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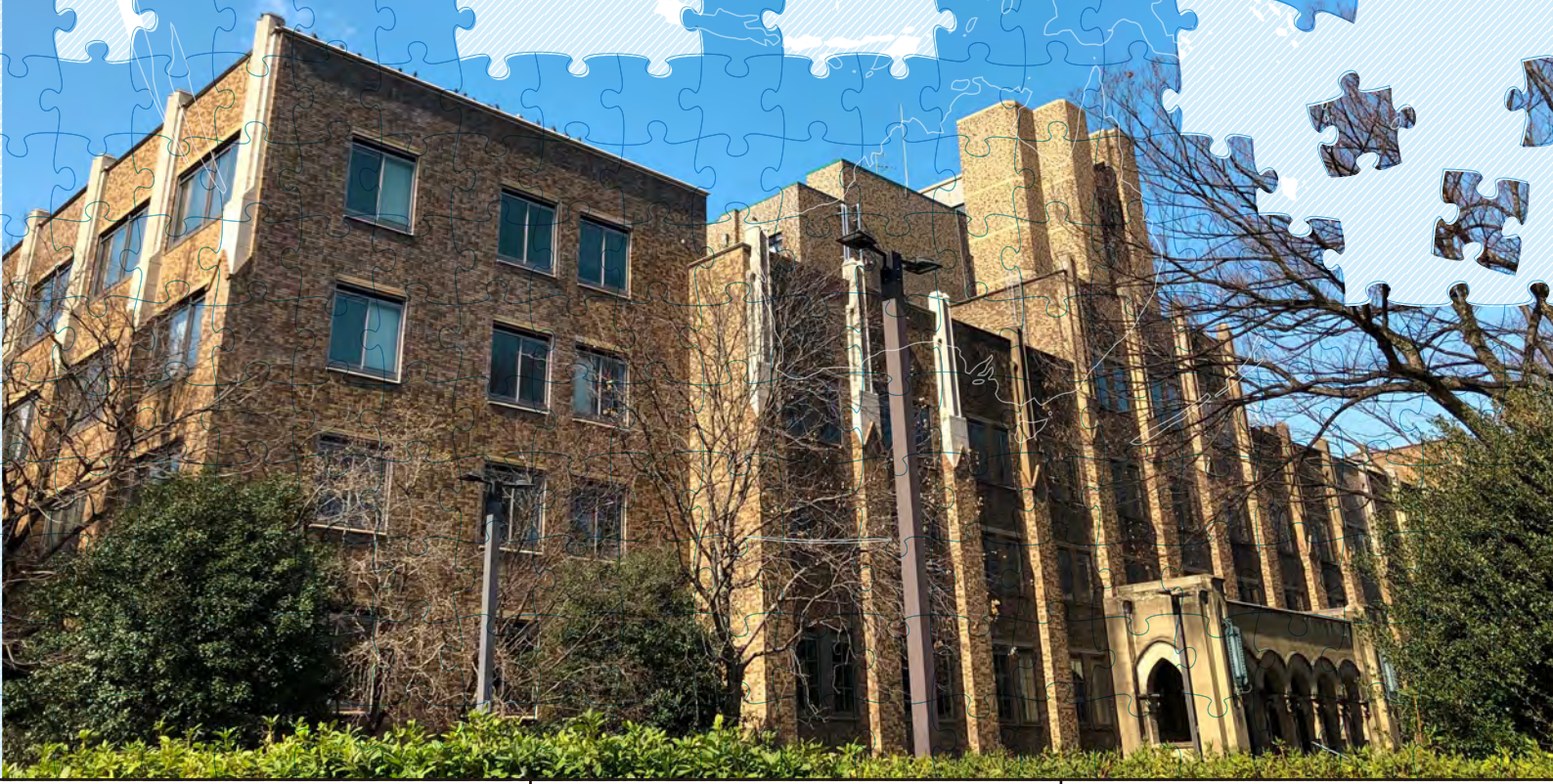

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Ownership Concentration or Market Efficiency?

Tackling Managerial Moral Hazards in Emerging Japan

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Abstract

We present a framework through which to analyze the impact of ownership structure on stockholder/manager conflicts. We first predict that in an inefficient market, investors motivate managers to pursue a higher return on equity instead of a higher return on assets and that this focus on short-term performance leads to leverage distortion. Using a sample of late-nineteenth-to-early-twentieth-century Japanese firms, we show that mediocre- and poorly performing firms tended to increase their return on equity through bond flotation and that a higher president-ownership concentration increased the return on assets and curbed the excessive use of bond leverage in the inefficient Japanese capital market. President-ownership concentration offsets market inefficiency.

Keywords: stockholder/manager conflicts; multitask moral hazard; ownership structure; self-fulfilling distortion; skewness-adjusted variation coefficient.
JEL Codes: G32; L23; O16; K22

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1 Introduction

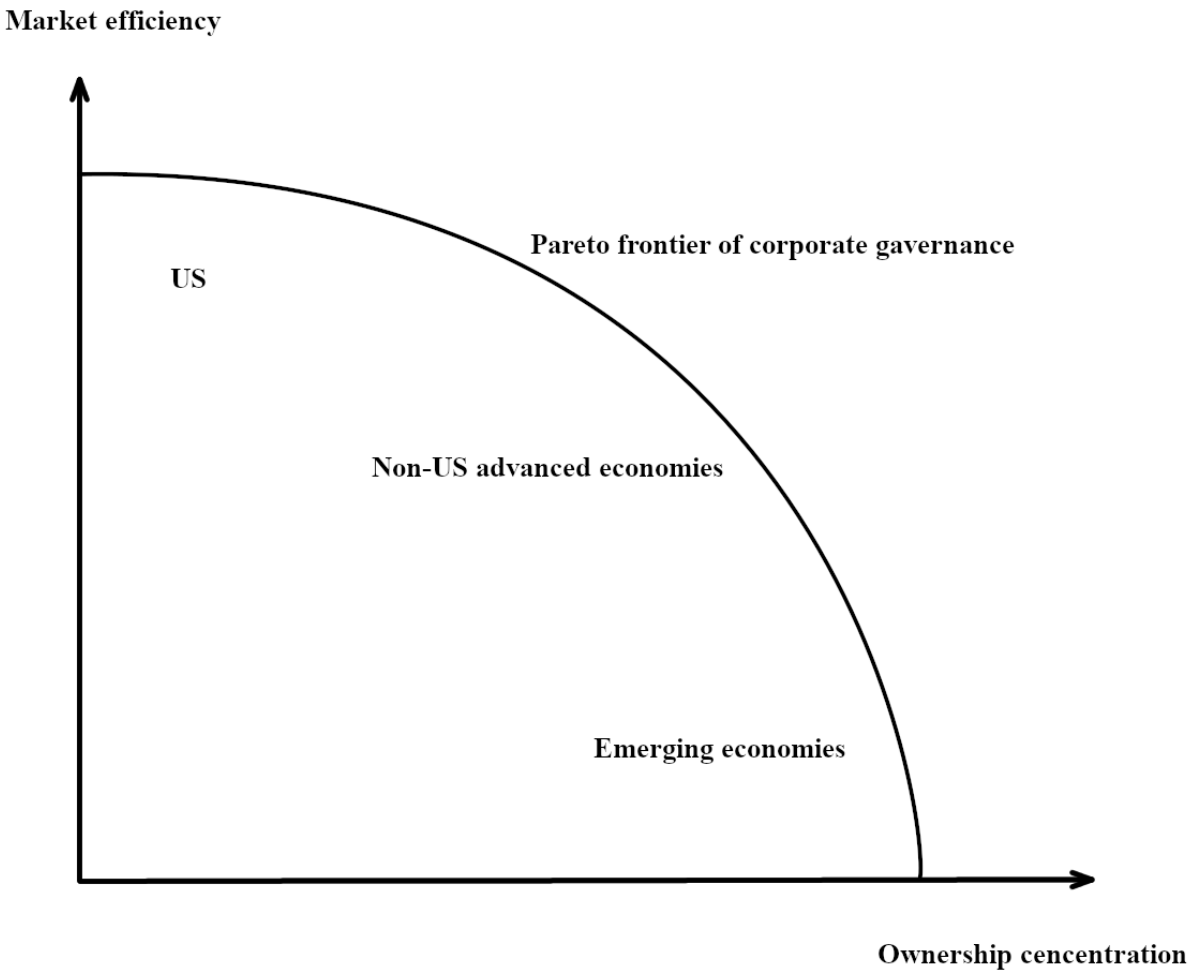
While commercial banking, such as discounting promissory notes issued by a seller to a buyer, is backed by trades of existing commodities, corporate finance is essentially an investment in something that does not yet exist and is thus in the future. The risk of moral hazards in this context is accordingly higher. Regarding this point, Adam Smith pessimistically predicted that the decentralization of ownership in the form of joint stock companies would result in moral hazards among managers and lead to poor company performance (Smith, 1937, 699–799), and the pessimism was widely shared in England in the early nineteenth century (Taylor, 2006, 32–37). However, if equity markets are perfectly efficient, any firms that are undervalued in terms of their physical and human assets due to poor management are acquired by potential managers. This possibility disciplines existing managers, and if they fail, their firms are acquired by other potential managers. Therefore, in contrast to Smith's prediction, capital structure does not affect the performance of firms, as demonstrated by Demsetz and Lehn (1985). The argument made by Demsetz and Lehn (1985) holds for US-listed firms (Himmelberg et al., 1999; Demsetz and Villalonga, 2001).

However, in Europe and Japan, capital structure is associated with firm performance, and centralized ownership tends to improve performance, as predicted by Smith (1937) (Lichtenberg and Pushner, 1994; Morck et al., 2000; Gedajlovic and Shapiro, 2002; Davies et al., 2005; Laeven and Levine, 2008; Ben-Nasr et al., 2015; Pindado et al., 2014; Hamadi and Heinen, 2015). Furthermore, in Japan, family firms outperform other firms, given possible adoption of nonconsanguineous sons as heirs for the continuity of family businesses, which is a tradition passed down from early modern times (Mehrotra et al., 2013). Not surprisingly, ownership structure affects corporate performance in emerging economies (Abdallah and Ismail, 2017; Haider et al., 2018).

In summary, either ownership concentration or market efficiency can drive efficient

resource allocation within firms. If markets are not efficient enough, Smith (1937) would be right. If markets are efficient enough, Demsetz and Lehn (1985) would be right. Emerging economies fall into the category of the former, while the US is placed in that of the latter. Ordinary advanced economies such as Europe and Japan are situated between them. Depending on the degree of market inefficiency referred to by Smith (1937), ownership concentration is important in terms of offsetting inefficiency to approach the Pareto frontier of corporate governance, as depicted in Figure 1.

Figure 1: Pareto frontier of corporate governance composition.



In practice, if the moral hazards of managers cause any distortion, the most likely outcome is a manipulation of leverage to mechanically, or artificially, increase returns on equity. In this chapter, we theoretically predict that if managers are risk averse and markets are inefficient, less concentrated ownership leads to leverage distortion through more debt than is optimal, and investors encourage this phenomenon in a self-fulfilling way to decrease the risk premium compensation paid to managers; moreover, president-ownership concentration, in contrast, leads to the pursuit of higher returns on assets with smaller leverage distortions.

Among the industries leading Japan's industrialization, the cotton-spinning and railway industries raised funds from the stock markets as publicly listed companies. The railway industry needed to raise funds for its high fixed initial costs. The cotton-spinning industry had to compete with its mature British and Indian competitors, so starting with large factories and financing them through stock issuance was essential. Thus, capital structure and market efficiency were critical issues for Japan's industrialization.

Using the data of all the firms listed on the Tokyo Stock Exchange from 1878 to 1910, we empirically demonstrate that the ownership decentralization of poorly performing firms led to leverage distortion through more-than-optimal bond flotation to mechanically increase returns on equity, the short-term indicator of performance, and that in contrast, president-ownership concentration implied the pursuit of higher returns on assets rather than returns on equity, without distorting leverage. The managerial moral hazard predicted by Smith (1937) existed as a threat because of market inefficiency, and thus, ownership concentration played an important role in setting off inefficiency at the dawn of Japanese capitalism. Concentrated ownership among founding presidents helped contain possible managerial moral hazards, as presented in this chapter.

The abovementioned issue is surely the most relevant for emerging economies, such as Japan, whose institutions are yet to be established, from the late nineteenth to the early twentieth centuries. Thus, this chapter tracks changes in ownership structure, financial

leverage, performance, and market valuation during Japanese modernization. To do this, we construct a dataset of all firms listed on the Tokyo Stock Exchange from 1878 to 1910 by collecting financial statement data. In the late nineteenth century, Japan was one of the early cases of non-US nations that succeeded in nurturing a capitalist economy.

We consider the possibility of leverage distortion by nonowner-managers to manipulate the return on equity (ROE), instead of maximizing the return on assets (ROA), in the short term. For a focused and practical prediction, we deploy a multitask moral hazard model tailored to managerial incentives. Shareholders can use two proxies—ROE and ROA—to measure nonowner-managerial performance. Shareholders may want to motivate nonowner-managers via performance-based payments based on evaluation by the above proxies. Moreover, managers can reduce ROE variance via leverage distortion. This composes a shareholder maximization problem. Let us suppose a sufficiently inefficient and large market, where investor information asymmetry is severe and shareholders cannot govern each other through relational contracts. Then, it can be optimal for shareholders to reward ROE instead of ROA and save the risk premium to be paid to risk-averse nonowner-managers. Although the moral hazard of nonowner-managers is predictable, anonymous shareholders do not contain but rather encourage it in a self-fulfilling way.

The remainder of this paper is organized as follows. Section 2 briefly describes the historical development of Japanese corporate finance under the corporate law modeled on German law. Section 3 introduces the related literature. Section 4 presents a model with which to capture the degree of self-fulfilling financial leverage distortion by strategic interactions between shareholders and risk-averse managers under the separation of ownership and management. Thus, among the possible stockholder/manager conflicts discussed by Jensen (2000), we focus on leverage distortions. We propose a few hypotheses to be empirically tested. We predict that nonowner-managers have incentives to raise

more than the optimal amount of leverage. Moreover, in an inefficient market with information asymmetry about nonowner-manager actions, investors encourage leverage distortion to save the risk premium to be paid as part of compensation for risk-averse nonowner-manager compensation. Section 5 describes the dataset. Section 6 examines whether ownership structure affects performance and how the market rewarded corporate performance. We also test whether the enactment of the Commercial Code of 1899 affected the impact of ownership structure on performance. Section 7 focuses on bond flotation distortion. Section 8 discusses the results and concludes the paper.

2 Retrospection in German–Japanese resemblance

After the Meiji Restoration of 1868, the Japanese government adopted civil law from continental Europe. The Commercial Code of 1899, modeled on German law, completed modernization of corporate law. The rising power of Germany inspired Japan's modernization in the adoption of the German-style constitution from 1890 to 1945 and the German-style commercial code from 1899 to date. The effort at taking inspiration from Germany included the establishment of the Industrial Bank of Japan in 1897 to support crucial industries with a government debt guarantee (Lehmbruch, 2001; Vitols, 2001). This shared legal foundation is a basis for the establishment of corporate governance features that emphasize not only shareholder value but also stakeholder interests in contemporary civil law countries, such as Japan, Germany, and France (Shleifer and Vishny, 1997; Tirole, 2001; Salazar and Raggiunti, 2016).

However, we cannot characterize the challenges faced by Germany, Japan and other emerging powers from the late nineteenth century to the early twentieth century only via an effort to achieve domestic industrialization of a small, closed economy. In the first age of globalization from the 1870s to the 1910s (Mauro et al. (2006), 1–45; Thomadakis et al. (2017); Betrán and Huberman (2016); Varian (2018)), the internationalization of

financial markets—the well-integrated international financial markets centered around the London market and efficient cross-border capital flow—as well as the free trade of goods was also of vital importance. Japan embraced the advantage of the imposed free trade (Nakabayashi, 2014; Kawashima, 2018) and, furthermore, adopted the gold standard (Mauro et al. (2006), 49–54; Nakabayashi (2012)).

Before the First World War, the financial markets of the industrial world were even more deeply integrated, and cross-border capital flow was active (Rajan and Zingales, 2003; Mauro et al., 2006). National financial markets were well embedded in such international financial markets and presented minor differences. Before the First World War, the German economy was competitive and market oriented rather than coordinative, and its civil law characteristics did not influence corporate finance and governance in the country (Fohlin, 2007; Burhop and Lübbers, 2009).

Japanese and German corporate governance began to change gradually after the First World War and in earnest during the Second World War. Cartels gained bargaining power in Weimar Germany when the state direction was combined with property relationships and brought about a "social market economy" in the Federal Republic of Germany. Similarly, state coordination was institutionalized in Japan during the Second World War, and postwar Japan inherited state-guided characteristics through "industrial policies." The transformations in Japan and Germany accompanied a rise in the role of the banking sector in corporate finance under the stringent regulations introduced in the 1920s and 1930s, and that mode of corporation financing survived until deregulation in the 1980s (Okazaki, 1999; Jackson, 2001; Vitols, 2001; Ferguson and Voth, 2008).

Thus, the distinction between common law countries, represented by the US and the UK, and civil law countries, represented by Japan and Germany, became significant because of structural changes from the 1920s to the 1940s, when the latter formed the Axis. While the Axis shared legal origins dating back to the late nineteenth century, the heterogeneity of the industrial world was smaller in the integrated international financial

markets under British dominance before the First World War.

Therefore, we begin our study not from La Porta et al. (2008)'s view on the post-Second World War divide between common law and civil law countries but from a data-driven approach. As we later demonstrate, until the early twentieth century, the Japanese market was not efficient; hence, ownership structure was important. The difference between the common law and civil law distinctions is inconsequential to this fact.

The Japanese experience, particularly in the period when the separation of ownership and management according to Berle and Means (1933) and Chandler (1977) was underway, is a promising case to understand the evolution of non-Western capitalism. Japan transformed itself from a samurai nation to a modern capitalist economy, without sharing history with the West. After toppling the Shogunate in 1868, the new imperial government began its modernization efforts. In 1878, the Tokyo Stock Exchange and the Osaka Stock Exchange were established. Furthermore, the Commercial Code of 1899 stipulated legal requirements for a joint-stock company and standardized financial statement forms. More information became publicly available and prompted the further expansion of the stock and bond markets.

Beginning in the late nineteenth century, Japanese corporate finance and governance experienced two distinct phases. The first phase was the entrepreneurial boom of the mid-1880s. The cotton-spinning, railway, and other modern industries incurred massive initial expenses by taking the form of joint-stock companies, issuing corporate shares while relying on bank loans. The second phase was a reduction in the degree of bank loan reliance and an increase in bond flotation from the late 1890s (Hoshi and Kashyap, 2001, 15–50). Furthermore, from the late 1890s, senior employees began to climb to management positions and be promoted to board members. The functional diversification of the board toward professional management meant that shareholders faced the possibility of managerial moral hazard.

Studies on advanced nations' experiences in the nineteenth and early twentieth centuries,such as Borg et al. (1989), Leeth and Borg (1994, 2000), and Banerjee and Eckard (2001) on the US, Franks et al. (2006) and Kling (2006) on Germany, and Hamano et al. (2009) on Japan, along with this chapter, also provide us with contemporary policy implications. The financial markets of advanced economies were tightly regulated until the 1980s. Many regulations in advanced economies were introduced in response to the collapse of financial markets, followed by the Great Depression in the 1930s. Amid the Great Depression, advanced nations tightened their corporate finance regulations, reckoning that the market failure was caused by severe market distortion due to information asymmetry. For example, the US enacted the Securities Act of 1933 and the Securities Exchange Act of 1934, which led to the creation of the Securities and Exchange Commission and established the Generally Accepted Accounting Principles in the 1930s. Among advanced nations, regulations in Japan and Germany were made particularly stringent; under the tightened regulations, the banking sector replaced the stock and bond markets as the primary source of corporate finance.

In the US, the more stringent banking sector regulations induced households to reallocate financial assets from banks to brokerage accounts in the 1970s. Banks demanded deregulation, which led to disintermediation and brokerage-banking reconvergence from the 1980s to the 1990s. The development of information and communication technologies that improved financial market efficiency validated this deregulation.

Other advanced nations have followed the US's experience since the 1980s. In the reform efforts of Japan and Germany, a cornerstone has been stock and bond market deregulation, which, along with the subsequent disintermediation from the 1980s, meant the recovery of pre-Great Depression direct finance. Borg et al. (1989), Leeth and Borg (1994, 2000), Banerjee and Eckard (2001), Franks et al. (2006), Kling (2006), Hamano et al. (2009), and Nakabayashi (2017), among others, were carried out on the pre-Great Depression stock markets of advanced nations. Likewise, cross-country overviews such as

La Porta et al. (2008) provide regulatory alternatives. However, the following most basic questions is not addressed: Did the market discipline work or did ownership structure complement a potentially imperfect market under lighter regulations in each nation before the Great Depression?

Most nations have implemented structural reforms to recover vibrant stock and bond markets without being conscious of how markets work under lighter regulations, to what extent they were distorted due to asymmetric information, and to what extent the ownership structure complemented the potentially imperfect market in the period before the Great Depression. This study attempts to lay a foundation for understanding the origin of the Japanese capital market alongside previous works on preregulated markets. Reflecting on Japan's century-old experiences of ownership structure changes can provide meaningful lessons regarding Japan's ongoing structural reforms as well as those of other nations.

3 Relevant literature

When residual claimants do not directly perform residual control, moral hazards such as the managerial exploitation of shareholders may arise (Smith, 1937, 699–799). Such moral hazards may come in the form of stockholder/manager conflicts Smith (1937), which were revisited by Jensen and Meckling (1976), Byrd et al. (1998) and Parrino et al. (2005). Furthermore, such moral hazards may come in the form of stockholder/bondholder conflicts by controlling shareholders, who are often founders, as highlighted by Jensen and Meckling (1976). This effect is expected to be severe when controlling shareholders do not invest "real capital" in the firm (Morck et al., 2005).

To remedy moral hazard, an active secondary market for corporate shares should be in place (Holmstrom and Tirole, 1993). The threat of the acquisition and replacement of managers is expected to discipline current managers, as has been argued since the

works of Jensen and Meckling (1976) and Fama (1980).

Arising from this view is questioned the importance of ownership structure for corporate governance because the discipline by an efficient stock market would prevent moral hazard regardless of ownership structure. Demsetz and Lehn (1985) indeed rejected a possible relationship between ownership concentration and performance for major US-listed firms, which was later supported by Himmelberg et al. (1999) and Demsetz and Villalonga (2001). Using US data, Anderson and Reeb (2003) did not find evidence for minority shareholder exploitation by founding owner-managers. Helwege et al. (2007) described the evolution of listed firms via a 1970–2001 US initial public offering dataset and reported that better performers became more widely held after being listed and that agency costs did not significantly affect ownership structure evolution.

Meanwhile, as Shleifer and Vishny (1986), Bolton and Scharfstein (1996), Mahrt-Smith (2005), Gorton and Kahl (2008), Aslan and Kumar (2012), and Dhillon and Rossetto (2015), among others, predict, there is ownership structure diversity among US firms, and thus, there must be a rationale for this diversity. The empirical results on the irrelevance of the difference in ownership structure do not contradict such theoretical predictions and the reality of diversity. Let us consider an efficient market. A sufficiently efficient market implies market participation capitalizing on price distortion and resource reallocation through arbitrage transactions. Thus, at equilibrium, we observe multiple ownership structure types but hardly find significant differences in performance among them. These results do not deny that ownership structure may affect corporate behaviors in the US like risk taking (Abugri and Osah, 2021). Additionally, in oligopolistic sectors, concerns due to diffuse ownership are suggested (Basu et al., 2199). However, regarding performance as a result of certain behaviors, we do not have significant evidence of associations between ownership structure and performance in the US.

In contrast to the US results on the irrelevance of ownership structure on corporate performance, Davies et al. (2005), using British data, reported a codeterministic relation-

ship between ownership structure and performance. A characteristic of the continental European ownership structure is blockholding (Enriques and Volpin, 2007). However, the structural implications are mixed. Using European data, Laeven and Levine (2008) showed that multiple blockholders help prevent managers from exploiting small shareholders, which indicates that ownership structure is important for performance. Using French data, Ben-Nasr et al. (2015) demonstrated that ownership structure is associated with financial leverage; that is, firms with larger ownership-management divides are prone to extended debt maturity, whereas the presence of multiple blockholders curbs such distortions. More broadly, using data from 44 major economies, Eugster and Wang (2023) reported that there is a negative association between ownership concentration and stock price crash risk. The positive contribution of concentrated ownership is factored into stock market prices. Although Franks and Mayer (2001), using German data, denied the ownership structure effect on performance, their results did not necessarily contradict the hypothesis of Laeven and Levine (2008). The banking sector has dominated German corporate finance, although this has been gradually changing over the last two or three decades (Ringe, 2015). If banks' monitoring is effective enough to curb managerial moral hazard, then it also lessens the possible impacts due to differences in ownership structure on corporate performance.

Pindado et al. (2014), using Western European data, extracted an inverse U-shaped relationship between the ownership concentration and performance of family firms; performance increases to a threshold in ownership concentration and decreases beyond that threshold. In nonfamily firms, compared to family firms, ownership power is more favorable. Hamadi and Heinen (2015), using Belgian data, reported that the market valuation of nonfamily firms tends to monotonically increase with the degree of ownership concentration, whereas this relationship is inversely U-shaped in family firms.

Furthermore, economic development and institutional quality of financial markets tend to be saliently associated particularly in emerging economies (Pradhan et al., 2023).

Indeed, Abdallah and Ismail (2017), using data from the Gulf Cooperation Council, also showed that a smaller ownership concentration should be accompanied by better governance to achieve the same performance. Using Malaysian data, Alhadi et al. (2020) reported that managerial ownership contributed to corporate performance.

Japan is no exception among such non-US economies. After Japan surrendered in the Second World War, the US attempted to transform Japan's market into a "widely held" market, such as that in the US, by procuring conglomerate corporate shares and selling them to small investors and corporate employees. As a result, Japan became a "widely held" market along with the US and the UK (La Porta et al., 1999).

In contrast to the US, however, diffused ownership did not nullify ownership discipline. Lichtenberg and Pushner (1994) reported a positive relationship between insider ownership concentration and performance. Morck et al. (2000) validated this result by showing that managerial ownership monotonically contributed to corporate valuation. While postwar Japan-specific factors such as the main bank system made the relationship relatively ambiguous (Gedajlovic et al., 2005), the overall tendency was that more concentrated managerial ownership was positively correlated with better performance (Gedajlovic and Shapiro, 2002). Using data from the 2000s, Aman and Nguyen (2013) reported that institutional ownership improved corporate credit ratings. Sakawa and Watanabel (2018), using data from the late 2000s to the early 2010s, demonstrated that parent firm control contributed to the growth of subsidiary firms. Thus, despite the US's experiment to transform the Japanese market into one like that of the US, there was a positive relationship between ownership concentration and performance and valuation, as is the case in advanced non-US economies.

The differing observations between the US and non-US countries indicate that the significance of ownership structure is dependent on a condition that the US satisfies but others do not—a sufficiently efficient market. Let us summarize the observations of previous works on the two dimensions of market efficiency and ownership concen-

tration. To approach the Pareto frontier of corporate governance on the plane, firms must be traded in a perfectly efficient market, be exclusively owned, or be between these extremes. As depicted in Figure 1 above, the US is in the northwest of the plane, emerging economies dominated by conglomerates are in the southeast, and advanced non-US economies are located between them. As an economy is distant from the Far West, discipline by concentrated ownership is more important in the economy to attain the same level of governance efficiency.

The less efficient the market is, the greater the ownership concentration must be to offset inefficiency and curb distortion. In particular, we share a common concern with Parrino et al. (2005) about stockholder/manager conflicts under managerial risk aversion. While Parrino et al. (2005) evaluated possible distortions in investment decision with the leverage as given, we focus on possible leverage distortions by risk-averse managers.

4 Model

4.1 Model of self-fulfilling leverage distortion

Among the possible stockholder/manager conflicts mentioned by Jensen (2000), we focus on leverage distortions by risk-averse managers. We make predictions by applying Holmstrom and Milgrom (1991)'s multitask principal–agent model to the context of an undesirable self-fulfilling equilibrium in an imperfect market (Diamond and Dybvig, 1983; Goldstein and Pauzner, 2004; Kunieda and Shibata, 2016).

For simplicity, we consider an extreme case where managers do not own shares. Assuming a two-dimensional task for a manager, the first dimension, t_1, is to increase ROE, and the second dimension, t_2, is to increase ROA. We standardize managerial human resource endowment as 1 such that $t_1 + t_2 = 1$. Let C denote the total personal cost incurred by the manager. We assume that the effort costs to increase ROE and ROA

are identical. We further assume that C is strictly convex such that $C_{11}C_{22} - C_{12}^2 > 0$, where $C_{11} \equiv \partial^2 C/\partial t_1^2$, $C_{22} \equiv \partial^2 C/\partial t_2^2$, and $C_{12} \equiv \partial^2/\partial t_1 \partial t_2$. The identical costs in both dimensions imply that $C_{11} = C_{22}$. Thus, under the strict convexity assumption, $C_{11} = C_{22} > C_{12}$. Note that we do not exclude the possibility of efforts in both dimensions being complements such that $C_{12} < 0$.

Let B_1 and B_2 denote the marginal effort contribution in each dimension such that $B_1 \equiv \partial \text{ROE}/\partial t_1$ and $B_2 \equiv \partial \text{ROA}/\partial t_2$, respectively. For simplicity, we assume that the marginal contributions of the first-best efforts for both ROA and ROE are identical and standardized such that $B_1 = B_2 = 1$. The following theoretical predictions also hold when allowing $B_1 \neq B_2$. Given the random market shock, we assume that ROE and ROA are realized such that $\text{ROE} = t_1 + \epsilon_1$ and $\text{ROA} = t_2 + \epsilon_2$, respectively, where $\epsilon_1 \sim N(0, \sigma_1^2)$, $\epsilon_2 \sim N(0, \sigma_2^2)$, and $\epsilon_1 \epsilon_2 \equiv \sigma_{12}$.

We further assume that the manager is risk averse such that his or her utility function is approximated by an absolute-constant-risk-averse utility function (Pratt, 1964; Arrow, 1971; Holmstrom and Milgrom, 1987), $u(w - C) = 1 - \exp[-r(w - C)]$, where w is the remuneration and r is the constant absolute risk-averse coefficient. Conventional wisdom encourages managers to be risk tolerant. However, as many empirical works have shown, managerial compensation in contemporary US firms is largely designed to reduce the degree of risk taken by managers (Blanchard et al., 1994; Murphy, 1999; Kraft and Niederprüm, 1999; Bertrand and Mullainathan, 2001). The most persuasive explanation of this phenomenon is that managers are risk averse by nature (Murphy, 2002).

Since Knight (1921), the essential role of managers has been considered bearing risk and uncertainty, which is transformed into subjective risk (Savage, 1954). This argument is not inconsistent with the emphasis on the risk aversion of managers. Firms that take greater risks tend to make massive payments to firm executives, notably in the US. Managerial compensation is to marginally increase if managerial utility marginally

diminishes over remuneration, that is, if their utility function is concave. The concavity of the utility function is equivalent to the risk aversion of the agent, and the curvature of the utility function is the measure of risk aversion if the agent's utility function follows the von Neumann–Morgenstern utility function (von Neumann and Morgenstern, 2007, 15–31).

For simplicity, we temporarily assume that $\mathrm{E}[\mathrm{ROE}] = \mathrm{E}[\mathrm{ROA}]$ under no leverage distortion. In a perfect market under symmetric information, any financial leverage distortion is impossible. Hence, $\sigma_1^2 = \sigma_2^2$ and $\sigma_{12} = 1$ since random shock arises only in terms of the current profit—the common numerator. However, in an imperfect market, managers can mechanically stabilize or increase ROE by manipulating leverage and withholding information about such manipulation.

Suppose that the market evaluates managers in terms of ROE and ROA, the latter of which is not manipulable by financial leverage, and that the market is inefficient. Then, risk-averse managers distort the distribution of manipulable ROE such that $\sigma_1^2 < \sigma_2^2$ and $\sigma_{12} < 1$ and its expected value is greater than that of ROA. We see this type of manipulation of ROE and greater reliability of ROA in emerging markets whose transparency is still yet to be completely realized (de Wet and du Toit, 2007; Mahor and Amit, 2023). However, this issue also arises in advanced economies (Bergstresser et al., 2006). Japan's early-stage experience should provide practical lessons to contemporary investors.

Note that for shares to be actively traded and for sufficient liquidity to be maintained, the market needs a sufficient number of "uninformed" investors who know only publicly available information (Kyle, 1985; Admati and Pfleiderer, 1988; Collin-Dufresne and Fos, 2016).

For analytical simplicity, we proceed with holding the assumption that $\mathrm{E}[\mathrm{ROE}] = \mathrm{E}[\mathrm{ROA}]$, $\epsilon_1 \sim N(0, \sigma_1^2)$, and $\epsilon_2 \sim N(0, \sigma_2^2)$, $\epsilon_1 \epsilon_2 \equiv \sigma_{12}$. Relying on the liquid market's monitoring power (Holmstrom and Tirole, 1993), to motivate risk-averse managers, their

compensation is designed to reflect stock prices, either directly through stock options or indirectly through bonuses. We standardize the compensation schedule as follows:

$$w = \alpha + \text{STP} = \alpha + \beta_1 \text{ROE} + \beta_2 \text{ROA} = \alpha + \beta_1(t_1 + \epsilon_1) + \beta_2(t_2 + \epsilon_2), \tag{1}$$

where STP is the firm's stock price and α is the minimum transfer that satisfies the individual rationality constraint by equality. We obtain the following lemma (see the Mathematical Appendix for the derivation and proof).

Lemma 1. *Self-fulfilling distortion:*

(i) In an efficient market, the incentive is not distorted.

(ii) In an inefficient market, the incentive is distorted toward an overemphasis on ROE.

(iii) Distortion increases with the degree of market inefficiency.

Specifically, successful reduction in ROE risk through managerial leverage distortion implies a decrease in the variance in ROE compared with that in ROA, being standardized by the expected value and skewness (Kraus and Litzenberger, 1976; Scott and Horvath, 1980; Adrian and Rosenberg, 2008; Conrad et al., 2013). That is, $(\sigma_1/\text{E}[\text{ROE}])\,|\gamma_1| < (\sigma_2/\text{E}[\text{ROA}])/\,|\gamma_2|$, where σ_1 and σ_2 are standard deviations and $\gamma_1 \equiv \text{E}\left[(\text{ROE} - \text{E}[\text{ROE}])^3\right]/\sigma_1^3$ and $\gamma_2 \equiv \text{E}\left[(\text{ROA} - \text{E}[\text{ROA}])^3\right]/\sigma_2^3$ are the skewness of ROE and ROA, respectively.

4.2 Skewness-adjusted variation coefficient: A measure of market distortion

Thus, the above statement can be described by variances standardized by the mean and the third-order central moment or, equivalently, by the skewness-adjusted variation

coefficients, instead of raw variances as follows: if the market is perfectly efficient, then

$$\begin{aligned}\left|\frac{\sigma_1^2}{\mathrm{E}\left[\mathrm{ROE}\right]}\times\frac{\sigma_1^2}{\mathrm{E}\left[\left(\mathrm{ROE}-\mathrm{E}\left[\mathrm{ROE}\right]\right)^3\right]}\right| &= \\ \left|\frac{\sigma_1/\mathrm{E}\left[\mathrm{ROE}\right]}{\gamma_1}\right| &= \left|\frac{\sigma_2/\mathrm{E}\left[\mathrm{ROA}\right]}{\gamma_2}\right| \\ &= \left|\frac{\sigma_2^2}{\mathrm{E}\left[\mathrm{ROA}\right]}\times\frac{\sigma_2^2}{\mathrm{E}\left[\left(\mathrm{ROA}-\mathrm{E}\left[\mathrm{ROA}\right]\right)^3\right]}\right|,\end{aligned} \tag{2}$$

and if the market is inefficient, then

$$\left|\frac{\sigma_1/\mathrm{E}\left[\mathrm{ROE}\right]}{\gamma_1}\right| < \left|\frac{\sigma_2/\mathrm{E}\left[\mathrm{ROA}\right]}{\gamma_2}\right|. \tag{3}$$

Investors can become aware that the skewness-adjusted variation coefficient of ROE is smaller than that of ROA via a cross-sectional comparison and hence can infer that some managers may distort the financial leverage to smooth or increase ROE mechanically. However, given a small share of each firm's ownership, individual investors do not have incentives to incur costs for investigating what a specific firm is doing, and because of this, they rely on the market price to monitor firm performance. This situation is essentially explained as free-riding among the investors concerned in the way of Smith (1937). The resulting financial leverage distortion implies that the skewness-adjusted variation coefficient of ROA is greater than that of ROE. Therefore, investors increase the ROE weight as a determinant of compensations for managers to save the risk premium to be paid to risk-averse managers, which induces managerial overemphasis on ROE. Overemphasis in evaluating managers' performance inexorably exacerbates financial leverage distortion, that mechanically results in an increase in ROE.

The risk aversion of managers in an inefficient market where they can withhold information about their financial leverage manipulation implies that the distortion is encouraged by investors and arises in a self-fulfilling way. Although investors believe

that emphasizing short-term ROE distorts leverage and reduces the long-term value of the firm, all parties are free-riding one another in monitoring managers, and the myopic emphasis on ROE continues.

4.3 Testable hypotheses

A way in which to reduce such distortion is to have a dominant shareholder who owns shares on a long-term horizon. Managers may distort leverage intending to be mechanically smooth or increase ROE. The adverse effects of this distortion on the long-term profitability discernible in time when confronting the repayment of more than optimal debt. If an uninformed shareholder pursues short-term transactions, then he or she believes that he or she can successfully sell at a profit to another uninformed investor before the distortion is ultimately revealed rather than making costly efforts to curb the distortion.

Short-sighted trades by small, uninformed investors valuing higher ROE are individually optimal responses to one another and hence can constitute an equilibrium strategy. Alternatively, a high ROE may be correctly perceived as a signal of leverage distortion. If so, large buyers expect that the correction of the distortion leads to better long-term performance by blockholding and finding a reason to buy. If a current shareholder perceives the possibility of distortion but does not have an incentive and a claim to correct it, then the possible distortion is a reason to sell the shares to buyers. In that case, a market that rewards ROE brings about an incremental improvement in resource allocation through the transfer of ownership. Trade transfers ownership between equally uninformed investors but from a market participant who is more likely to make an incorrect decision to one who is more likely to make a correct decision in the sense of Bond and Eraslan (2010). Thus, if there already exists a dominant shareholder to seek long-term growth in the share price or if an investor finds an opportunity to become a dominant

shareholder and correct distortion, then he or she has an incentive to reduce or remove distortion. Blockholders on the board not only have no incentive to distort leverage as owners but also have information to correct any distortion as informed investors.

The return on a commitment to long-term holding can be greater only if he or she recognizes the short-term divergence between the share price and the fundamentals unknown to other market participants. This situation means that he or she is an informed investor. The best-informed position is to be on the board. If he or she manages the firm, then he or she knows the business fundamentals better than do outsiders. A higher concentration of manager-ownership reduces the agency problem because of having a higher claim and being better informed.

Earlier cases for the advantages of ownership concentration included privately owned British cotton-spinning firms, which additional funds were raised from the banking sector, during the Industrial Revolution (Chapman (1967), 125–144; Rose (2000), 60–79) and before their replacement with joint stock companies in the late nineteenth century (Farnie (1979), 209–243; Kenny (1982)). The firms were free from the concern of moral hazard raised by Smith (1937). A more recent case of public firm ownership concentration by a founding family is an early generation of rising East Asian family firms (Claessens et al., 2000). In Japan, from the late nineteenth century to the early twentieth century, a single dominant shareholder implied founding family ownership.

However, whether these family firms can be long-lived is another question. Exploitation of minority shareholders by the founding family owner, highlighted by Jensen and Meckling (1976), is a challenge. Another challenge is that related to successor talent. Consanguineous descendants of talented founders are not necessarily talented. A Japanese choice is adopting a talented adult as a successor of the family business. The system dates back to the late seventeenth century, when it prevailed from farmer to samurai, and has disciplined Japanese family businesses. On average, family firms perform better than do nonfamily firms, which is different from other advanced economies

(Mehrotra et al., 2013).

By paraphrasing the implications of Lemma 1, our hypotheses to be empirically tested are as follows:

H1 In an inefficient market, the skewness-adjusted variation coefficient of ROE is smaller than that of ROA, and stock prices are more responsive to ROE than to ROA.

H2 In an inefficient market, a higher president–ownership concentration implies a smaller degree of financial leverage distortion.

H3 In an inefficient market, a higher president–ownership concentration implies better performance as measured by ROA.

5 Data

5.1 Ownership structure

Senior employees were promoted to managers, and independent businesspeople were hired as "professional managers" among leading companies from the 1890s to the 1900s, as Berle and Means (1933) and Chandler (1977) observed in US cases; Foreman-Peck and Hannah (2013) observed in British cases; and Yui (1979, 1989, 1992), Miyamoto and Abe (1999), and Nakamura (2000, 2007) observed in Japanese cases. Furthermore, Miwa and Ramseyer (2002) showed that "prominent" managerial board participation positively contributed to corporate performance in Japanese cases in the early twentieth century.

These studies, however, did not address the possible effects of ownership structure changes within the board. If the internal promotion and recruitment of employed professional managers went through with the diffusion of ownership, then the change in the

board structure might have been accompanied by adverse effects of ownership diffusion that provided room for managerial moral hazard. The positive effects of "professional managers" might have been dominated by adverse effects of a higher probability of managerial moral hazard allowed by the diffused ownership in an inefficient market.

To differentiate the ownership structure, we introduce two simple measures. The first measure is the president's stockholding ratio. The second measure is the product of the president's stockholding ratio and that of the board member with the smallest stockholding. The first measure is expected to capture the effects of preventing managerial moral hazard. The effects are expected to increase with the president's stockholding ratio; hence, the performance of the case firm is expected to increase with this measure (H2 and H3). The second measure examines how the degree of managerial ownership consolidation affects performance. If the board is occupied only by blockholders, the value of the second measure is greater. However, if an employee is promoted to a board member, then the value of the second measure is expected to decrease. The measure evaluates how deviation from the classical form of the board through the diffusion of ownership and employee promotion to board members could affect performance (H2 and H3).

In the entire Tokyo market, which has small shareholders, ownership concentration was considerable. Overall, the top 1% largest shareholders owned 53% of the shares of listed firms as of 1897 (Table 1). We exploit the ownership variance for our estimates.

5.2 Dataset description

Our sample covers all 95 firms (i) listed on the Tokyo Stock Exchange from the first half of 1878 to the second half of 1910 (t). The financial statements of the firms are available in the business archives of the Japan Digital Archives Center, delivered by Maruzen-

Table 1 Distribution of ownership, 1897.

Shares owned	Individuals				Institutions				Total			
	Number of shareholders	share	Number of shares	share	Number of shareholders	share	Number of shares	share	Number of shareholders	share	Number of shares	share
1-99	467	24.4%	22,043	1.5%	2	4.5%	189	0.0%	469	24.0%	22,232	1.0%
100-499	962	50.3%	209,432	14.5%	10	22.7%	2,571	0.3%	972	49.7%	212,003	9.5%
500-999	207	10.8%	140,402	9.7%	7	15.9%	3,917	0.5%	214	10.9%	144,319	6.5%
1,000-1,999	151	7.9%	201,586	14.0%	6	13.6%	9,808	1.3%	157	8.0%	211,394	9.5%
2,000-2,999	50	2.6%	120,260	8.3%	4	9.1%	8,182	1.0%	54	2.8%	128,442	5.8%
3,000-3,999	22	1.2%	73,142	5.1%	2	4.5%	7,286	0.9%	24	1.2%	80,428	3.6%
4,000-4,999	9	0.5%	40,137	2.8%	1	2.3%	4,000	0.5%	10	0.5%	44,137	2.0%
5,000-5,999	13	0.7%	68,844	4.8%	1	2.3%	5,250	0.7%	14	0.7%	74,094	3.3%
6,000-6,999	4	0.2%	25,318	1.8%	0	0.0%	0	0.0%	4	0.2%	25,318	1.1%
7,000-7,999	3	0.2%	22,524	1.6%	2	4.5%	14,221	1.8%	5	0.3%	36,745	1.7%
8,000-8,999	2	0.1%	16,766	1.2%	3	6.8%	25,694	3.3%	5	0.3%	42,460	1.9%
9,000-9,999	2	0.1%	18,625	1.3%	1	2.3%	9,575	1.2%	3	0.2%	28,200	1.3%
10,000-	20	1.0%	482,785	33.5%	5	11.4%	691,558	88.4%	25	1.3%	1,174,343	52.8%
Total	1,912	100.0%	1,441,864	100.0%	44	100.0%	782,251	100.0%	1,956	100.0%	2,224,115	100.0%

Yushodo.[1] Note that firms predominantly owned by conglomerates such as Mitsubishi and Mitsui were not listed public firms and are thus not included in our samples. Thus, distortion due to substantial conglomerate protection by the government does not affect our results. We manually collected information about financial status and stockholdings to construct a panel dataset of 95 firms.

The financial status variables we use are sales ($\mathrm{SAL}_{i,t}$), total assets ($\mathrm{TAS}_{i,t}$), and paid-in stock ($\mathrm{STK}_{i,t}$),[2] outstanding bank loans ($\mathrm{LON}_{i,t}$), outstanding bonds ($\mathrm{BND}_{i,t}$), profit in the current term ($\mathrm{PRF}_{i,t}$), total dividends ($\mathrm{DVD}_{i,t}$)[3], and balance brought forward ($\mathrm{BBF}_{i,t}$) for firm i in term t. Discrepancies in the total observation numbers come from unstandardized financial statements, particularly before the enactment of the Commercial Code of 1899.

As measures of ownership structure, we calculate the president's stockholding ratio ($\mathrm{SCEO}_{i,t}$), the stockholding ratio of the board member with the smallest ratio ($\mathrm{SMIN}_{i,t}$), and their product ($\mathrm{CNSL}_{i,t} \equiv \mathrm{SCEO}_{i,t} \times \mathrm{SMIN}_{i,t}$) for firm i in term t.

Regarding share prices, we use average prices $\mathrm{STP}_{i,t}$ for firm i in term t published in (Tokyo Stock Exchange, 1928, 125–261). The observations of stock prices are fewer in number than are those of financial reports because over-the-counter exchanges, to which stock prices in the stock exchanges were referred, were active.

To control for financial market conditions when estimating the determinants of bank loans and bond flotation, we use average bank interest rates in the prefecture of Tokyo surveyed by the Bank of Japan.[4] Interest rates are available only from the second half of 1886. The descriptive statistics are shown in Table 2.

[1] https://j-dac.jp/top/eng/index.html Last accessed: September 12, 2016.

[2] The Japanese Commercial Code, as its counterpart in the West, then requires a joint-stock company to specify the face value of its share and permitted partial payment at subscription; hence, the following two kinds of "capital" exist as legal terms: the capital stock registered, which is the total sum of the face value of issued shares, and the paid-in capital, which is the amount actually invested. Thus, the paid-in stock is capital in an ordinary sense.

[3] This is the sum of ordinary dividends and special dividends in the term.

[4] Historical Statistics: Institute for Monetary and Economic Studies, Bank of Japan (http://www.imes.boj.or.jp/hstat/: Last accessed on September 18, 2016).

Table 2 Descriptive statistics of firms listed at the Tokyo Stock Exchange, from the first half of 1878 to the second half half of 1910.

Number of individual firms (cross sections) / variables	95	Number of total observations	Unit	Mean	Median	Maximum	Minimum	Standard deviation	Skewness	Kurtosis
Amount of sales in the current term	SAL	1,101	Yen	1,673,988	524,863	19,305,644	600	2,818,222.923	2.791	11.617
Total assets as of the current term	TAS	1,119	Yen	15,717,824	3,651,671	301,457,885	52,168	35,907,995.178	5.014	31.721
Paid-in stock as of the current term	STK	1,077	Yen	6,111,014	1,600,000	102,000,000	25,000	12,036,180.793	4.681	32.877
Bank loans as of the current term	LON	1,119	Yen	375,992	0	13,146,042	0	1,083,525.975	4.911	36.511
Outstanding bond as of the current term	BND	1,119	Yen	1,471,965	0	93,568,012	0	8,000,257.208	7.924	70.028
Profit in the current term	PRF	1,081	Yen	388,115	97,992	18,084,554	-1,318,361	837,159.095	9.887	188.851
Total dividends in the current term	DVD	979	Yen	283,615	75,000	3,648,813	0	480,640.730	2.721	12.120
Balance brought forward as of the end of the current term	BBF	1,113	Yen	88,170	10,195	2,316,513	-1,065,271	241,258.728	3.750	26.400
Average share price in the current term	STP	323	Yen	89.1015	68.3000	425.5000	6.2400	76.721	1.818	6.290
Return on equity: =PRF/(STP+BBF)	ROE	1,040	percent	8.1012%	6.2254%	104.6430%	-104.7981%	0.108	1.598	33.371
Return on asset: =PRF/TAS	ROA	1,080	percent	3.3989%	2.9467%	34.6725%	-33.8713%	0.038	0.875	23.463
Stock holding ratio of the president as of the current term: =[Shares owned by President]/[Total Share]	SCEO	610	percent	5.1408%	2.7633%	70.0000%	0.0000%	0.071	4.248	30.622
Stock holding ratio of the director whose stock holding ratio is the smallest in the board as of the current term: [Share owned by the board member]/[Total Share]	SMIN	610	percent	1.1309%	0.7000%	10.0000%	0.0000%	0.015	3.360	17.700
Measure of ownership consolidation in the board: =SCEO×SMIN	CNSL	610	per ten thousand	8.7819‰	2.0000‰	130.0000‰	0.0000‰	0.002	3.630	16.941

Notes : All values are nominal terms. Japan had adopted the silver standard until September 1897 and hence its exchange rate against th US dollar and the Sterling pound had been voltile. From October 1897 to the First World War, Japan adopted the gold standard. The fixed exchange rate stiputed by the Coinage Act of 1897 was JPY100=USD49.875 and the rate was sustained by the monetary policy of the Bank of Japan until the breakout of the First Word War.

We use a cross-sectional fixed effects model as an estimation method to control for invariant variables, such as long-established routines, historical legacy, corporate culture, corporate philosophy, and other time-invariant institutional factors, during the sample period. We can then identify the effect of ownership structure changes on financial leverage and performance. To control for common cyclical shocks, we use the growth in the real gross national product ($\Delta \mathrm{GNP}_t \equiv \mathrm{GNP}_t - \mathrm{GNP}_{t-1}$) as a control variable.[5]

In our estimates below, we stick to fixed effects models because of the concern that error terms and independent variables may be correlated. With our dataset, the Hausman pretests do not necessarily reject the pretest null hypothesis that the random effects model is correct. Furthermore, we confirm that random effects models do not qualitatively change our results. However, given the concern about the Hausman pretest (Guggenberger, 2010), we conservatively adopt the fixed effects model.

6 Ownership structure and market efficiency

6.1 Responsiveness and prediction power of the market

We first evaluate whether the Japanese market from 1878 to 1910 was distorted due to market inefficiency. The skewness-adjusted variation coefficients defined in Section 4.2 of ROE ($\mathrm{ROE}_{i,t}(\equiv \mathrm{PRF}_{i,t}/\left(\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}\right)$) and that of ROA ($\mathrm{ROA}_{i,t} \equiv \mathrm{PRF}_{i,t}/\mathrm{TAS}_{I,t}$) are shown in Table 3.

The skewness-adjusted variation coefficient of ROE becomes smaller than that of ROA if managers mechanically smoothen or increase ROE via leverage distortion. Thus, a change in the gap between the skewness-adjusted variation coefficient of ROE and that of ROA tracks the evolution of market distortion. Table 4 shows that the gap increased

[5]The GNP series from 1877 to 1884 is from (Teranishi, 1983, 181), and those from 1885 to 1910 are from (Ohkawa et al., 1974, 225). The GNP series in those sources are the annual basis; hence, we produce biannual series via linear supplements.

Table 3 Skewness-adjusted variation coefficient from the first half of 1878 to the second half of 1910.

peirod	ROE	ROA	Degree of distortion
	a	*b*	*b* – *a*
1878–1888	0.3185	0.3425	0.0239
Number of observations	59	72	
1889–1899	0.3891	0.4877	0.0986
Number of observations	245	250	
1900–1910	24.8754	119.7480	94.8726
Number of observations	736	758	
1878–1910	0.8355	1.2643	0.4288
Number of observations	1,040	1,080	

Notes: ROE: return on equity. ROA: return on asset.

over time. Thus, the leverage distortion to manipulate ROE was exacerbated on average in the Tokyo market throughout the sample period, 1878 to 1910. This finding indicates that the Tokyo market as a whole became increasingly less efficient during this period.

There are two conceivable reasons for the deteriorating efficiency of the Tokyo market. One reason is the Bank of Japan's asset purchases. Nakabayashi (2017), using micro data from the 1890s, reported that the Bank of Japan actively purchased stocks to avert financial crises in the 1890s and that this unconventional monetary policy accompanied a drastic decrease in the equity risk premium. The decreases in the risk premium are likely to have captured a distortion of stock pricing by the Bank of Japan's intervention. Another reason is low liquidity, on average, partly due to a rapid increase in the number of listed firms. Hamano et al. (2009) noted inefficient pricing due to low liquidity in the Tokyo Stock Exchange in the early twentieth century. The capitalization of the Tokyo Stock Exchange continued to increase from 50% of the gross domestic product in 1920 to 122% in 1936 (Hoshi and Kashyap, 2001, 39). Nevertheless, Bassino and Lagoarde-Segot (2015) demonstrated that the price index of the Tokyo Stock Exchange did not satisfy weak-form efficiency using data from the 1930s. After all, the Tokyo market never became efficient enough before the Second World War.

The results show that the distorted incentives of managers remained an issue throughout the entire sample period, which is in line with our H1 on the difference in the skewness-adjusted variation coefficients. This finding is consistent with those of previous works on the inefficient Tokyo market before the Second World War.

We then test H1 on market responsiveness to ROE and ROA. We first regress the logarithmic returns of the stock prices ($\log \mathrm{STP}_{i,t} / \log \mathrm{STP}_{i,t-1} \equiv \Delta \log \mathrm{STP}_{i,t}$) on the growth in ROE ($\Delta\mathrm{ROE}_{i,t}$) and ROA ($\Delta\mathrm{ROA}_{i,t}$) in line with Equation (1), controlling for the growth in real gross national product ($\Delta\mathrm{GNP}_t$) as follows:

$$\Delta \log (\mathrm{STP}_{i,t}) = \beta_0 + \beta_1 \Delta\mathrm{ROE}_{i,t} + \beta_2 \Delta\mathrm{ROA}_{i,t} + \beta_3 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}, \tag{4}$$

where μ_i is the dummy variable for firm i and $\epsilon_{i,t}$ is the error term.

When $\Delta\text{ROE}_{i,t}$ and $\Delta\text{ROA}_{i,t}$ are separately included in specifications 4–1 and 4–2, both have significantly positive coefficients. However, following (4), once we include both in specification 4–3, only $\Delta\text{ROE}_{i,t}$ has a significantly positive coefficient. The market responded predominantly to ROE than to ROA. This result supports our H1 on short-sighted ROE emphasis by an inefficient market.

We also test the market response to the dividend. If the market is sufficiently efficient such that payout reveals no additional information privately withheld by firms, then this term is expected to have a significantly negative coefficient to keep shareholder value constant after payout of dividends, as predicted by Miller and Modigliani (1961). If dividend growth reveals additional information to predict future cash flow increases, then the term is expected to have a significantly positive coefficient, as predicted by Bar-Yosef and Huffman (1986). Our estimate specifications thus are

$$\Delta \log(\text{STP}_{i,t}) = \beta_0 + \beta_1 \Delta\text{ROE}_{i,t} + \beta_2 \Delta\text{ROA}_{i,t} + \beta_3 \left[\frac{\text{TOD}_{i,t}}{\text{TAS}_{i,t}}\right] + \beta_4 \Delta\text{GNP}_t + \mu_i + \epsilon_{i,t}, \quad (5)$$

When only $\text{TOD}_{i,t}/\text{TAS}_{i,t}$ is in specification 4–4, it has a significantly positive coefficient. The result is robust when (5) is applied in specification 4–5. The market responded to the payout as a positive signal, which indicates a low level of market efficiency.

6.2 Ownership structure and performance

We now analyze the relationship between ownership structure and performance. We regress ROE ($\text{ROE}_{i,t}$), ROA ($\text{ROA}_{i,t}$), and return on sales (ROS) ($\text{ROS}_{i,t}$) on the following two ownership structure indicators: 1) the president's stockholding ratio, $\text{SCEO}_{i,t}$, and 2) the degree of ownership consolidation within the board, characterized as $\text{CNSL}_{i,t} = \text{SCEO}_{i,t} \times \text{SMIN}_{i,t}$, where $\text{SMIN}_{i,t}$ denotes the stockholding ratio of

Table 4 Determinants of the stock prices (STP), from the first half of 1879 to the second half of 1910.

Dependent variable	$\Delta\log(STP_{i,t})$		$\Delta\log(STP_{i,t})$		$\Delta\log(STP_{i,t})$		$\Delta\log(STP_{i,t})$		$\Delta\log(STP_{i,t})$	
	4−1		4−2		4−3		4−4		4−5	
estimation method	panel least squares		panel least squares		panel least squares		panel least squares		panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	-0.0046	-0.22	-0.0085	-0.40	-0.0042	-0.20	0.0021	0.11	0.0022	0.11
$\Delta ROE_{i,t}$	1.5407	3.66 ***			2.2891	3.24 ***			-0.0242	-0.38
$\Delta ROA_{i,t}$			2.4061	2.12 **	-2.4499	-1.31			-1.5132	-0.74
$\Delta(TOD_{i,t}/TAS_{i,t})$							7.4979	4.30 ***	9.3439	3.22 ***
ΔGNP_t	0.0000	0.22	0.0001	0.37	0.0000	0.16			0.0000	0.34
adjusted R^2		0.04		-0.01		0.04		0.07		0.08
Log likelihood		-3.38		-7.75		-2.40		9.39		12.66
F statistic		1.33		0.92		1.35		1.69 **		1.69 **
Number of individual firms (cross sections)		24		25		24		23		22
Number of total observations		217		218		217		209		201

Notes : STP: Stock price offirm i in semiannual period. ROE: returon on equity. ROA: return on asset. TOD: total payouf of dividend. TAS: total assets. GNP: Groth National Product. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

the board member with the smallest stockholding ratio. ROA captures efficiency in using corporate total assets, and ROS measures how large the margin is and hence how operational costs are saved. Our interest is in whether the ownership structure affects efficiency in asset usage and operations.

The first indicator directly measures firm controllability by the president, who is often the founding owner in the sample period. The second indicator measures whether the board functions as the consolidated representative of shareholders. If the ownership structure diffuses or employees are promoted as board members, then $\mathrm{CNSL}_{i,t}$ decreases. A decrease in $\mathrm{CNSL}_{i,t}$ implies that the board becomes less representative of shareholders and, hence, may be more likely to deviate from the maximization of shareholder value. We also include sales ($\mathrm{SAL}_{i,t}$) as a regressor to control for cyclical but heterogeneous changes in business volume.

Thus, for ROE, we run

$$\begin{aligned} \mathrm{ROE}_{i,t} &= \beta_0 + \beta_1 \mathrm{SCEO}_{i,t} + \beta_2 \mathrm{SAL}_{i,t} + \beta_3 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}, \\ \mathrm{ROE}_{i,t} &= \beta_0 + \beta_1 \mathrm{CNSL}_{i,t} + \beta_2 \mathrm{SAL}_{i,t} + \beta_3 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}; \end{aligned} \tag{6}$$

for the ROA, we run

$$\begin{aligned} \mathrm{ROA}_{i,t} &= \beta_0 + \beta_1 \mathrm{SCEO}_{i,t} + \beta_2 \mathrm{SAL}_{i,t} + \beta_3 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}, \\ \mathrm{ROA}_{i,t} &= \beta_0 + \beta_1 \mathrm{CNSL}_{i,t} + \beta_2 \mathrm{SAL}_{i,t} + \beta_3 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}; \end{aligned} \tag{7}$$

and for the ROS, dropping sales from the regressors, we run

$$\begin{aligned} \mathrm{ROS}_{i,t} &= \beta_0 + \beta_1 \mathrm{SCEO}_{i,t} + \beta_2 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}, \\ \mathrm{ROS}_{i,t} &= \beta_0 + \beta_1 \mathrm{CNSL}_{i,t} + \beta_2 \Delta\mathrm{GNP}_t + \mu_i + \epsilon_{i,t}. \end{aligned} \tag{8}$$

The results are presented in Table 5. We find that the president–ownership concentration, SCEO, was not significantly associated with ROE (specification 5–1) but

was significantly positively associated with ROA (5–3) and ROS (5–5). Furthermore, a higher consolidation of ownership within the board ($\text{CNSL}_{i,t}$) improved all of ROE, ROA, and ROS (5–2, 5–4, and 5–6, respectively).

Thus, we can conclude that higher-level president–ownership concentration or greater consolidation of ownership within the board was positively associated with long-term growth and profitability by increasing asset usage and operational efficiency. These results are consistent with our H3 on the positive impact of president–ownership concentration on ROA.

6.3 Impact of the enactment of the Commercial Code of 1899

The Commercial Code of 1899, modeled after German law, came into force, introducing German corporate law for corporate governance. An immediate change was the greater transparency in the disclosure of financial status. According to this code, joint-stock companies were obligated to disclose their financial status in a detailed and standardized form. Its enforcement made corporate financial status information more transparent and publicly available and may have reduced the degree of distortion due to asymmetric information. We insert the interaction term between the dummy variable of enactment (d1899) (which takes a value of 1 if the year is 1899 or later and 0 otherwise) and the ownership structure variables ($\text{d1899} \times \text{SCEO}_{i,t}$, $\text{d1899} \times \text{CNSL}_{i,t}$) and the enactment dummy variable itself (d1899) into specifications (6), (7), and (8), respectively, to examine the effect.

The results are presented in Table 6. All specifications indicate that the Commercial Code of 1899 did not affect performance on its own. However, the significantly positive interaction term $\text{d1899} \times \text{SCEO}_{i,t}$ coefficient in specification 6–5 suggests that the enactment of the Code was positively associated with the operational efficiency of firms

Table 5 The return on equity (ROE), return on asset (ROA), and return on sales (ROS) and the stock ownership structure, from the second half of 1878 to the second half of 1910.

Dependent variables	$ROE_{i,t}$		$ROE_{i,t}$		$ROA_{i,t}$		$ROA_{i,t}$		$ROS_{i,t}$		$ROS_{i,t}$	
	5–1		5–2		5–3		5–4		5–5		5–6	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	0.0678	8.37 ***	0.0688	11.44 ***	0.0292	10.44 ***	0.0317	14.96 ***	-0.3955	-3.90 ***	0.0351	0.47
$SCEO_{i,t}$	0.0945	0.83			0.0943	2.45 **			11.9172	7.90 ***		
$CNSL_{i,t}$			7.0553	2.29 **			2.8618	2.76 ***			223.2661	5.32 ***
$SAL_{i,t}$	0.0000	8.41 ***	0.0000	8.56 ***	0.0000	6.77 ***	0.0000	6.76 ***				
ΔGNP_t	-0.0001	-3.52 ***	-0.0001	-3.55 ***	0.0000	-2.97 ***	0.0000	-3.09 ***	-0.0003	-0.64	-0.0004	-0.96
adjusted R^2		0.47		0.48		0.42		0.42		0.18		0.12
Log likelihood		599.53		591.10		1,225.36		1,226.28		-909.40		-927.25
F statistic		8.21 ***		8.36 ***		6.86 ***		6.90 ***		2.76 ***		2.17
Number of individual firms (cross sections)		67		67		70		70		70		70
Number of total observations		560		560		582		582		582		582

Notes: ROE: returon on equity. ROA: returon on asset. ROS: returon on sales. SCEO: ownership share of the CEO. CNSL:Ownership consolidation within the board = SCEO×SMIN, where SIMIN: ownership shaer of the board member whose onwership was smallest withiint the board. SAL: sales. GNP: gross national product. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

with high-level president–ownership concentration. The code was intended to make the market more transparent. However, its enactment did not make ownership discipline less compelling. Ownership concentration and the judiciary system's development were not substitutes but complements to improving organizational efficiency in terms of asset usage. This result is consistent with that of Alhadi et al. (2020) on modern Malaysia, who demonstrated complementarity between managerial ownership and the higher-level transparency of accounting for corporate performance, and that of Eugster and Wang (2023), who demonstrated complementarity between blockholders and the improvement in the enforcement of the legally mandated transparency of corporate governance.

In Tables 5 and 6, contrary to modern US firms, we conclude that ownership structure was relevant. The results indicate that the Japanese market was not sufficiently efficient and allowed for self-fulfilling distortion, as predicted by Lemma 1.

7 Distorted financial leverage

7.1 Financial leverage and performance

We have shown that president–ownership concentration was positively associated with asset usage efficiency in an inefficient market. Our prediction is that a lower-level ownership concentration allows risk-averse managers to distort leverage and manipulate ROE in response to market inefficiency (H2).

To examine the validity of this hypothesis, we first regress ROE ($\mathrm{ROE}_{i,t}$) on two channels of financial leverage—bank loans ($\mathrm{LON}_{i,t}$) and outstanding bonds ($\mathrm{BND}_{i,t}$)—over paid-in capital ($\mathrm{STK}_{i,t}$) and the balance brought forward ($\mathrm{BBF}_{i,t}$), such that

Table 6 Impacts of the Commercial Code on the asset and operation efficiency, from the second half of 1878 to the second half of 1910.

Dependent variables	$ROE_{i,t}$		$ROE_{i,t}$		$ROA_{i,t}$		$ROA_{i,t}$		$ROS_{i,t}$		$ROS_{i,t}$	
	6–1		6–2		6–3		6–4		6–5		6–6	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	0.0829	5.53 ***	0.0817	7.15 ***	0.0313	6.23 ***	0.0345	8.77 ***	-0.1119	-0.59	-0.1238	-0.78
$SCEO_{i,t}$	0.0555	0.24			0.1086	1.47			1.0395	0.37		
$d1899 \times SCEO_{i,t}$	0.0397	0.17			-0.0186	-0.25			13.0829	4.59 ***		
$CNSL_{i,t}$			8.2257	1.39			3.1851	1.65 *			192.4261	2.48 **
$d1899 \times CNSL_{i,t}$			-1.2086	-0.20			-0.3774	-0.19			37.1312	0.46
d1899	-0.0220	-1.31	-0.0198	-1.39	-0.0034	-0.58	-0.0045	-0.89	-0.3508	-1.58	0.2326	1.17
$SAL_{i,t}$	0.0000	8.57 ***	0.0000	8.74 ***	0.0000	6.83 ***	0.0000	6.85 ***				
ΔGNP_t	-0.0001	-3.51 ***	-0.0001	-3.54 ***	0.0000	-2.96 ***	0.0000	-3.09 ***	-0.0003	-0.62	-0.0004	-0.98
adjusted R^2		0.47		0.48		0.42		0.42		0.21		0.13
Log likelihood		601.08		592.83		1,225.98		1,227.04		-895.13		-925.62
F statistic		8.03 ***		8.19 ***		6.67 ***		6.72 ***		3.16		2.15
Number of individual firms (cross sections)		67		66		70		70		70		70
Number of total observations		560		552		582		582		582		582

Notes : ROE: return on equity. ROA: return on asset. ROS: return on sales. SCEO: Share of ownership of the CEO. d1899: Dummy variable of enactment of the Civil Code of 1899, takes 1 if year is 1899 or later and 0 otherwise. CNSL: Ownersship consolidation within the board = SCEO×SMIN, where SMIN: the ownership share of the board member whose ownership was smallest within the board. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

$$\begin{aligned} \mathrm{ROE}_{i,t} = \beta_0 + \beta_1 \frac{\mathrm{LON}_{i,t}}{\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}} + \beta_2 \frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}} \\ + \beta_3 \mathrm{SAL}_{i,t} + \beta_4 \Delta \mathrm{GNP}_t + \mu_i + \epsilon_{i,t}. \end{aligned} \tag{9}$$

The results are shown in Table 7. Specification 7–1, including the entire sample, does not show a significant trend. This result hints at heterogeneous effects across sample firms. Thus, specifications 7–2, 7–3, 7–4, 7–5, and 7–6 separate the sample into the following ROE ranges, respectively: less than 0%, 0% to 10%, 10% to 20%, 20% to 30%, and greater than 30%. For the subsamples where ROE is less than 0% and less than 10% (specifications 7–2 and 7–3, respectively), we see that the leverage by the outstanding bond is significantly positively associated with ROE. For the subsamples between 20% and 30% of ROE, outstanding bonds are slightly positively associated with ROE (7–5).

To further investigate leverage effects, we next regress ROA ($\mathrm{ROA}_{i,t}$) on financial leverage as follows:

$$\begin{aligned} \mathrm{ROA}_{i,t} = \beta_0 + \beta_1 \frac{\mathrm{LON}_{i,t}}{\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}} + \beta_2 \frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}} \\ + \beta_3 \mathrm{SAL}_{i,t} + \beta_4 \Delta \mathrm{GNP}_t + \mu_i + \epsilon_{i,t}. \end{aligned} \tag{10}$$

Table 8 shows that for the range of ROE higher than 30% (specification 8–6), outstanding bonds are significantly positively associated with ROA. Thus, after excluding the most profitable firms, financial leverage does not improve asset usage efficiency.

Next, we regress ROS ($\mathrm{ROS}_{i,t}$) on the leverages as follows:

$$\mathrm{ROS}_{i,t} = \beta_0 + \beta_1 \frac{\mathrm{LON}_{i,t}}{\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}} + \beta_2 \frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t} + \mathrm{BBF}_{i,t}} + \beta_3 \Delta \mathrm{GNP}_t + \mu_i + \epsilon_{i,t}, \tag{11}$$

Table 7 The return on equity (ROE) and the financial leverage, from the second half of 1878 to the second half of 1910.

Dependent variables	$ROE_{i,t}$		$ROE_{i,t}$		$ROE_{i,t}$		$ROE_{i,t}$		$ROE_{i,t}$		$ROE_{i,t}$	
	7–1		7–2		7–3		7–4		7–5		7–6	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	0.0639	14.69 ***	-0.1969	-1.92	0.0469	39.50 ***	0.1448	30.77 ***	0.2266	18.02 **	0.2806	2.69 **
$LON_{i,t}/(STK_{i,t}+BBF_{i,t})$	0.0097	1.24	-0.0137	-0.04	0.0013	0.74	-0.0106	-0.49	-0.0168	-0.17	-0.0169	-0.06
$BND_{i,t}/(STK_{i,t}+BBF_{i,t})$	0.0012	0.31	2.7259	2.21 **	0.0041	4.10 ***	-0.0023	-0.69	0.0870	1.74 *	1.1332	1.39
$SAL_{i,t}$	0.0000	7.31 ***	0.0000	-2.32 **	0.0000	6.10 ***	0.0000	-2.83 ***	0.0000	0.55	0.0000	2.14
ΔGNP_t	-0.0001	-3.70 ***	0.0003	1.36 *	0.0000	-1.75 *	0.0000	0.54	0.0000	1.24	0.0000	0.08 **
adjusted R^2		0.63		0.54		0.49		0.22		0.24		0.33
Log likelihood		1,184.50		57.67		1,991.91		364.04		132.96		21.81
F statistic		10.18 ***		3.18 ***		9.59 ***		2.05 **		1.91 **		2.24 *
number of individual firms (cross sections)		89		24		82		37		15		9
Restriction of observation by ROE		no restriction		ROE≤0%		0%<ROE≤10%		10%<ROE≤20%		20%<ROE≤30%		30%<ROE
Number of total observations		1,031		52		746		148		54		31

Notes: ROE: return on equity. LON: bank borrowing that did not include outstanding bond. STK+BBF=own capital, wheree STK=paid in stock and BBF=Balance broght forward (retained earnings). ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

Table 8 The return on asset (ROA) and the financial leverage, from the second half of 1878 to the second half of 1910.

Dependent variables	$ROA_{i,t}$		$ROA_{i,t}$		$ROA_{i,t}$		$ROA_{i,t}$		$ROA_{i,t}$		$ROA_{i,t}$	
	8–1		8–2		8–3		8–4		8–5		8–6	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	0.0334	19.94	-0.0707	-1.37	0.0241	24.63 ***	0.0754	28.94 ***	0.1146	12.88 ***	0.1013	4.22
$LON_{i,t}/(STK_{i,t}+BBF_{i,t})$	-0.0018	-0.61	-0.0279	-0.16	-0.0022	-1.48	-0.0292	-2.44 **	-0.0134	-0.20	-0.0127	-0.18
$BND_{i,t}/(STK_{i,t}+BBF_{i,t})$	-0.0007	-0.45	1.0002	1.62	-0.0006	-0.72	-0.0008	-0.44	-0.0413	-1.17	0.5041	2.68 **
$SAL_{i,t}$	0.0000	1.79 *	0.0000	-1.65	0.0000	2.61 ***	0.0000	-8.35 ***	0.0000	-3.11 ***	0.0000	-0.29
ΔGNP_t	0.0000	-2.61 ***	0.0001	1.26	0.0000	-0.69	0.0000	-1.04	0.0000	1.29	0.0001	0.75
adjusted R^2		0.32		-0.08		0.32		0.76		0.78		0.73
Log liklehood		2,169.01		93.48		2,135.60		451.61		151.63		67.34
F statistic		6.36 ***		0.86		5.15 ***		12.77 ***		11.70 ***		7.86 ***
number of individual firms (cross sections)		89		24		82		37		15		9
Restriction of observation by ROE	no restriction		ROE≤0%		0%<ROE≤10%		10%<ROE≤20%		20%<ROE≤30%		30%<ROE	
Number of total observations		1,031		52		746		148		54		31

Notes: ROA: return on asset. LON: outstanding bank borrowing. STK+BBF=own capital, where STK= paid in capital and BBF=Balance brought forward (retained earnings). BND: outstanding corporate bond liability. SAL: sales. GNP: gross national product. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

where we drop $\mathrm{SAL}_{i,t}$ from the regressors to avoid a mechanical correlation. The results are shown in Table 9. We observe that in the ROE ranges between 0% and 10% and between 10% and 20% (specifications 9–3 and 9–4, respectively), outstanding bonds are significantly negatively associated with ROS. Moreover, the bank loan results are mixed, showing a negative association with ROS in the ROE range of 10 to 20% (specification 9–4) and a positive association in the ROE range of 0 to 10% (specification 9–3).

Therefore, concerning the most profitable firms whose ROE is greater than 30%, bond leverage is significantly positively associated with ROA through asset usage efficiency (specification 8–6 in Table 8). The leverage of the outstanding bond is negatively associated with ROS in the ROE range of 0 to 20% (specifications 9–3 and 9–4 in Table 9). In contrast, the association between outstanding bonds and ROE is positive in the ROE range of less than 10% (specifications 7–2 and 7–3 in Table 7). The results indicate that leverage distortion smoothed or increased ROE mechanically among mediocre and poorly performing firms.

7.2 Ownership structure and financial leverage

From Lemma 1, we predict that a lower-level ownership concentration in an inefficient market implies greater financial leverage distortion to smooth or increase ROE mechanically at the expense of the optimal capital structure (H2). To specify a possible distortion, we first regress the financial leverage changes by bond flotation ($\Delta\left[\mathrm{BND}_{i,t}/(\mathrm{STK}_{i,t}+\mathrm{BBF}_{i,t})\right]$) on ownership structure changes, considering a possible association between changes in ownership structure and changes in ROA ($\Delta\mathrm{ROA}_{i,t}$), controlling for changes in business volume by growth in sales ($\Delta\mathrm{SAL}_{i,t}$) and changes in the Tokyo market interest rate ($\Delta\mathrm{TKR}_{t}$), as follows:

Table 9 The return on sales (ROS) and the financial leverage, from the second half of 1878 to the second half of 1910.

Dependent variables	$ROS_{i,t}$		$ROS_{i,t}$		$ROS_{i,t}$		$ROS_{i,t}$		$ROS_{i,t}$		$ROS_{i,t}$	
	9–1		9–2		9–3		9–4		9–5		9–6	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	0.2522	6.21 ***	-1.2166	-0.31	0.3050	35.39 ***	0.3528	29.63 ***	0.4509	15.35	0.6997	2.82 **
$LON_{i,t}/(STK_{i,t}+BBF_{i,t})$	0.1123	1.16	0.8750	0.06	0.0675	3.80 ***	-0.3112	-4.43 ***	-0.9404	-2.16	-0.2063	-0.13
$BND_{i,t}/(STK_{i,t}+BBF_{i,t})$	-0.0164	-0.34	0.6668	0.03	-0.0177	-1.83 *	-0.0289	-2.69 ***	-0.0347	-0.15	2.2648	0.75
ΔGNP_t	-0.0003	-1.00	-0.0041	-0.43	0.0000	-0.03	-0.0001	-1.78 *	0.0003	2.08	-0.0006	-0.26
adjusted R^2		0.10		-0.44		0.59		0.84		0.65		0.39
Log likelihood		-1,401.04		-137.61		283.71		187.88		50.67		-33.89
F statistic		2.28 ***		0.40		13.76 ***		20.35 ***		6.75 ***		2.78 **
number of individual firms (cross sections)		89		24		82		37		33		9
Restriction of observation by ROE		no restriction		ROE≤0%		0%<ROE≤10%		10%<ROE≤20%		20%<ROE≤30%		30%<ROE
Number of total observations		1,031		52		746		148		54		31

Notes : ROS: return on sales. LON: outtanding bank borrowing. STK+BBF=own capital, where STK= paid in capital and BBF = balance broaght forward (retained earnings). BND: Outstanding corporate bond liability. GNP: gross national product. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

$$
\begin{aligned}
\Delta\left[\frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t}+\mathrm{BBF}_{i,t}}\right] &= \beta_0+\beta_1\Delta\mathrm{SCEO}_{i,t} \\
&\quad +\beta_2\Delta\mathrm{SAL}_{i,t}+\beta_3\Delta\mathrm{TKR}_t+\beta_4\Delta\mathrm{GNP}_t+\mu_i+\epsilon_{i,t}, \\
\Delta\left[\frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t}+\mathrm{BBF}_{i,t}}\right] &= \beta_0+\beta_1\mathrm{SCEO}_{i,t}+\beta_2\Delta\mathrm{SCEO}_{i,t}\times\Delta\mathrm{ROA}_{i,t}+\beta_3\Delta\mathrm{ROA}_{i,t} \\
&\quad +\beta_4\Delta\mathrm{SAL}_{i,t}+\beta_5\Delta\mathrm{TKR}_t+\beta_6\Delta\mathrm{GNP}_t+\mu_i+\epsilon_{i,t},
\end{aligned}
\tag{12}
$$

and

$$
\begin{aligned}
\Delta\left[\frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t}+\mathrm{BBF}_{i,t}}\right] &= \beta_0+\beta_1\Delta\mathrm{CNSL}_{i,t} \\
&\quad +\beta_2\Delta\mathrm{SAL}_{i,t}+\beta_3\Delta\mathrm{TKR}_t+\beta_4\Delta\mathrm{GNP}_t+\mu_i+\epsilon_{i,t}, \\
\Delta\left[\frac{\mathrm{BND}_{i,t}}{\mathrm{STK}_{i,t}+\mathrm{BBF}_{i,t}}\right] &= \beta_0+\beta_1\Delta\mathrm{CNSL}_{i,t}+\beta_2\Delta\mathrm{CNSL}_{i,t}\times\Delta\mathrm{ROA}_{i,t} \\
&\quad +\beta_3\mathrm{ROA}_{i,t}+\beta_4\Delta\mathrm{SAL}_{i,t}+\beta_5\Delta\mathrm{TKR}_t \\
&\quad +\beta_6\Delta\mathrm{GNP}_t+\mu_i+\epsilon_{i,t}.
\end{aligned}
\tag{13}
$$

The results are presented in Table 10. First, we observe that president–ownership concentration ($\mathrm{SCEO}_{i,t}$) tends to be significantly negatively associated with financial leverage through bond flotation (specification 10–1). However, we also observe that president–ownership concentration is significantly associated with leverage through bond flotation when a rise in leverage is accompanied by an increase in ROA, as shown by the significantly positive coefficient of the interaction term ($\Delta\mathrm{SCEO}_{i,t}\times\Delta\mathrm{ROA}_{i,t}$) in specification 10–2. The president–ownership concentration is likely to throttle off financial leverage unless it is associated with an improvement in asset usage efficiency. This result is consistent with our H2 on leverage distortion reduction by ownership concentration.

By running the same regressions for the changes in leverage caused by an increase in the amount of bank loans, we find no significant impact of the ownership structure,

Table 10 Determinants of the changes in outstanding bond (BND), from the first half of 1887 to the second half of 1910.

Dependent variables	$\Delta[BND_{i,t}/(STK_{i,t}+BBF_{i,t})]$		$\Delta[BND_{i,t}/(STK_{i,t}+BBF_{i,t})]$		$\Delta[BND_{i,t}/(STK_{i,t}+BBF_{i,t})]$		$\Delta[BND_{i,t}/(STK_{i,t}+BBF_{i,t})]$	
	10–1		10–2		10–3		10–4	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	0.0011	0.56	0.0018	0.90	0.0013	0.63	0.0019	
$\Delta SCEO_{i,t}$	-0.1238	-1.88 *	-0.0475	-0.63				
$\Delta SCEO_{i,t} \times \Delta ROA_{i,t}$			14.2044	2.03 **				
$\Delta CNSL_{i,t}$					-0.0302	-0.01	-0.5787	-0.22
$\Delta CNSL_{i,t} \times \Delta ROA_{i,t}$							-45.9281	-0.56
$\Delta ROA_{i,t}$			-0.1619	-2.59 **			-0.1795	-2.78 ***
$\Delta SAL_{i,t}$	0.0000	-0.01	0.0000	1.23	0.0000	-0.06	0.0000	1.50
ΔTKR_t	0.0007	0.34	0.0011	0.54	0.0002	0.08	0.0002	0.10
ΔGNP_t	0.0000	0.97	0.0000	0.52	0.0000	0.95	0.0000	0.48
adjusted R^2		0.02		0.07		0.01		0.05
Log likelihood		808.57		818.37		806.58		813.64
F statistic		1.20		1.61		1.11		1.40
Number of individual firms (cross sections)		43		42		43		42
Number of total observations		397		390		397		390

Notes : BND: Outstanding corporate bond liability. STK+BBF=own capital, where STK=paid in capital, BBF=balance brought forward. SCEO: Share of ownership of the CEO. ROA: return on asset. CNSL: ownership consolidation withint the borad=SCEO×SNIN, where SMIN=share of the board member whose ownership share was smallest within the board. TAR: market interest rate in Tokyo prefecture. GNP: gross national product. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

as shown in Table 11. Leverage distortion due to a diffused ownership structure is substantial in the bond market but not in terms of bank loans.

7.3 Bond flotation as the channel of distortion

A higher-level president–ownership concentration was positively associated with an increase in ROA (Table 5). Higher-level leverage through bond flotation was accompanied by a rise in ROA only for top firms whose ROE is higher than 30% (Table 8). A higher-level president–ownership concentration was associated with a decrease in the level of financial leverage through bond flotation but with an increase in financial leverage if it was accompanied by an increase in ROA (Table 10). President–ownership concentration never affected ROE (Table 5). Moreover, greater leverage through bond flotation accompanied an increase in ROE in the range of less than 10% (Table 7).

Given the above results, we conclude that mediocre and poorly performing firms whose ownership structure was more diffuse were more prone to financial leverage distortion through overreliance on bond flotation. Mediocre and poorly performing firms in the ROE range of less than 10% deceived the market when increasing the leverage to smooth or increase the short-term ROE mechanically. In contrast, a higher-level president–ownership concentration held down the bond flotation but raised the bond flotation when accompanied by an increase in ROA. Thus, in the inefficient market, a higher-level ownership concentration was associated with better leverage. These results are mutually consistent and support our H2 on the reduction in leverage distortion caused by greater ownership concentration.

8 Conclusions

The ownership structure is inconsequential for the performance of modern US firms (Demsetz and Lehn, 1985; Himmelberg et al., 1999; Demsetz and Villalonga, 2001).

Table 11 Determinants of the changes in bank loans (LON), from the first half of 1887 to the second half of 1910.

Dependent variables	$\Delta[LON_{i,t}/(STK_{i,t}+BBF_{i,t})]$		$\Delta[LON_{i,t}/(STK_{i,t}+BBF_{i,t})]$		$\Delta[LON_{i,t}/(STK_{i,t}+BBF_{i,t})]$		$\Delta[LON_{i,t}/(STK_{i,t}+BBF_{i,t})]$	
	11–1		11–2		11–3		11–4	
estimation method	Panel least squares		Panel least squares		Panel least squares		Panel least squares	
Cross section fixed effect	fixed		fixed		fixed		fixed	
Independent variables		*t* statistic		*t* statistic		*t* statistic		*t* statistic
Constant	-0.0185	-0.54	-0.0185	-0.53	-0.0190	-0.56	-0.0190	-0.55
$\Delta SCEO_{i,t}$	-0.2910	-0.27	0.0342	0.03				
$\Delta SCEO_{i,t} \times \Delta ROA_{i,t}$			55.1128	0.44				
$\Delta CNSL_{i,t}$					-1.6403	-0.32	-10.2520	-0.22
$\Delta CNSL_{i,t} \times \Delta ROA_{i,t}$							-2.5717	0.00
$\Delta ROA_{i,t}$			-0.6215	-0.56			-0.6353	-0.56
$\Delta SAL_{i,t}$	0.0000	-0.05	0.0000	0.22	0.0000	-0.06	0.0000	0.26
ΔTKR_t	0.1136	3.17 ***	0.1147	3.15 ***	0.1129	3.17 ***	0.1130	3.13 ***
ΔGNP_t	0.0004	1.60	0.0004	1.52	0.0004	1.61	0.0004	1.51
adjusted R^2		-0.04		-0.05		-0.04		-0.05
Log likelihood		-307.90		-305.52		-307.88		-305.63
F statistic		0.64		0.63		0.64		0.62
Number of individual firms (cross sections)		43		42		43		42
Number of total observations		397		390		397		390

Notes : LON: outstanding banking borrowing. STK+BBF=own capital, where STK=paid in capital, BBF=balance brought forward. SCEO: ownership share of the CEO. ROA: return on asset. CNSL: ownership consolidation withint the borad =SCEO×SMIN, where SMIN=ownership share of the board member whose ownership share was the smallest within the board. SAL: sales: TKR: market interest rate in Tokyo prefecture. GNP: gross national proeuct. ***, **, and * denote significance of 1, 5, and 10 percent levels respectively.

This situation seems to be the case because of the sufficient degree of efficiency of the modern US market.

In contrast, our results show that ownership structure was likely to affect corporate performance in the Tokyo market from the late nineteenth century to the early twentieth century. Pricing in the Tokyo market predominantly rewarded ROE but not ROA. Unlike ROA, ROE is mechanically manipulable by leverage distortion and can be discerned by investors. However, if the market is so inefficient that it is considerably costly to specify the leverage distortion by each firm, then it is optimal for investors to reward ROE instead of ROA. ROE is manipulable by managerial leverage distortion; hence, investors can save the risk premium to be paid to risk-averse managers by rewarding ROE rather than ROA. This approach sacrifices the long-term performance of the investment at hand. However, the opportunity loss of the investment for the long-term performance is beyond the scope of uninformed and short-sighted investors.

The way in which to offset market weakness is an ownership concentration centered on the president, who is often the founder. A long-sighted and informed president pursues long-term growth in the firm's valuation. Our results show that a higher-level president–ownership concentration was associated with a higher ROA but not with a higher ROE. The enactment of the Commercial Code of 1899 was likely to augment the positive effects of the president–ownership concentration. The enhancements of standardized disclosure and the ownership discipline were complements rather than substitutes.

A higher-level president–ownership concentration was associated with holding down leverage by bond flotation unless it was intended to increase ROA. Higher bond leverage increased ROA only for top-tier firms. Moreover, for mediocre and poorly performing firms, an increase in bond leverage was associated with an increase in ROE. This finding is consistent with an inference that bond leverages were distorted in such firms to manipulate ROE.

In contrast, we do not find evidence of bank loan distortion. The different results

for corporate bonds and bank loans are consistent with what we observed recently in Japan after the deregulation that has occurred in the country since the 1980s. The agency problem is more significant in the bond market, as banks facing disintermediation improve their screening efficiency (Anderson and Makhija, 1999; Uchida and Satake, 2009; Nakagawa and Uchida, 2011; Uchida and Udell, 2019).

In summary, the inefficient Tokyo market from the late nineteenth century to the early twentieth century was likely to allow managers to manipulate ROE through bond flotation. A higher-level president–ownership concentration curbed the adverse effect of market inefficiency. Thus, our work, similar to Morck et al. (2000), Gedajlovic and Shapiro (2002), Pindado et al. (2014), and Hamadi and Heinen (2015), provides more evidence that ownership is important in non-US markets.

We observed that a higher-level management–ownership concentration was more likely to enable the firm to pursue long-term growth. A remaining question is whether ownership concentration on its own, which was not necessarily at the management level , helped. Case studies support this possibility. A leading industry in Japan's industrialization process was the railway industry (Nakamura, 2000). The railway industry in the late nineteenth century was among the most technology-intensive industries. There, the other way of addressing shareholder/manager conflicts arose. Small and medium-sized shareholders who tended to sell shares in short order preferred payout to investment in equipment for long-term growth. Typically, large shareholders who tended to be of the "buy-and-hold" type helped management avoid underinvestment (Nakamura, 2014). In the case of another leading industry in the period, cotton spinning (Nakamura, 2015; Dong et al., 2015), large "buy-and-hold"-type shareholders tended to persuade small and medium-sized shareholders to approve the investment in plants and equipment suggested by managers rather than demand payouts in shareholders' annual meetings (Yuki, 2011). These case studies indicate the possibility of ownership concentration itself improving management in an emerging Japan, as Abdallah and Ismail (2017) showed for the Gulf

Cooperative Council region.

Our results also have policy implications. The prevalence of family firms in non-US nations often attracts attention because it may accompany a divide between management and control—typically in the form of stockholder/bondholder conflicts—and negatively affect efficiency (Claessens et al., 2000; Hamadi and Heinen, 2015). The exploitation of other stakeholders by the founding owner is precisely the issue on which Jensen and Meckling (1976) focused. However, we should also acknowledge the virtue of blockholding, which includes founding families. If the market is not sufficiently efficient to contain stockholder/manager conflicts, then some other factor must set it off. In the absence of an efficient market, concentrated ownership is among the second-best alternatives, which is why family firms still prosper in non-US nations. Desirable reforms in those nations would thus be those that make the market more transparent, without restricting blockholding.

Mathematical appendix

SA 1 Derivation of Lemma 1

Given the abovementioned assumptions regarding managers' Constant Absolute Risk-Averse utility function, we have managers' expected utility $\mathrm{E}\left[u\left(w-C\right)\right]=1-\exp\left[-r\left(\mathrm{E}\left[w\right]-C-r\mathrm{V}\left[w\right.\right.\right.$ $1-\exp\left[-r\left(\boldsymbol{\beta}^{T}\boldsymbol{t}-C(\boldsymbol{t})-r\boldsymbol{\beta}^{T}\boldsymbol{\Sigma}\boldsymbol{\beta}/2\right)\right]$, where $\boldsymbol{t}\equiv\left(t_1,t_2\right)^{T}$ and $\boldsymbol{\beta}\equiv\left(\beta_1,\beta_2\right)^{T}$, and $\boldsymbol{\Sigma}$ denotes the covariance matrix whose diagonal elements are σ_1^2 and σ_2^2 and off-diagonal elements are σ_{12}. The manager then chooses $\boldsymbol{t}$, given remuneration schedule $\boldsymbol{\beta}$, such that $\boldsymbol{t}=\arg\max_{\boldsymbol{t}}\boldsymbol{\beta}^{T}\boldsymbol{t}-C(\boldsymbol{t})-r\boldsymbol{\beta}^{T}\boldsymbol{\Sigma}\boldsymbol{\beta}/2$. Its first-order condition to maximize the managers' expected utility is $\boldsymbol{\beta}^{T}=\partial C(\boldsymbol{t})/\partial\boldsymbol{t}$, which is the incentive compatibility constraint of the manager.

Given $\partial C(t)/\partial t=\boldsymbol{\beta}^{T}$, shareholder j of n total shareholders maximizes the total sur-

plus multiplied by the number of shares owned such that $\max s_j \left[B(\boldsymbol{t}) - C(\boldsymbol{t}) - r\boldsymbol{\beta}^T\boldsymbol{\Sigma}\boldsymbol{\beta}/2\right]$, where s_j denotes the stock holding ratio of shareholder j and $\sum_{j=1}^{j=n} s_j = 1$, given the incentive compatibility constraint of the manager.

The first-order condition of shareholder maximization gives the optimal vector of incentive weights, $\boldsymbol{\beta^*} = (\partial B/\partial \boldsymbol{t})\left[\boldsymbol{I} + r\boldsymbol{\Sigma}\nabla C(\boldsymbol{t})\right]^{-1}$, where $\boldsymbol{I}$ is a unit matrix and $\nabla C(\boldsymbol{t})$ is a Hessian matrix of $C(\boldsymbol{t})$. Therefore, under the assumptions that $B_1 = B_2 = 1$ and $C_{11} = C_{22}$, we have the optimal incentive vector $\boldsymbol{\beta}^*$ as follows.

$$\begin{aligned}\beta_1^* =& \frac{1 + r\left(\sigma_2^2 - \sigma_{12}\right)\left(C_{11} - C_{12}\right)}{1 + r\left[\left(\sigma_1^2 + \sigma_2^2\right)C_{11} + 2\sigma_{12}C_{12}\right] + r^2\left(\sigma_1^2\sigma_2^2 - \sigma_{12}^2\right)\left(C_{11}^2 - C_{12}^2\right)},\\ \beta_2^* =& \frac{1 + r\left(\sigma_1^2 - \sigma_{12}\right)\left(C_{11} - C_{12}\right)}{1 + r\left[\left(\sigma_1^2 + \sigma_2^2\right)C_{11} + 2\sigma_{12}C_{12}\right] + r^2\left(\sigma_1^2\sigma_2^2 - \sigma_{12}^2\right)\left(C_{11}^2 - C_{12}^2\right)}.\end{aligned} \tag{A1}$$

SA 2 Proof of Lemma 1

We immediately have the following lemma:

Lemma 1. *Self-fulfilling distortion:*

(i) In an efficient market, the incentive is not distorted.

(ii) In an inefficient market, the incentive is distorted toward an overemphasis on ROE.

(iii) Distortion is increases with the degree of market inefficiency.

Proof. (i) In an efficient market, $\sigma_1^2 = \sigma_2^2$. This implies that $\beta_1 = \beta_2$, which is the first best under $B_1 = B_2$.

(ii) In an inefficient market, $\sigma_1^2 < \sigma_2^2$ due to the manipulated financial leverage. This implies that $\beta_1^* > \beta_2^*$, which deviates from the first best under $B_1 = B_2$.

(iii) The more inefficient the market is, the smaller σ_{12}. Furthermore,

$$\frac{\partial\left(\beta_1/\beta_2\right)}{\partial\sigma_{12}} = \frac{r^2\left(\sigma_2^2-\sigma_1^2\right)\left(C_{11}-C_{12}\right)^2}{\left[\left(r\sigma_1^2-r\sigma_{12}\right)\left(C_{11}-C_{12}\right)+1\right]^2} > 0,$$

in an inefficient market, where $\sigma_1^2 < \sigma_2^2$.

□

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