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# PRIVATE ORDERING AT THE WORLD'S FIRST FUTURES EXCHANGE

Mark D. West\*

## INTRODUCTION

Modern derivative securities — financial instruments whose value is linked to or “derived” from some other asset — are often sophisticated, complex, and subject to a variety of rules and regulations. The same is true of the derivative instruments traded at the world’s first organized futures exchange, the Dojima Rice Exchange in Osaka, Japan, where trade flourished for nearly 300 years, from the late seventeenth century until shortly before World War II. This Article analyzes Dojima’s organization, efficiency, and amalgam of legal and extralegal rules. In doing so, it contributes to a growing body of literature on commercial self-regulation<sup>1</sup> while shedding new light on three areas of legal and economic theory.

First, unlike participants in many other studied markets, Dojima traders did not *opt* out of the legal system. Like other parties to discrete transactions in early modern Japan, Dojima traders were *forced* out by the shogunate government. Although participants operated in the shadow of latent state regulation, the government remained largely hands-off by, most importantly, denying legal enforceability of futures contracts. The distinction between opting out *of* and being forced *from* the legal system is more than historical curiosity. In a recent article, for instance, Lynn Stout argued in the context of modern over-the-counter derivative markets that private ordering can be superior when parties “are involuntarily *shut* out” of the legal system.<sup>2</sup> Thus, she advocates the decriminalization of off-exchange derivative

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1. See, e.g., Stuart Banner, *The Origin of the New York Stock Exchange, 1791-1860*, 27 J. LEGAL STUD. 113 (1998); Lisa Bernstein, *Opting Out of the Legal System: Extralegal Contractual Relations in the Diamond Industry*, 21 J. LEGAL STUD. 115 (1992); Robert C. Ellickson, *A Hypothesis of Wealth-Maximizing Norms: Evidence from the Whaling Industry*, 5 J.L. ECON. & ORG. 83 (1989); Stephen Craig Pirrong, *The Efficient Scope of Private Transactions-Cost-Reducing Institutions: The Successes and Failures of Commodities Exchanges*, 24 J. LEGAL STUD. 229 (1995); Mark D. West, *Legal Rules and Social Norms in Japan’s Secret World of Sumo*, 26 J. LEGAL STUD. 165 (1997).

2. Lynn A. Stout, *Why the Law Hates Speculators: Regulation and Private Ordering in the Market for OTC Derivatives*, 48 DUKE L.J. 701, 777-83 (1999).

trading, but rejects civil enforceability of such contracts — the exact approach adopted in Japan three centuries ago. Similarly, in early 2000, the chairman of the Federal Reserve, the Treasury Secretary, and the chairman of the Commodity Futures Trading Commission called on Congress to exempt over-the-counter derivatives from the Commodity Exchange Act.<sup>3</sup> Dojima provides an empirical basis for analyzing these regulatory approaches, as well as more general proposals for exchange self-regulation.<sup>4</sup>

Second, this Article explores claims made by others that legal intervention can improve the welfare of market participants only when participants have poor judgment or face high drafting costs.<sup>5</sup> Absent these circumstances, legal intervention hurts participants. After nearly half a century of forced reliance by Dojima participants on extralegal arrangements, the shogunate in 1773 temporarily made futures contracts enforceable in court. Comparison of pre- and post-1773 Dojima market indicators thus offers a unique opportunity to analyze the market-wide effects of legal intervention.

Third, unlike the bartered exchange transactions (among, for instance, ranchers, whalers, and diamond merchants) that provide the basis of much recent scholarship, derivatives transactions can be quite complex. Because losses from derivative trading are not limited to the amount invested, huge losses may result — as recent billion-dollar losses at Barings Bank, Metallgesellschaft, Orange County, and Sumitomo Corporation demonstrate. This Article is the first to examine extralegal rules arising from such complex transactions. Because the Exchange data lend themselves to accepted econometric techniques, this Article also attempts to calculate rough measures of market efficiency.

In addition, while I do not claim that this Article supplants the excellent work of Japanese economic historians on Dojima,<sup>6</sup> it is one of

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3. See Gerard Baker, *Greenspan Wants Derivatives Freed Up*, FIN. TIMES, Feb. 11, 2000, at 11.

4. See, e.g., Paul G. Mahoney, *The Exchange as Regulator*, 83 VA. L. REV. 1453 (1997) (proposing self-regulation); A.C. Pritchard, *Markets as Monitors: A Proposal to Replace Class Actions with Exchanges as Securities Fraud Enforcers*, 85 VA. L. REV. 925 (1999) (same); see also Tokushū, *Rekishi ni Manabu "Shijō" tai "Kokka"* [Special Issue: Lessons from History on the Market Versus the State], PRESIDENT 251 (Nov. 1999) (series of articles focusing on Dojima in Japanese business magazine).

5. See, e.g., Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87 (1989); David Charny, *Nonlegal Sanctions in Commercial Relationships*, 104 HARV. L. REV. 375, 429-44 (1990).

6. See, e.g., NORITAKA DOHI, *KOME TO EDO JIDAI* [RICE AND THE TOKUGAWA ERA] (1980); MATAO MIYAMOTO, *KINSEI NIHON NO SHIJŌ KEIZAI* [EARLY MODERN JAPANESE MARKET ECONOMICS] (1988); TOKUICHI SHIMAMOTO, *TOKUGAWA JIDAI NO SHŌKEN SHIJŌ NO KENKYŪ* [RESEARCH ON TOKUGAWA ERA SECURITIES MARKETS] (1953); MASAHIKO SUGIE, *TŌKI TO SAKIMONO TORIHIKI NO RIRON: WAGA KUNI SAKIMONO TORIHIKI SEIDO NO SEIRITSU NI KANSURU KENKYŪ* [THEORY OF SPECULATION AND FORWARDS TRANSACTIONS: RESEARCH ON THE ESTABLISHMENT OF FORWARDS

the very few works on Dojima available in English,<sup>7</sup> and the first in any language to place Dojima in context using a law-and-economics methodology. Although the study of early modern Japanese institutions can be daunting (in this Article, for instance, I rely heavily on eighteenth-century documents written, unfortunately, in eighteenth-century Japanese), the gap in the literature is remarkable nonetheless. Dojima merits obligatory mention in virtually every popular work, introductory textbook, and law review article on derivatives and markets as “the world’s first organized futures market.”<sup>8</sup> Moreover, Dojima development bears striking resemblance to that of early Western markets, suggesting that similar private-ordering systems tend to arise in similar institutional environments — independent of social structures, cultural constraints, and (arguably) Western conceptions of contract, norms, and reputation.

I am the first to acknowledge the sketchiness of some of the 300-year-old evidence from early modern Japan. But the best evidence available, which I have attempted to assemble here, leads to two central claims. First, Exchange participants appear to have developed effective means of discipline, governance, and dispute settlement, with only minimal “shadow-of-regulation” input from the state. Second, the Dojima Rice Exchange appears to have performed well when futures trading was illegal, when it was made legal but contracts were legally unenforceable, and when contracts were legally enforceable. The government’s decision to make futures contracts legally enforceable appears not to have dramatically increased — or for that matter decreased — several market performance measures.

This Article proceeds as follows. Part I sets forth the history of the Exchange, describes trading mechanics and regulation, and discusses

TRANSACTIONS IN JAPAN] (1984); Takatoshi Ito, 18 *Seiki, Dojima no Kome Sakimono Shijō no Kōritsusei ni Tsuite* [Regarding the Efficiency of the 18th Century Dojima Futures Market], 44 *KEIZAI KENKYŪ* 339 (1993); Shigeru Wakita, *Kinsei Osaka Dojima Kome Sakimono Shijō ni Okeru Gōriteki Kitai no Seiritsu* [The Establishment of Rational Expectations in the Early Modern Dojima Rice Futures Market in Osaka], 47 *KEIZAI KENKYŪ* 238 (1996).

7. A search of U.S. scholarship reveals only one article: Ulrike Schaede, *Forwards and Futures in Tokugawa-Period Japan: A New Perspective on the Dōjima Rice Market*, 13 *J. BANK. & FIN.* 487 (1989) [hereinafter Schaede, *Forwards and Futures*]. A slightly different version appears as Ulrike Schaede, *The Development of Organized Futures Trading: The Osaka Rice Bill Market of 1730*, in *JAPANESE FINANCIAL MARKET RESEARCH* 339 (W.T. Ziemba et al. eds., 1991). Each is largely a finance-centered description of trading mechanics. In this Article, in addition to adopting a different methodology, I rely on data and sources not examined by Schaede and sources not available at the time of that article’s publication.

8. PETER L. BERNSTEIN, *AGAINST THE GODS: THE REMARKABLE STORY OF RISK* 306 (1996); BARBARA B. DIAMOND & MARK P. KOLLAR, *24-HOUR TRADING: THE GLOBAL NETWORK OF FUTURES AND OPTIONS MARKETS* 6-9 (1989); JERRY W. MARKHAM, *THE HISTORY OF COMMODITY FUTURES TRADING AND ITS REGULATION* 3 (1987); RICHARD J. TEWELES & FRANK J. JONES, *THE FUTURES GAME: WHO WINS? WHO LOSES? WHY?* 8-9 (2d ed. 1987); Roberta Romano, *A Thumbnail Sketch of Derivative Securities and Their Regulation*, 55 *MD. L. REV.* 1, 10 (1996).

reasons why the world's first organized futures exchange began at Dojima and not elsewhere. Part II discusses the governance and anti-manipulation institutions of the Exchange and analyzes Dojima's relative reliance on formal internal rules rather than informal constraints. Part III attempts to measure the efficiency of the institutions discussed in Parts I and II by using price data gathered from eighteenth- and nineteenth-century Japanese documents. Part IV examines the effect of state-provided dispute resolution at Dojima by comparing dispute resolution and performance measures at Dojima before, during, and after the period in which shogunate courts were open to Dojima suits (1773-1784).

## I. THE MARKET

### A. *Economic, Social, and Legal Setting*

Around 1600, Ieyasu Tokugawa led a coalition of local lords to victory in battle and established a Japanese national dynasty that would last until the Meiji Restoration of 1868. Though Tokugawa Japan is generally characterized as isolationist and peaceful,<sup>9</sup> recent scholarship casts doubt on strong isolationist claims, noting that most Europeans left on their own after losing a trade war to the Dutch, and that Japan was always open to trade with other Asian countries.<sup>10</sup> But peaceful it certainly appears to have been, as the Tokugawa unification marked the end of 100 years of civil war and a prelude to the dramatic changes that would occur in the Western-influenced late-nineteenth century.

With peace came growth in population, cities, and commerce. Edo (modern-day Tokyo) became the country's political center, while Osaka — the “country's kitchen” — became the commercial center. Unlike many other feudal societies, Japan enjoyed a flourishing market economy, a development attributable to a combination of restrictions on foreign trade, a fragmented political system of 250 economically interdependent feudal domains, and the need of feudal leaders to fund expensive, centrally mandated trips to Edo every two years under a system of alternate residence.<sup>11</sup> Economic specialization increased,

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9. See, e.g., WALTER LEFEBER, *THE CLASH: A HISTORY OF U.S.-JAPANESE RELATIONS* 8 (1997); PATRICK SMITH, *JAPAN: A REINTERPRETATION* 53 (1997); TETSURŌ WATSUJI, *SAKOKU: NIHON NO HIGEKI [NATIONAL ISOLATION: THE TRAGEDY OF JAPAN]* (1953).

10. See, e.g., RONALD P. TOBY, *STATE AND DIPLOMACY IN EARLY MODERN JAPAN: ASIA IN THE DEVELOPMENT OF THE TOKUGAWA BAKUFU* (1984); Kazui Tashiro, *Foreign Relations During the Edo Period: Sakoku Reexamined*, 8 J. JAPANESE STUD. 283 (Susan Downing Videen trans., 1982); Robert LeRoy Innes, *The Door Ajar: Japan's Foreign Trade in the Seventeenth Century* (1980) (unpublished Ph.D. dissertation, University of Michigan) (on file with author).

11. See, e.g., YASUNARI MARUYAMA, *NIHON KINSEI KŌTSŪSHI NO KENKYŪ [STUDY OF TRANSPORTATION HISTORY IN EARLY MODERN JAPAN]* 585-600 (1989); Kenji Date,

and the port city of Osaka, located near many large rice fields, became a center of agricultural commerce and industry.

The Tokugawa government did not rely on a single currency, but three — gold coin (mostly used in Eastern Japan), silver currency (by weight, mostly used in Western Japan, including Osaka), and copper coin (used nationwide). But currency demand outpaced production, due at least in part to the Tokugawa government's monopoly over gold and silver mines. Local domains turned to substitutes, often minting their own currency.<sup>12</sup> Sometimes financial instruments such as promissory notes, bills of exchange, and letters of credit also filled the gap.<sup>13</sup>

In part because of its availability and ease of measurement, rice became a substitute currency.<sup>14</sup> Rice, "the most important commodity in Tokugawa society,"<sup>15</sup> was the measure by which the shogunate figured its annual budget.<sup>16</sup> Many feudal lords collected taxes from peasant subjects in rice and financed their governments by converting rice into currency at markets. Domain lords stored their rice in warehouses in Osaka, and, in a preliminary step toward the creation of an organized marketplace, paid Osaka merchants to manage it as their agents.<sup>17</sup>

The relative social status of the feudal lords and warehouse merchants was quite clear. Tokugawa society was divided into four hereditary vocational status groups, in descending order: samurai, farm-

*Edo ni Okeru Shokō no Keihi Seikatsu ni Tsuite* [The Consumptive Life of Edo Period Feudal Lords], 4 REKISHIGAKU KENKYŪ 75 (1935).

12. See YŌTARŌ SAKUDŌ, NIHON KAHEI KIN'YŪSHI NO KENKYŪ: HŌKEN SHAKAI NO SHIN'YŌ TSUKA NI KANSURU KISOTEKI KENKYŪ [A STUDY OF THE HISTORY OF JAPANESE CURRENCY IN FEUDAL SOCIETY] 33-58 (1961); Sydney Crawcour, *The Development of a Credit System in Seventeenth-Century Japan*, 21 J. ECON. HIST. 342 (1961).

13. Bills of credit first appeared in Osaka in 1628. See MATAJI MIYAMOTO, ŌSAKA CHŌNIN [OSAKA MERCHANTS] 41-44 (1957); see also SUSUMU KITAHARA, EDO NO FUDASASHI [TOKYO MONEYLENDERS] 7-8 (1985); Masaru Iwahashi, *Tokugawa Jidai no Kahei Sūryō* [Currency Distribution in the Tokugawa Era] in NIHON KEIZAI NO HATTEN [THE DEVELOPMENT OF JAPANESE ECONOMICS] (Mataji Umemura et al. eds., 1976). Bills of exchange are said to have begun in Europe in the late twelfth century. See Meir Kohn, *Bills of Exchange and the Money Market to 1600*, in MEIR KOHN, FINANCE, BUSINESS, AND GOVERNMENT BEFORE THE INDUSTRIAL REVOLUTION (forthcoming 2000) (manuscript at 1, on file with author and available at <http://www.srn.com>).

14. For an eloquent description of rice as pure commodity, see BERTOLT BRECHT, *The Measures Taken*, in THE MEASURES TAKEN, AND OTHER LEHRSTÜCKE 23-24 (Carl R. Mueller et al. trans., 1997) ("What is rice anyway?/Do I know what rice is?/How should I know who should know?/I don't know what rice is./All I know is its price.").

15. Tsuneo Satō, *Tokugawa Villages and Agriculture*, in TOKUGAWA JAPAN: THE SOCIAL AND ECONOMIC ANTECEDENTS OF MODERN JAPAN 37, 73 (Chie Nakane & Shinzaburō Ōishi eds., 1990).

16. See FUYUJI DOMON, EDO SHŌNIN NO KEIZAIGAKU [THE ECONOMICS OF TOKUGAWA MERCHANTS] 9 (1996).

17. See OSAMU WAKITA, KINSEI HŌKEN SHAKAI NO KEIZAI KŌZŌ [THE ECONOMIC STRUCTURE OF EARLY MODERN FEUDAL SOCIETY] 23-36 (1963).

ers, artisans, and merchants. The merchant status group was not monolithic, including both merchant property owners and day laborers. But merchants were clearly at the bottom of the social hierarchy, above only the extremely underprivileged, and were often subject to persecution from above by feudal lords in the form of asset confiscation and from below by peasants in the form of arson and theft.<sup>18</sup>

The Tokugawa legal system was one of fragmented federalism.<sup>19</sup> Tokugawa law applied in principle only in territory controlled directly by the central government, or perhaps more precisely, the Tokugawa feudal lord — about one-third of Japan, which included Osaka. The remainder of Japan was governed by a hodgepodge of feudal laws, the only guiding principle being a supremacy clause of sorts that mandated (in 1615) local statutes not contravene those of the government.<sup>20</sup> While property rights were not afforded statutory protection, local domains enforced “*de facto* property rights.”<sup>21</sup> Spotted use of legal precedents may have occurred in some regions,<sup>22</sup> but it was not until 1742 that important statutes and precedents were assembled into a code.<sup>23</sup>

By most accounts, dispute resolution was hierarchical, individualistic, and unpredictable. The judicial system relied on the Tokugawa social structure to control and channel disputes. Disputants first brought their claims to the local village leader and were referred to the next level in the hierarchy only if they could not be resolved in the first instance. The government explicitly discouraged suits against superiors or against members of another social status group, perhaps to preclude potential threats to its sovereignty.<sup>24</sup> The primary goals of those in charge of the legal system appear to have been settlement and the maintenance of social order, goals made more attainable by the in-

18. See, e.g., JOHN G. ROBERTS, *MITSUI: THREE CENTURIES OF JAPANESE BUSINESS* 36 (2d ed. 1988).

19. See J. MARK RAMSEYER, *ODD MARKETS IN JAPANESE HISTORY: LAW AND ECONOMIC GROWTH* 18 (1996).

20. See, e.g., MINJI KANREI RUISSHŪ [COLLECTION OF CIVIL LAWS] (Yutaka Tezuka & Mitsuo Rikō eds., 1969); HARUO ŌKUBO, *EDO NO KEIHŌ OSADAMEGAKI HYAKKAJŌ* [CRIMINAL PROVISIONS OF TOKUGAWA ERA OSADAMEGAKI] (1978); CARL STEENSTRUP, *A HISTORY OF LAW IN JAPAN UNTIL 1868*, at 121 (1991).

21. Tetsuji Okazaki & Masahiro Okuno-Fujiwara, *Evolution of Economic Systems: The Case of Japan*, in *THE INSTITUTIONS OF EAST ASIAN ECONOMIC DEVELOPMENT* 482, 494 (Yujiro Hayami & Masahiko Aoki eds., 1998).

22. See Yoshirō Hiramatsu, *Kinsei hō* [Early Modern Law], in 11 *IWANAMI KŌZANIHON REKISHI* [IWANAMI SERIES ON JAPANESE HISTORY] 331, 341-42 (1976).

23. This code was in the form of the Osadamegaki. See DAN FENNO HENDERSON, *1 CONCILIATION AND JAPANESE LAW: TOKUGAWA AND MODERN* 15-16 (1965).

24. See Dan F. Henderson, *Some Aspects of Tokugawa Law*, 27 *WASH. L. REV.* 85, 92 (1952).

termingling of civil and criminal law — civil litigants might face such novel sanctions as beheading for refusing to settle.<sup>25</sup>

### B. *Beginnings*

Dojima's story begins in 1616 — four years before the *Mayflower* left England, and fifteen years after the arrival in Japan of Englishman William Adams (the character fictionalized in James Clavell's *Shōgun*) — when a rice merchant from Nagoya (located halfway between Osaka and Edo) named Chozaemon takes a trip to Edo. According to the traditional — which does not necessarily mean historically accurate — story, along the way to Edo, Chozaemon stops at an inn where he meets a traveler from Sendai (north of Edo). Chozaemon strikes a deal with the man: you tell me if there's a rice shortage up North; I'll tell you if there's one down South. Five years later, on his pilgrimage to the Ise Shrine, the man from the North visits Chozaemon in Nagoya and informs him that this year's northern harvest looks bleak; next year it looks as if the North will send to Tokyo only half of its usual crop. Chozaemon begins hoarding rice from that year's southern bumper crop. A fellow Nagoyan named Ichizaemon hears of Chozaemon's efforts, and asks him to purchase 500 *ryō* worth of rice on his behalf. Chozaemon is eager to help, but because he has no warehouse to store that much rice on top of his own, he makes a deal. Pay me just 60 *ryō* now, he says, and when I sell the rice next year, you'll pay me the remaining 440 *ryō* along with interest at the rate of 3 *shō* (about a pound) of rice, and I'll give you the profits. But if the price of rice falls, and it's not profitable to sell, I'll keep your 60 *ryō*. Fortunately for both, the price skyrockets. Chozaemon realizes that he can do this again, and does so regularly, issuing 100 *ryō* of rice "receipts" for a two percent down payment, taking a middleman's fee, and setting contract maturity dates of two to three months.<sup>26</sup>

In the following years, several feudal lords begin to follow Chozaemon's example, issuing rice receipts that entitle the bearer to rice from the lords' agent-managed Osaka warehouses. By issuing receipts, lords could ensure a steady income stream from their otherwise seasonal and weather-dependent product. Like other promissory notes or bills of exchange that would dominate the Tokugawa merchant economy,<sup>27</sup> the receipts entitled the bearer to a certain quantity of goods — rice in an Osaka warehouse. But unlike other goods on

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25. See, e.g., HENDERSON, *supra* note 23, at 101, 132-62 (noting that "criminal-civil distinction was not clearly observed and Tokugawa practice" and including transcript of civil suit in which local official routinely threatens death penalty).

26. See DOHI, *supra* note 6, at 32-33; SUGIE, *supra* note 6, at 8-9.

27. By the end of the Tokugawa period, 99% of payments between merchants were settled by bills. See SAKUDŌ, *supra* note 12, at 249.

which promissory notes or bills of exchange were based, rice was itself a form of currency, and accordingly, these rice receipts, or bills, soon acquired a currency-like quality with a value independent of the underlying physical rice. Warehouses routinely issued “empty” bills (*kūmai kütte*) that were traded as credit instruments rather than actual entitlements to physical rice, which did not exist in the issuing warehouse.<sup>28</sup> Records of the Osaka city commissioner show that by 1654 (and perhaps several years earlier), Osaka traders had formed a functioning market for these rice bills.<sup>29</sup>

The trading house of Saburaemon Yodoya, in the Kitahama district of Osaka, became the primary trading site for rice bills.<sup>30</sup> As Ihara Saikaku, the son of an Osaka merchant and one of Japan’s most gifted novelists, wrote some 300 years ago:

The Kitahama Rice Market, as is fitting of Osaka’s position as the largest port in Japan, sometimes had speculative transactions of 50,000 *kan* [42.6 tons] in a two-hour period. The rice was crammed to the tops of the warehouses. People bought and sold by speculating based on the condition of the sky, the evening winds, and the morning rains. They argued over a mere one or two *bu* of silver, the market was full of people, and people who had never met before would trade thousands or even ten thousands of *koku* of rice, and once they had clapped hands over it, neither party would breach the contract.<sup>31</sup>

Saikaku’s prose suggests a glorious market of which the state might have been proud. But authorities’ initial larger concern was urban congestion, as traffic jams on Kitahama Road outside of the House of Yodoya were a common occurrence. In 1688 the government requested that rice traders move their market across the river to Dojima (today a few blocks from Osaka Station). They complied, and in 1697 Yodoya moved to Dojima as well.<sup>32</sup>

In 1705, the shogunate closed Yodoya’s business and confiscated his assets.<sup>33</sup> The official reason for the shogunate’s action was Yodoya’s criminal violation of sumptuary laws by ostentatious dis-

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28. See, e.g., SHIMAMOTO, *supra* note 6, at 14-15.

29. See SAKUDŌ, *supra* note 12, at 345.

30. Although many sources cite Yodoya as the birthplace of futures trading, it is possible that Yodoya was one of several trading sites. See SUGIE, *supra* note 6, at 12.

31. IHARA SAIKAKU, NIPPON EITAIGURA [JAPAN’S ETERNAL STOREHOUSE] (1688), quoted in YAMATANE GROUP KINEN SHUPPANKAI, NIHON SHIJŌSHI [HISTORY OF JAPANESE MARKETS] 62 (1989).

32. See, e.g., MIYAMOTO, *supra* note 6, at 196.

33. Yodoya’s wealth was astounding; if the commonly cited inventory of his wealth is accurate, he was a thousand times richer than other merchants, was owed 100 million *ryō* (several times the national income of Japan), and the amount confiscated by the government was equal to two hundred years of shogunate income. See, e.g., E.S. Crawcour, *Changes in Japanese Commerce in the Tokugawa Period*, 22 J. ASIAN STUD. 387, 392 (1962).

plays of wealth.<sup>34</sup> But some scholars suggest that Yodoya had been overeager in enforcing loans made to influential lords in Kyushu and Shikoku,<sup>35</sup> while others claim that the shogunate actually closed Yodoya because it wanted to halt futures transactions, which it considered gambling.<sup>36</sup> Gambling or not, the government had additional reasons to stop the trade — it believed that futures transactions led to artificially inflated physical rice prices, thereby leading to general price inflation.<sup>37</sup> Prohibited or not, market participants continued to trade rice bills in futures transactions on the black market in front of Yodoya's house. Only spot trading (the trading of physical rice) continued legally at Dojima.

### C. *Formal Establishment*

In 1716, Yoshimune became the eighth Tokugawa shogun, taking over a government with deteriorating finances. Yoshimune soon began a series of economic reforms, including a reduction of government spending and increases in land tax collection in 1721, and restrictions on feudal lord extravagance in 1724. One of Yoshimune's greatest concerns was falling rice prices. As Table 1 shows, prices had fallen considerably from the period immediately before Yoshimune took office.

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34. See SUGIE, *supra* note 6, at 177; James L. McClain, *Space, Power, Wealth and Status in Seventeenth-Century Osaka*, in OSAKA: THE MERCHANT'S CAPITAL OF EARLY MODERN JAPAN (James L. McClain & Osamu Wakita eds., 1999) at 44, 58.

35. See DOHI, *supra* note 6, at 176-79; SUGIE, *supra* note 6, at 17.

36. See DOHI, *supra* note 6, at 176-79; SUGIE, *supra* note 6, at 17.

37. See MIYAMOTO, *supra* note 6, at 196-97; SUGIE, *supra* note 6, at 17.

TABLE 1: OSAKA RICE PRICES, 1713-1730

Year	Price (Silver <i>monme</i> per <i>koku</i> )
1713	155.0
1714	155.2
1715	115.5
1716	98.8
1717	110.9
1718	33.0
1719	42.2
1720	68.2
1721	75.0
1722	44.5
1723	41.5
1724	47.4
1725	55.5
1726	56.9
1727	40.6
1728	40.6
1729	30.4
1730	32.9

Source: RYŪZWŌ YAMAZAKI, KINSEI BUKKASHI KENKYŪ [A STUDY OF EARLY MODERN PRICE HISTORY] 92-93 (1983).

Low rice prices were a concern because members of the military received their salaries in rice, which they subsequently sold for cash to brokers,<sup>38</sup> and because feudal lords repaid loans from local temples and shrines in rice.<sup>39</sup> The government could easily inflate rice prices by controlling supply; the trick was to do so without causing widespread inflation. Just as the previous government had outlawed futures transactions because of their perceived tendency to raise rice prices (and rice prices alone), Yoshimune — later dubbed the “rice shogun” — decided to employ them precisely for that reason in order to appease demands from the military and lords. In 1730, after receiving a petition from Tokyo merchants in Osaka (whom the government apparently felt it could trust more than the locals),<sup>40</sup> Yoshimune officially authorized futures trading at the Dojima market. Yoshimune’s 1730 edict stated in pertinent part:

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38. See, e.g., GEORGE SANSOM, A HISTORY OF JAPAN 1615-1867, at 164 (1963).

39. See ROBERTS, *supra* note 18, at 16.

40. See DOHI, *supra* note 6, at 89; MIYAMOTO, *supra* note 6, at 196.

The rice trade of Osaka shall be conducted strictly in keeping with the customs observed until now, and such dealing in futures shall be permitted for the merchants of the provinces, as well as Osaka middlemen. The fifty clearinghouses historically in existence shall conduct their business only under their private regulations and following their old customs in margin accounts, closing accounts, and so on; they shall extend their business as widely as possible, so that they may not cause inconvenience to the rice trade. The purpose of this authorization is to raise rice prices, and they should accordingly engage freely in their trade. The [old rice exchange] is abolished, but all the old customs are hereby valid. If anyone attempts to deceive the public by calling a rule an old custom when in fact it is not, he shall be tried and severely punished. *Except in extreme circumstances, no suit relating to rice trade shall be heard.*<sup>41</sup>

Yoshimune sent a second edict specifically to Edo, to which he attached the first, and ordered simply that "no petition by a person of this town as to the rice market in Osaka shall be heard."<sup>42</sup>

#### D. Trading Practices

Despite the legal unenforceability of futures contracts after Yoshimune's edict, futures trading flourished at the formally established Dojima Exchange. In this Section, in order to describe the functional aspects of the Exchange, I analyze the Dojima Rice Exchange using the eight factors Roberta Romano has identified as features of futures exchanges.<sup>43</sup> Although forward transactions appeared in Europe before Dojima's formal establishment,<sup>44</sup> the following characteristics make Dojima the world's first organized futures exchange.

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41. BEISHŌ KYŪKI (1616-1870) (emphasis added) *reprinted as* MATAJI MIYAMOTO, 3 ŌSAKA KEIZAI SHIRYŌ SHŪSEI [COMPILATION OF ŌSAKA ECONOMY DOCUMENTS] 76-77 (1973); *see also* SHIMAMOTO, *supra* note 6, at 9-10; SUGIE, *supra* note 6, at 31. The decree applied specifically to futures contracts. Spot transactions at Dojima apparently had separate legal treatment. At some point in the An'ei era (1772-1780), the shogunate systematically gave spot transaction suits precedence over other suits, rendering quick judgments and accepting filings on days other than the two-a-month "suing days" specified for such matters. *See* SHIMAMOTO, *supra* note 6, at 20.

42. BEISHŌ KYŪKI, *supra* note 41, at 77.

43. *See* Romano, *supra* note 8, at 10-20. Romano's list is similar to others, *see, for example*, A.W.B. Simpson, *The Origins of Futures Trading in the Liverpool Cotton Market*, in *ESSAYS FOR PATRICK ATIYAH* 179, 180-81 (Peter Cane & Jane Stapleton eds., 1991). Unless otherwise indicated, I draw here principally from BEISHŌ KYŪKI, *supra* note 41, and more modern accounts reported in MIYAMOTO, *supra* note 6, at 195-232; SHIMAMOTO, *supra* note 6, at 11-78; and SUGIE, *supra* note 6, at 31-83.

44. *See* Meir Kohn, *Risk Instruments in the Medieval and Early Modern Economy*, in KOHN, *supra* note 13, at 10-12. The mid-sixteenth-century wagers on exchange rates at Antwerp that Kohn says "seem like modern futures contracts," *id.* at 12 & n.37, appear merely to be forwards, with no evidence of standardized contracts, clearinghouses, and the like. *See* RICHARD EHRENBERG, *CAPITAL & FINANCE IN THE AGE OF THE RENAISSANCE: A STUDY OF THE FUGGERS AND THEIR CONNECTIONS* 243-44 (H.M. Lucas trans., 1928).

### 1. *Standardized Terms*

A forward contract is an agreement for the future delivery of an asset at a specified price at the end of a designated period of time. A futures exchange is a market in which participants trade standardized forward contracts. Futures contracts thus normally have standardized terms: a typical modern London Metal Exchange futures contract, for instance, specifies quotation unit, grade of material, quantity, price, delivery terms and procedures, and contract duration.<sup>45</sup> At Dojima, the standard trading unit was 100 *koku*, each contract was equal to 100 *koku*, and minimum price movements were measured at one *koku*. Delivery terms and procedures depended on the type of rice (rice was chosen by the market from the area that had the best harvest, for instance, Kaga in the summer) and the warehouse in question. Because rice could be “branded” by harvest location, geography provided a convenient grading mechanism.<sup>46</sup>

Contract duration was fixed by a trimester trading calendar, consisting of a spring term (January 8 – April 28), a summer term (May 7 – October 9), and a winter term (October 17 – December 24).<sup>47</sup> Contracts had to be settled by the closing date of each term, and the end of each term included a three-day liquidation period. The market closed at the end of each term, and no trades for the following period could be made between terms. Although the system restricted the ability of traders to contract freely, it also provided an institutional constraint to prevent transactions with infinite time horizons that no market — including most modern markets — could handle.

Dojima’s major innovation was the “book” transaction system (*chōaimai*) for recording such trades. In the book transaction system, when traders reached an agreement, the names of the parties and the amount of rice traded were recorded in the market “book.” The parties were then required to complete the transaction through cash settlement by the close of the trading term. Under this system, neither party required rice or cash when they made the bargain, making the practice well-suited for hedging. The book transaction system enabled organized futures trading at Dojima.

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45. The Exchange also has special contract rules pertaining to such matters as quality and quotation unit for each commodity. See ROBERT GIBSON-JARVIE, *THE LONDON METAL EXCHANGE: A COMMODITY MARKET* 29-33 (1976); RUDOLF WOLFF & CO LTD., *WOLFF’S GUIDE TO THE LONDON METALS EXCHANGE* 199-221 (5th ed. 1995).

46. On the importance of grading, see Pirrong, *supra* note 1, at 234-35; Simpson, *supra* note 43, at 182.

47. Dates may vary based on days of the week, and the winter and spring terms may technically have been one term split by the year-end holidays. See SHIMAMOTO, *supra* note 6, at 38. Technically the months are lunar months and do not correspond exactly to the solar Gregorian calendar. The particular dates referred to herein are not important enough to merit revision of dates to the Gregorian system.

## 2. *Transferability*

Futures contracts are readily transferable, which allows for closing out a position by taking the opposite side of the transaction. At Dojima, futures contracts were easily and commonly transferred, and parties could effectively close out positions by entering the opposite transaction (a buy versus a sell for the same amount of rice) on the book. Thus, as in modern futures markets, Dojima traders routinely closed out positions without purchasing the underlying physical quantity of rice, thereby reducing transaction costs.

## 3. *Auction Trading*

Futures are usually traded in a pure auction model, unlike stock exchanges, which often use a specialist system. Dojima, like the famous hand signals and shouts of the Chicago market pits, also relied on an auction system. No specialist was necessary to make a trade.

## 4. *Price Limits*

Price limits are maximum daily price changes that a contract specifies can occur. When a futures contract moves outside the price limit, no transactions can take place on that day. Such limits are used to prevent large fluctuations. Although Dojima futures contracts appear to have had no formal price limits, as Part II discusses, another institution — the firebox system — performed a similar function.

## 5. *Price Discovery*

According to theory, futures market prices communicate price information to underlying spot markets, and that information moves spot prices in the right direction.<sup>48</sup> The Dojima market performed a similar price discovery function for physical rice transactions. The data presented in Part III provide empirical support, which is at least tentatively buttressed by two bits of anecdotal evidence. First, as a rule, trading in the Dojima futures market began two hours *before* trading in the Dojima spot market, suggesting that traders used futures information in their spot trading.<sup>49</sup> Second, Dojima price information was so significant that it was transmitted immediately to Edo (Tokyo),

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48. *See, e.g.*, FRANK J. FABOZZI ET AL., FOUNDATIONS OF FINANCIAL MARKETS AND INSTITUTIONS 507-08 (2d ed. 1998).

49. *See* SAKUDŌ, *supra* note 12, at 369.

350 miles away and normally a six-day journey, by flag signals, smoke signals, and carrier pigeons.<sup>50</sup>

## 6. Settlement

Futures contracts are settled in cash, and sometimes by physical delivery. At Dojima, very few contracts were actually settled by physical delivery; like Chicago grain markets, Dojima was largely a place where “men who don’t own something are selling that something to men who don’t really want it.”<sup>51</sup> In most cases, traders settled all open positions through cash payment, a method made simple and convenient by the book transaction system.

## 7. Clearinghouses

In futures markets, a clearinghouse (normally an independent corporation) guarantees a transaction by entering into both sides of a futures contract. When parties in futures markets reach an agreement, they actually contract with the clearinghouse as a third party. The clearinghouse becomes the seller to the buyer of the contract, and the buyer to the seller. In so doing, it guarantees performance and reduces risk from market transactions. It also reduces transaction costs by simplifying the process of unwinding positions by the settlement (delivery) date by allowing a party to contract with the clearinghouse and avoid searching for the original counterparty to the transaction.

Remarkably, the seventeenth-century Dojima Exchange had such a clearinghouse institution. Initially, moneychangers, which numbered more than one thousand in 1700,<sup>52</sup> changed rice into cash — a function made necessary largely because of the lack of a single unified currency. As transactions became more numerous and complex, merchants relied more on these moneychangers — now functioning as brokers — to hold their deposits, and eventually to manage their affairs. These brokers soon developed into full-fledged clearinghouses, serving as transaction intermediaries between contracting parties. While forward contract trading apparently occurred in Europe at about the same time as Dojima, the clearinghouse system sets Dojima apart as the first formalized futures exchange.<sup>53</sup>

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50. See MATAJI MIYAMOTO, *NIHON SHÖGYÖSHI [JAPANESE COMMERCIAL HISTORY]* 120-21 (1949). *But see* MIYAMOTO, *supra* note 6, at 386-402 (noting the lack of united market until the mid-eighteenth century and finding less correlation among isolated markets).

51. Morton Rothstein, *Frank Norris and Popular Perceptions of the Market*, 56 *AGRIC. HIST.* 58 (1982), *cited in* WILLIAM CRONON, *NATURE’S METROPOLIS: CHICAGO AND THE GREAT WEST* 125 (1992).

52. See McClain, *supra* note 34, at 64-65.

53. Most modern exchanges rely on one central clearinghouse institution, while Dojima had multiple clearinghouses. Although competition among multiple clearinghouses operat-

## 8. Clearinghouse Requirements

Clearinghouses must be compensated for their undertaking of risk, and compensation normally comes in the form of margin and daily settlement requirements. Clearinghouses set margin requirements for members, who must maintain specified amounts in their margin accounts to continue trading with the clearinghouse. Daily settlement requirements mitigate against the possibility of cumulative losses. Dojima clearinghouses had similar requirements, requiring margin payments to incur trading risk and requiring traders to enter their transactions into the house's trading book at the end of the trading day. The clearinghouses employed a ten-day mark-to-market mechanism, adjusting margin accounts every ten days to reflect changes in the value of traders' positions. As in modern futures markets, customers who experienced gains over the ten-day period could withdraw funds from margin accounts, while those who experienced losses had their margin account balance reduced. And as in modern futures markets, lending institutions arose to help traders finance margin requirements.<sup>54</sup>

The historical record suggests at least four reasons why Dojima participants were able to construct these formal market institutions at least 100 years before similar institutions developed in Europe. First, the shogunate's policy, intentional or otherwise, of allowing competition among three forms of currency fostered the development of money exchange brokers.<sup>55</sup> These brokers formed the basis of the clearinghouse institutions and designed alternative payment systems (such as bills of credit) that led to the development of standardized futures contracts. Second, the feudal political system made financial demands on lords but did not limit their ability to exert power in the marketplace. Third, because rice was both an alternative currency and a seasonal, weather-sensitive commodity, it encouraged formal hedging by these lords. Finally, socioeconomic and even religious structures may have played a role. Merchants, divorced from the land, had both the ability and incentives to create a central marketplace in Osaka, and unlike some of their European counterparts, were unfettered by a Christian or Muslim moral code that discouraged or prohibited debt and usury.<sup>56</sup>

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ing as brokers might seem efficient, the duplication of basic clearinghouse services by multiple parties may have reduced potential gains.

54. See MIYAMOTO, *supra* note 6, at 205.

55. On the merits of currency competition, see F.A. HAYEK, *DENATIONALISATION OF MONEY: AN ANALYSIS OF THE THEORY AND PRACTICE OF CONCURRENT CURRENCIES* (1976).

56. See OSAMU WAKITA, *KINSEI ŌSAKA NO KEIZAI TO BUNKA* [ECONOMICS AND CULTURE OF EARLY MODERN ŌSAKA] 44 (1994); JACK WEATHERFORD, *THE HISTORY OF MONEY: FROM SANDSTONE TO CYBERSPACE* 73-74 (1997) (noting that "if Christians lent

## E. Regulation

The Japanese government was largely uninvolved in the development of these futures exchange institutions. Four brief exceptions tend to prove the rule. First, Yoshimune's 1730 edict established a licensing requirement, discussed further in Section II.B. Second, until a 1765 edict provided a special exemption,<sup>57</sup> the shogunate could (but seldom actually did) confiscate rice bills as a criminal penalty just as it had confiscated Yodoya's assets.<sup>58</sup> That the assets of a merchant as large as Yodoya could be confiscated so easily is said to have caused other merchants to take great care in subsequent dealings.<sup>59</sup> Third, the shogunate occasionally regulated the national rice market, mandating limits on the volume of rice that feudal lords could send to Osaka to prevent dumping, and setting city- and nation-wide price floors and ceilings on physical rice in times of crisis.<sup>60</sup> Finally, as discussed further in Part IV, in 1773, after nearly fifty years of denying civil enforceability, the government agreed to hear disputes and required rice sold at Dojima to bear the official seal of its newly appointed rice inspector.<sup>61</sup> As two economic historians put it, "[t]he Osaka rice market

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money for interest, the Catholic church excommunicated them" and that "[t]he Koran specifically prohibited bills of exchange"). While usury prohibitions may have hampered the development of debt and financial intermediaries in Europe, they did encourage the early development of bills of exchange. See Kohn, *supra* note 13, at 9-10.

57. See DOHI, *supra* note 6, at 206.

58. See *supra* text accompanying note 33. Confiscation of assets (*kessho*) was connected with punishments for all types of crimes. The severity of the confiscation depended on the severity of the crime. See RYŌSUKU ISHII, NIHON HŌSEISHI GAISETSU [OUTLINE OF JAPANESE LEGAL HISTORY] 495, 498 n.13 (1948) [hereinafter RYŌSUKU ISHII, NIHON HŌSEISHI GAISETSU]; see also RYŌSUKU ISHII, KEIBATSU NO REKISHI [THE HISTORY OF PUNISHMENT] 132 (1992) (explaining how Yoshimune established graduated fine system to complement asset confiscation in 1718). Confiscation normally applied only to the offender and not to an offender's group. See SHINZŌ TAKAYANAGI, EDO JIDAI NO TSUMI TO KEIBATSU SHŌSETSU [CRIME AND PUNISHMENT IN THE TOKUGAWA PERIOD] 414 (1988).

59. See YOSHIO SAKATA, CHŌNIN [MERCHANTS] 38 (1949).

60. See Shinzaburō Ōishi, *Hōreki, Tenmeiki no Bakusei* [Shogunate Government in the Hōreki-Tenmei Era (1751-1789)], in 11 IWANAMI KŌZA NIHON REKISHI [IWANAMI SERIES ON JAPANESE HISTORY] 139 (1976); E.S. Crawcour & Kozo Yamamura, *The Tokugawa Monetary System: 1787-1868*, 18 ECON. DEV. & CULTURAL CHANGE 489, 500 (1970); Shigeaki Yasuoka, *Edo Chūki no Osaka Torihiki Soshiki* [The Trade Structure of Osaka in the Middle Tokugawa Era], 16 DŌSHISHA SHŌGAKU 290 (1964). After 1830 and toward the end of the Tokugawa government, price control measures occurred with some regularity. See MASANORI HONJŌ, BAKUHANSEI SHAKAI NO TENKAI BEIKOKU SHIJŌ [DEVELOPMENT OF FEUDAL GOVERNMENT AND RICE MARKETS] 361 (1994).

61. See SHIMAMOTO, *supra* note 6, at 19; Nobuhiko Nakai & James L. McClain, *Commercial Change and Urban Growth in Early Modern Japan*, in 4 CAMBRIDGE HISTORY OF JAPAN 519, 587 (John Whitney Hall ed., 1991). After 1773, the shogunate still occasionally issued decrees regarding money claims, twice announcing that money claims must be settled out of court, and granting amnesty to old futures-related claims. See Heiichirō Kaneda, *Tokugawa Jidai no Tokubetsu Minji Soshōhō: Kanekuji no Kenkyū* [Special Procedural Law of the Tokugawa Era: Research on Money Suits], 43 KOKKA GAKKAI ZASSHI 362 (1928).

seems to have been largely beyond the control of the [government] . . . . It seems strange . . . that the [government] did not attempt to influence the market more directly.”<sup>62</sup>

Despite the shogunate’s relative laxity, Dojima participants nevertheless acted in the long shadow of latent governmental regulation. Licensing requirements determined the players of the game. The monopoly on futures contracts granted to Dojima likely increased the force of internal sanctions. The threat of license confiscation may have created additional incentives for proper behavior. The Dojima experience thus leaves open the possibility that the development of efficient rules in self-organized markets may require something less than complete governmental withdrawal.

Regulatory developments at Dojima, especially *before* 1730, bear striking resemblance to those in early European and American markets. In the famous seventeenth-century Dutch tulip forwards market, trading persisted despite six government attempts to ban such trading.<sup>63</sup> In England, the passage in 1734 of Sir John Barnard’s Act, “[a]n act to prevent the infamous practice of stock-jobbing,” effectively banned the trading of options.<sup>64</sup> Yet despite fines for selling stock that one does not own, option transactions apparently continued.<sup>65</sup> In New York, a 1792 law, the “watered-down equivalent of Barnard’s Act,” did not explicitly prohibit options transactions, but made options contracts void and thus unenforceable in court. In New York as in England, “time bargains went on as before, but were enforced privately, without the assistance of the legal system.”<sup>66</sup>

Still, developments at Dojima differ from the English and American cases both in the degree of and the motives underlying governmental restrictions. English legislation expressly prohibited futures trading, while the Japanese edict expressly legalized it, if only for one exchange. Part of the reason for the difference may lie in motive. Eighteenth-century English and American (and even in more recent times)<sup>67</sup> authorities largely feared the harmful effects of “gambling” speculators on market prices. But, as I discuss in Part IV, the Japanese government, which had once itself viewed futures trading

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62. *Crawcour & Yamamura*, *supra* note 60, at 500.

63. *See* MIKE DASH, *TULIPOMANIA: THE STORY OF THE WORLD’S MOST COVETED FLOWER AND THE EXTRAORDINARY PASSIONS IT AROUSED 187-95* (2000); *see also* sources cited *supra* note 44.

64. STUART BANNER, *ANGLO-AMERICAN SECURITIES REGULATION 104-05* (1998).

65. *See id.* at 106.

66. *Id.* at 173-74. A similar phenomenon occurred in Chicago futures markets. *See* JEFFREY WILLIAMS, *THE ECONOMIC FUNCTION OF FUTURES MARKETS* § 5.2, at 154-56 (1986).

67. *See* Stout, *supra* note 2, at 717.

with suspicion, apparently sought to promote, not to prohibit, private ordering.

## II. RULES OF ORDER

As a full-fledged futures exchange in a relatively primitive legal and economic system, Dojima traders needed to devise governance mechanisms to ensure market order. This Part argues that while relational contracting played a role, the Exchange chose to rely more heavily on formal internal rules and institutions than on relational constraints.

### A. Governance

Exchanges have historically been commercial mutual nonprofit institutions managed by boards of directors and standing committees pursuant to by-laws — possibly a consequence of member heterogeneity.<sup>68</sup> Dojima employed a similar structure. Until the Meiji Restoration of 1868, the Exchange remained a nonprofit association of traders. Although Exchange expenses were originally apportioned among members, the warehouses eventually took over payment.<sup>69</sup> But while warehouses paid the fees, Exchange members elected Exchange officials.

Formal governance of the Exchange was preceded by monopolistic, geographically-based rice trader coalitions formed shortly after the passage of the 1730 law legalizing futures trading. From these coalitions came Exchange directors. Exchange members elected five “annual directors” in a general election. They also elected five “monthly directors,” but the coalition system ensured that the heads of the five largest groups of coalitions became monthly directors by default. Annual directors conducted the activities of the Exchange with some measure of independence, while monthly directors more directly represented member and coalition interests, thereby likely reducing agency costs.

The system had at least one drawback. In order to maintain independence, annual directors were required to cease trading upon taking office. But because annual director salaries could not compete with profits that a director might otherwise earn from trading, few potential directors wanted the job. Compensation aside, the job was not an easy one, as directors were required to attend the Exchange daily. Those

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68. See Henry Hansmann, *The Role of Nonprofit Enterprise*, 89 YALE L.J. 835, 841 (1980); Craig Pirrong, *A Positive Theory of Financial Exchange Organization with Normative Implications for Financial Market Regulation*, at 37 (Working Paper, Oct. 16, 1997), at <http://www.olin.wustl.edu/faculty/pirrong>.

69. See TASHICHIRO TANAKA, *NIHON TORIHIKIJO RON [THEORY OF JAPANESE MARKETS]* 29 (1910); see also Schaede, *Forwards and Futures*, *supra* note 7, at 496.

who did take the job often took sick days or purposely engaged in trading mid-term in order to disqualify themselves from further service. In 1774, the system was modified to allow sitting annual directors to pick their successors and serve consecutive terms, thus enabling those who actually wanted the job and could develop professional managerial expertise over a period of time to take the position.<sup>70</sup>

## B. *Market Order*

At least four *ex ante* institutional features of the Dojima market may have helped to prevent market abuses: licensing, cash settlement, the firebox pricing system, and coalitions.

### 1. *Licensing*

The government required a license of all Exchange players.<sup>71</sup> The 1730 shogunate edict limited the number of clearinghouses to the fifty then in existence, and the Exchange also required each trader to purchase a trading license and affiliate with a clearinghouse. The shogunate kept strict controls on the number of authorized traders. Little information remains regarding the criteria for allotment, and even contemporaneous sources differ on the details: one source finds 1,351 licenses issued;<sup>72</sup> another finds exactly 1,300.<sup>73</sup> Traders purchased licenses for a fee from the government, and in most circumstances could only transfer them to their children or a worker who had been employed by the trader for more than ten years.<sup>74</sup> While some of the traders worked as agents on behalf of feudal lord “clients,” most functioned independently.<sup>75</sup>

The licensing system was the first regular mechanism for taxing the commercial sector in Japan and provided a significant source of sho-

70. See MIYAMOTO, *supra* note 6, at 203; SHOHEI SUZUKI, DOJIMA KOME SHIJŌSHI [HISTORY OF THE DOJIMA RICE MARKET] 56-57 (1940).

71. The Kyōhō reforms of the 1710s and 1720s stressed the formation of protective associations and licensing requirements across a wide variety of industries. See SHINZABURŌ ŌSHI, KYŌHŌ KAIKAKU NO SHŌGYŌ SEISAKU [COMMERCIAL POLICY OF THE KYŌHŌ REFORMS] 201-03 (1998); Nakai & McClain, *supra* note 61, at 570-73.

72. See BEISHŌ KYŌKI, *supra* note 41, at 61 (stating that the shogunate issued 451 licenses in 1730, 538 in 1731, and 362 in 1734, for a total of 1,351, of which 451 were for spot transactions and 900 for futures).

73. See HAMAKATA KIROKU [HAMAKATA RECORDS] (begun 1716), reprinted as EIJIRO HONJŌ ET AL., 2 KINSEI SHAKAI KEIZAI SŌSHO [EARLY MODERN SOCIETY ECONOMICS SERIES] 24 (1926) (stating that the shogunate issued a total of only 1,300, including 500 in 1731, 500 in 1732, and 300 in 1736).

74. See DOHI, *supra* note 6, at 94-95; SHIMAMOTO, *supra* note 6, at 58.

75. In the Shōtoku Period (1711-1715), Osaka is said to have been home to 17,727 merchants, of which 483 were formal agents of feudal lords. See SANSOM, *supra* note 38, at 128.

gunate income.<sup>76</sup> But from the traders' perspective, licensing not only protected monopoly rights, it also limited the total number of disputants and eliminated or at least checked the number of novice traders. More importantly, the licensing system established a closed system in which forced bond-posting reduced the cost of scrutinizing trading partners and enabled punishment of participants even in the absence of strong inter-trader reputational bonds.<sup>77</sup> To be sure, reputation played a role, as no repeat player would desire a reputation for untrustworthiness.<sup>78</sup> But the licensing requirement, which relied not directly on reputation but on the ability to pay the fee (which itself may engender reputation), also helped ensure that internally mandated punishments could be instituted effectively by limiting participation by outsiders.

## 2. Cash Settlement

Dojima's general policy of cash settlement may have reduced opportunities for abuse. According to Craig Pirrong, most modern commodity futures contracts — over ninety-eight percent of physical commodity futures contracts by volume — are settled by delivery of the underlying asset.<sup>79</sup> But Dojima's book transaction system lent itself to a cash settlement system.<sup>80</sup> Many financial economists argue that cash-settled futures contracts are less susceptible to manipulation through market "cornering" or "squeezing." In contrast to a physical settlement system, potential abusers in a cash-settlement system cannot as easily use their market share to control the actual physical commodity underlying the future.<sup>81</sup> The cash settlement thus might have reduced the possibility of abuse.

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76. See 2 TOKUGAWA JIDAI SHÖGYÖ SÖSHO [TOKUGAWA ERA COMMERCIAL SERIES] 9 (Matajira Akabori ed. 1965) (1913).

77. Compare to the diamond trading industry, which allows participation by nonmembers. See Bernstein, *supra* note 1, at 152.

78. See Lisa Bernstein, *The Questionable Empirical Basis of Article 2's Incorporation Strategy: A Preliminary Study*, 66 U. CHI. L. REV. 710, 774-75 (1999) (noting that membership requirements can also aid in reputational constraints).

79. See Stephen Craig Pirrong, *Manipulation of Cash-Settled Futures Contracts*, 74 J. BUS. (forthcoming 2001) (manuscript at 1 n.2, on file with author and available at <http://www.olin.wustl.edu/faculty/pirrong>).

80. See *supra* text accompanying note 47.

81. Among other things, cash settlement does not allow the buyer to demand an excessive number of deliveries. See, e.g., Frank J. Jones, *The Economics of Futures and Options Contracts Based on Cash Settlement*, 2 J. FUTURES MARKETS 63 (1982); Steven Manaster, *Economic Consequences of Delivery Options for Financial Futures Contracts: Analysis and Review*, 11 REV. FUTURES MARKETS 142 (1992); cf. Praveen Kumar & Duane J. Seppi, *Futures Manipulation with "Cash Settlement"*, 47 J. FIN. 1485 (1992) (noting that traders can manipulate cash-settled contracts through asymmetric information exploitation by "punching the settlement price"); Pirrong, *supra* note 79 (noting that traders can manipulate cash-

### 3. *The Firebox System*

The Exchange created an institution — the firebox system — that drastically limited a trader's ability to manipulate the market through cornering.<sup>82</sup> In their study of modern grain futures contracts, Craig Pirrong, David Haddock, and Roger Kormendi note four distinct methods of deterring manipulation: formal rules of an exchange or regulatory authority, ex post enforcement through punishment, contract design, and informal enforcement through reputational loss.<sup>83</sup> The most straightforward ex ante method, they note, is the use of formal rules regarding position limits.<sup>84</sup>

Dojima participants utilized a modified position-limit mechanism.<sup>85</sup> The trading day for futures started precisely at 8 a.m., but a unique mechanism determined each day's closing time and closing price. In the Exchange hung a wooden box containing a wick. At the beginning of each day, Exchange officials set the wick on fire; when the fire went out, trading for that day ended. Much like modern exchanges fix settlement prices,<sup>86</sup> Dojima set the closing price for the day, and accord-

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settled contracts through market power manipulation by squeezing the commodity used to determine the value of the contract).

82. Craig Pirrong argues that control of manipulation by the state might be desirable in some circumstances. See Stephen Craig Pirrong, *The Self-Regulation of Commodity Exchanges: The Case of Market Manipulation*, 38 J.L. & ECON. 141 (1995). But see Frank H. Easterbrook, *Monopoly, Manipulation, and the Regulation of Futures Markets*, 59 J. BUS. S103 (1986); Daniel R. Fischel & David J. Ross, *Should the Law Prohibit "Manipulation" in Financial Markets?*, 105 HARV. L. REV. 503 (1991). Even if Pirrong is correct, Dojima differs from the markets that Pirrong examines. The Dojima rules discussed herein (but perhaps not the practice) appear to differ from those of the Chicago Board of Trade and other exchanges that Pirrong finds "took few, if any, actions to deter manipulation." Pirrong, *supra*, at 195. Pirrong also finds that effective self-regulation came about only after the advent of federal commodity laws. See Pirrong, *supra*, at 192-95. Dojima rules changed little after legal intervention. See *infra* text accompanying note 130.

Determining why Dojima rules differ from other markets — why traders adopted the firebox system — is more difficult. Perhaps the answer lies in homogeneity. See Pirrong, *supra*, at 158. But the degree of homogeneity of financial interests that existed among merchants, which comprised a very broad status group, is unclear at best, and the size of the exchange points toward heterogeneity. See Pirrong, *supra*, at 162 (noting that enforcement is lower when exchange membership is large). Perhaps the answer lies in the inability to cost-shift. Pirrong argues that consumers of exchange services may bear the bulk of costs of manipulation, not exchange members. See Pirrong, *supra*, at 164. But while Dojima may have had fewer external consumers than some modern markets, they did exist. See *supra* text accompanying note 75. Perhaps a better answer is that the firebox system was adopted simply to determine objectively a closing time, and its antimanipulation effects were an inadvertent bonus.

83. See S. CRAIG PIRRONG ET AL., *GRAIN FUTURES CONTRACTS: AN ECONOMIC APPRAISAL* 82-102 (1993).

84. See *id.* at 82.

85. The following description relies on SHIMAMOTO, *supra* note 6, at 45-46, 107; SUGIE, *supra* note 6, at 46; and SUZUKI, *supra* note 70, at 100-01.

86. See, e.g., FABOZZI ET AL., *supra* note 48, at 503.

ingly the opening price for the following day, at a price representative of trading when the fire went out. Sometimes the closing price was the last trading price, but sometimes the last trades were ignored and officials set the closing price at a general average based on preceding trades.

If the Exchange could not determine a closing price, or if the wick did not burn up completely, all trades for that day were declared void. That day's opening price became the closing price, and consequently the opening price for the next day. It was as if that trading day never occurred. By way of example, in May 1762, due to a drought in the southern island of Kyushu, futures prices rose from 55.8 *monme* of silver on May 7 to 72 *monme* on May 29. The price of 72 was seen as incredibly high, and traders stopped trading midday. Unable to find an official closing price, all transactions for that day were voided, and the next day's opening price was set at the previous day's closing price of 68 *monme*.<sup>87</sup>

Although the firebox system had its quirks (for instance, the Exchange apparently would void a trading day even if rain extinguished the fire),<sup>88</sup> it played an important role in market management. Occasionally it created a ruckus, as on-a-roll traders had their assistants fan the wick, and losers of the day tried to extinguish the flame.<sup>89</sup> But generally the firebox system appears to have been an effective method of curbing abuses such as cornering or dumping. Made aware of a potential manipulation scheme, traders simply stopped trading. At the end of the day, no closing price could be found, all transactions would be voided, and the potential abuser would not profit. The system thus encouraged mutual monitoring of trading activity.

It is possible that the firebox system may have also been used to punish nonmanipulating traders. But no record of such behavior exists, a fact possibly attributable to collective action problems in organizing a punitive strike. At the least, the mechanism does not suffer from the unappealing qualities that arbitrary fixed position limits set by outside enforcers sometimes do.

#### 4. Coalitions

Finally, in addition to the above rules, the geographical coalitions that arose after 1730<sup>90</sup> discouraged abuses through reputational

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87. See SHIMAMOTO, *supra* note 6, at 46.

88. See *id.* at 43.

89. Exchange directors were once forced to issue an order to control related violence. See BEISHŌ KYŪKI, *supra* note 41, at 307.

90. See *supra* text accompanying note 69.

bonds.<sup>91</sup> Merchants within a particular coalition would be unlikely to cheat one another for fear of being barred from the coalition, which would result in loss of livelihood. Likewise, merchants from other coalitions would think twice about cheating a member of another coalition for fear of mass reprisal. Coalitions thus improved upon simple intertrader reputation mechanisms by reducing the premium that merchants must pay to keep their trading partners honest.

### C. *Why Rules?*

In matters of both governance and abuse prevention, Dojima participants appear to have relied less heavily on informal reputational monitoring and enforcement by market participants than on formal monitoring and enforcement by the organization. Inter-trader reputation certainly mattered, and the geographic coalitions surely facilitated exploitation of intertrader reputational bonds. But the Exchange appears to have addressed major problems of market organization and efficiency primarily through formal constraints: rules, licenses, clearinghouse institutions, and so on. Moreover, many of the longstanding trading and governance rules and practices existed at least fifty years before the rise of coalitions, suggesting that rules reliant on organizational, rather than individual, monitoring of reputation may have been more important at Dojima than in other (largely) self-regulating groups. At least three reasons suggest why Dojima relied on rules to the extent that it did.

First, in some cases, such as the trader licensing system, Dojima participants had no choice between rules and inter-trader reputation, as the state mandated the decision. Participants might have preferred an internally devised membership constraint that might have led to greater reliance on reputational bonds, but they were not given the option. Indeed, they actually formulated some of their own internal licensing requirements that were ultimately co-opted by the state.

Second, as Lisa Bernstein notes in her analysis of the cotton industry, reputation may be more important in industries in which grading of goods is difficult.<sup>92</sup> Because rice could easily be graded by geographic origin,<sup>93</sup> it may have been more easily subject to relatively rigid internal rules. Were rice as difficult to grade as diamonds, perhaps intertrader reputational constraints would have been more important.

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91. See Avner Grief, *Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition*, 83 AM. ECON. REV. 525 (1993); Paul R. Milgrom et al., *The Role of Institutions in the Revival of Trade: The Law Merchant, Private Judges, and the Champagne Fairs*, 2 ECON. & POL. 1 (1990).

92. See Lisa Bernstein, *Private Commercial Law in the Cotton Industry: Value Creation Through Rules, Norms, and Institutions*, 99 MICH. L. REV. (forthcoming June 2001).

93. See *supra* text accompanying note 46.

Finally, unlike many of the other self-regulated commercial markets analyzed in the law and economics literature, participants at Dojima did not choose to opt out of the legal system. Given the choice, they might have preferred shogunate-imposed rules and support. But while the shogunate's 1730 edict explicitly adopted many existing Dojima institutions, it forced participants themselves to organize many aspects of the Exchange, including governance and dispute resolution mechanisms.<sup>94</sup>

### III. MARKET PERFORMANCE

How effective were Dojima institutions in reducing transaction costs and establishing an ordered market? In some studies of self-regulating commercial markets, a lack of data forces analysts into relatively ad hoc conclusions: private ordering in such markets is efficient because long-lasting; were it inefficient, these markets would not exist. The argument applies here as well — the Exchange is unlikely to have been terribly inefficient, given its long history and high trading volume for such an extended period of time.

But fortunately, Dojima provides relevant data, which offer more precise alternatives than mere longevity, but not necessarily less available conclusions, for judging efficiency. For at least three generations, the House of Tamao, located in Shiga Prefecture near Kyoto, kept price records for various early modern Japanese rice markets in the form of a thirteen-volume Market Price Diary (*Mansōba Nikki*). From these brush-stroke manuscripts, historian Mieko Tsuruoka compiled a list of spot prices for various rice markets and futures prices for Dojima for the continuous period beginning in 1755 and ending in 1827; she then published it as an attachment to her 1972 article in a publication as obscure as its title suggests: Department of Historical

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94. The force-out nature of the Exchange and the rules and organization that resulted may point to a difference among self-organized markets. Organizations that have the ability to rely on relational bonds among market participants as more precisely tailored substitutes for legal rules may be more likely than other organizations to opt out of the legal system. But in force-out cases, organizations might not opt out of the legal system because the binding propensity of relations is less significant. Relations might be less binding because the group is less homogenous, because costs are significant, or because the transactions involved are complex and rely more on an informed market than a relationally sound one. In these instances, groups may be more likely to turn to rules, or organizational monitoring, to govern their affairs. The opt-out/force-out dichotomy may help explain why "it is primarily the fear of damage to reputation that maintains discipline in the diamond trade, not the bourse's board of arbitrators" that governs diamond traders who "opt out" of the legal system, Bernstein, *supra* note 1, at 152, just as close-knit groups like cattle ranchers and farmers in Shasta County animal trespass rely on social norms, see Ellickson, *supra* note 1, while early participants at the New York Stock Exchange relied on a "miniature legal system" that "filled the void created by the unenforceability of time bargains in New York courts," Banner, *supra* note 1, at 132. Although Dojima traders were all members of the merchant status group, that designation alone may have been insufficient to establish the requisite bonds needed for inter-trader monitoring and a preemptive opt-out.

Documents Research Bulletin (*Shiryōkan Kenkyū Kiyō*).<sup>95</sup> Japanese economists who have used portions of the Tsuruoka dataset have reported it to be reliable.<sup>96</sup> But because the dataset omits brief periods, I examined the manuscripts directly to confirm the dataset's accuracy. My examination led to changes in two price entries (one omission and one apparent transposition of figures) and the addition of two missing prices.

The Tsuruoka dataset lists prices at approximately two-week intervals but does not contain specific entries for one important category: opening and closing prices for each term in the trimester system. The only available source for such data canvasses a comparatively shorter period of time. In September 1762, the House of Kashiwahara in Osaka published "Ancient and Modern Rice Price Chart" (*Kokon Hachimoku Sōbachō*)<sup>97</sup> in which it listed annual opening and closing prices, as well as occasional annual trading volume data from 1724 to 1762. Although these data improve over the course of the period, even the data from better years are too sparse to be statistically useful. But the Appendix (*Dōtsuikō*) to that volume, published in 1781 by the House of Fuji,<sup>98</sup> contains similar data from more regular intervals (monthly rice bill volume data and opening and closing prices for each term) from 1763 to 1780. In his 1970 collection of Dojima source materials, historian Tokuichi Shimamoto reprinted these House of Fuji opening and closing prices.<sup>99</sup> Once again, I confirmed the accuracy of the dataset by examining a copy of the original manuscript housed in the Mitsui Archives and found only minor discrepancies. I added these data to the Tsuruoka dataset.

95. Mieko Tsuruoka, *Ōtsu Kokurui Sonota Sōbakyō [Chart of Grain and Other Commodity Prices in Ōtsu]*, attached to *Kinsei Beikoku torihiki Shūjō toshite no Ōtsu [Ōtsu as a Tokugawa Rice Market]*, 5 SHIRYŌKAN KENKYŪ KIYŌ 19, 114-207 (1972). The Bulletin was at the time administered by the Ministry of Education but now by the National Institute of Japanese Literature.

96. See MIYAMOTO, *supra* note 6, at 365; Ito, *supra* note 6, at 343; Wakita, *supra* note 6, at 241. To my knowledge, these three works, all in Japanese, are the only formal economic analyses of Dojima that exist. Each uses the Tsuruoka dataset. Miyamoto uses the entire dataset, but his examination focuses on the Exchange's efficiency relative to each shogun's reign and to currency valuation, and does not acknowledge the bias presented by the closed-trimester system, providing results that Ito bluntly calls "meaningless." Ito, *supra* note 6, at 345. Ito uses Tsuruoka data, but only for the period from 1763 to 1780, and only to fill in gaps between closing dates. Wakita uses a fuller set, from 1760 to 1811, but his focus is seasonal variation.

97. *Hachimoku* is an early modern word for rice. See *Kahei no Sanpomichi [Currency Walking Tour]*, INSTITUTE FOR MONETARY AND ECONOMIC STUDIES, BANK OF JAPAN, ch. 16, available at [http://imes.boj.or.jp/cm/htmls/feature\\_16.htm](http://imes.boj.or.jp/cm/htmls/feature_16.htm). Some sources, both English and Japanese, occasionally mistransliterate the Japanese characters as "yagi," the surname that uses the same characters.

98. See generally Tsuruoka, *supra* note 95, at 113.

99. See *Hachimoku Sōbachō Tsuikō [Rice Price Appendix]*; TOKUICHI SHIMAMOTO, DŌJIMA KOME KAIJŌ BUNKENSHŪ [COLLECTED DOJIMA RICE EXCHANGE SOURCE MATERIALS] 1-37 (1970).

To these data I added the occasional prices listed in the Rice Trade Chronicle (*Beishō Kyūki*), recorded from 1616 to 1870. As in all empirical studies, more data would be preferable, but by adding these prices to the combination of the Tsuruoka (House of Tamao) and Shimamoto (House of Fuji) datasets, I have compiled the most complete database of Dojima prices ever assembled. Except where otherwise noted, the remainder of this Part, including all figures, is based on this database.

In this Part, I use the database to examine two simple efficiency-related questions. First, how closely do spot and futures prices correlate and what factors affect that correlation? Second, what happens to that correlation at the end of a trading term?<sup>100</sup> Unfortunately, insufficient data exist to determine the market's informational efficiency — the degree to and speed with which its prices reflect publicly available information — through an event study or similar methodology. The scarcity of the available data may also yield differing interpretations. But with those caveats, the following tests of the data can still provide insight into whether Dojima functioned in accordance with modern efficient market theory.

#### A. *Correlation of Spot and Forwards (Futures) Prices*

Traders use futures to reduce risk by hedging — counterbalancing activities in the market for physical goods to protect themselves against price movements. If spot prices (the price of current physical goods) and futures prices (the price of forward-contract goods) diverge frequently, such risk-reduction measures may be uncertain and difficult, and traders can only use futures prices for speculative excess. If the Dojima Rice Exchange fulfilled its risk reduction function well and was not merely a tool for speculation, spot prices and futures prices should be highly correlated, with relatively smooth movements during the trading term.

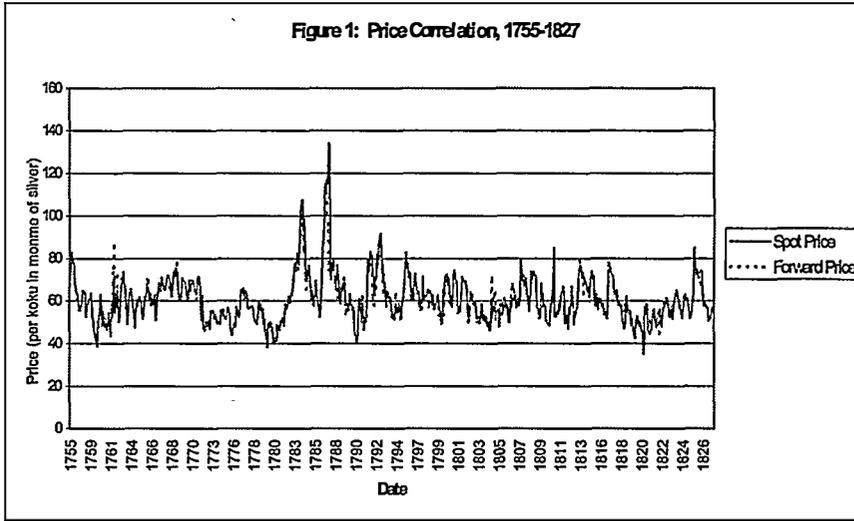
Contemporaneous accounts indicate that spot and futures prices did indeed correlate. Consider a 1798 popular instruction manual — the Tokugawa equivalent of *How to Make a Million in the Market*. The book boasted a win rate of seventy to eighty percent and stated in typically roundabout prose, “The rise and fall of the spot and book prices appear different, but are the same; they appear the same, but are different in their inner workings alone; they are the same difference.”<sup>101</sup>

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100. As noted *infra* notes 108 and 112, Japanese economists have attempted to address both questions, using smaller data sets and different tests, but obtaining similar results.

101. Master Kenikukan, *Hachimoku Ryūnōkan* [*Dragon Book of Rice*] (1798), in TARŌ ADACHI, TOKUGAWA JIDAI KEIZAI HIROKU ZENSHŪ [COMPILATION OF SECRET ECONOMIC RECORDS OF THE TOKUGAWA ERA] 371, 385 (1941).

The data tend to confirm the accounts. Figure 1 shows the correlation between spot and futures prices during the period 1755-1827. As theory predicts, price movements are smooth, and spot and forward prices are correlated, with no major anomalies. The movements correspond favorably to those of modern futures markets.<sup>102</sup>

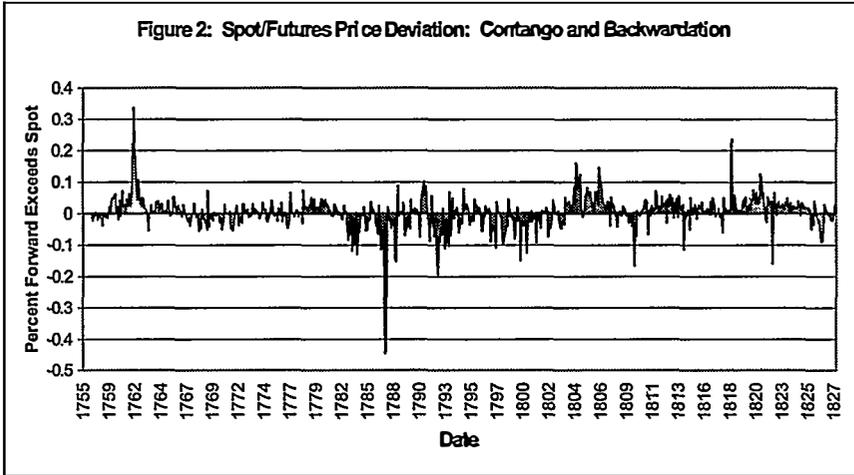


The Exchange can also be examined by analyzing the spread between spot and futures prices. Intuitively, one might expect futures prices to exceed spot prices: because of carrying costs such as interest, storage costs, and insurance, a buyer can purchase today one sack of rice for less money than he can purchase the right to purchase that rice in the future. When futures prices exceed spot prices, the situation is termed “contango” or “normal carry,” or, in eighteenth-century Japanese, “upper margin” (*uwazaya*). But short-term price increases, low carrying costs, and premiums paid by producers for the ability to hedge their own anticipated supplies, can often result in higher spot prices than futures prices, a situation known as “backwardation” or “inverse carrying charge,”<sup>103</sup> or, in eighteenth-century Japanese,

102. See, e.g., WALTER C. LABYS & C.W.J. GRANGER, SPECULATION, HEDGING AND COMMODITY PRICE FORECASTS 25-32 (1970); MIYAMOTO, *supra* note 6, at 365-85. The trimester trading system, see *supra* text accompanying note 47, makes detailed empirical comparisons of this measure with other futures markets difficult, if not impossible.

103. See Eugene F. Fama & Kenneth R. French, *Business Cycles and the Behavior of Metals Prices*, 53 J. FIN. 1075 (1988); Holbrook Working, *Theory of the Inverse Carrying Charge in Futures Markets*, 30 J. FUTURE ECON. 9 (1949). On the efficiency of Dojima as a hedge institution, see Matao Miyamoto, *Edo Jidai no Kome Shijō: Sono Kōzō to Kinō* [The Structure and Function of Tokugawa Era Rice Markets], GENDAI KEIZAI, 48, 56-62 (Spring 1982).

“lower margin” (*shitazaya*). Relative to the spot market, a futures market is either in contango or backwardation. Figure 2 shows graphically the differences in the spot and futures prices for the same period depicted in Figure 1.



Movements above zero indicate periods in which the futures price exceeded the spot price, in other words, when the market is in contango. Movements below zero indicate backwardation. Some degree of backwardation is not surprising; although transportation costs were high, storage costs were relatively low.<sup>104</sup> The market experienced periods of both backwardation and contango, with the only major period of extreme backwardation occurring in 1787 during the Great Tenmei Famine.<sup>105</sup> The Famine, which began in 1783 and continued through 1787 as a result of flooding and volcanic eruption, drove short-term spot prices much higher than futures prices and explains both the increased average backwardation and the large dip in that period.<sup>106</sup>

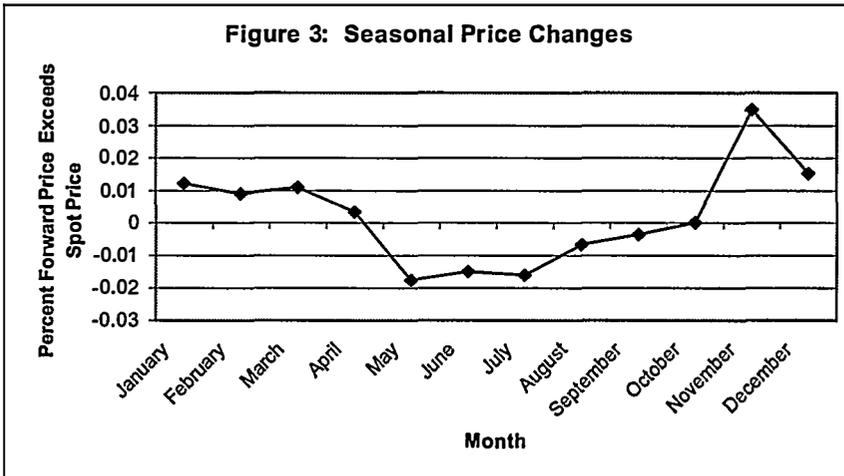
The lack of either lengthy or extreme periods of backwardation or contango tentatively suggests that the market was suitable for hedging. But because the long-term data are noisy and conclusions are difficult, I have attempted to find clearer patterns. Recall that Dojima was a

104. See MIYAMOTO, *supra* note 6, at 190-91.

105. That the famine occurred at all may indicate the limited reach of the shogunate government. See AMARTYA SEN, *DEVELOPMENT AS FREEDOM* (1999).

106. Other large movements are more difficult to explain. The early 1762 contango occurred at about the same time that the shogunate offered financial assistance to at least one rice brokerage suffering from low physical rice prices, perhaps due to excess supply. See DOHI, *supra* note 6, at 206. Spot prices rose in mid-1762 due to the Kyushu drought. See *supra* text accompanying note 87.

seasonal market with three distinct trading terms.<sup>107</sup> Each year was divided into a spring term (January 8 – April 28), a summer term (May 7 – October 9), and a winter term (October 17 – December 24), and traders were required to settle all contracts by the end of each term when the market closed. To test whether market conditions may differ in each term, I recalculated the data presented in Figure 2 by month. Figure 3 represents the combined annual monthly averages of those calculations.



The seasonal data reveal two interesting trends. First, the terms are indeed distinct in the data, indicating that traders may have had different concerns depending on the season. Second, as the figure shows, futures prices were generally higher than spot prices in the spring and fall markets, while the opposite was generally true in the summer market. This trend may be an indication that (1) transportation costs peaked in the fall, when rice arrived in Osaka after the harvest, which could lead to higher futures prices, and (2) the summer season, as an off-farming season that preceded the fall harvest, reflects low transportation costs, more potential for short-term squeezes of dwindling rice, and the payment of a premium by traders and suppliers hedging against the uncertain incoming fall harvest.<sup>108</sup>

107. See *supra* text accompanying note 47.

108. See Wakita, *supra* note 6, at 243 (showing seasonal efficiency with a smaller dataset by regressing the log of the spread against a seasonal dummy).

### B. *End of Trading Term*

All things being equal, spot and futures prices should converge as the delivery date approaches and carrying costs decrease to near zero. In most markets, which have continuous seasons and multitudinous contracts with differing delivery dates, this relationship is difficult, if not impossible, to analyze empirically.<sup>109</sup> But the trimester system at Dojima makes exposition of the theory possible like virtually no other market. In short, no matter how significantly spot and futures prices deviate from one another during the trading period, they should converge at the end of a term because futures contracts cannot extend beyond that point. Intuitively, the value of a forward contract for rice today should equal the value of rice bought on the market today.<sup>110</sup>

Again, contemporaneous evidence of this phenomenon at Dojima exists. As economic philosopher Banto Yamagata observed in 1802:

The blood of this world is the book transaction system, and the spot price and the book price are like day and night, working together and not against each other. Though the prices diverge, at the end of April, October, and December, the spot and book price are the same; they become the same blood.<sup>111</sup>

The data tend to confirm Yamagata's observation.<sup>112</sup> Market opening and closing date price data are available for the period 1763-1780. Because a single chart covering that period would provide insufficient detail, I instead present data graphically for three years: one in the beginning (1764), one in the middle (1773), and one at the end (1780) of that period. The remaining years exhibit the same trend as these years, presented in Figures 4, 5, and 6.

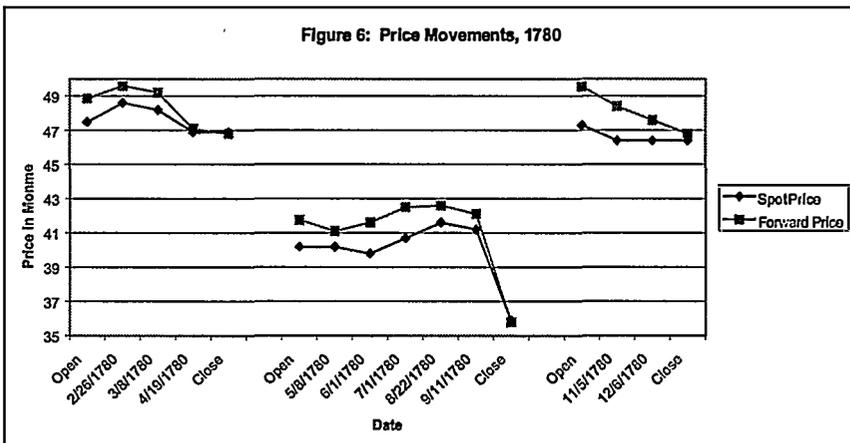
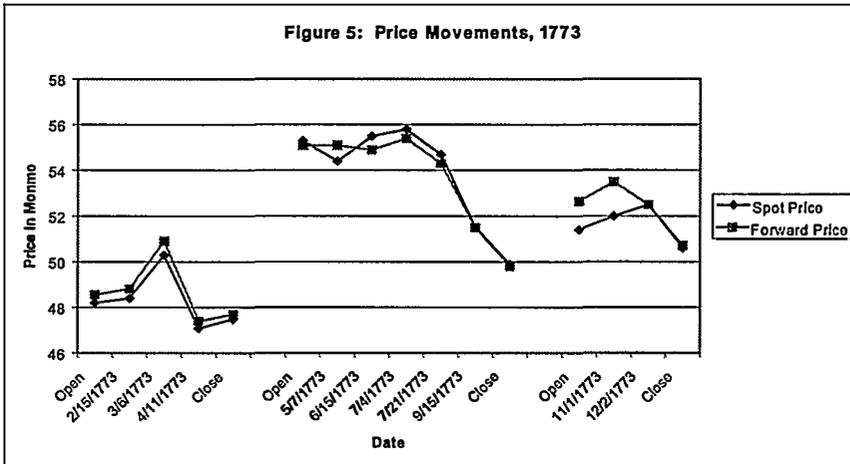
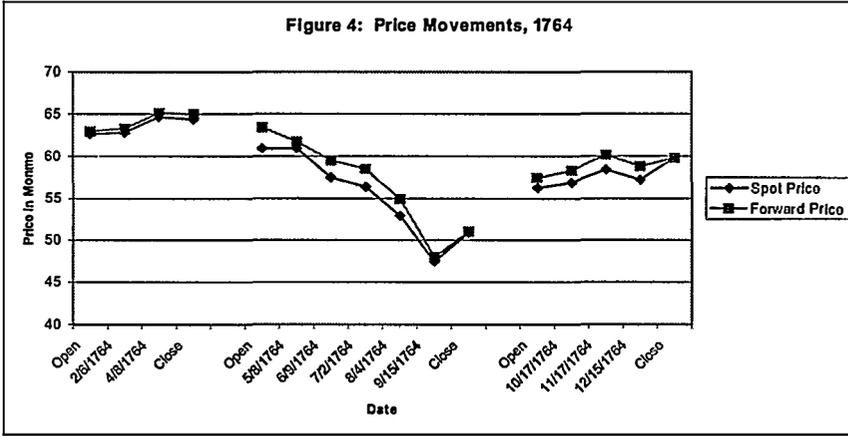
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109. See PIRRONG ET AL., *supra* note 83, at 15-16.

110. The data in Section III.A are biased toward higher correlation because of this phenomenon, but the monthly correlations show the same general trend even in the absence of term-ending months.

111. Banto Yamagata, *Yume no Shiro [The Stuff of Dreams]* (1802), in TOMINAGA NAKAMOTO, YAMAGATA BANTO 141, 398 (Norihisa Mizuta et al. eds., 1973).

112. Ito conducts a similar test for different periods using a smaller dataset. See Ito, *supra* note 6, at 343.



In each period, as the figures show, if one did not know the exact closing date, finding the point at which spot prices and forward prices converge would serve as a good indicator. In each period, the market performed as theory predicts — although prices varied during the course of the trading period, the lack of carrying costs ensured that they converge at the end of each period.

Aggregate data tend to confirm the results of the individual period data. For the period 1763-1780, I calculate the average difference in closing prices to be .04 monme, and the average difference in non-closing prices to be .11 monme. In percentage terms, on average, closing forward prices were a miniscule .07% higher than closing spot prices, while non-closing forward prices were a full .35% higher. In short, the data suggest that the market performed just as theory would predict.

#### IV. DISPUTE RESOLUTION

The data presented in Part III indicate that the Exchange performed the tasks of risk reduction and price discovery well and that its prices accord with economic theories of market efficiency. In this Part, I examine the murkier relationship between state regulation and Exchange efficiency.

##### A. The 1730 System

The 1730 shogunate decision to disallow suits over futures contracts<sup>113</sup> was part of a broader legal and institutional plan. Although crossover occurred, the shogunate generally distinguished between two types of suits: criminal proceedings (*ginmisuji*) and civil proceedings (*deirisuji*).<sup>114</sup> Civil proceedings were further divided into three types: suits involving close relations (*nakamagoto*); “money suits” (*kanekuji*), which were suits “based on unsecured money claims upon which interest was charged;”<sup>115</sup> and “main suits” (*honkuji*), which were claims based on general property rights and involved security.

The ability to sue in shogunate courts depended on the type of proceeding, which in turn was determined by the relationship of the parties. The shogunate prohibited suits involving close relations, specifically excluding suits involving rotating credit associations, contracts among several persons to start certain businesses, and controversies arising from gate receipts at entertainment events such as plays and sumo matches. In each case, the shogunate, because of the close relationship among parties to such transactions (including the latter rela-

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113. See *supra* text accompanying note 41.

114. See RYŌSUKE ISHII, *NIHON HŌSEISHI GAISETSU*, *supra* note 58, at 471.

115. Henderson, *supra* note 23, at 108.

tionship between theater proprietors and money-backing producers), withheld jurisdiction and forced parties to such private transactions to solve their own disputes.<sup>116</sup>

The shogunate also distinguished between money suits and main suits, the former being strictly limited by minimum amounts in controversy requirements and the constraint that damages be paid in installments rather than as a lump sum.<sup>117</sup> Courts more liberally heard main suits, namely those most likely to occur between strangers.

Potential explanations for these distinctions might be the elimination of court congestion, paucity of judicial resources, or the shogunate's lack of real regulatory power within the federalist system. These factors likely were real concerns. But the shogunate's policy of tying enforceability to relation-based criteria, along with its broad policy of coalition establishment in other contexts, supports the claim of several Japanese legal and economic scholars who suggest an additional reason why the shogunate limited suits: to encourage the private resolution of problems that might arise from merchant contracts.<sup>118</sup> By requiring private dispute resolution, the shogunate may have hoped to provide incentives for parties to develop efficient rules and norms to avoid disputes, thus spurring economic growth through market development without expending government resources.<sup>119</sup>

As with other relationship-based transactions, the state prohibited suits at Dojima altogether. Forced out of the legal system, the Exchange had to develop dispute resolution institutions on its own. Unfortunately, little has been recorded about the specifics of Dojima dispute resolution. Exchange directors appointed a conciliation committee, which apparently had broad powers to resolve disputes, and promulgated rules largely on an individual basis with nominal regard to internal precedent.<sup>120</sup>

116. See RYŌSUKU ISHII, KINSEI TORIHIKIHŌSHI [HISTORY OF EARLY MODERN COMMERCIAL LAW] 52-58 (1982). On ten occasions in the Tokugawa period (about every twenty years, and four times after the Exchange's founding, in 1746, 1789, 1797, and 1843), the shogunate issued orders (*aitasumashirei*) refusing to hear all credit-related suits. See *id.* at 15-49.

117. See RYŌSUKU ISHII, NIHON HŌSEISHI GAISETSU, *supra* note 58, at 527, 529-30.

118. See TETSUJI OKAZAKI, EDO NO SHIJŌ KEIZAI: REKISHI SEIDO BUNSEKI KARA MITA KABUNAKAMA [MARKET ECONOMICS OF EDO: COALITIONS THROUGH THE LENS OF HISTORICAL SYSTEM ANALYSIS] 76 (1999); see also MATAJI MIYAMOTO, KABUNAKAMA NO KENKYŪ [STUDY OF COMPANION SHARES] 21-33 (1938); ŌISHI, *supra* note 71.

119. See ISHII, *supra* note 116, at 52-58; OKAZAKI, *supra* note 118, at 76.

120. See BEISHŌ KYŪKI, *supra* note 41, at 105 (discussing provisions for dealing with rule violators); ISHII, *supra* note 116, at 52-58; OKAZAKI, *supra* note 118, at 76; see also DIAMOND & KOLLAR, *supra* note 8, at 7-8.

### B. *The 1773 System*

In February 1773, the commissioner of Osaka, a shogunate official with broad administrative and judicial powers,<sup>121</sup> issued a decree in which he reversed Yoshimune's 1730 edict<sup>122</sup> by agreeing to hear futures-related suits on designated "suing days."<sup>123</sup> If a plaintiff proved his case, the shogunate would pay damages to the plaintiff and collect the judgment from the defendant.<sup>124</sup> Dojima traders could thus choose between state and internal dispute resolution mechanisms.

There are at least four plausible theories as to why the decree was issued. First, the government may have thought it was responding to a need for dispute settlement services that the Exchange was not providing adequately. Second, one scholar surmises that the shogunate sought to increase trading volume and control of the Exchange in general.<sup>125</sup> Third, broader political motives may have been responsible for the decree. The policies of shogun Tanuma (1719-1788) were remarkably different from those of the "rice shogun" Yoshimune, whose 1730 edict legalized Dojima trading. Tanuma intervened in a variety of markets, including Dojima, to gain greater control for the government over macroeconomic conditions.<sup>126</sup> Finally, the shogunate may have desired to control the Exchange in order to limit the power of nouveaux riche Dojima merchants who were owed great debts by status-superior samurai.<sup>127</sup>

The 1773 edict was short-lived. The shogunate discontinued the system in November 1784, and the government once again removed

121. Unlike the Edo commissioner, which apparently was largely a civil administration organ, the Osaka commissioner was charged with the administration of justice, including the powers to legislate and hear suits. See GENTARŌ HARUHARA, ŌSAKA NO MACHIBUGYŌSHO TO SAIBAN [LAWSUITS AND THE OSAKA TOWN COMMISSION] 11 (1962). The Osaka commissioner had criminal investigative powers as well, but often relied on private enforcement. See YOSHII FUJII, ŌSAKA MACHIBUGYŌ TO KEIBATSU [CRIMINAL PUNISHMENT AND THE OSAKA TOWN COMMISSIONER] 73, 83 (1990).

122. See *supra* text accompanying note 41.

123. See BEISHŌ KYŌKI, *supra* note 41, at 177 (1971); OFUREGAKI TENMEI SHŪSEI [COMPILATION OF TENMEI PERIOD ORDINANCES (1781-1789)] 835 (Shinzō Takayanagi & Ryōsuke Ishii eds., 1936); SAKUDŌ, *supra* note 12, at 370.

124. See SHIMAMOTO, *supra* note 6, at 19. If a plaintiff had been forced to enforce the judgment against the defendant, the best way to enforce a debt claim was said to be the hiring of "[g]angs of ruffians to beat up non-paying debtors." STEENSTRUP, *supra* note 20, at 146; see also Curtis J. Milhaupt & Mark D. West, *The Dark Side of Private Ordering: An Institutional and Empirical Analysis of Organized Crime*, 67 U. CHI. L. REV. 41 (2000).

125. See SAKUDŌ, *supra* note 12, at 370.

126. See generally CHARLES DAVID SHELDON, *THE RISE OF THE MERCHANT CLASS IN TOKUGAWA JAPAN 1600-1868*, at 114-21 (1958).

127. See NAOTARŌ SEKIYAMA, *NIHON KAHEI KIN'YŪSHI KENKYŪ* [A STUDY OF JAPANESE CURRENCY FINANCIAL HISTORY] (1943).

itself from Dojima dispute resolution.<sup>128</sup> Beginning in 1785, traders returned to the pre-1773 status quo of settling all their own disputes.

It is difficult accurately to determine how many post-1773 suits from Dojima actually reached shogunate courts. Table 2 offers the best available solution by detailing the total number of suits of all types heard by the Osaka commissioner:

TABLE 2: LAWSUITS FILED WITH THE OSAKA COMMISSIONER

Year	Total Suits
1735	13,625
1736	12,817
1737	10,917
* * *	
1782	20,201
1783	27,868
1784	24,159
1785	16,285
1786	13,278

SOURCE: GENTARŌ HARUHARA, ŌSAKA NO MACHIBUGYŌSHO TO SAIBAN [LAWSUITS AND THE OSAKA TOWN COMMISSION] 12-13 (1962).

Both the accuracy of the data and the ability of these gross data properly to reflect futures-specific suits naturally warrant a fair degree of skepticism. But in general, the annual number of suits in the period after the 1773 decree (allowing for a huge 45-year data gap) was not dramatically higher than the number of suits in the period 1735-1737, and some increase is to be expected in a period of growing commercialism and population expansion.<sup>129</sup> Likewise, there is no surviving evidence of any significant change in the use of the Exchange's conciliation mechanism.

128. See OFUREGAKI TENMEI SHŪSEI [COMPILATION OF TENMEI PERIOD ORDINANCES (1781-1789)], *supra* note 123, at 837-38. After September 1782, rice bills were required to carry the seal of the commissioner's designated rice inspector, who settled disputes. *See id.*; *see also* SAKUDŌ, *supra* note 12, at 370; SHIMAMOTO, *supra* note 6, at 20.

129. The impact of population on litigation rates in this case is ambiguous at best. The most precise estimates measure the population of Osaka at 268,760 in 1635, 389,866 in 1736, peaking at 419,863 in 1765, and gradually declining to 380,416 in 1785. *See* Osamu Wakita, *Kinsei Ōsaka Chiiki no Toshi to Nōson* [Farm Villages and Cities of the Early Modern Osaka Region], in KINSEI OSAKA CHIHI NO SHITEKI BUNSEKI [HISTORICAL ANALYSIS OF THE EARLY MODERN OSAKA REGION] 295, 304 (Osamu Wakita ed., 1980). Other sources place the peak in the 1750s and at about 400,000. *See, e.g.*, DOHI, *supra* note 6, at 18. If Wakita's figures are accurate, litigation rates in 18th-century Osaka (in 1785, about 43 suits per 1,000 population) were far higher than those in most contemporary United States jurisdictions. *See* Marc Galanter, *Reading the Landscape of Disputes: What We Know and Don't Know (and Think We Know) About Our Allegedly Contentious and Litigious Society*, 31 UCLA L. REV. 4 (1983).

But note the sudden drop in suits in 1785 following the discontinuance of the shogunate dispute resolution system in 1784. Contemporaneous accounts state that the system's 1784 discontinuance occurred because the shogunate, with limited resources, was unable to keep up with the demand for dispute resolution services.<sup>130</sup> To the extent that such accounts are correct, the shogunate's response is nonetheless interesting. Instead of devoting more governmental resources to the pressing problem of solving disputes, the shogunate apparently abandoned the system altogether.

The shogunate's abandonment of the system, the debatable absence of a sustained increase in post-1773 litigation (to the extent suggested by the data), or both, might be explained by the quality of shogunate legal rules. Like other Tokugawa coalitions, Dojima "performed important functions for the Tokugawa economy as well, the most important of which was the establishment of rules for mercantile practices. Because the government did not establish a body of customary law to enforce business transactions, [coalitions] were forced to do so by themselves."<sup>131</sup> It is unclear the extent to which shogunate courts would have applied customary law in trading cases at the end of the eighteenth century. To the extent that shogunate courts did not apply customary law and were thus less predictable than a conciliation committee's application of Dojima internal rules,<sup>132</sup> plaintiffs would likely have preferred to bring suit in shogunate court only in cases in which the Dojima conciliation committee would have ruled against them.<sup>133</sup> To the extent that Tokugawa courts did apply customary law (as they often did in commercial cases),<sup>134</sup> assuming that they applied it the same way as private courts, trader disputants would likely be no better off in court than before the exchange conciliation committee. Perhaps some traders rationally preferred to rely on familiar private internal institutions rather than public legal ones with which they had little experience. Perhaps some traders could receive more favorable judgments in one court than another, perhaps because of institutional factors, or perhaps because the systems were rigged one way or another. Whatever the case, while it may generally be

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130. See OFUREGAKI TENMEI SHŪSEI [COMPILATION OF TENMEI PERIOD ORDINANCES (1781-1789)], *supra* note 123, at 837-38; see also SAKUDŌ, *supra* note 12, at 370.

131. Matao Miyamoto, *The Development of Business Associations in Prewar Japan*, in TRADE ASSOCIATIONS IN BUSINESS HISTORY 7 (Hiroaki Yamazaki & Matao Miyamoto eds., 1988); see also OKAZAKI, *supra* note 118.

132. Dan Henderson finds that the general philosophy of Tokugawa courts was that "[r]eason is significantly superior to customary law." HENDERSON, *supra* note 23, at 58-59.

133. See George L. Priest & Benjamin Klein, *The Selection of Disputes for Litigation*, 13 J. LEGAL STUD. 1 (1984). In the Japanese context, see J. MARK RAMSEYER & MINORU NAKAZATO, JAPANESE LAW: AN ECONOMIC APPROACH 92-95 (1999).

134. See, e.g., OKAZAKI, *supra* note 118, at 71.

preferable for public lawmakers to provide default rules rather than mandatory ones,<sup>135</sup> giving plaintiffs a forum-shopping option at Dojima likely reduced the predictability of dispute resolution.

### C. *Comparing the Two Systems*

The shogunate announced and implemented its reverse-course decision to allow suits based on trading at Dojima on designated “suing days” in 1773. If privately ordered internal rules were functioning efficiently, the decision should not have drastically altered market arrangements. Although the effect on litigation rates is unclear, market institutions remained intact after 1773. The discontinuance of the edict after only twelve years also calls into question the efficacy of the shogunate courts. We can also look to five more precise measures to determine the effect of the decree: price trends, trading volume, spot-futures correlation, volatility, and price.<sup>136</sup>

First, it is useful simply to eyeball 1773 price changes, as shown in Figure 5 above (Section III.B). 1773 appears to be a relatively normal year, with relatively normal price fluctuations and price convergence at the end of each trading period. It also corresponds to the average seasonal price changes depicted in Figure 3.

Second, I attempted to compare trading volume for the pre-edict period and the edict period. Trading volume should give some general indication of the extent to which the shogunate’s decision increased trading efficiency — traders might be less likely to trade in an inefficient market.<sup>137</sup> Volume data listing either actual amount of rice traded at Dojima or the number of contracts traded at regular intervals are not available. But as a substitute, for the period from 1763 to 1780, the House of Fuji manuscript lists on a monthly basis the number of bales (each about two bushels) of rice on which Osaka warehouses initially issued rice bills.<sup>138</sup>

Admittedly, there are problems with using bill issuance as a proxy for volume. Because many rice receipts bore no relation to the issuing warehouse’s actual inventory, Dojima traders effectively traded contracts, not rice, and accordingly measuring the size of rice bills may be somewhat artificial. Second, some of these rice bills were merely unbacked bonds not traded at Dojima. Still, assuming that these factors

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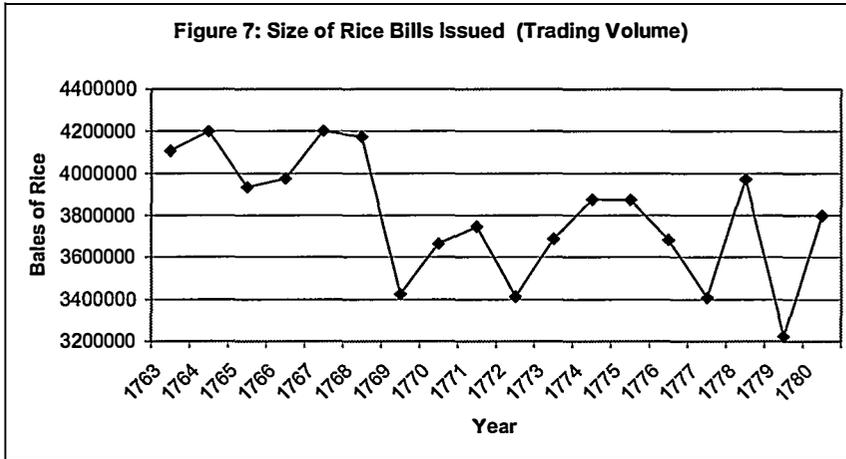
135. See Avery Katz, *Taking Private Ordering Seriously*, 144 U. PA. L. REV. 1745, 1752 (1996).

136. The latter two variables I examine at the suggestion of Omri Yadlin. An event study to calculate abnormal returns based on the 1773 edict would be probative, but the data are too scarce for such a study.

137. Of course, because of Dojima’s futures trading monopoly, the only legal alternative to futures trading at Dojima is not trading futures.

138. Average = 3,797,840; standard deviation = 293,081.2.

remained relatively constant during the period in question, the data might still provide some general hints as to whether and how Exchange trading volume was affected by the edict. Figure 7 shows the annual totals of rice bills issued by volume as recorded in the House of Fuji manuscript.



During the pre-edict period (1763-1772), in which traders solved their own disputes, warehouses wrote rice bills for an annual average of 3,883,891 bales of rice.<sup>139</sup> During the time of the edict in which futures contracts were enforceable (beginning in 1773 and ending with the end of data in 1780), rice bill volume fell to 3,690,276 bales of rice, a drop of nearly five percent, and never once climbed above 4 million.<sup>140</sup> But if the pre-edict period of comparison is not 1763-1772, but the shorter period 1768-1772, the edict actually brought about a 3.6% *increase* and volume of 3,800,000 bales for the first time in four years. These findings would tend to support claims of efficient regulation. The data are so noisy, however, that it is difficult to come to a firm conclusion regarding the effect of the edict on volume measures.

Third, I compared the annual average correlations of spot and futures prices. As Section III.B suggests, correlations are biased upward, as prices converge at the end of each term, but this calculation should nevertheless provide a comparative measure of how useful futures were as a hedging device before (1761-1772), during (1773-1784), and after (1785-1796) the edict. As Table 3 shows, the average annual correlation between spot and forward prices was greater during the

139. Standard deviation = 305,362.1.

140. Standard deviation = 254,788.7.

pre-edict period than during the period in which the edict was enforced.

TABLE 3: EDICT PERIOD COMPARISONS

Legal Status <sup>141</sup>	Volume	Annual Average Correlation of Spot and Fu- tures Prices	Volatility		Price	
			Spot	Futures	Spot	Futures
Pre-Edict: Dojima Courts	3,883,891 Bales	.912	.06516	.06149	61.478	61.121
Edict: Shogu- nate and Dojima Courts	3,690,276 Bales	.883	.06702	.06207	57.755	57.480
Post-Edict: Dojima Courts	Unavailable	.754	.06615	.06053	67.790	65.402

Of course, factors other than the edict may have been responsible for the lower correlation of spot and futures prices, and the correlation in the pre-edict period may have been so high that there was little room for increase by the edict. Thus, while interesting that the best measure of the price discovery function did not increase during the period in which contracts were legally enforceable, the analysis is at best uncertain.

Fourth, I compared the volatility of spot and futures prices before, during, and after the edict, by calculating the standard deviation of logarithmic price differences, or geometric returns.<sup>142</sup> The results of annual average log-volatility calculations for the three periods are reported in Table 3.<sup>143</sup> As the table shows, the differences among the

141. For volume, the periods are pre-edict 1763-1772 and edict 1773-1780, as limited by the available data. For correlation, volatility, and price, I used equal eleven-year periods: pre-edict 1761-1772, edict 1773-1784, and post-edict 1785-1796. Using the full dataset for these periods results in pre-edict (1755-1772) correlation of .924 and post-edict (1785-1827) correlation of .807. Removing the Great Tenmei Famine period raises the edict period correlation to .898 and the post-edict correlation to .817. Using the full dataset for volatility results in pre-edict (1755-1772) log-volatility of spots .06286 and futures .06061, and post-edict log-volatility of spots .08404 and futures .07954. Using the full dataset for price results in a pre-edict (1755-1772) average spot price of 60.911 and average futures price of 61.367, and a post-edict (1785-1827) spot price of 61.364 and futures price of 61.034.

142. Standard deviation, which I mistakenly reported in an early draft of this Article, is an inappropriate and inaccurate measure of volatility because, among other things, it assumes a normal price distribution in which negative prices could exist. See Glyn A. Holton, *Time: The Second Dimension of Risk*, FIN. ANALYSTS J., Nov./Dec. 1992, at 38.

143. Because these figures may be affected by the Great Tenmei Famine (1783-1787), I also calculated log-volatilities designating the edict period as ending in 1782, and designating the post-edict period as beginning in 1788. The figures for the 1773-1782 period are spots, .06705; futures, .06178. The figures for the 1788-1827 period are spots, .07977; futures, .07484. I also calculated volatility at five-year intervals, with the following results: 1768-1772, spots, .06456; futures, .05903; 1773-1777, spots, .07015; futures, .06604; 1778-1782, spots, .07377; futures, .07167.

periods are small and insignificant, suggesting that the edict did not result in a more stable market.<sup>144</sup> Still, the correlation to the edict period does not necessarily indicate causation.

Finally, I compared average prices before, during, and after the edict. As seen in Table 3, spot and futures prices were lower during the edict than in the period before and after. How exactly to interpret that fact is unclear. Regardless of economic efficiency, high rice prices might indicate that the shogunate accomplished its stated goal of raising those prices, while low prices might suggest policy failure.<sup>145</sup> But price differences may have been attributable to several complex factors, including lower risk or increased rice supply. One likely explanation is simply that prices were lower during the period for a wide range of goods, and rice was no exception. The House of Mitsui kept detailed records for much of the relevant period of consumer good prices, including rice, soy bean paste, soy sauce, sake, and lamp oil in Kyoto, the former capital city located about 25 miles from Dojima.<sup>146</sup> Using these House of Mitsui data, E.S. Crawcour and Kozo Yamamura calculated a price index for the contiguous period 1773-1817.<sup>147</sup> Although the data are not equally complete for all commodities, this Kyoto price index indicates a steep decline in average prices from 1773 to 1783. 1780 and 1781 index prices were the lowest in the entire dataset, and edict years represent five of the six lowest rice prices in the dataset. Not surprisingly, regression analysis indicates a statistically significant relationship between futures prices and the Kyoto price index ( $r = .650$ ,  $t = 2.02$ ,  $p = .048$ ).

In short, there is no strong evidence that allowing suits in shogunate courts had a positive impact on various measures of market performance. Nor is there strong evidence of adverse consequences of state intervention. My hunch — and given the nature of the data it is difficult to offer substantially more — is that the combination of public and private dispute resolution mechanisms was not as good as, and certainly no better than, the private one. I find that conclusion marginally more persuasive given the data, and two fora for dispute resolution are likely to be less predictable than one. Moreover, as David Charny argues, legal intervention can improve transactors' welfare when transactors have limited information, or when the law enforces terms that transactors would have placed into contracts in the absence

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144. See generally Robert J. Shiller, *The Use of Volatility Measures in Assessing Market Efficiency*, 36 J. FIN. 291 (1981).

145. See *supra* text accompanying notes 38-42.

146. See KINSEI KŌKI NI OKERU SHUYŌ BUKKA NO DŪTAI [MOVEMENTS OF MAJOR COMMODITY PRICES DURING THE LATE TOKUGAWA PERIOD] 68-72 (Nobuhiko Nakai ed., 1952).

147. See Crawcour & Yamamura, *supra* note 60, at 27-28.

of high drafting costs.<sup>148</sup> While I acknowledge the inherent circularity here of theory and empirics, it is at least clear that whatever problems Dojima traders may have faced, they did not appear to face problems of limited information or high drafting costs in those areas of attempted state regulation.<sup>149</sup> Little changed in either Dojima contracts or Dojima institutions after 1773,<sup>150</sup> suggesting that whatever informational or drafting problems traders may have had, making contracts legally enforceable did not solve them.

### CONCLUSION

Most commercial markets and institutions of the Tokugawa feudal period did not survive the 1868 Meiji Restoration that began shortly after Japan was opened to the West. Increased foreign goods and foreign traders, as well as increased production of Japanese goods for foreign markets, disrupted long-established trading patterns. The Osaka economy was "in turmoil," financial institutions dissolved, and currency value was uncertain.<sup>151</sup> In 1869, the new imperial government abolished the Dojima Rice Exchange and all other "transactions in differences," which it now labeled gambling, as had been done in the West.<sup>152</sup> But as in seventeenth-century Japan, early eighteenth-century England, and late eighteenth-century New York, nineteenth-century Japanese rice merchants continued to trade secretly in the absence of law. In 1871 the government granted a petition submitted by traders to reopen the market.<sup>153</sup> Dojima subsequently continued as a quasi-governmental organization (1881-1887), and then as a for-profit corporation that charged its members dues (1887-1939),<sup>154</sup> until wartime controls forced Dojima to cease operation. All that remains of the Exchange today is a monument that, appropriately enough, resembles a gravestone.

At the hands of government bureaucrats, Dojima died a somewhat ungraceful death. But for nearly 300 years, it remained a central insti-

148. See Charny, *supra* note 5, at 433-35; see also Ayres & Gertner, *supra* note 5; Richard A. Posner & Eric B. Rasmusen, *Creating and Enforcing Norms, with Special Reference to Sanctions*, 19 INT'L REV. L. & ECON. 369, 381 (1999).

149. Perhaps state laws to address issues not addressed well by traders, such as nationwide trading or long-term contracting, might have been more successful.

150. See, e.g., SHIMAMOTO, *supra* note 6, at 1.

151. See MASAYUKI TSUGAWA, ŌSAKA DŌJIMA KOME SHŌKAIJO NO KENKYŪ [A STUDY OF THE DOJIMA RICE MARKET] 6-26 (1990).

152. Zensaku Sano & Sentaro Iura, *Commodity Exchanges in Japan*, 155 ANNALS AM. ACAD. POL. & SOC. SCI. 223, 228 (1931).

153. See, e.g., YAMATANE GROUP KINEN SHUPPANKAI, *supra* note 31, at 130-31.

154. See ŌSAKA DŌJIMA SHŌKAIJO KISOKU [OSAKA DOJIMA RICE MARKET RULES] 2 (Kunimatsu Miyamoto ed., 1880), *microformed on* 4DM48902 (capitalized at 75,000 yen with 750 shares and formally established officers); Sano & Iura, *supra* note 152, at 225, 230.

tution of the Japanese economy. Whatever problems Dojima may have had, it was apparently efficient enough to squelch strong demands for reorganization. As this Article has shown, one of the reasons for its success — whether measured solely by longevity or by the more formal methods detailed herein — was likely its system of privately ordered rules and organizational constraints. The shadow of the law was always present. But anecdotal information and price data indicate that Dojima functioned for centuries in accordance with modern theories of efficient markets without direct government intervention or strict regulation. The data from the shogunate's 1773 experiment in public dispute resolution are more ambiguous, but they certainly do not present a strong case for government intervention.