

Poaching, Courts, and Settlements

Complementarity of Governance in Labor Markets*

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Abstract

Transition between private governance mechanisms and the state court is not necessarily unidirectional. This research assumes that non-monotonic changes in governance mechanism comes from complementarity between the private and public mechanisms when neither of both is sufficiently efficient. Then it studies transition of governance in the labor market of Japanese silk-reeling industry from the 1890s to the 1920s, which rapidly grew then and often showed poaching, and ascertains that employers first had recourse to the court for enforcement of employment contract, they second built private mechanisms for settlement backed by the court, and third abandoned the private mechanism.

Key words: Employment contract; scope of the state court; complementarity between judicial and endogenous systems; Japan.

JEL: K12; H11; L14; J42; N65.

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1 Introduction: Governance of labor markets

Protection of claim on investment in human capital has been a lasting issue in economic history. Claim on the transportation of cost has been an issue, too. As long as individual workers themselves finance these costs, there are no problems. Investment level would be set at the optimal level where its marginal return equals to the cost. However, these costs are not often covered up to the optimal level by workers' wealth and imperfect financial markets fail to finance their migration. Then, in order to improve welfare, somebody else has to finance these. One of the ways in which finance can be facilitated is to make the claim of the party that finances human capital investment or human mobility transferable without agreement from the party whose transportation is financed; that is, to protect the claim such that it satisfies requirements for perfection. Claim of perfection, typically known as the real right, allows the claimant to transfer the claim without accordance from the bondee. An agent on whom a permanently perfect claim is placed is called a slave. In some societies, such as Europe and the US before the early twentieth century, the claim of the indenture holder was also perfect. Indentured immigrants from Europe were auctioned in American cities—their destinations—and the mechanism indeed facilitated labor mobility between both sides of the Atlantic in the 18–19th centuries (Galenson (1981, 1984) and Grubb (1985, 1986, 1988, 1994, 2001)).

More or less, most agricultural societies experienced a period of utilization of slave, indentured workers, or other similar tradable human workforce. Sooner or later, as the society and its economy develop, such phenomena vanish. A possible explanation is that slavery can be a steady state under some land/labor ratio, and is endogenously destabilized with growth (Lagerlöf (2009)). Another possible explanation tells that exclusive contracts such as indenture contracts are more efficient in a thin market, middle thick markets can have multiple equilibria, and free contracts are more efficient in a thick market (Matouschek and Ramezzana (2007)). Thus, growth and market expansion are expected to favor free contracts. In particular, improved efficiency in the financial market is known to end indenture trades, because the contract arrangement of indenture was originally invoked due to imperfect financial markets.¹ Although relative efficiency of the free labor market system is not clear and multiple equilibria can arise when a society leaves slavery,² free labor societies experienced faster growth and the free labor market became a “stationary equilibrium.” On the path toward modernization, developed societies have believed that liberalization of the movement of persons would contribute to better matching in the labor market and thus facilitate better resource allocation. First slavery was abandoned, and then indentures came to be contained. During this transition phase, the protection of claim to human capital emerged as an issue. Liberalization of people has generally implied weakened claim to human capital investment and human transportation, and inevitably has made the claim to financial assets sunk in human capital tricky.

An extreme approach is legal prohibition of enticement, as seen in the Postbellum US South. In the case of the United States, mobility of liberalized black workers significantly fell and wages were contained. The claim to human capital was protected at the expense of

¹See Grubb (1994), pp. 815–818.

²See Hicks (1969), pp. 130–137; Lagerlöf (2009), p. 335 and Matouschek and Ramezzana (2007), pp. 364–366.

welfare potentially to be improved by better matching.³

However, some kinds of labor markets succeed in setting subtle equilibria where employers' claim is perfected and employees' mobility is encouraged, as seen in the labor markets of professional sports.⁴ There, with quasi-rent belonging to employees, employees are motivated to follow a private governance mechanism setup by employers. Such a mechanism is to privately run once a modern judicial system that does not allow a claim for an employee to satisfy requirements for perfection comes into play.

The Japanese Civil Codes effective in 1898 generally did not allow a claim to a person to be perfection. Furthermore, in the case of employment contract, it has been recognized as lawful since the 1900s for an entrant (potential) employer to infringe on an incumbent (current) employer's claim to his/her employee, in order to prompt competition in the labor market and improve social welfare. The United States prohibited indenture contracts, under which the claim to an employee was perfection, as late as in 1917. In a sense, the Japanese Civil Codes appear to have been more advanced than optimal in terms of economic efficiency. To improve resource allocation, private institutions where the transfer of claim to an employee satisfied requirements for perfection was desired to be formed. Indeed, these were formed and utilized in Japan from the 1900s to the early 1920s in the most productive industry then—the silk-reeling.

Concurrent transitions of governance structure in the labor market in principle depended on relative transaction costs, in the meaning suggested by Williamson (1985),⁵ between the private governance based on repeated transactions and third-party enforcement by the state court. The development from private to public governance of trades is typically depicted as the transition from a private institution when the market is thin and small to a public institution when the market is thick and large market, because the state court system requires such a large fixed cost that the volume of trades under the governance mechanism is to be accordingly large and because the private institution depends on personally repeated interactions to hold a subgame perfect equilibrium strategy of honest trades.⁶ Development of the public institution is typically assumed to be monotonically increasing in market, and that of the private institution is expected to be monotonically decreasing in market size.

The case of the Japanese silk-reeling industry is, however, different. In the early phase, manufacturers had recourse to the court for fulfillment of employment contracts when their employees were poached, while they privately settled such disputes with closely neighboring manufacturers. The second phase was interactive coexistence of the court and private mechanisms. This phase can be separated into two sub-phases. First, they indirectly utilized the state court. The state court did not allow a claim to an employee to satisfy requirements for perfection, and hence, they would privately negotiate with each other and use the judgement by the court as a bargaining device for settlement. Next, when the industry expanded, they established a private institution under which claims to employees of member manufacturers were transferred as if they satisfied requirements for perfection within member manufacturers

³See Naidu (2010), pp. 420–438.

⁴See Kahn (2000), p.89.

⁵Williamson (1985), pp. 15–42

⁶See Dixit (2004), pp. 1–14, 59–95; and Mulligan and Shleifer (2005), pp. 1451–1464

and member manufacturers were not allowed to resort to the state court. Finally in the third phase when the industry was large enough and matured, the private institution was dissolved and the governance of the labor market was back to the state court.

2 Underlining framework

2.1 The model

Dixit (2004) and Matouschek and Ramezzana (2007) provided general models to describe processes of endogenous changes in governance mechanisms. From a nation-wide viewpoint, formation of judicial system is also a part of endogenous process of institutional changes. Their general approaches present useful perspectives to understand entire pictures of such institutional changes in the very long-term. Meanwhile, it might be a reality-based approach to assume that performance of the judicial system as an exogenous variable and examine potential interactions between the court and private mechanisms in order to disentangle pictures in the mid-term. Thus, we here narrowly focus on interactions between the exogenous state court and endogenous choices of private mechanisms. Following Choi and Triantis (2008) who argued for potential complementarity between litigation and relational contracting to self-enforce incomplete contracts, we here explicitly deal with complementarity between the court and a private governance mechanism.

Non-monotonic trajectory of governance mechanism in Japanese experience is thought to be not least affected by change in the degree of complementarity between the judicial system and endogenous governance mechanisms. If they are not complements, a private mechanism or the judicial system would dominate governance of trades. If they are complements, they would co-exist, although the judicial system is not utilized on-the-equilibrium path. The judicial system off-the-equilibrium path as an outside option could reinforce the private governance mechanism on-the-equilibrium path.

First we consider a relational contracting setting without the state court. Suppose that a worker moves between firm A and firm B. When a trade between firm A and firm B is settled, that is, claims related to the movement of the worker are cleared, the trade costs s but an improved matching provides benefit y^s . We assume that the net social surplus $y^s - s$ is equally divided between A and B and both A and B have a common discount factor δ . At the same time, a firm could poach a worker from the other and refuse a trade to compensate the movement. We assume that the pure poaching without trade brings the poaching firm with profit π^p .

Suppose that both A and B play a trigger strategy as follows:

First period When a worker moves from one to the other, the firm to which the worker has moved settles a trade with the other from which the worker moves and each player receives $(y^s - s)/2$.

From the second period If both players have always settled trades whenever a worker moved, then both players agree to settle a trade when a worker moves from one to the

other. Otherwise, they never settle a trade.

Then, the incentive compatible constraint such that both players settle a trade when a worker moves to him/her from the other is

$$\pi^p \leq \frac{\delta(y^s - s)}{2(1 - \delta)}.$$

Thus, the least δ^* that satisfies the incentive compatible constraint is

$$(1) \quad \delta^* = \frac{2\pi^p}{2\pi^p + y^s - s}$$

Next, consider an environment with the state court. Suppose that the judicial service realizes benefit $y^c = dy^s$ and costs $c/2$ to each party. Some relevant information may be observable but not verifiable and hence we assume that efficiency of governance by the court is smaller than the private governance such that $d < 1$. Assume a trigger strategy as follows:

First period When a worker moves from one to the other, the firm to which the worker has moved privately settles a trade with the other from which the worker moves and each player receives $(y^s - s)/2$.

From the second period If both players have always settled trades whenever a worker moved, then both players agree to privately settle a trade when a worker moves from one to the other. Otherwise, the firm from which a worker moves to the other always has a recourse to the court for governance of trade whenever a worker moves.

Under this strategy, the incentive constraint not to deviate to the judicial service is,

$$\pi^p \leq \frac{\delta [(y^s - s) - (y^c - c)]}{2(1 - \delta)}.$$

The least δ^{**} that satisfies the incentive compatible constraint above is

$$(2) \quad \delta^{**} = \frac{2\pi^p}{2\pi^p + (1 - d)y^s + c - s}.$$

Motivated by Itoh (2010, 2011), we focus on the difference between the least discount factors that satisfy relevant incentive constraints,

$$(3) \quad \delta^* - \delta^{**} = \frac{2\pi^p(c - dy^s)}{(2\pi^p + y^s - s)[2\pi^p + (1 - d)y^s + c - s]} \equiv D.$$

and interpret $D > 0$ as the degree of complementarity between the judicial system and the private governance mechanism.

2.2 Complementarity between the court and the private mechanism

Then, we have an implication about institutional choices.

Proposition 1. *For the efficiency of the private governance mechanism and the court, we have followings.*

- a. If the benefit from the private governance is sufficiently large, then the judicial system and the private governance mechanism are substitutes.*
- b. If the efficiency of the court is sufficiently low, the private governance mechanism based on relational contracting and the court are complements.*
- c. As the efficiency of the court is improved, degree of the the complementarity between two mechanisms decreases.*

Proof. a. If y^s is sufficiently large, then $D < 0$.

b. If c is sufficiently large and/or d is sufficiently small, then $D > 0$.

c. Furthermore, $\partial D/\partial d < 0$ and $\partial D/\partial c < 0$.

□

This is a theoretical interpretation of the “shadow of the law” effects (Stevenson and Wolfers (2006)).

2.3 Non-monotonic history of governance

From **Proposition 1**, we can predict a historically non-monotonic trajectory as follows:

First phase When the labor market is small and hence trading community is small, the private governance and the state court are substitutes. Employers may rely on either a private mechanism or the state court. In practice, they are expected to rely on relational contracting in trades with close neighbors where private governance efficiently works and have recourse to the court when they deal with others.

Second phase When the trading community grows and the efficiency of the private governance accordingly decreases but the state court is still weak, then employers sustain the private governance mechanism implicitly supported by the court. On-the-path-equilibrium, they do not have recourse to the court, which might make the private governance dominates. In fact, however, the equilibrium is stable due to the existence of the court.

Third phase Finally, when the trading community grows more and the state court improves its efficiency, employers dissolve the private governance mechanism and have recourse to the court.

We believe that this narrative is applicable to transitory economies in a broad context. About the Indian experience, Dixit (2004) assumed the Indian less reliable court as an example of a substitute to private governance mechanisms.⁷ In fact, however, dense within-caste private governance mechanisms were rather enhanced from the late nineteenth century, when the British controlled imperial government found the “Indian common law” from domestic customs, codified it, and implemented it by the state court (Kanda (2008)). In France, chamber of commerce, once abandoned during the Revolution, was recovered from the mid-nineteenth century and came to explicitly work as a complement to the centralized but weak judicial system by backing the regional commercial courts. This is why, for instance, we can trust in the regionally controlled quality of French wines (Lemerrier (2003)) We ascertain below whether this narrative is applicable to the experience in Japanese labor markets.

3 Governance of trade under the judicial system

3.1 Labor markets of the Japanese silk-reeling industry

The silk-reeling industry was a driving force of Japan’s industrialization. After 230 years of isolating itself from the international market, Japan was forced to come back to the free trade regime by western powers in 1859. The biggest export then was hand-reeled raw silk to Europe. In the 1870s, when persistent international deflation that was to last till the 1890s began, however, export of hand-reeled raw silk from Japan to France decreased while that from China to France continued to increase. Japanese traditional silk-reeling lost its competitive advantage over its Chinese counterpart.

In contrast to the stagnant European market, the US market began to grow from the late 1870s, and continued to expand in the 1880s. Moreover, during this period, power looms prevailed rapidly over the American silk fabric industry. The American silk fabric industry concentrated on factory-made fabrics for mass consumption, while the silk fabric industry in Lyon maintained the feature of a luxury industry by using hand looms.⁸ The US modern fabric industry exhibited a strong demand for machine-reeled raw silk, called filature raw silk. Responding to this international shift in demand, the silk-reeling industry in Japan modernized and drastically increased exports to the United States. Japan’s share of the US raw silk market reached 50 percent by the end of the 1880s, 70 percent by the 1910s, and 80 percent by the 1920s (Nakabayashi (2006, forthcoming)). In addition, raw silk accounted for about 30 percent of total export of Japan before the Second World War.

The development of the modern silk-reeling industry was led by silk reeling manufacturers in Suwa county, Nagano prefecture of central Japan. In the county, the demand for female workers, who operated the reeling machines, increased by over 10 percent annually from the 1880s to the 1890s, thereby making labor market highly competitive and tight. Though the demand on semi-macro level in the long-term was met by the inflow of workers from other

⁷See Dixit (2004), p. 3

⁸See Cottareau (1997) and Federico (1997), pp. 61–78.

areas of central Japan,⁹ In the case of the silk-reeling industry in Japan, wages were higher, and consequently, the sector absorbed workers of higher productivity from distant regions. Further, and within Suwa county, Nagano prefecture, the core district of the industry, wage payment was extremely performance-based. Workers, most of whom were unmarried young women, lived in dormitories at each firm with the room and board being paid for by the firm. The monetary wage paid by the firm was completely piece-rate and was a tailored 4-dimensional measure of performance, and the wage differential between the most productive and the least productive was roughly 6,000–7,000 percent.¹⁰ However, the tightness of the labor market caused a problem on the micro level in the short term wherein this counts dual employment contracts, or movement of workers from a factory to another factory.

Because it was costly for a manufacturer to recruit workers from distant areas, manufacturers tried to prevent workers from moving by imposing large damages in employment contracts. If the cost of recruiting had not been compensated at all, no manufacturer would have tried to recruit any worker from distant areas and the supply of labor would have been less than optimal; therefore, some compensation was necessary.

However, worker mobility would improve not only between-industry matching,¹¹ but also within-industry matching by offering very high-powered incentives.¹² Hence, governance of the labor market to constrain mobility could have worked to deter potentially better matching.

Now that it would have been inefficient to cease movement, the deal for the movement of workers should have been conducted under some governance.¹³

3.2 Transformation of employment contracts

In the early 1890s, competition for workers among silk-reeling manufacturers was getting fierce. In addition to increased wages and side payments,¹⁴ some problems in transaction also emerged when entering into the contract or after the contract.

Every year, in January, manufacturers sent agents to distant areas to recruit workers. In the Japanese silk-reeling industry, most workers were young females.¹⁵ The manufacturers entered into contracts with young women in their late teens to their twenties, which were to be endorsed by their fathers or their husbands.¹⁶ In Suwa, the term of the employment contract

⁹See Saito (1998), pp. 60–61.

¹⁰See Nakabayashi (2003), pp 241–288 and Nakabayashi (2006), pp.200–203.

¹¹See Kim (1998), pp. 481–495.

¹²See Booth and Frank (1999), pp. 449–461.

¹³That is, governance of trade is to maintain the trade between players under asymmetric information where they can cheat each other, in order to avoid the most inefficient equilibrium—ceasing the trade—such as “prisoners’ dilemma.” See Aoki (2001), pp. 60–61.

¹⁴Most of these side payments were fabric, which were pleased by female workers.

¹⁵The reason why silk-reeling firms stuck to young females instead of continuing to use the services of matured and skilled female workers is another question. See Hunter (2003).

¹⁶The Civil Codes of Japan before the Second World War required the agreement of a minor’s guardian when a minor made a contract, and it required the agreement of the head of the household when a woman, even if she was an adult, made a contract to “restrict” her—typically, for the woman to work in a factory and to live in a dormitory.

was one year or less, and whole wages were paid in one lump sum at the end of the year. Female workers lived in dormitories through the year and all living expenses including meals were paid by employers. When a contract was made, agents made an advance on wages. Thus, by cheating agents, the woman, her father, or her husband could receive advances from multiple contracts. Contracts other than the one taken by her were not eventually fulfilled. A local newspaper often reported situation as follows.

Among silk-reeling manufacturers, there are drones who poach female workers trained by others into their factories and among female workers, there are cunning ones who enter into employment contracts with several silk-reeling manufacturers, and these not only inflict a loss honest silk-reeling manufacturers, but also would result in lost control of female workers' society and not least affect the silk-reeling industry...¹⁷

In the Suwa and Ina regions, silk-reeling manufacturers recently offer money to silk-reeling workers employed by others and try to poach them, or offer piece good for kimono and other fringe benefits and induce them...¹⁸

Silk-reeling manufacturers are now sending their staffs and acutely competing local silk-reeling manufacturers, as each other saying "we additionally pay so much" to induce female silk-reeling workers, and so now it is the time workers get flushed...¹⁹

In the Suwa region..., female silk-reeling workers fell in shortage, and most female workers should not be employed by factories that offer lower wages..., skilled female workers receive offers many factories, and some offer several yen as bribes, offer piece goods for kimono, send spies, reward recruiting agents, and sought any possible measure, exactly as representatives compete...²⁰

Even after workers came to the factory, they moved to another factory when offered a higher wage. In such a case, the female worker usually waived the wage accumulated but unpaid at this point, and therefore workers moved only in about the first third of the year.

By the means of the employment contract, the employer got a claim for the employee to work at the factory, and the employee got a claim for wages as a return service. The value of the employer's claim was equal to the cost for recruiting the employee such as the cost incurred

¹⁷"Seishi koje yosei no hituyo (Necessity of training of female silk-reeling workers)," *Shinano Mainichi Shimbun (The Shinano Daily Newspaper)*, April 27, 1892. Shinano is the old name of Nagano prefecture.

¹⁸"Seishi koje yatoiire no serial (Competition for employing female silk-reeling workers)," *Shinano Mainichi Shimbun (The Shinano Daily Newspaper)*, June 8, 1892. Wages paid to female workers were generally transferred their parents after they came back home. Meanwhile, fringe benefits in kind such as piece goods were often reserved by workers themselves.

¹⁹"Kojono hippari (Competition for female workers)," *Shinano Mainichi Shimbun (The Shinano Daily Newspaper)*, June 23, 1892.

²⁰"Kojono hippari kyoso ha daigishi no kyoso ni nitari (Competition for female workers resembles competition of representatives)," *Shinano Mainichi Shimbun (The Shinano Daily Newspaper)*, March 7, 1894.

in sending an agent and making an advance payment adding to the expected profit she would have made. The tightness of the labor market and movement of workers made claim protection necessary against infringement by other manufacturers under such dual employment contracts.

However, it was not unlawful for an employer to infringe on another employer's claim right to an employee by poaching, according to the Civil Codes of Japan, which held the rule of civil liberties and free competition.²¹ Therefore, it was impossible for a manufacturer to have recourse to the court to secure claim right to the employee against other prospective employers.

Under such a condition, the simplest way to prevent other manufacturers from infringing was to put a clause on damages on nonfulfillment in the employment contract. Indeed, since the early 1890s, employment contracts came to typically include a damages clause. The clause claimed enough damages to prevent a worker from moving, which was equal to from half to full of a year's wage. By such a contract, manufacturers tried to deter the movement of workers to other factories.

What was the effect of the damages clause? In fact, the Ward Court of Suwa actually delivered a judgment to impose damages on the defendant (the employee) as claimed by the plaintiff (the employer) when the employee did not fulfill the contract and the employer filed a case. Therefore, the fulfillment of a contract could be enforced by the court through a lawsuit for damages against an employee.

This, however, means that the court could cease trade between employers, or cease movement of employees between factories because enforcement of either the fulfillment of employment contract or the payment of damages virtually meant to force an employee to continue to work at the first factory. Even if a wage was higher at the factory to which moved than at the factor from which the worker moved, the large amount of damages definitely cancelled out the premium from the movement. Though claims gave each employer an option to obtain protection by ceasing trade, it was not an efficient solution in terms of matching in a frictional market. A better second-best solution would be allowing the workers to move to a more efficient factory with the claim of the ex-employer secured or compensated by an amount equal to the recruitment cost. The governance under the court, indeed, evolved in such a direction.

3.3 Indirect governance of trades between employers by the court

In the mid-1890s, two kinds of lawsuits related to employment contracts were brought into the Ward Court of Suwa: 1) lawsuits for the fulfillment of employment contract or damages and 2) lawsuits for damages on the nonfulfillment of employment contract. Regarding the former, the court would deliver the judgment ordering the defendant (employee) to fulfill the employment contract, or to pay the amount covering the damages, as required by the contract. On the other hand, for the latter, the court would simply order the defendant to pay the amount covering the damages. Thus, while lawsuits for the fulfillment of employment contract or damages still

²¹See Ishizaka (1908a, 1908a, 1908b, 1908c); Suehiro (1914), p. 44; and Wagatsuma (1940), pp. 13–14, 79–80. Though infringement on a claim came to be recognized as wrongful in some cases after the 1910s, affected by the German law, infringement of a claim on the employment contract has not been recognized as wrongful, according to the rule of individual liberties and free competition, up until now. See Yoshida (1991).

had recourse to the court for the enforcement of the fulfillment, lawsuits for damages on the nonfulfillment of employment contract were just for damages, taking the nonfulfillment of the employment contract for granted.

In both cases, the court officially governed trades between an employer and an employee. However, if the court had governed only transactions between an employer and an employee and consequently the employee would have been forced to pay the damages for herself amounting to half to full of her annual income, then the effect of both kinds of lawsuits would have been equivalent: ceasing movement and fulfillment of the employment contract. Because no premium could be earned from a movement and a worker from a poor peasant family could not pay the amount equal to the whole yearly wage anyway, only choice would be the fulfillment of employment contract.

Nevertheless, lawsuits related to employment contract had changed by the end of the 1890s. After 1900, lawsuits for the fulfillment of employment contract or damages disappeared and all related issues turned into lawsuits for damages on the nonfulfillment of employment contract (**Table 1**). This indicates that there was some change in governance by the court; Actually, the court virtually began to govern trades between employers.

Among transactions governed by the court as cases officially between an employer and an employee, there were two types of real transactions: actual transactions between an employer and an employee—when a worker would not fulfill the contract because of illness and consequent withdrawal from the labor market—and virtual transactions between relevant employers—when a worker moved to another factory.

What a kind of judgment did the court deliver in the first case? The court dismissed the claim by the plaintiff (an employer), because the Civil Code recognized the immediate cancelation of the employment contract for an “unavoidable reason,” which typically was the sickness of an employee.²² Therefore, given that employers typically lost in such cases, we can infer that employers usually sued employees when they moved to another factory.

Then, who did cover the damages equivalent to the whole yearly wage? If the manufacturer to whom the worker moved did not pay the damages or did not negotiate with the ex-employer,

²²Indeed, in a case of nonfulfillment caused by sickness of a worker, the court denied nonfulfillment of the contract and recognized the termination of the contract, and dismissed the claim of the manufacturer, which followed from Clause 628 of the Civil Codes. Case of damages on nonfulfillment of employment contract /Sehei Hayashi (plaintiff, manufacturer) vs. Kimi Tanaka (defendant worker) / Judge: Naoya Kawachi / Court: The Ward Court of Suwa / Date: 11/21/1900 / Result: Loss of the plaintiff / The text: Dismissal of the claim / Responsibility for the cost of lawlawsuit: plaintiff. In this case, the defendant did not refer Clause 628 when she pleaded, probably because she did not know the effect of the clause and was too poor to hire a lawyer. Nevertheless, the Judge dismissed the claim of the plaintiff, which indicates the strong intent of the court to deliver a loss to the plaintiff. The court might recognize the real transaction between employers in usual cases, in which employees did not need to pay the amount covering damages; therefore the court might be tending to dismiss the claim of the plaintiff in this case, which actually claimed for damages against the defendant. Thus, the court probably came to recognize the transaction between employers in the case of the movement of workers, and came to prompt such movement according to the “freedom of business.” That is, the court came to indirectly govern the trade among manufacturers. See, Nakabayashi (2001), pp. 113–115, and Nakabayashi (2003), pp. 297–298. For Clause 628, see Ume (1897), pp. 686–687; and Matsunami, Niho and Niida (1903), pp. 1210–1214. The Civil Code of Japan was drafted by a French scholar, Gustave Emile Boissonade, was promulgated in 1896 and was in force from 1898.

no worker would have moved and no lawsuit would have been brought. Thus, it is natural to presume that the manufacturer to whom the worker moved negotiated with the ex-employer.

If a worker moved to another factory that offered a higher wage, it would have been difficult for the ex-employer to get the worker back and it would not have been efficient as an offer of higher wage should inflect a better matching. What the manufacturer could do was to claim for damages and then negotiate with the new employer. Indeed lawsuits for the fulfillment of employment contract or damages disappeared by the end of the 1890s. The court began affecting the negotiation between employers.

Moreover, only if such a situation is assumed, some cases can be understood. In quite many cases, defendants (employees) lost damages lawsuits by default; at the same time, in some cases, plaintiffs (employers) also lost by default. Such cases become understandable only if it is supposed that the relevant manufacturers settled trades out of the court. Thus, damages were virtually used as a chip for bargaining by the manufacturer from whom the worker had moved. As for the deal, the recruiting cost or some part of damages could be compensated by the renunciation of the unpaid wage of the worker. It was observed by contemporary officials in the early 1900s that most of poaching occurred before the mid August because movement to another factory implied workers' waiver of unpaid wages.²³ In other words, employers from whom workers moved were usually compensated by unpaid wages.

The change in type of lawsuits from the mid-1890s to the early 1900s reflected the change in trades: from between an employer and an employee to between employers. Moreover, in the 1900s, the court seemed to recognize the real transaction between manufacturers being held in parallel with the official transaction between a manufacturer and a worker in the court. The court did not protect an employer's claim if it was not thought that the employee was poached. For example, in the case of a layoff, the court recognized it as the cancelation of the employment contract by the employer, and dismissed any claim of the employer after the layoff.²⁴

Therefore, we can consider that the judicial system indirectly governed trades between employers in the labor market (**Figure 1**). Let C denote a deal in the court that follows the Code of Civil Procedure, and S denote a deal outside of the court. Then the process of negotiation under this indirect governance could be depicted as follows:²⁵

($S - 1$) When worker W moves from manufacturer M_A to manufacturer M_B and does not

²³Noshomusho Shokokyoku Komuka Kojochosakakari (Factory Surveillance Section, Department of Commerce and Manufacturing, Ministry of Agriculture and Commerce), Kiito Shokko Jijo (Conditions of Workers in the Silk-reeling industry), Tokyo: Ministry of Agriculture and Commerce, 1903 (Edited by Takao Tuchiya and reprinted Tokyo: Shinkigensha, 1976), p. 180.

²⁴Case of damages on nonfulfillment of employment contract / Katsuhei Ito (plaintiff, manufacturer) vs. Kiroku Aikawa (defendant, father of the worker) / Judge: Yoshiyuki Ariizumi / the court: The Ward Court of Suwa / Date: 10/15/1904 / Result: Loss of the plaintiff / The text: Dismissal of the claim / Responsibility for the cost of lawsuit: plaintiff. See Nakabayashi (2001), pp. 117–120 and Nakabayashi (2003), pp. 299–302. The Constitutional Law of Japanese Empire was promulgated in 1889, and was in force from 1890. It secured the property right, which meant it also secured free competition. In the 1900s, this rule came to be indeed understood by government officials and judges.

²⁵See Nakabayashi (2001), pp. 120–123 and Nakabayashi (2003), pp. 302–304.

fulfill the employment contract with M_A , M_A investigates where the factory of M_B is and requires M_B to send W back to M_A or to compensate the value of M_A 's claim.

- ($C - 1$) M_A has recourse to the Ward Court of Suwa for ordering W (or the head of her family) to pay the amount to cover damages on nonfulfillment of the employment contract, following which the court makes a decision to order W to pay the same.
- ($S - 2$) M_A and M_B negotiate for settlement, by balancing out a part or all of the damages using the unpaid wage of W held by M_A , or by sending W back to M_A . If they arrive at a settlement on this stage, the negotiation finishes. If not, the process goes to the next stage.
- ($C - 2$) W (actually M_B) files an objection against the decision within 14 days after ($C - 1$), and then the lawsuit begins.
- ($S - 3$) If they reach a settlement after ($C - 2$), the negotiation finishes. M_A does not require the court to set a day of oral proceedings, which means the discontinuance of the lawsuit, or M_A is absent on the day for the oral proceedings and then loses by default; his claim is dismissed by the court. If they do not reach any settlement, they go to the next stage.
- ($C - 3$) M_A attends and W does not attend the oral proceedings, and then M_A wins by default; the court delivers a judgment ordering W to pay amount to cover the damages.
- ($S - 4$) If they reach a settlement, the negotiation finishes. If not, the process goes ahead.
- ($C - 4$) W (M_B) files an objection against the judgment by default within 14 days after ($C - 3$), and then ($C - 3$) is repeated. The judgment on this stage is an ultimatum to M_B , because W (M_B) cannot make another objection against the judgment by default.
- ($S - 5$) They reach a settlement. The negotiation is done.

The court systematically governed trades. The primary role of the governance was adjustment of threat point in the Nash bargaining between both manufacturers. A possible enforcement of payment of damages increased disagreement point of M_A , and by doing so moved Nash bargaining solution to the direction favoring M_A . If this adjusted a possible solution such that it satisfies M_A 's participation constraint, M_A comes back to the private settlement with M_B and the trade could improve efficiency. Thus, the judicial process supported the private governance mechanism and the public and private mechanisms here were complements in the sense of **Proposition 1**. These real practices were a little more complicated than the one **Proposition 1** assumed. To inquire the reason, recall that we assumed discount factors were common to any player. In practice, they could depend on each market participant. To average employers to whom workers moved, possibility of lawsuit was sufficient to make them accept private settlement. On-the-equilibrium path, no real lawsuit happened. However, some participants might have smaller discount factors. In the real legal procedure described above, the court prepared technically four stages of legal costs; an order, a lawsuit at the ward court, a lawsuit at the local court, and an appeal to the court of appeal or the supreme court,

where the cumulative legal cost discontinuously jumped. In the case period, no case was sent to the local court, located at a distant city. Given the accumulated legal cost and additional transportation, a suit at the local court was off-the-equilibrium path to discount factor level of any market participant. By changing the transaction cost c , the court could adjust to different δ and make them be back to private settlement.

Indeed, the number of lawsuits was not large given the number of workers. In 1900, there were 142 silk-reeling factories. Basins equipped, on each of which a reeling worker operated, were 10,963.²⁶ For over 10,000 employees, the number of lawsuits in **Table 1** looks rather small though it was not negligible. Real lawsuits seems to have occurred if both parties failed to communicate relevant information and/or the manufacturer from whom a worker moved had a discount factor smaller than the equilibrium strategy required. In this sense, we could assume that a lawsuit was usually off-the-equilibrium path. At the same time, we can naturally presume that this “shadow” of the court off-the-equilibrium path could affect bargaining powers favoring for employers from whom workers moved (Stevenson and Wolfers (2006)).

This governance, however, was costly. The cost of this standard process was about 7 yens to each party excluding a fee paid for a lawyer and damages.²⁷ In addition, it took a long time until they reached a settlement. Moreover, M_A had to search W by himself and M_B may have to pay a part of damages. Taken into account that the cost to recruit a worker without an advance was about 0.5 yen and an advance was about 1 to 2 yen in the late 1890s,²⁸ the transaction cost under indirect governance by the court seems large.

One of the reasons of the high cost under this governance was the indirectness itself. If the court had directly governed the claim between M_A and M_B , some part of the transaction cost could have been saved. Such direct governance by the court, however, was impossible under the Japanese Civil Codes that did not allow the claim to an employee to be perfection.²⁹ If the manufacturers wanted to lower the transaction cost, they had to form a private institution for the purpose.

4 Private governance in the shadow of the court

4.1 Formation of a worker registration system

Indeed, major manufacturers began to form an informal organization to settle such disputes in the mid-1890s.³⁰ They recognized their claims over the workers they employed, and they negotiated with each other when workers moved between them. This organization, however, restricted its membership to a small group of neighboring manufacturers, and did not emerge as an institution to govern trades in the whole labor market of Suwa county.

²⁶Nakabayashi (2006), p. 189.

²⁷See Nakabayashi (2003), pp. 303–304. Respective parties had to pay this cost to the court according to the Code of Civil Procedure.

²⁸See Nakabayashi (1999), p. 16.

²⁹See Nakabayashi (2001), p. 125 and Nakabayashi (2003), pp. 305–306.

³⁰See Hiramoto (1985), pp. 3–4.

A larger body including all manufacturers in Suwa county, The League of Silk-Reeling Manufacturers of Suwa (Suwa Seishi Domei) was organized in 1900 to realize more efficient governance. First, the league prohibited its members from filing damage lawsuits against a worker who moved to another member factory. Obviously, the most important objective of the league was to diminish the transaction cost under indirect governance by the court.³¹

In turn, in 1903, the league established a worker registration system from 1903. Under the worker registration system, the league obliged its member manufacturers to register all employees with the league secretariat while allowing each member employer the exclusive “right” to employ registered workers. This exclusive right was effective against any member of the league. That is, the right was secured as a kind of “real right” that satisfies requirements for perfection, different from just a claim secured under the modern judicial system that was not always effective against a bystander. If the members did not register their employees, or unfairly registered them under false names, they were severely punished, and they lost their “rights.” Under this system, the head office of the league could recognize all workers employed by its member manufacturers and could identify dual employment contracts.³²

Most previous works assumed that the purpose and effect of this registration system was to restrict the movement of workers between factories, and that the league was a cartel of manufacturers to suppress turnover.³³ These works literally interpreted the expressions of an article in the “Rules of the League” to secure the rights. The first clause of the rule is,

The First Article Female workers who were employed by other members in the summer season of the last year should not be employed through the next year. In this regard, for a worker who were employed by more than one members, the member who employed her for more days has the right of employment.³⁴

This article has been interpreted as it literally prohibited employment of a worker hired by another member manufacturer within the previous and current years. However, if such an interpretation is correct, the provisory clause from “in this regard” is redundant. Meanwhile, a following article mentioned above stipulated payment of a contract money and advancement at double contracting.

The Eleventh Article Between members of this league, a member should not sue against a member relating to an employment contract of a female worker. In this regard, contract money and advancement should be paid from the member who holds the right to the other member.

³¹See Nakabayashi (2000); and Nakabayashi (2003), pp. 306–308.

³²See Nakabayashi (2001) and Nakabayashi (2003), pp. 309–310.

³³See Iwamoto (1970); Ishii (1972), pp. 277–290; Tojo (1990); Tsurumi (1990), pp. 74–75 and Kambayashi (2007), pp. 48–53.

³⁴“Domei Kiyaku Sho (The Rules of the League), effective in 1902,” December 1901. Included in “Seishikumiai Kankei Kirokurui (Records of silk-reeling association),” held by Okaya Shiritsu Okaya Sanshi Hakubutsukan (Okaya Silk Museum, City of Okaya) and indexed in *Okaya Sanshi Hakubutsukan Shiryo Mokuroku (Catalog of Documents and Records of Okaya Silk Museum)*, No.1.

Thus, articles of the rule strictly protected the right of a member to employ a specific worker, but did not prohibit trades of the right. Or, the rule was open for trades of the right. Indeed, a regime to enable such trades was established.

It is true that, meanwhile, at the time when the internal arbitration began, no-lawsuit against a worker hired by a member manufacturer was not necessarily stable equilibrium strategy. For trades of “right,” the league was supposed to supplant the state court, and indeed, the league recorded every case for which it implemented arbitration from 1903. In the second case of 1903, a settlement was hard to reach, and the “plaintiff” manufacturer indicated a possible lawsuit against the “defendant” manufacturer if his claim was not protected. Then the case was settled such that the “defendant” compensated the advance paid by the “plaintiff” manufacturer paid to the worker under dispute who moved to the “defendant” manufacturer.³⁵ The “defendant” was Kanetaro Katakura, the largest manufacturer not only in the region, but also all over Japan. This case reminded largest member manufacturers of the reservation value of smaller members to be compensated by larger members. After this case, indication of lawsuit at the state court disappeared in the records of the league.

4.2 Private governance of trade supported by the court

Major manufacturers had little need to restrain the movement of workers since they could entice them with the promise of high wages. In fact, the most of workers’ turnover was a result of enticement by the major manufacturers who dominated the league. Moreover, large part of workers’ movement was between major manufacturers and was balanced between them, and hence, movement mainly was driven by adjustment of mismatching. Indeed the league did not punish those major manufacturers. Consequently, it is estimated that even after the establishment of the worker registration system, as many as 50 percent of the workers changed employers in any given year.³⁶

The worker registration system functioned not to restrict the movement of workers but rather to decrease the transaction cost incurred when workers moved. When worker W moved from manufacturer M_A to manufacturer M_B , the head office of the league recognized a double booking of the right to employ W . Responding to the request by M_A , the head office began to arbitrate between M_A and M_B . In most of the cases both parties reached settlement smoothly, and in many cases, especially in cases between major manufacturers, they agreed to “lend” the right, to “cede” the right, or to “clear” the right using the right lent by M_A to M_B before. Thus, the movement of the worker was dealt with by having the employer lay a claim to the right of hiring registered workers first, and by trading the claims. Even when multiple workers moved at the same time, only a part of them was sent back to M_A in some cases (**Table 2**). In particular, for major manufacturers among whom net movement of workers was balanced, obedience to governance by the league and renouncement of lawsuits could be a stable equilibrium.

³⁵Case 2, 1903, in “Miscellaneous records (Sho kiroku),” The Office of the League of Silk Reeling Manufacturers, assembled in Tohoku University, ed (1970), p. 16.

³⁶See Ishii (1972), p. 271.

The primary characteristic of the system was that the claim to an employee was protected against infringement by any bystander and could be traded, exactly as it was under indirect governance by the state court, but at a much smaller cost. Protection of the claim and facilitation of workers' mobility was at least one of the better-second best equilibria. Such a practice could not be directly introduced into the judicial system, because the modern civil codes do not allow real rights to be established over human beings.³⁷ However, this does not mean that the worker registration system existed irrespective of the state court. Possible lawsuit at the court made the registration system a stable equilibrium by suppressing the payoff of the outside option. Deviation from the league implied that employees enticed would be sued in the court by ex-employers, thereby ensuring a larger transaction cost.

Rigorous governance by the state court first made the claim to an employee tradable by its indirect governance. By this institutional invention, the worst equilibrium, no trade, was avoided. Then, after the registration system was established, the state court made the private institution of direct governance stable by ensuring a heavier transaction cost as predicted by **Proposition 2**. The private institution and the state court were complements, and without the latter, the former would have found it less stable.

4.3 Abolition of the registration system

The registration system worked well by the end of the boom during the First World War, but became less functional after the war and was finally abolished in 1926. A reason for the abolition was the political pressure from labor movement, the prefecture government, local newspapers, and the police department, all of which recognized the practice of trading the right to hire a female worker immoral. However, these factors only partially reflected changes that had progressed in depth.

Possible players in interest who could be against the system and call for support from outsiders were of two kinds: small- and medium-scale manufacturers, and workers. From the 1900s to the 1920s, concentration of production capacity proceeded and the gap between large firms and small firms expanded. This resulted in the imbalance of workers' movement between large firms and small firms, with the former increasing the net absorption. The larger the gap, the weaker the incentive for the small firms to follow the system. Further, a particular feature of the system was that the rights could be traded as if they were real rights and that the trade need not necessarily coincide with the workers' decisions. If wages paid to workers in Suwa were sufficiently higher than those paid outside, that is, the premium for following the system was sufficiently high, workers would willingly follow the institution, but would not otherwise. In the 1900s when the productivity of silk-reeling manufacturers in Suwa in general was much higher than the manufacturers in other regions and wages were accordingly much higher, workers had enough incentives to follow the setup. However, in the 1920s, while a few leading companies still offered good wages, wage levels in Suwa on average were not higher than those in other areas. This was a factor that motivated workers to call for support from outsiders.

³⁷See Wagatsuma (1983), pp. 1–9.

Even more essentially, as largest manufactures in Suwa grew the national leading companies, more of their registered employee came to work outside of Suwa county and even out of Nagano prefecture (**Table 3**). The double contracting ratio that are movement of workers recognized and handled by the office of the league, k/j in **Table 3**, hit the historical highest 4 percent in 1912 and then declined to 2 to 3 percent. It does not seem to imply that double contracting really declined from 1912, as we see that the ratio of registered basins outside of Suwa county, $(g + h)/i$ in **Table 3**, increased from 39 percent in 1912 to 54 percent in 1920 and 59 percent in 1925. Decreasing ratio of double registration recognized by the league appears to just mean that the private mechanism did not reach geographically distant trades of workers anymore. In the model above, y^s seems to have declined and s to have increased from the 1910s.

In addition, while college-level law education drastically expanded due to encouraging policies of the government in the 1920s. In Japan, college graduates specialized in law were 1,431 in 1920 but it jumped up to 12,481 in 1930. While the number of judges was stable around 1,200 from the 1890 to the 1920s, private attorneys increased from 1,590 in 1900 and 2,008 in 1910 to 3,082 in 1920 and 6,599 in 1930. Accordingly, new civil cases filed that were 104,739 in 1900 and 99,900 in 1910 increased to 129,152 in 1920 and 249,980 in 1930. The public judicial system as a whole came to take a much larger role in the 1920 in the Japanese society as a whole.³⁸ Enhanced performance of the judicial system, which is captured by larger s and smaller c in the model above, predicts a change into the phase where the court and private mechanisms were substitutes. What happened is consistent to such a prediction.

5 Tentative conclusion and extension to empirical tests

In the labor market of the Japanese silk-reeling industry in the late 19th and the early 20th centuries, three mechanisms of governance were feasible. First, the state court could exactly deter turnover and protect an employer's claim by enforcing the employment contract as written. This governance mechanism indeed worked in the 1890s, but the strict enforcement of the employment contract and the suppression of labor mobility were not desirable to the silk-reeling industry in Suwa county as a whole because it might have deterred potentially better match.

Following this, silk-reeling manufacturers moved to a negotiation mechanism that would run parallel to the lawsuit in the state court, and the court too implicitly recognized the negotiation outside the court. This indirect governance increased the disagreement point of the ex-employer, the manufacturer from whom the worker moved, and moved the bargaining solution in a direction favoring the ex-employer, and by doing so, had the ex-employer participate in the trade to realize a more efficient allocation of labor resource. A shortcoming of this indirect governance was the high cost. In theory, a private governance mechanism to directly govern trades between employers could save on the transaction cost, and the manufacturers did indeed move in this direction.

³⁸Haley (1991), pp. 96–104.

Under the worker registration system run by the League of Silk-Reeling Manufacturers of Suwa, all workers employed by member manufacturers were registered and trades of claim right to each employee were governed under the system. Member manufacturers were strictly prohibited to sue an employee poached by another member manufacturer in the state court. In this sense, an objective of the system was to completely separate the governance of the labor market from the state court, and to save on the transaction cost. Furthermore, cumulative stages of the legal costs from an order, judgement given by the ward court, and possibility of a court to the local court, could adjust to potentially different discount factors of relevant manufacturers to whom workers moved and satisfied their participant constraint to be back to the private settlement.

However, the stability of private governance was supported by the existence of the state court as an outside option. Once a member manufacturer deviated from the system, workers he poached would be sued in the state court, and the trading cost would increase by much. This condition provided member manufacturers—particularly, medium-scale ones—with an incentive to respect ex-employers’ claims. Furthermore, if wanted, an ex-employer could choose “no trade” by having recourse to the court to enforce the payment of damages for the nonfulfillment of employment contract. This condition gave large manufacturers an incentive to respect ex-employers’ claims.

The private institution, which seems to have worked well, were dissolved in the mid-1920s. A peculiar aspect of our example is in that the transition was not monotonic. Trades were first governed by the state court, then the court-led private governance and the private governance supported by the court, and finally by the state court again, as we predict from **Proposition 1**. From **Proposition 1**, we interpret the middle phases that the court-led first and then the private-mechanism-led second as complementarity regimes between the court and the private mechanism. Further, this non-monotonic transition is not unique to the Japanese silk-reeling industry. After the modern state system came into being in the 19 century, similar experiences seem to have been repeated particularly in growing and profitable sectors.

The silk-reeling industry in Suwa went through three phases: governance by the state court, complementary governance by the court and the private institution where the former led and then the latter led, and the governance by the state court. The sector saw the highest productivity and wages in the first two phases. At the same time, the productivity gap among the manufacturers was smaller in the first two phases as compared in the third phase. Governance by the private mechanism in the second phases appears to require the wages higher than outside options and less concentrated organization of the industry. Then, what was the reason why manufacturers relied on the state court in the first phase?

The private governance mechanism and the court can be complementary if surplus from trades between players is sufficiently large and if neither private governance nor the court is dominantly efficient. Under such a condition, the private governance can be supported by the court as a costly outside option off-the-equilibrium path, as **Proposition 1** predicts. Further, this transitory complementarity provides a non-monotonic trajectory of historical development as shown in our case.

In this version, we have only descriptively introduced internal arbitration under the private governance by the League of Silk-Reeling Manufacturers. However, the number of cases

internally settled by the league is sufficient to build a data set to test how the equilibrium of internal settlement was stable, and by doing so, to empirically examine whether our theoretical prediction is relevant. Thus, it is what we are working on to build such a data base. The next version of this paper will include such an empirical inquiry.

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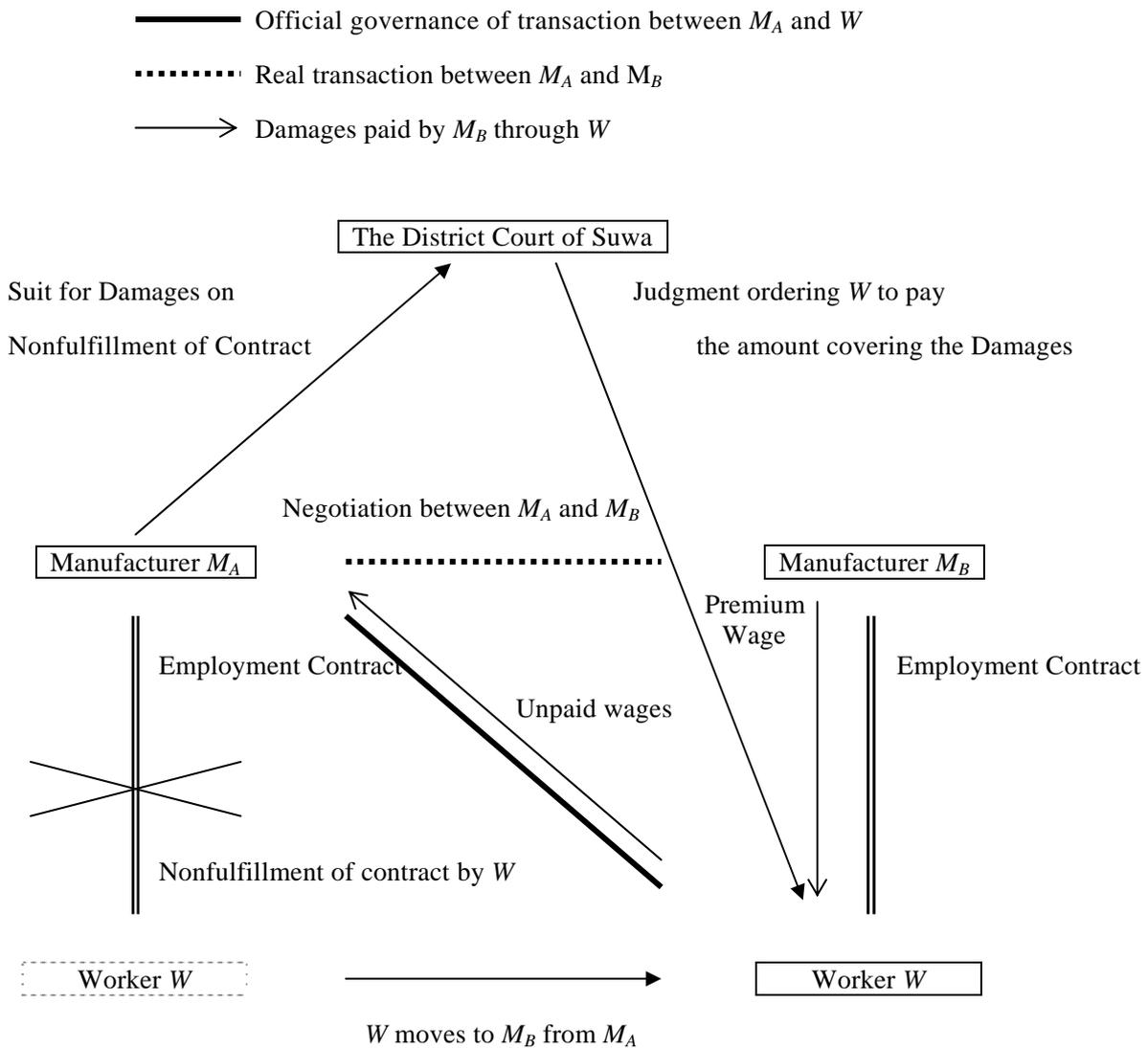
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Figure 1 The indirect governance of trade between manufacturers when a worker moves



† Real amount paid by M_B through W to cover damages is determined by the negotiation between M_A and M_B . It could be compensated with the unpaid Wage of W held by M_A .

Table 1 Civil lawsuits related to employment contracts brought by silk reeling manufacturers

	12/1892- 06/1896	12/1899- 12/1900	01/1901- 12/1901
Lawsuits for fulfillment of employment contract or damages	8	0	0
Lawsuits for damages on nonfulfillment of employment contract	5	23	20
Lawsuits for payback of the cost of training in cases	0	0	2

Source : "Kamisuwa ku saibansho minji Hanketsu genpon tsuzuri" (Judgments of Civil Cases, delivered by the District Court of Suwa).

Notes : All related judgments delivered from December 1892 to December 1901, and kept by the Branch in Suwa of the District Court of Nagano, are covered. Lawsuits for payback of the cost of training was brought when a young (about 15-year old) worker did not fulfill the apprentice employment contract.

Table 2 Governance of Trade between manufacturers by the League of Silk Reeling Manufacturers in Suwa: 1904.

Arbitrations of disputes on the trade of the "right" to employ a worker						
	Settlements				Send back workers	
	Clear of "rights"	Rent of "rights"	Cession of "rights"	Send back workers		
				All	Partly	
64	63	10	5	5	13	5

Source : Suwa sehisi domei jimusho (Secretary of the League of Silk Reeling Manufacturers in Suwa), "Koshoroku" (The record of negotiations).

Table 3 Scale and activities of the worker registration system.

year	Number of member manufacturers	Number of member factories				Number of member factories' basins				Number of registered workers	Number of double registration
		Suwa county	Other counties in Nagano	Other prefectures	Total	Suwa county	Other counties in Nagano	Other prefectures	Total		
1903	31	47	2	7	56	7,127	718	968	8,813	4,125	
1904	31	63	2	9	74	8,229	853	1,569	10,651	4,369	
1905	31	58	4	13	75	8,550	1,258	2,591	12,399	7,801	96
1906	37	64	3	16	83	9,616	1,281	3,851	14,748	12,222	157
1907	42	75	4	21	100	11,189	1,385	5,022	17,596	13,964	253
1908	43	71	5	22	98	12,236	1,999	6,068	20,303	17,874	186
1909	46	75	6	25	106	13,322	2,230	6,525	22,077	19,372	377
1910	80	114	10	29	153	15,826	2,600	7,624	26,050	23,433	585
1911	89	135	8	32	175	18,466	2,758	9,783	31,007	28,461	777
1912	104	157	9	31	197	22,209	3,166	10,911	36,286	32,056	1,177
1913	113	169	10	36	215	23,914	3,282	12,431	39,627	32,707	726
1914	127	186	9	43	238	26,235	3,361	14,607	44,203	38,295	804
1915	130	196	8	42	246	26,803	3,259	15,300	45,362	32,444	554
1916	137	207	9	41	257	28,600	3,262	17,537	49,399	45,046	933
1917	147	220	8	58	286	39,592	3,399	24,357	67,348	69,365	1,683
1918	147	218	8	55	281	33,614	3,489	27,025	64,128	49,992	1,466
1919	149	214	19	59	292	33,641	4,762	29,023	67,426	51,173	1,457
1920	138	204	21	67	292	34,417	7,215	32,856	74,488	66,385	1,675
1921	124	182	21	72	275	33,737	7,206	35,066	76,009	48,001	967
1922	121	185	20	79	284	33,045	6,932	36,848	76,825	58,511	1,709
1923	110	172	20	74	266	32,134	6,968	35,439	74,541	51,362	1,520
1924	109	173	19	76	268	31,896	6,857	37,329	76,082	46,081	1,163
1925	120	169	19	75	263	31,978	7,016	38,292	77,286	44,752	852
1926	125	183	19	77	279	32,176	6,683	38,616	77,475	20,758	155

Source : Village of Hirano, History of the Village of Hirano, Suwa County, Nagano: Municipal Office of Village of Hirano, 1932, pp. 254-255

Note : Numbers for 1926 are those until the end of February, when the registration system ceased to work.