder wealth.

However, it may not be possible to 'bundle' shareholder interests.[115] Each shareholder does not have enough incentives to invest optimally in investigating the consequences of corporate actions. These consequences accrue to the company rather than to the active shareholder. Also, shareholders face diseconomies of incorrect voting. When a shareholder votes for a sub-optimal investment project, he or she imposes an external diseconomy of incorrect voting on the other shareholders. This line of reasoning suggests that shareholder activism has its own shortcomings. A move towards shareholder activism is quite similar to the introduction of a referendum in politics. A referendum leads to greater divisions of power, which invite not only duplicative decision costs but also costly backlashes. Taking the case for a referendum as an analogy, shareholder intervention may not be the proper answer to the agency problem in corporations.

Widely divergent shareholder interests, however, suggest a role for institutional investors. Investors can choose to put their money in institutions[116] – mutual funds, insurance companies, or investment banks – that serve as market watchdogs. These institutions specialize in processing market news stories and factoring these stories into market prices via direct share trading. Cost savings in the acquisition of information allow these institutions to reap economies of scale and scope. Insofar as there are legal rules in place to ameliorate any conflict of interest, these institutions can cast more unbiased votes on corporate matters. Recent studies report that institutional ownership concentration is closely related to better stock performance[117], more performance-sensitive executive compensation[118],

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114   See also Lucian A. Bebchuk, The Case for Increasing Shareholder Power. 118 Harvard Law Review 833, 846-843 (2005) (suggesting that shareholder voting improvements may serve as a good alternative control mechanism).

115   Kiwi A.D. Camara, Shareholder Voting and the Bundling Problem in Corporate Law, 2004 Wisconsin Law Review 1425, 1471-1476 (2005).

116   Institutional investors can be facilitative of other (complementary) control mechanisms, for instance, the market for corporate control. See also Andrei Shleifer and Robert W. Vishny, Large Shareholders and Corporate Control, 94 Journal of Political Economy 461 (1986). For recent discussions on the monitoring role of institutions, see also Black, supra note 21; Bernard S. Black, Agents Watching Agents: The Promise of Institutional Voice, 39 UCLA Law Review 811 (1991); Ronald J. Gilson and Reinier Kraakman, Reinventing the Outside Director: An Agenda for Institutional Investors, 43 Stanford Law Review 863 (1991); Bernard S. Black, The Value of Institutional Investor Monitoring: The Empirical Evidence, 39 UCLA Law Review 895 (1991); Coffee, supra note 7.

117   Paul Gompers and Andrew Metrick, Institutional investors and equity prices, 116 Quarterly Journal of Economics 229, 246-251 (2001).

118   Jay C. Hartzell and Laura T. Starks, Institutional Ownership and Executive Compensation, 58 Journal of Finance 2351, 2352-2354, 2362-2366 (2003).

and lower total executive pay[119]. These findings suggest that institutions play a vital monitoring role in mitigating the agency problem between shareholders and managers. Given that it is difficult to bundle widely diverse shareholder interests, institutions could be a substitute for shareholder activism. Thus, we suggest a case for promoting institutional investor activity. To this end, a broader role of the stock exchange on which the company lists can affirmatively facilitate the pooling of campaign and decision costs. More precisely, the exchange is in a better position to investigate any conflict of interest between senior management and institutions that invest in the company. In this instance, institutional investors serve as a professional monitor that voices shareholder interests.

V.   Conclusions

We offer a theory that sheds light on the current debate over whether the form of corporate ownership converges to the Berle-Means image. Our analytical results are threefold. Firstly, legal rules and firm-specific protective arrangements are complementary. Secondly, corporate ownership patterns can be convergent or path dependent depending on the relative importance of these protective arrangements. More precisely, our model predicts a) diffuse stock ownership in countries that impose legal limits on blockholders' power to expropriate minority investor rights, and b) concentrated stock ownership in countries that rely on asset specificity as a form of protection. Lastly, we find that convergence toward diffuse share ownership is a movement towards the social optimum.

An examination of the data suggests that corporate ownership has persisted in recent years. But this result does not preclude the possibility of 'functional convergence', that is, convergence to the diffuse form of share ownership via cross-listings on U.S. stock exchanges that impose disclosure and listing requirements to prohibit control of concentrated shares. Overall, our results suggest a case for the co-existence of path dependence and functional convergence.

Our results shed light on at least two major policy lessons. The first lesson concerns the design of executive pay. Because stock-based executive compensation permits managers to have more leeway to expropriate shareholder value, a cut in this form of executive pay is desirable. Hence, we suggest a case for curbing stock-based executive pay to reduce managerial power.

The second lesson concerns the case for increasing shareholder power. This case – like the U.S. SEC's proposal to allow shareholders to nominate directors – entails the expansion of shareholder voting rights. Expanding these rights may, however, pose duplication and decision costs. Uninformed shareholders may cast incorrect votes at the expense of informed shareholders. To better bundle the diverse interests of shareholders, we propose a case for institutional investor activism. In this case, the stock exchange on which the company lists can better spot any potential conflict of interest between management and institutions that invest in the company. Hence, our proposed case helps facilitate the pooling of shareholder interests.

The recent past sheds light on the evolution of corporate ownership around the world. In the most likely scenarios, some countries will face the inevitable challenge to adopt necessary law reforms to close the gap between the social optimum and the status quo. Our proposed reforms – albeit radial – accord with the existing literature and evidence. Time will tell whether these reforms prove to work in practice.

Table 1: Data Descriptions

Variable	Description	Source
Ownership		
Φ_0	Φ_0 denotes closely held shares expressed as a percentage of total common shares outstanding during 1994-1999.	Worldscope

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119   See also Hartzell and Starks, supra note 118 (2003).

$\Phi(t)$	$\Phi(t)$ denotes closely held shares expressed as a percentage of total common shares outstanding during 2003.	Worldscope

Governance

Govern	Govern denotes the arithmetic average of the 0-100 indicators of a) voice and accountability ('Voice'), b) political stability and absence of violence ('Politics'), c) government effectiveness ('GovtEff'), d) regulatory quality ('RegQ'), e) rule of law ('Law'), and f) control of corruption ('Corru').	World Bank; Kaufman, Kraay, and Matruzzi (2003)
Voice	Voice denotes 'Voice and Accountability' as covered in the 'Governance Matters III database', encompassing such areas as: political process, civil liberties, and political rights.	World Bank; Kaufman, Kraay, and Matruzzi (2003)
Politics	Politics denotes 'Political Stability and Absence of Violence' as covered in the 'Governance Matters III database', encompassing such areas as: likelihood of wrenching changes in government due to unconstitutional means, domestic violence, or terrorism.	World Bank; Kaufman, Kraay, and Matruzzi (2003)
GovtEff	GovtEff denotes 'Government Effectiveness' as covered in the 'Governance Matters III database', encompassing such areas as: Quality of public service provision and bureaucracy, competency of civil servants, credibility of government's policy commitments, and independence of civil services from political pressures.	World Bank; Kaufman, Kraay, and Matruzzi (2003)
RegQ	RegQ denotes 'Quality of Regulation' as covered in the 'Governance Matters III database', encompassing such areas as: Incidence of market - unfriendly policies and perceived burdens imposed by excessive regulation.	World Bank; Kaufman, Kraay, and Matruzzi (2003)
Law	Law denotes 'Rule of Law' as covered in the 'Governance Matters III database', encompassing such areas as: perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts.	World Bank; Kaufman, Kraay, and Matruzzi (2003)
Corru	Corru denotes 'Control of Corruption' as covered in the 'Governance Matters III database', encompassing such areas as: perceptions of corruption (conventionally defined as the exercise of public power for private gain).	World Bank; Kaufman, Kraay, and Matruzzi (2003)

Politics

Polity	Polity denotes the regime's institutionalized authority characteristics (measured as the difference between 'Democ' and 'Autoc' (see below)).	Polity IV Project by Marshall and Jaggers (2003)
Persist	Persist denotes that number of years (rounded) that a particular polity case or a politically independent regime has persisted since 1872.	Polity IV Project by Marshall and Jaggers (2003)
Democ	Democ denotes the democracy score as covered in the 'Polity IV Project', describing the general openness of political institutions.	Polity IV Project by Marshall and Jaggers (2003)
Autoc	Auto denotes the autocracy score as covered in the 'Polity IV Project', describing the general closeness of political institutions.	Polity IV Project by Marshall and Jaggers (2003)

Cross-listings

CL100	CL100 denotes the number of non-U.S. firms that cross-listed their shares or ADRs on all major U.S. stock exchanges (NYSE, Nasdaq, OTC and PORTAL) between January 1985 and June 1999, expressed as a proportion of the number of listed companies for a given country.	Reese and Weisbach (JFE 2002)
NNCL100	NNCL100 denotes the number of non-U.S. firms that cross-listed their shares or ADRs on NYSE or Nasdaq between January 1985 and June 1999, expressed as a proportion of the number of listed companies for a given country.	Reese and Weisbach (JFE 2002)

Happy life expectancy

HLE	HLE denotes the number of years during which the typical citizen in a given country lives happily at a certain point in time.	Veenhoven (2004)

Sustainability

ESI	ESI denotes the arithmetic average of the following five sustainability indicators: a) environmental sustainability, b) ecosystem stress, c) human sustenance, d) institutional governance, and e) global stewardship.	Yale Center for Environmental Law and Policy; Esy, Levy, Srebotnjak, and de Sherbinin (2005).
Environ	Environ denotes the indicator variable that describes the relative degree of air quality, water quantity and quality, biodiversity, and terrestrial systems in a given country.	Yale Center for Environmental Law and Policy; Esy, Levy, Srebotnjak, and de Sherbinin (2005).

Stress	Stress denotes the indicator variable that describes the relative degree of policy remedies for air pollution, water stress, ecosystem stress, waste and consumption pressures, resource management, and population pressure.	Yale Center for Environmental Law and Policy; Esy, Levy, Srebotnjak, and de Sherbinin (2005).
Human	Human denotes the indicator variable that describes the relative degree of basic human sustenance and environmental health.	Yale Center for Environmental Law and Policy; Esy, Levy, Srebotnjak, and de Sherbinin (2005).
Institu	Institu denotes the indicator variable that describes the relative degree of advances in science and technology, capacity for debate, private sector responsiveness, environmental governance, and eco‑efficiency.	Yale Center for Environmental Law and Policy; Esy, Levy, Srebotnjak, and de Sherbinin (2005).
Globalss	Globalss denotes the indicator variable that describes the relative degree of participation in international cooperative efforts and policies designed to minimize greenhouse gas emissions and transboundary environmental pressures.	Yale Center for Environmental Law and Policy; Esy, Levy, Srebotnjak, and de Sherbinin (2005).

Financial attributes

PtB	PtB denotes the median ratio of market price over book value per share at yearend of 2003.	Worldscope
DtA	DtA denotes the median ratio of total debt over total net assets, which are computed as follows: a) total debt comprises short- and long-term debt, and b) customer liability acceptances and/or custody securities are subtracted from total assets for banks and non-bank financial institutions.	Worldscope
AG	AG denotes the median growth rate of net assets at yearend of 2003.	Worldscope
CapexA	CapexA denotes the median ratio of capital expenditures to total net assets at yearend of 2003.	Worldscope
TA	TA denotes the median net asset base at yearend of 2003.	Worldscope
EtA	EtA denotes the median ratio of net income to total net assets at yearend of 2003. Net income is the net income that the company uses to calculate its earnings per share (before extraordinary items). For U.S. corporations, net income is one of the following: a) net income after preferred dividends, b) common and common equivalent net income (including the effect of those securities considered common equivalent), c) fully diluted net income (including the effects of all convertible securities and the exercise of stock options and	Worldscope

	warrants). For non-U.S. corporations, net income is generally net income after preferred dividends.	
RoA	RoA denotes the net return as a proportion of total net assets. In general, RoA is computed as RoA = (Net Income before Preferred Dividends + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Last Year's Total Assets * 100. For banks, RoA is computed as RoA = Net Income before Preferred Dividends + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / (Last Year's Total Assets - Last Year's Customer Liabilities on Acceptances) * 100. Customer Liabilities on Acceptances only subtracted when included in Total Assets. For insurance companies, RoA is computed as RoA = (Net Income before Preferred Dividends + ((Interest Expense on Debt-Interest Capitalized) *(1-Tax Rate))) + Policyholders' Surplus) / Last Year's Total Assets * 100. For non-bank financial institutions, RoA is computed as RoA = (Net Income before Preferred Dividends + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / (Last Year's Total Assets - Last Year's Custody Securities) * 100.	Worldscope
RoE	RoE denotes the net return as a proportion of common equity.	Worldscope

Legal origin

Engmo	Engmo denotes the dummy variable that carries a value of 1 for a country with the British legal origin and 0 otherwise.	La Porta et al. (JF 2004)
FRSPmo	FRSPmo denotes the dummy variable that carries a value of 1 for a country with the French or Spanish legal origin and 0 otherwise.	La Porta et al. (JF 2004)
Scandmo	Scandmo denotes the dummy variable that carries a value of 1 for a country with the Scandinavian legal origin and 0 otherwise.	La Porta et al. (JF 2004)
Germmo	Germmo denotes the dummy variable that carries a value of 1 for a country with the German legal origin and 0 otherwise.	La Porta et al. (JF 2004)

Endowments

Latitude	Latitude denotes the absolute value of the latitude of a country, as measured by La Porta et al.	La Porta et al. (2004)
Tropical	Tropical denotes the presence or absence of tropical climate. This dummy variable equals 1 if the country is in a tropical-climate zone.	La Porta et al. (2004)
Transplant	Transplant denotes that sum of indicator-variables for receptive-indirect transplants, unreceptive direct transplants, and unreceptive in-direct transplants.	La Porta et al. (2004)

Table 2: Descriptive Statistics and Correlations

Variable	Φ(t)	Φ₀	Voice	Politics	GovtEff	RegQ	Law	Corru	Environ	Stress	Human	Institu	Globalss	Polity	Persist	Democ	Autoc	CL100	NNCL100
Mean	52.3%	48.4%	67.1%	61.4%	72.2%	71.0%	70.2%	71.1%	46.4%	41.6%	65.8%	68.6%	53.9%	8.236	39.694	8.667	0.431	12.0%	5.5%
Stdev	15.3%	17.6%	14.5%	17.3%	17.7%	14.9%	17.8%	20.7%	18.2%	9.7%	15.3%	16.4%	16.0%	3.461	40.487	2.342	1.190	10.7%	6.1%
Obs	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36	35	35
Φ(t)	1.00																		
Φ0	**0.78**	1.00																	
Voice	**-0.54**	**-0.37**	1.00																
Politics	**-0.46**	**-0.39**	**0.78**	1.00															
GovtEff	**-0.57**	**-0.38**	**0.84**	**0.84**	1.00														
RegQ	**-0.51**	**-0.35**	**0.87**	**0.87**	**0.95**	1.00													
Law	**-0.61**	**-0.43**	**0.86**	**0.85**	**0.97**	**0.95**	1.00												
Corru	**-0.53**	**-0.35**	**0.86**	**0.83**	**0.97**	**0.96**	**0.97**	1.00											
Environ	-0.15	-0.15	**0.40**	**0.41**	**0.36**	**0.41**	**0.41**	**0.46**	1.00										
Stress	**0.49**	**0.35**	**-0.35**	-0.23	**-0.44**	**-0.40**	**-0.40**	**-0.33**	**0.43**	1.00									
Human	-0.24	-0.05	**0.61**	**0.51**	**0.63**	**0.64**	**0.66**	**0.65**	**0.49**	-0.05	1.00								
Institu	**-0.55**	**-0.41**	**0.89**	**0.71**	**0.76**	**0.75**	**0.81**	**0.77**	**0.38**	**-0.35**	**0.59**	1.00							
Globalss	0.16	0.06	0.00	-0.02	-0.07	-0.11	-0.03	-0.03	-0.04	0.15	-0.09	0.20	1.00						
Polity	-0.29	-0.24	**0.69**	0.30	0.27	**0.36**	**0.35**	0.29	0.18	-0.15	**0.38**	**0.67**	0.00	1.00					
Persist	**-0.54**	**-0.39**	**0.65**	**0.59**	**0.70**	**0.63**	**0.71**	**0.71**	**0.47**	-0.20	**0.47**	**0.61**	-0.10	0.29	1.00				
Democ	-0.31	-0.24	**0.73**	0.33	0.32	**0.41**	**0.41**	0.36	0.18	-0.16	**0.42**	**0.68**	-0.02	**0.99**	**0.35**	1.00			
Autoc	0.23	0.23	**-0.58**	-0.22	-0.15	-0.24	-0.21	-0.15	-0.17	0.13	-0.27	**-0.59**	-0.06	**-0.96**	-0.16	**-0.91**	1.00		
CL100	-0.32	-0.17	**0.37**	**0.37**	0.32	**0.39**	**0.33**	**0.36**	**0.48**	0.14	**0.34**	0.25	-0.17	0.22	0.29	0.24	-0.16	1.00	
NNCL100	**-0.38**	-0.17	**0.45**	**0.33**	**0.35**	**0.42**	**0.36**	**0.40**	**0.39**	0.03	**0.43**	0.31	-0.02	0.30	0.28	0.32	-0.24	**0.87**	1.00

See also Table 1 for a detailed summary of the variables covered in this matrix.

Table 3: OLS regressions

Model	Intercept	Φ_0	Engmo	FRSPmo	Scandmo	Germmo	Latitude	Tropical	Tranplant	Govern	Persist	Democ	Autoc	CL100	NNCL100	R^2
Path Dependence	0.209	0.652														57.4%
	4.063	**6.571**														
Legal Origin	0.308	0.519	-0.047	0.096	-0.025	0.039										63.7%
	1.907	**4.151**	-0.319	0.919	-0.215	0.359										
Endowment	0.284	0.579					-0.143	0.104	-0.013							76.1%
	3.348	**7.171**					-1.055	**2.068**	-0.325							
Governance	0.462	0.541								-0.290						66.5%
	4.686	**5.567**								**-2.905**						
Voice	0.457	0.562								-0.302						65.3%
	4.362	**5.785**								**-2.647**						
Politics	0.375	0.564								-0.199						62.1%
	3.825	**5.358**								**-1.955**						
Government	0.464	0.542								-0.279						67.4%
	4.914	**5.700**								**-3.082**						
Regulation	0.458	0.564								-0.291						65.2%
	4.329	**5.795**								**-2.628**						
Rule of Law	0.482	0.520								-0.299						68.5%
	5.122	**5.443**								**-3.300**						
Corruption	0.413	0.559								-0.224						66.3%
	4.860	**5.854**								**-2.863**						
Political Independence	0.283	0.579									-0.001					63.8%
	4.915	**5.895**									**-2.345**					
Democracy	0.289	0.630										-0.008				58.9%
	3.132	**6.201**										-1.041				
Autocracy	0.211	0.645											0.005			57.6%
	4.020	**6.252**											0.338			
All Cross-Listings	0.258	0.620												-0.281		61.5%
	4.553	**6.353**												-1.802		
NYSE-Nasdaq Cross-Listings	0.263	0.614													-0.630	64.1%
	4.954	**6.524**													**-2.391**	

Table 3: OLS regressions (continued…)

Model	Intercept	Φ_0	Engmo	FRSPmo	Scandmo	Germmo	Latitude	Tropical	Tranplant	Govern	Persist	Democ	Autoc	CL100	NNCL100	R^2
Legal Protection vs.	0.418	0.514								-0.122	-0.001					58.4%
Political Independence	**3.722**	**4.803**								-0.861	-1.579					
Governance (control)	0.437	0.484	-0.010	0.045	0.003	0.024	-0.169	0.089	-0.051	-0.135						71.0%
	2.390	**4.571**	-0.119	0.512	0.029	0.265	-0.922	1.463	-1.016	-0.986						
Political Independence (control)	0.465	0.483	-0.076	-0.027	-0.066	-0.063	-0.193	0.090	-0.069		-0.001					71.5%
	2.522	**4.643**	-0.713	-0.242	-0.574	-0.525	-1.075	1.489	-1.234		-1.184					
Cross-Listings (control)	0.274	0.479	0.039	0.094	0.038	0.035									-0.612	74.2%
	2.070	**4.908**	0.476	1.109	0.405	0.422									**-2.016**	
Legal Protection vs.	0.379	0.455	0.028	0.084	0.031	0.027	-0.023	0.127	-0.056	-0.118					-0.594	74.0%
NYSE-Nasdaq Cross-Listings	**2.154**	**4.482**	0.331	0.976	0.336	0.320	-0.119	**2.079**	-1.184	-0.910					**-1.964**	
Political Independence vs.	0.454	0.437	-0.055	-0.006	-0.055	-0.086	-0.021	0.133	-0.089		-0.001				-0.684	75.8%
NYSE-Nasdaq Cross-Listings	**2.674**	**4.460**	-0.560	-0.062	-0.514	-0.780	-0.118	**2.261**	-1.704		-1.616				**-2.302**	

The first row of each model entry reports the estimated coefficients and the second row reports the t-statistics. See also Table 1 for a detailed summary of the variables used in the OLS regressions.

Table 4: 3SLS regressions

Model	Intercept	Φ_0	Govern	NNCL100	$\Phi(t)$	System Weighted R^2
Happy Life Expectancy						78.9%
Functional Convergence	0.548	0.648	-0.456	-0.335		
	4.67	**6.36**	**-3.57**	-1.51		
Social Desirability	67.581				-30.900	
	12.23				**-2.96**	
Overall Sustainability						71.0%
Functional Convergence	0.593	0.512	-0.417	-0.529		
	6.17	**6.58**	**-3.42**	**-2.31**		
Social Desirability	0.747				-0.359	
	10.02				**-2.61**	
Environmental Sustainability						65.7%
Functional Convergence	0.502	0.544	-0.303	-0.580		
	4.96	6.57	-2.39	-2.38		
Social Desirability	0.780				-0.598	
	5.04				**-2.09**	
Ecosystem Stress						60.1%
Functional Convergence	0.480	0.568	-0.302	-0.408		
	4.33	**6.24**	**-2.22**	-1.50		
Social Desirability	0.299				0.229	
	4.00				1.66	
Human Sustenance						65.2%
Functional Convergence	0.572	0.510	-0.388	-0.498		
	5.46	**5.94**	**-2.98**	**-1.96**		
Social Desirability	0.979				-0.605	
	7.42				**-2.48**	
Institutional Governance						71.4%
Functional Convergence	0.606	0.555	-0.481	-0.356		
	6.27	**7.05**	**-3.94**	-1.54		
Social Desirability	1.163				0.890	
	10.47				**-4.34**	
Global Stewardship						63.3%
Functional Convergence	0.492	0.574	-0.325	-0.377		
	4.49	**6.42**	**-2.41**	-1.42		
Social Desirability	0.541				0.019	
	4.06				0.08	

Table 4: 3SLS regressions (continued…)

Model	Intercept	Φ_0	Govern	NNCL100	$\Phi(t)$	System Weighted R^2
Price to Book						68.3%
Functional Convergence	0.491	0.547	-0.293	-0.536		
	4.62	**6.31**	**-2.22**	**-2.08**		
Social Desirability	2.499				-1.988	
	7.11				**-3.06**	
Debt to Assets						61.1%
Functional Convergence	0.479	0.578	-0.307	-0.416		
	4.31	**6.34**	**-2.25**	-1.53		
Social Desirability	0.176				0.045	
	3.35				0.47	
Asset Growth						65.7%
Functional Convergence	0.548	0.558	-0.391	-0.449		
	5.45	6.79	-3.10	-1.85		
Social Desirability	-0.009				0.095	
	-0.25				1.43	
Capex to Assets						60.7%
Functional Convergence	0.477	0.575	-0.303	-0.394		
	4.29	**6.29**	**-2.23**	-1.45		
Social Desirability	3.623				0.206	
	4.12				0.13	
Total Assets						61.3%
Functional Convergence	0.485	0.576	-0.313	-0.441		
	4.43	**6.39**	**-2.32**	-1.65		
Social Desirability	353.088				-39.112	
	1.66				-0.10	
Earnings to Assets						60.9%
Functional Convergence	0.499	0.572	-0.335	-0.384		
	4.51	**6.27**	**-2.47**	-1.41		
Social Desirability	0.051				-0.003	
	3.11				-0.11	
Return on Assets						60.7%
Functional Convergence	0.514	0.571	-0.356	-0.380		
	4.69	**6.31**	**-2.64**	-1.42		
Social Desirability	4.511				3.563	
	2.20				0.94	
Return on Equity						61.7%
Functional Convergence	0.485	0.578	-0.319	-0.383		
	4.37	**6.32**	**-2.34**	-1.41		
Social Desirability	12.436				-2.820	
	3.60				-0.44	

Appendix 1: Model Derivation

This appendix shows the step-by-step mathematical derivation of the model discussed in Section II.A. Our starting point is the full degree of investor protection for a set of legal and asset governance structures at time t: $F(f(t),x(t)) = \alpha f(t) + \beta x(t)$ where α and β denote the corresponding relative weights attached to $f(t)$ and $x(t)$ that denote 'asset protection' and 'legal protection' respectively. Moreover, we assume that insiders benefit from positive stock ownership of the firm ($0 < \phi < 1$). We scale this term by F/f, or $(\alpha f + \beta x)/f$, to measure the combined degree of legal and asset protections. Thus, the expression $[\phi \cdot (\alpha f + \beta x)/f]$ denotes the benefits of legal and asset protections that are due to 'full' stock ownership. We can extend this expression to capture the benefits of legal and asset protections that are due to any partial stock ownership: $[\phi \cdot (\alpha f + \beta x)/f] \cdot d\phi$ where $d\phi$ denotes a marginal change in share ownership.

As discussed in Section II.A, a marginal change in full protection, dF, can be expressed as a function of a marginal change in the full benefits of legal and asset protections arising from partial inside stock ownership, $[\phi \cdot (\alpha f + \beta x)/f] \cdot d\phi$. We assume this relation to be proportional, with a positive constant k being the proportionality factor ($k > 0$). This characterization leads to (Eq 1):

(Eq 1)
$$dF\big(f(t), x(t)\big) = (-) \cdot \frac{1}{k} \cdot \phi(x(t)) \cdot \left(\frac{\alpha f(t) + \beta x(t)}{f(t)} \right) \cdot d\phi(x(t))$$

We rearrange (Eq 1) as follows:

$$\frac{dF\big(f(t), x(t)\big)}{d\phi(x(t))} = \left(-\frac{1}{k} \right) \cdot \phi(x(t)) \cdot \left(\frac{\alpha f(t) + \beta x(t)}{f(t)} \right)$$

With the substitution of $dF/d\phi = (dF/dx)(dx/d\phi) = \beta dx/d\phi$, we obtain:

$$\frac{dF}{d\phi} = \beta \left(\frac{dx}{d\phi} \right) = \left(-\frac{1}{k} \right) \cdot \phi(x(t)) \cdot \left(\frac{\alpha f(t) + \beta x(t)}{f(t)} \right)$$

(Eq 2)
$$\phi(x(t)) \cdot d\phi(x(t)) = (-)k \left(\frac{\beta f(t)}{\alpha f(t) + \beta x(t)} \right) dx(t)$$

$$\int \phi \cdot d\phi = c_0 + \int (-)k \left(\frac{\beta f}{\alpha f + \beta x} \right) dx$$

where c_0 is an arbitrage constant. Next, we derive the following:

$$\frac{\phi(x(t))^2}{2} = c_0 - \left(\frac{\beta k f(t)}{\beta} \right) \ln\big(\alpha f(t) + \beta x(t)\big)$$

(Eq 3)
$$\phi(x(t)) = \sqrt{c - 2kf(t)\ln\big(\alpha f(t) + \beta x(t)\big)}$$

where $c = 2c_0$. By definition, $\phi(x(t))$ is strictly positive and therefore (Eq 3) holds for plausible values of k, α, and β. Let the initial condition be $\phi(x(0)) = \phi(0) = \phi_0$, we obtain:

$$\phi(x(0)) = \phi(0) = \phi_0 = \sqrt{c - 2kf(t)\ln\big(\alpha f(t)\big)}$$

$$\therefore c = \phi_0^2 + 2kf(t)\ln\big(\alpha f(t)\big)$$

Substituting this result into (Eq 3) yields the following:

$$\phi(x(t))\big|_{\phi(x(0))=\phi(0)=\phi_0} = \sqrt{\phi_0{}^2 + 2kf(t)\ln(\alpha f(t)) - 2kf(t)\ln(\alpha f(t) + \beta x(t))}$$

(Eq 4) $\quad \phi(x(t))\big|_{\phi(x(0))=\phi(0)=\phi_0} = \sqrt{\phi_0{}^2 + 2kf(t)\ln\left(\dfrac{\alpha f(t)}{\alpha f(t) + \beta x(t)}\right)}$

We define $\theta(f(t),x(t))$ as follows:

(Eq 5) $\quad \theta(f(t), x(t)) = 2kf(t)\ln\left(\dfrac{\alpha\, f(t)}{\alpha\, f(t) + \beta\, x(t)}\right)$

Then (Eq 4) becomes the following:

(Eq 6) $\quad \phi(x(t))\big|_{\phi(0)=\phi(x(0))=\phi_0} = \sqrt{\phi_0^2 + \theta(f(t), x(t))}$

where $\theta(f(t),x(t))$ is named the 'convergence determinant'.

Next, we rearrange (Eq 4) to yield a function of legal protection of investor rights at time t, x(t):

(Eq 7) $\quad x(t) = \left(\dfrac{\alpha}{\beta}\right)f(t)\left(e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}} - 1\right)$

We assume that blockholders acquire a percentage of equity in the firm, $\phi^*(t)$, as a response to the socially optimal degree of legal protection of minority shareholder rights, $x^*(t)$, which is defined as $x^*(t) = \max\{x(t); t \in \{1,2,3\ldots\}\}$. In mathematical terms, $x^*(t)$ can be expressed as follows:

(Eq 8) $\quad x^*(t) = \left(\dfrac{\alpha}{\beta}\right)f(t)\left(e^{\frac{\phi_0^2 - \phi^*(t)^2}{2kf(t)}} - 1\right)$

Now we find the equivalent expressions for the degree of full protection of investor rights, $F(f(t),x(t))$, and the socially desirable degree of full investor protection, $F(f^*(t), x^*(t))$:

$$F(f(t), x(t)) = \alpha f(t) + \beta x(t)$$

$$= \alpha f(t) + \beta\left(\dfrac{\alpha}{\beta}\right)f(t)\left(e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}} - 1\right)$$

(Eq 9) $\quad F(f(t), x(t)) = \alpha f(t)e^{\frac{\phi_0^2 - \phi^*(t)^2}{2kf(t)}}$

Similarly, we derive $F(f^*(t),x^*(t))$ as follows:

$$F(f^*(t), x^*(t)) = \alpha f^*(t) + \beta x^*(t)$$

$$= \alpha f^*(t) + \beta\left(\dfrac{\alpha}{\beta}\right)f(t)\left(e^{\frac{\phi_0^2 - \phi^*(t)^2}{2kf(t)}} - 1\right)$$

(Eq 10) $\quad F(f^*(t), x^*(t)) = \alpha\left(f^*(t) + f(t)\left(e^{\frac{\phi_0^2 - \phi^*(t)^2}{2kf(t)}} - 1\right)\right)$

where the socially desirable degree of asset protection of minority shareholder rights, f*(t), is defined as f*(t)=max{f(t); t ∈ {1,2,3…}}. Suppose ξ(t) denotes the gap between the socially desirable degree of full investor protection and the privately efficient counterpart at any point in time:

(Eq 11)
$$\xi(t) = F\big(f*(t), x*(t)\big) - F\big(f(t), x(t)\big)$$

$$= \alpha\, f*(t) + \alpha\, f(t)\left(e^{\frac{\phi_0^2 - \phi*(t)^2}{2\,kf(t)}} - e^{\frac{\phi_0^2 - \phi(x(t))^2}{2\,kf(t)}} - 1 \right)$$

The socially desirable outcome arises from the scenario where ξ(t)=0. Hence, the optimization problem is to minimize ξ(t) with respect to the prevailing level of inside equity ownership for a given degree of legal protection x at time t, φ(x(t)):

$$\min_{\phi(x(t))} \xi(t) = \frac{d\xi}{d\phi}$$

$$= \frac{d\left[\alpha f*(t) + \alpha f(t)\left(e^{\frac{\phi_0^2 - \phi*(t)^2}{2kf(t)}} - e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}} - 1 \right)\right]}{d\phi}$$

$$= \big(-\alpha f(t)\big)\cdot\left(-\frac{2\phi(x(t))}{2kf(t)} \right)\cdot e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}}$$

(Eq 12)
$$\min_{\phi(x(t))} \xi(t) = \left(\frac{\alpha}{k}\right)\cdot \phi(x(t))\cdot e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}}$$

(Eq 12) allows us to examine the property of inside equity ownership around its socially optimal level. In theory, one observes the social optimum at which dξ/dφ is sufficiently close to zero. As discussed in Subsection II.B, (Eq 4) suggests that the level of inside stock ownership for a given degree of legal protection x at time t, φ(x(t)), is expected to be equal to or less than the initial level of inside ownership. More precisely, the exponential term cannot be less than e^0 or unity. It is thus reasonable to view this term as a constant that exceeds unity at time t. (Eq 12) can then be simplified to the following:

(Eq 13)
$$\min_{\phi(x(t))} \xi(t) = k(t)\cdot \alpha \cdot \phi(x(t))$$

where $k(t) = k\, e^{\frac{\phi_0^2 - \phi(x(t))^2}{2kf(t)}}$ is an arbitrary constant at time t.

Appendix 2: Comparative Statics

This appendix reports the comparative statics that we derive from the model discussed in Section II.A and Appendix 1. Our goal is to test for the presence or absence of institutional complementarities. This issue is important because complementarities could define the terrain on which corporate structures may or may not converge over time. Our motivation comes from the belief that investors seek legal and asset protections from share ownership. On the one hand, some see blocks of stock as a substitute for poor protection. In turn, investors benefit from legal and firm-specific arrangements that protect minority shareholder rights. On the other hand, blocks of stock may exclude other investors from legal and asset protections. As a result, this exclusion implies that legal rules and asset endowments may

exhibit weak complementarities. In summary, share ownership poses the implicit link between legal and asset protections, albeit this link is theoretically ambiguous.

We would like to know if an increase in the effectiveness of one mechanism (say, 'legal rules') induces an increase in the effectiveness of the other mechanism ('asset protection') and vice versa. To this end, we work out first-order derivatives and then use these derivatives and other measures to examine if legal and asset protections reinforce each other. In microeconomic terms, we aim to derive the (positive) elasticity of legal protection with respect to asset protection: (dx/x)/(df/f).

By the chain rule, we work out the first-order derivatives, dϕ/dα and dϕ/dβ, using (Eq 4) as a reference guide:

(Eq 4)
$$\phi(x(t)) = \sqrt{\phi_0^2 + 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)}\right)}$$

$$\frac{d\phi}{d\alpha} = \frac{d\phi}{dG_\alpha} \cdot \frac{dF_\alpha}{dE_\alpha} \cdot \frac{dE_\alpha}{dD_\alpha} \cdot \frac{dD_\alpha}{dC_\alpha} \cdot \frac{dC_\alpha}{dB_\alpha} \cdot \frac{dB_\alpha}{dA_\alpha} \cdot \frac{dA_\alpha}{d\alpha}$$

$$= (1) \cdot \left(\frac{1}{2 \cdot \sqrt{\phi_0^2 + 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)}\right)}}\right) \cdot (1) \cdot 2kf(t) \cdot$$

$$\left(\frac{\alpha f(t) + \beta x(t)}{\alpha f(t)}\right) \cdot \left(\frac{-\alpha f(t)}{(\alpha f(t) + \beta x(t))^2}\right) \cdot f(t)$$

(Eq 7)
$$\frac{d\phi}{d\alpha} = (-) \cdot \left(\frac{k f(t)^2}{(\alpha f(t) + \beta x(t)) \cdot \sqrt{\phi_0^2 + 2kf(t)\ln\left(\frac{\alpha f(t)}{\alpha f(t) + \beta x(t)}\right)}}\right)$$

where
$$A_\alpha = \alpha f(t), \; B_\alpha = A_\alpha + \beta x(t), \; C_\alpha = A_\alpha / B_\alpha, \; D_\alpha = \ln(C_\alpha),$$
$$E_\alpha = 2kf(t) \cdot D_\alpha, \; F_\alpha = \phi_0^2 + E_\alpha, \; G_\alpha = \sqrt{F_\alpha}, \qquad \phi = G_\alpha$$

$$\frac{d\phi}{d\beta} = \frac{d\phi}{dG_\beta} \cdot \frac{dF_\beta}{dE_\beta} \cdot \frac{dE_\beta}{dD_\beta} \cdot \frac{dD_\beta}{dC_\beta} \cdot \frac{dC_\beta}{dB_\beta} \cdot \frac{dB_\beta}{dA_\beta} \cdot \frac{dA_\beta}{d\beta}$$

$$= (1) \cdot \left(\frac{1}{2 \cdot \sqrt{\phi_0^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}} \right) \cdot (1) \cdot 2kf(t) \cdot$$

$$\left(\frac{\alpha\,f(t)+\beta\,x(t)}{\alpha\,f(t)} \right) \cdot \left(\frac{\beta\,x(t)}{(\alpha\,f(t)+\beta\,x(t))^2} \right) \cdot x(t)$$

(Eq 8) $\qquad \dfrac{d\phi}{d\beta} = \left(\dfrac{k\,\beta\,x(t)}{\alpha \cdot (\alpha\,f(t)+\beta\,x(t)) \cdot \sqrt{\phi_0^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}} \right)$

where $\qquad A_\beta = \beta\,x(t),\ B_\beta = \alpha\,f(t) + A_\beta,\ C_\beta = 1 - A_\beta / B_\beta,\ D_\beta = \ln(C_\beta),$

$\qquad E_\beta = 2kf(t) \cdot D_\beta,\ F_\beta = \phi_0^2 + E_\beta,\ G_\beta = \sqrt{F_\beta},\qquad \phi = G_\beta$

The sum of the relative weights, $\alpha + \beta = 1$, suggests that $d\beta/d\alpha = -1$. We then use this result and the first-order derivatives as derived in (Eq 7) and (Eq 8) to solve for α and β:

$$\frac{d\alpha}{d\beta} = \frac{d\alpha}{d\phi} \cdot \frac{d\phi}{d\beta}$$

$$= (-) \cdot \left(\frac{(\alpha\,f(t)+\beta\,x(t)) \cdot \sqrt{\phi_0^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}}{k\,f(t)^2} \right) \cdot$$

$$\left(\frac{k\,\beta\,x(t)}{\alpha \cdot (\alpha\,f(t)+\beta\,x(t)) \cdot \sqrt{\phi_0^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}} \right)$$

$$= (-) \cdot \left(\frac{\beta}{\alpha} \right) \cdot \left(\frac{x(t)}{f(t)^2} \right)$$

$$(-1) = (-) \cdot \left(\frac{\beta}{\alpha}\right) \cdot \left(\frac{x(t)}{f(t)^2}\right)$$

$$\beta = \alpha \cdot \left(\frac{f(t)^2}{x(t)}\right)$$

$$1 - \alpha = \alpha \cdot \left(\frac{f(t)^2}{x(t)}\right)$$

$$\alpha = \frac{1}{\left(\frac{f(t)^2 + x(t)}{x(t)}\right)}$$

(Eq 9) $\qquad \alpha = \left(\frac{x(t)}{f(t)^2 + x(t)}\right)$

(Eq 10) $\qquad \beta = \left(\frac{f(t)^2}{f(t)^2 + x(t)}\right)$

The next step is to work out the respective first-order derivatives, dx/dϕ and dϕ/df, using (Eq 2) and (Eq 4) as our guide:

(Eq 2) $\qquad \phi \, d\phi = (-)k \left(\frac{\beta \, f(t)}{\alpha \, f(t) + \beta \, x(t)}\right) dx$

(Eq 11) $\qquad \dfrac{dx}{d\phi} = (-) \left(\dfrac{(\alpha \, f(t) + \beta \, x(t)) \cdot \sqrt{\phi_0{}^2 + 2kf(t)\ln\left(\dfrac{\alpha \, f(t)}{\alpha \, f(t) + \beta \, x(t)}\right)}}{\beta \, k \, f(t)} \right)$

(Eq 4) $\qquad \phi(x(t)) = \sqrt{\phi_0{}^2 + 2kf(t)\ln\left(\dfrac{\alpha \, f(t)}{\alpha \, f(t) + \beta \, x(t)}\right)}$

$$\frac{d\phi}{df} = \frac{d\phi}{dG_f} \cdot \frac{dF_f}{dE_f} \cdot \frac{dE_f}{dD_f} \cdot \frac{dD_f}{dC_f} \cdot \frac{dC_f}{dB_f} \cdot \frac{dB_f}{dA_f} \cdot \frac{dA_f}{df}$$

$$= (1) \cdot \left(\dfrac{1}{2 \cdot \sqrt{\phi_0{}^2 + 2kf(t)\ln\left(\dfrac{\alpha \, f(t)}{\alpha \, f(t) + \beta \, x(t)}\right)}} \right) \cdot (1) \cdot 2kf(t) \cdot$$

$$\left(\frac{\alpha\,f(t)+\beta\,x(t)}{\alpha\,f(t)}\right)\cdot\left(\frac{-\alpha\,f(t)}{(\alpha\,f(t)+\beta\,x(t))^2}\right)\cdot\alpha$$

(Eq 12) $\qquad \dfrac{d\phi}{df} \quad = \left(\dfrac{-\alpha\,k\,f(t)}{(\alpha\,f(t)+\beta\,x(t))\cdot\sqrt{\phi_0{}^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}}\right)$

where $\qquad A_f = \alpha\,f(t),\ B_f = A_f + \beta\,x(t),\ C_f = A_f / B_f,\ D_f = \ln(C_f),$

$\qquad E_f = 2kf(t)\cdot D_f,\ F_f = \phi_0{}^2 + E_f,\ G_f = \sqrt{F_f}\,, \qquad \phi = G_f$

The final step is to solve for dx/df = (dx/dφ) (dφ/df). This step entails an inverse function, x=g⁻¹(φ), for the corresponding function, φ=g(x), where g(.) is a function that maps a given level of legal protection to the optimal level of share ownership required as a response to that level of legal protection.

$$\frac{dg}{dx}\times\frac{dg^{-1}}{d\phi}=1 \ \Rightarrow\ \frac{dx}{d\phi}=\frac{dg^{-1}}{d\phi}=\frac{1}{dg/dx}=\left(\frac{dg}{dx}\right)^{-1}$$

$$\frac{dx}{d\phi}\frac{d\phi}{df}=\left(\frac{dg}{dx}\right)^{-1}\times\frac{d\phi}{df}=\frac{d\phi/df}{d\phi/dx}=\frac{dx}{d\phi}\times\frac{d\phi}{df}$$

We now solve for dx/df = (dx/dφ) (dφ/df), using both (Eq 11) and (Eq 12):

$$\frac{dx}{df} \quad = \frac{dx}{d\phi}\cdot\frac{d\phi}{df}$$

$$= (-)\left(\frac{(\alpha\,f(t)+\beta\,x(t))\cdot\sqrt{\phi_0{}^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}}{\beta\,k\,f(t)}\right)$$

$$\left(\frac{-\alpha\,k\,f(t)}{(\alpha\,f(t)+\beta\,x(t))\cdot\sqrt{\phi_0{}^2 + 2\,kf(t)\ln\left(\dfrac{\alpha\,f(t)}{\alpha\,f(t)+\beta\,x(t)}\right)}}\right)$$

$$= \left(\frac{\alpha}{\beta}\right)$$

(Eq 13) $$\frac{dx}{df} = \left(\frac{x(t)}{f(t)^2} \right) > 0$$

(Eq 13) suggests that legal and asset protections are indeed complementary mechanisms. Alternatively, we derive the elasticity of legal protection with respect to asset protection: $(dx/x)/(df/f) = 1/f(t) > 0$. This result implies that the effectiveness of legal protection is likely to increase by $1/f(t)$ percent in response to a one-percent increase in the effectiveness of asset protection.