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Employment Protection and Productivity: Evidence from firm-level panel data in Japan

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Employment Protection and Productivity: Evidence from firm-level panel data in Japan[†]

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Abstract

Recent developments in the literature on employment protection legislation (EPL) have revealed that changing the stringency of employment protection can lead to extensive consequences outside of the labour market, by affecting firms' production decisions or workers' commitment levels. This paper provides the first empirical evaluation of the comprehensive effect of restrictions on firing employees in Japan, by exploiting the variations in court decisions. We find that judgments lenient to workers significantly reduce firms' total-factor productivity growth rate. The effect on capital is mixed and inconclusive, although we obtain modest evidence that an increase in firing costs induces a negative scale effect on capital inputs.

Keywords: Employment protection, Productivity, Innovation.
JEL classification: J65, K31, K41

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I. Introduction

The consequences of the employment protection legislation (EPL) are one of the core issues that have been widely studied in labour economics. Since EPL places a tax on firing costs, that tax may cause an inefficient Coasean contract and reduce employment levels, depending on the extent to which wages can absorb the incurred cost (Lazear 1990). From the dynamic point of view, this firing tax dampens both inflow and outflow of employment, but the consequences on the employment level again depend on other parameters, such as the discount rate or the attrition rates of a firm's employment (Bentolila and Bertola, 1990; Hopenhayn and Rogerson, 1993). Empirical studies have tested the impact of EPL on labour market outcomes, some by utilizing the cross-country variation in firing regulations (Lazear, 1990; OECD, 1999; Heckman and Pages-Serra, 2004; Amable, Demmoub, and Gattic, 2011; Feldmann, 2009),[4] and others by examining regional variations within a country (Besley and Burgess, 2004; Autor, Donohue, and Schwab 2006; Okudaira, 2008).[5] Overall, most studies confirmed that the effect of strict EPL on total employment rate is negative, if not significant.

[4] For instance, OECD (1999) generated the ordinal index by grading the difficulty in firing procedures or severance payments and found negative but insignificant correlation between the EPL index and the employment rate among young and female workers. Heckman and Pages-Serra (2004) provided a more credible cross-country comparison by constructing the cardinal EPL index for OECD and Caribbean countries. Their results indicated that high severance payments moderately decrease total employment. Addison and Teixeira (2001) provided a broad survey of cross-country studies and concluded that strict employment protection has a negative, if not significant, impact on employment rate.

[5] Besley and Burgess (2004) found that pro-worker amendment of the Indian Industrial Relations Act reduces state output per capita and hinders welfare by increasing the urban poverty. Similarly, Autor, Donohue and Schwab (2006) examined the effect of the "implied-contract" exception to the employment-at-will doctrine on employment-to-population ratio and indicated that employment rate falls significantly if state courts accept the exception. Okudaira (2008) found that prefecture employment rate is reduced by approximately 1.5% if a prefecture receives more pro-worker judgments than pro-employer ones in a given year.

However, the impact of EPL is not confined to the labour market. Recent studies emphasize that strict EPL eventually affects firm productivity, given that it changes the agent's behaviour in many dimensions. For instance, intuitively it seems likely that firms might hesitate in starting new projects if they have to hoard old workers due to strict firing restriction. If firing is costly, firms may also become very picky in hiring new employees, which might increase the quality of workers and the firm's productivity level in the end. Similarly, some workers slack off when they have no fear of being fired, while some may be happy to work very hard when their employers are required to guarantee lifetime employment under the strict firing restriction. Since these insights point in the opposite directions in regards to the impact on productivity, the total effect is *a priori* unknown.

The aim of this paper is to test whether the strict EPL reduces the productivity of firms, using Japanese firm-level panel data. Using the *Basic Survey of Japanese Business Structure and Activities* annual files for the years 1994 to 2002, we calculate firms' total factor productivity and labour productivity and regress them on the EPL index proposed by Okudaira (2008). Since our dataset contains abundant information about firms' financial and personnel conditions, we control for these observed firm attributes in our estimation model.

Some studies have already investigated the empirical effect of EPL on productivity. As far as we know, most of these studies document similar results. OECD (2007) used their aggregate EPL index and industry-level panel data across 18 countries to show that strict employment protection

significantly reduces the growth rate of both labour productivity and total factor productivity.[6] Autor, Kerr, and Kugler (2007) confirmed the evidence by using the state-level variation in U.S. wrongful-discharge laws. They showed that a firm's total factor productivity declines in states where the courts have adopted exceptions to the at-will doctrine. On the other hand, Cingano et al. (2008) found negative but insignificant impact on productivity, using firm-level data in Italy. Cingano et al. (2008) also shed light on substitution effects among factor inputs, showing that the magnitude of EPL impact depends on firms' ability to reallocate their resources (e.g., constraints in the financial market).

This paper contributes to the existing literature by adding the first evidence from Japan. More importantly, this paper also differs from previous works in that it identifies EPL's impact on productivity via variations in court decisions. Previous studies have either utilized regional difference in regulations (e.g., the Indian case in Besley and Burgess (2004)), or attempted to find an appropriate control group without any regional variation (e.g., the Italian case in Kugler and Pica (2008) and the Chilean case in Petrin and Sivadasan (2010)). Autor (2003) indexed the variant timings in the adoption of exceptions to at-will doctrine among the U.S. states, treating the change in case law as a change in established regulations.

Similar to the U.S. case in Autor (2003), Japanese EPL is mainly determined by court

[6] This reduction is not negligible in size, since, according to their estimates, the industry in a country with OECD-average EPL would experience a 0.08% higher growth rate in total factor productivity if it had EPL as flexible as the U.S. has.

decisions. Unlike the U.S. case, however, there are no legal boundaries between prefectures, since Japan employs one national court system. One possible interpretation for the variation in judgments by the Japanese courts, therefore, is a difference in the level at which worker protections are enforced rather than a difference in a case law. Before applying the usual difference-in-difference approach, we need somehow to quantify the enforcement level exercised by courts.

To overcome this problem, we employ the index proposed by Okudaira (2008). Okudaira constructed an index from the published precedent reports that represents prefecture-level variations in the direction of judgments in adjustment dismissal litigation (i.e., dismissals due to economic reasons). The idea rests on the observation that litigation outcomes differ remarkably from prefecture to prefecture, as we will explain with an example of district courts in Tokyo and Osaka in Table 1 of Section II. We regress our productivity measures on this index to obtain the causal estimates of court impact, after conditioning on regional and firm characteristics.

Our results are in line with the previous works. We found that pro-worker judgments significantly reduce growth rates in firms' total factor productivity and labour productivity, given the covariates fixed. In contrast, the effect on capital is mixed and inconclusive in Japan, which is contrary to the findings in Cingano et al. (2008) and Autor, Kerr, and Kugler (2007). We obtained modest evidence that an increase in firing costs induces a negative scale effect on capital inputs. Our findings survived some robustness tests.

The remainder of this paper is organized as follows. Section II presents theoretical background that links employment protection and productivity, and provides the institutional framework for employment protection in Japan. Section III introduces the construction of an index that represents the stringency of restriction, along with the estimation method and data source. Section IV summarizes our estimation results. Section V provides our conclusion.

II. Background Summary

Theoretical background

The economic theories provide no clear predictions on the total impact of employment protection on firm productivity. In a competitive market with some frictions or rigidities where the Coase theorem does not work, strict employment protection drives a wedge between wage and the value of the marginal product of labour. Theories have argued that this wedge causes a loss in allocative efficiency, but its impact on technical efficiency is unknown.[7] One prominent example of work that has analyzed the effects on allocative efficiency is the study by Hopenhayn and Rogerson (1993). Their calibrated model showed that a higher firing tax reduces job turnover rates and increases the

[7] Autor, Kerr and Kugler (2007, F195-196) provides an organized theoretical summary.

wedge, thereby dampening average labour productivity.[8] On the other hand, some scholars have pointed out that firms are selective in hiring new employees when workers are strictly protected (Kugler and Saint-Paul 2004), which may increase firms' technical efficiency. Others stress a loss in innovative investment. For example, Saint-Paul (2002) showed that an economy with a high firing cost tends to specialize in the improvement of existing processes, rather than in developing brand new products.[9] A reduction in R&D investment incentives can reduce firms' productivity levels. In sum, the direction of the impact on productivity is theoretically unknown.

In addition to the effect on firm productivity via market distortion, employment protection also acts as a commitment device to extract worker efforts, and thus can affect worker productivity. This commitment device view is relevant, especially in the presence of information asymmetry. Here too, however, theoretical prediction on productivity is ambiguous. Belot, Boone, and van Ours (2004) analyze the existence of an optimal degree of employment protection in a situation where employment protection gives workers an incentive to invest in relation-specific skills. They conclude that the optimal level of firing cost is larger than zero in most cases, which indicates the possibility that stricter protection improves productivity by enhancing firm-specific skill investment.[10] In contrast, firing restriction may also induce opportunistic sabotage by workers when their effort level

[8] Cabarello et al. (2004) confirms the similar results using sectoral panel dataset across 60 countries.

[9] See Koeniger (2005), Kanniaine and Vesala (2005), and Samaniego (2006) for the empirical support of this view.

[10] Koning (2003) makes use of firing information pertaining to soccer coaches in the Dutch Premier League and shows that firing indirectly incentivizes the rest of the workforce.

is unobservable. Ichino and Riphahn (2005) argue, in their simple theoretical framework, that lazy workers have an incentive to slack off and that this effect is exacerbated when workers are strictly protected and firms' monitoring no longer threatens them. This idea was empirically tested by Riphahn (2004) with German Socioeconomic Panel data; she found that workers in the public sector with strong protections show significantly higher absenteeism than those in control groups. Similarly, Ichino and Riphahn (2004) showed in their Italian bank dataset that, after the conclusion of a probationary period during which workers may be fired at will, worker absenteeism increases. Since worker productivity is more or less linked to overall firm productivity, these theoretical effects cannot be ignored.

Employment protection in Japan

A distinguishing feature of the Japanese employment protection is the effect of judicial review on its development. In contrast with the situation in European countries, there has been no Japanese statute that specifically requires just cause to dismiss workers. Instead, Japanese courts have established strict case laws for regulating abusive exercise of dismissal rights.[11]

[11] The Civil Code provides freedom of dismissal, by stating that "if the employment is not for a definite period, either party may make a request to terminate the contract at any time..." (Civil Code, Art. 627, Par.1). Judges de facto altered this written statute by the Doctrine of Abusive Dismissal in the face of a serious economic downturn immediately after the Second World War, when the cost of being fired was exceptionally high for workers. See Sugeno (2002, 473-493).

One prominent example is the four prerequisites in the Doctrine of Abusive Adjustment Dismissals (hereafter referred to as the *doctrine of four prerequisites*). An *adjustment dismissal* is a dismissal that results from business necessities, independent of the behaviour of the worker. Although the doctrine is not stipulated in a written statute, courts have de facto required a firm to satisfy the following four prerequisites in order to curtail their employees on account of economic necessity:

1. There must be a need to reduce the number of employees.

2. Resorting to adjustment dismissals must be necessary for attaining personnel reduction.

3. The selection of the person or persons to be dismissed must be appropriate.

4. The procedures must be appropriate.

These four prerequisites have strictly limited the ability of firms to adjust the number of employees and flexibly achieve their optimal production level. Ohtake (2004) studied all published adjustment dismissal litigation records and statistically revealed that Japanese courts have rigorously required defendant firms to experience a reduction in sales in the previous fiscal term in order for firms to satisfy the first prerequisite. As a result, firms must hoard unproductive labour until they meet the standards required by courts. The second prerequisite is also considered to restrict firms'

personnel decisions, since this requirement implicitly assumes that firing is a last resort. In other words, before legitimately dismissing workers, firms are required to make their best efforts to avoid adjustment dismissals—for example, by suspending hiring of mid-career and new graduates, reallocating workers within a company, farming out workers to related companies, or soliciting early retirement (Ohtake 2004, Sugeno 2002). By soliciting early retirement, firms also have to undertake the risk of forgoing productive labour. Ohtake (2004) estimated a probit model wherein he used the proportion of litigations won by employees as the dependent variable; he found that it was around the mid-1970s—in the midst of the oil crisis—that the four prerequisites arose. Similarly, Kawaguchi (2008) pointed out that, at least until the 1990s, courts had literally required firms to satisfy all four prerequisite in order to legitimately dismiss workers. Thus, the doctrine of four prerequisites has in practice imposed stringent employment protection or high firing costs on at least firms that appeared in courts.

In relation to other countries, Japan is regarded as having relatively stringent employment protection. OECD (1999) ranked Japan's employment protection 7th among 27 surveyed countries. OECD (2007) also noted that these protections are particularly restrictive for regular workers in Japan, compared to those for temporary or part-time workers.

While the doctrine of four prerequisites has been strictly applied, a large amount of discretion is left to courts, since the wording of the prerequisites is open to a wide range of interpretations. As a

matter of fact, it is well known among Japanese legal scholars and professions that some judges or courts exhibit judicial activism. For example, courts in Tokyo tend to show more lenient view toward firms than the other courts, especially those in Osaka do. Particularly after the 1990s, the Tokyo District Court has attempted to relax the prerequisites and to allow firms to resort to adjustment dismissal with more ease (Tsuchida 2002, Mori 2001).[12]

Similarly, it is also well known among Japanese labour economists that Tokyo Prefecture has experienced much higher firm victory ratio than Osaka Prefecture has (Ohtake and Fujikawa 2000, Ohtake 2002, Kawaguchi 2008, JILPT 2006, 2007, Kambayashi 2008). Table 1 confirms this observation. Figures indicate the ratios of worker victory in dismissal-related litigation at the High Courts and District Courts in Tokyo and Osaka Prefecture. After the late 1970s, courts in Osaka tended to adjudge employers of their abusiveness in adjustments dismissals, in a remarkable contrast to courts in Tokyo. Moreover, the third row in Table 1 presents the overall victory ratio for all 47 prefectures, from which it is even more evident that Tokyo and Osaka represent the extremes.

This paper takes advantage of the regional variations in court intervention in order to investigate the empirical impact of employment protection on firm productivity in Japan. In

[12] With regard to the second prerequisite mentioned above, for example, the "scope" of a labor contract is one of the questions at issue. The Tokyo District Court has tended to define the relatively narrow scope of a labor contract by requiring firms to reallocate workers only within an affiliated company and not across all related companies (Saitoh v. Chase Manhattan Bank, 609 Rodo Hanrei 63, Tokyo D. Ct. Feb. 27, 1992). Another issue is the legitimacy of hiring new workers immediately before or after the adjustment dismissal. The case of Uenishi v. Meiji Shoin (779 Rodo Hanrei 27, Tokyo D. Ct. Jan. 12, 2000) recognized the legitimacy of the second prerequisite; however, despite this, firms hired new employees around the time of the adjustment dismissals. This was considered to be a radical judgment for relaxing employment protection (Ukai 2001).

particular, we employ the index constructed in Okudaira (2008), which represents the regional dispersion in court leniency toward employment protection.[13]

Before we describe our methodology, it will be useful to lay out a brief summary of the Japanese judicial system. First, all litigations are bench trials in Japan, and, with the exception of serious criminal cases, they have no juries. Judges decide questions of fact in addition to questions of law (Ramseyer and Rasmusen 2003). Second, Japan employs a three-instance trial system, and parties usually have three opportunities to contest their case in courts—the District Court at each prefecture, High Court at each regional block, and Supreme Court as a final stage (see Appendix in Okudaira (2008) for more details). Finally, Japan is a country with a low frequency of litigation. In 1998, approximately 3,000 new labour-related cases were filed in Japan; in Germany, new cases numbered 600,000 (Araki 2002). However, this fact does not devaluate the significance or impact of litigation in establishing the case law. In fact, the accumulation of precedents has often led to the enactment of case law by the central government (see footnote 5 and 6 in Okudaira (2008)).

III. Methodology

Baseline model

[13] See The Index for Employment Protection Section below for details.

Our specification follows an ordinary least squares (OLS) model with some covariates to adjust for observable differences in firm, industry, prefecture, and year characteristics. Let Y denote output variable and CD denote a variable that indicates the strictness of employment protection; let subscript *i* refer to a firm, *j* refer to an industry, *p* refer to a prefecture, and *t* refer to a year. An OLS regression model is presented in equation (1):

$$\ln Y_{ijpt+1} - \ln Y_{ijpt} = \alpha + \beta_1 CD_{pt} + x'_{pt}\,\beta_2 + y'_{it}\,\beta_3 + \beta_4 z_{jt} + \beta_5 v_t + \varepsilon_{ijpt} \qquad (1)$$

We take a log difference in the output variable (e.g., productivity), assuming that it takes one year for firms and their attorneys to recognize a judicial change in firing restrictions. Prefecture (*x*), industry (*z*), firm (*y*), and year (*t*) characteristics are controlled in order to account for the possible correlation between the employment protection and observable attributes.[14]

Data

In order to measure output variable (Y) in equation (1), we draw on *the Basic Survey of Japanese*

[14] The specification of our model relies on those from Autor, Kerr, and Kugler (2007) and Fukao et al. (2006).

Business Structure and Activities (the Basic Firm Survey) annual files for the years 1994 to 2002 to calculate total factor productivity (TFP). The Basic Firm Survey is a census that covers all firms in the manufacturing, commercial, and mining sector with 50 or more employees and at least 30 million yen in start-up capital. It stands out from other surveys in that it comprises details regarding firms' financial and personnel information.[15]

In this study, we use the approach established by Good et al. (1997) for computing TFP. In many applications, a TFP index is often constructed as the difference between log output and log input indices; however, this approach, has severe limitations. With panel data, there is no way to chain output and input indices over time and get comparisons between firms in the cross section. Caves et al. (1982) address this issue by making comparison in cross sections and construct TFP for a hypothetical firm whose subcomponent cost shares are the arithmetic mean cost shares for all firms ($\overline{S}_{tf}$), and whose subcomponent quantities are the geometric means of the subcomponent quantities across all firms ($\overline{X}_{tf}$) in the same industry. Comparisons of individual firms are made relative to this hypothetical firm or to the industry mean. Good et al. (1997) then chain the hypothetical firms together over time to solve the problem in the panel data analysis. Following Good et al. (1997), we compute a TFP index, called the *multilateral TFP index*. In this approach, different hypothetical firms reference points are constructed for each cross section, and then the hypothetical firms are

[15] The Basic Firm Survey is conducted by the Ministiry of Economy, Trade, and Industry (METI) of the Japanese government. This dataset is often used in published studies (e.g., Kawaguchi, 2007; Morikawa, 2010).

linked together over time. This type of multilateral index has the advantage of providing measures either from year to year or from a sequence of years.

Let Q_{it} denote the output of firm *i* in year *t*, S_{itf} denote the cost share of input factor *f* for firm *i* in year *t*, and X_{itf} denote firm *i*'s input factor *f* in year *t*. Our measure of TFP level is defined as follows:

$$\ln TFP_{it} = (\ln Q_{it} - \ln \overline{Q}_t) - \sum_{f=1}^{n} \frac{1}{2}(S_{itf} + \overline{S}_{tf})(\ln X_{itf} - \ln \overline{X}_{tf}) + \sum_{s=1}^{t} (\ln \overline{Q}_s - \ln \overline{Q}_{s-1}) - \sum_{s=1}^{t} \sum_{f=1}^{n} \frac{1}{2}(\overline{S}_{sf} + \overline{S}_{s-1f})(\ln \overline{X}_{sf} - \ln \overline{X}_{s-1f}) \quad (2)$$

where variables with an upper bar indicate the industry average of that variable. The first two terms represent a cross-sectional comparison in TFP level between firm *i* and a hypothetical firm or industry mean. The last two terms sum the changes in output or input level of hypothetical firms in the past. By accumulating the terms, we are comparing a firm *i*'s TFP level in a specific year with that of the hypothetical firm in the same industry in the base year. A detailed description of TFP construction is provided in the Appendix.

To purge firm attributes, this paper adds control variables taken from the abundant firm information available in the Basic Firm Survey rather than adding firm-specific effects to equation (1). These control variables include capital-to-asset ratio, firm age, the portion of workers who are

female, and the ratio of researchers in total employment, among others. Appendix Table presents a list of control variables used in the estimation. Table 2 provides summary statistics.

The index for employment protection

To represent CD in equation (1), we use the EPL index proposed by Okudaira (2008), where the enforcement level of employment protection in each prefecture is quantified from the precedent reports. This index captures the relative stringency of employment protection enforced by district courts in the region. The main data source was obtained by searching for the keywords "adjustment dismissal (*Seiri Kaiko*)" in the Judicial Information System (JIS) to identify reports where plaintiff worker(s) claimed the defendant firm engaged in adjustment dismissals wrongfully. The JIS is an ideal data source, because it does not contain all the litigation filed in the courts but contains all the *publically released* reports that are likely to influence agents' decisions. The sample period ranges from January 1950 to December 2001, which sums up to a total of 260 adjustment dismissal cases.[16]

For the purpose of quantitative analysis, Okudaira (2008) assigned one of the three values to each case according to a simple rule: the case was assigned -1 if plaintiff workers lost the case, 1 if a defendant firm was charged with illegitimate or abusive dismissal, and 0 if the defendant firm won

[16] The original data source is taken from Ohtake (2004) (Okudaira 2008).

the case but a plaintiff worker also obtained some compensation. Then, these coded cases were allocated to each prefecture if it is held at the District Courts, to all prefectures under the jurisdiction if it is held at the High Courts, and to every prefecture if it is held at the Supreme Court. A zero is assigned if a prefecture observes no judgments in adjustment dismissals in a given year. In years with multiple judgments, Okudaira (2008) sums up to obtain the total values of precedents and transforms them into an indicator of the general direction of change---a plus one is assigned if the total value is positive, and a minus one is assigned if the total value is negative. This creates prefecture-level panel data indicating the direction of judgment from 1950 to 2001.

As a final step, the judgment indicators are accumulated over time in each prefecture, beginning from 1950.[17] Since all prefectures have the same starting point, the accumulated judgment indicators represent the overall direction of judgments made in the past. Okudaira (2008) defines this accumulated variable as *CourtDecision*, and we use this variable as CD in equation (1). Since it is mandatory for plaintiff workers to bring their case to a lower court in the region where defendant firms reside, *CourtDecision* represents the accumulated information of agents regarding judicial environments specific to each prefecture.[18] A positive value of this variable implies that courts have

[17] There are obvious reasons why the accumulation commences in 1950. Firstly, the Allied High Command introduced a new set of labor regulations between 1945 and 1947, immediately after the Second World War. The second reason is more obvious: JIS has few adjustment dismissal cases filed prior to 1950.

[18] While the variable construction procedure in Okudaira (2008) is rather similar to the one in Besley and Burgess (2004), Okudaira (2008) has an implicit but important modification. In the Indian case of Besley and Burgess (2004), they accumulated state-specific amendments to the Indian Industrial Relations Act, a written law. The amendment persists within the state forever unless it is abolished. On the other hand, *CourtDecision* represents the accumulated information of agents regarding judicial environments, including judicial decision standards or judges' discretion exercised thus far within a prefecture.

been likely to deem adjustment dismissals illegitimate, or make pro-worker decisions in the past. If the estimated coefficient β_1 is negative, it indicates that the strict employment protection proposed by courts reduce the productivity growth rate, given that CD correctly measures the regional differences in judicial standards. Figure 1 presents a graph of the accumulated direction of judgments (*CourtDecision*) for each prefecture. Note that *CourtDecision* is constructed under several strict assumptions and indicates only one among economic agents' many possible perceptions about the judicial environment. To examine the sensitivity of our estimates against different definitions of CD, robustness checks explained below construct the alternative variable by relaxing this assumption.

Remarks in identification

We have two major concerns in causally identifying β_1 in equation (1). First, since judgments reflect social and economic conditions in local areas, the endogeneity is a serious issue. Ichino et al. (2003) analyzed a detailed dataset pertaining to an Italian bank to show that judges indeed express unbalanced leniency toward workers in judgments when the local labour market is in a depression. If judges are sympathetic toward workers, and if pro-worker judgments do increase firing costs, two equilibriums may arise: 1) a high employment rate and pro-employer judgments, and 2) a low

employment rate and pro-worker judgments (Ichino et al. 2003). It is possible that, as in the Italian case, the large divergence in *CourtDecision* between Tokyo and Osaka indicates that reverse causation is also at work in Japan, generating the multiple equilibriums.[19] Similarly, it is possible that a firm's location decision is endogenous. If firms with high productivity growth rate tend to relocate to prefectures with courts that rule favourably toward firms, the estimated coefficient for CD would not represent the true causal relationship.

To overcome the endogeneity problem, Okudaira (2008) made use of triennial judge-transfers, which is shown to be orthogonal to the local labour market condition. The variation obtained from random moves of judges among prefectures should identify the exogenous change in firing restrictions. She estimated judge-specific effects from litigation records, and instrumented them to the direction of judgment (*CourtDecision* in this paper) in the original prefecture-level panel model, providing the causal effect of employment protection on the employment rate.

Unfortunately, this method requires a sample period long enough to obtain the variations generated by judge transfers in the first stage estimations. Since our firm data only covers 1994 to 2002, judge-specific effects are too weak to instrument in our firm productivity analysis[20]. Instead of instrumenting the judge-specific effects to *CourtDecision*, we take advantage of the firm-level structure of our dataset and overcome the endogeneity problem simply by adding some controls that

[19] Table 1 and Figure 1 in Okudaira (2008) exhibit this possibility.
[20] Okudaira (2008) shows the OLS results remain the same even in the IV estimations.

proxy prefecture-level economic conditions. Specifically, we control the prefecture-level jobs-to-applicants ratio and the level of uncertainty in prefecture real gross production in equation (1).[21] We also conducted a robustness check by restricting our sample to firms that did not relocate their headquarters to other prefectures during the period 1994–2002. We further restricted our sample to firms in Tokyo or Osaka prefectures, where a notable change in the variable *CourtDecision* is evident. This method allows us to ignore variations in productivity growth that arise from endogeneity in firms' decisions to relocate because of a shift in judicial attitude, at least during our sample period.[22]

Our second concern stems from the limitations of our dataset. The Basic Firm Survey is a firm-level survey and not an establishment-level one. Some firms have branch offices in a prefecture other than the one in which their headquarters is located, and it is possible that court decisions made in several prefectures may simultaneously affect a firm's optimization behaviour. Unfortunately, the survey does not allow us to identify the prefectures where firms' branch offices are located, though we do have information on firm headquarters location in our dataset. Because plaintiff workers are supposed to bring their cases to the district court where the defendant firm resides, this limitation

[21] The level of uncertainty in prefecture real gross production is estimated by running a rolling regression of AR(1) with a ten-year sample window for each prefecture:

$$\Delta \ln q_t = c_0 + c_1 \Delta \ln q_{t-1} + u_t$$

where q_t indicates real gross prefecture production. The level of uncertainty is defined as the standard error of the regression above. This method is followed by Ghosal and Loungani (1996) and Ogawa and Suzuki (2000).

[22] Unfortunately, our data contain no information about firms' locations prior to our sample period. Thus, we cannot rule out endogeneity in firms' decisions to enter or shift locations prior to 1994.

inevitably forces us to impose a strong assumption about the firms' employment decision: firms make all the personnel decision at their headquarters and these decisions are never affected by court decisions in the other prefectures. We relax this assumption later in section IV, although our results remain the same in most cases.

IV. Results

Main results

Column 1 of Table 3 presents the baseline estimation in equation (1). Results reveal that strict enforcement of employment protection by courts, or pro-worker judgments, significantly reduce TFP growth rate on average after conditioning on the covariates. Columns 2 through 5 examine the same hypothesis in different specifications, by dropping some explanatory variables or by dividing our sample to subgroups. All the estimations preserve the baseline result with a slight difference in the magnitude in *CourtDecision* impacts. For example, column 2 presents a slightly larger negative impact of *CourtDecision* on TFP growth than the one in column 1, which may indicate that innovative investments are reduced due to the judgments lenient to workers. Similarly, column 3

shows an estimate that excludes the part-time workers that are included in column 1; it provides a coarse test to examine the existence of substitution effect from full-time to part-time workers (Autor 2003). Since the magnitude of coefficients in *CourtDecision* remains almost the same, judgments lenient to workers do not significantly result in full-time workers being substituted for part-time workers. Columns 4 and 5 show that the effect of *CourtDecision* remains, even when we divide our sample by industry.

Table 4 provides estimation results when the dependent variable is replaced by the capital-labour ratio (Column 1), labour productivity (Column 2), or the amount of investment (Column 3). The first column tests whether an increase in labour costs induces a substitution of capital. There is no significant evidence of capital deepening (p-value = 0.258). Since capital stock possibly evolves slowly over time, we also examined the impact on change in investment in Column 3.[23] Interestingly, CD demonstrates a significant *negative* impact. Because an increase in labour costs could induce both a substitution of capital (substitution effect) and an increase in overall marginal cost, thereby reducing the production level (scale effect), this result implies a negative scale effect on capital in the Japanese case. In addition, this result contrasts with those reported by Autor, Kerr, and Kugler (2007), who found a significant positive effect on investment. Finally, the second column checks the impact of strict employment protection on labour productivity. We

[23] In order to account for the firm size, we also conducted the similar analysis for the change in investment-sales ratio (I/Y), and obtained the same results. Estimation table is available upon request.

consistently found that a court decision favouring workers significantly reduces overall growth in overall labour productivity.

Robustness checks

This section conducts three types of robustness tests. First, as discussed in section III, we have imposed a strong assumption that headquarters make all personnel decisions even for those branch offices located in different prefectures. To relax this assumption, we restricted our sample to firms whose management functions are likely to be centralized at the corporate headquarters. In particular, we limited our sample in two ways: first, to firms with a higher proportion of employees working at their headquarters; and second, to firms with a lower proportion of part-time workers. The second method relies on a conjecture that central management is involved in employment decisions concerning full-time workers while branch offices directly hire part-time workers from the local labour market.

Table 5 presents the results from the robustness checks. Each cell provides the estimated coefficient from a separate regression. Panel A replicates baseline results from tables 3 and 4. Comparing panel A with panels B and C, we find that our baseline results are quite robust to relaxing the assumption, except that we obtained several insignificant estimates for the investment model in

Column 4. Judgments favouring workers significantly reduce the growth rate of TFP and labour productivity, while no clear capital replacement effect is observed. It is also unclear whether an increase in labour costs induces a negative scale effect on capital.

Note that this robustness check may induce a sample selection bias, since firm productivity can correlate with composition of workers. For example, if firms with a lower proportion of part-time workers were those with potential projects that were more likely to be constrained by strict firing restrictions, then the negative estimates for *CourtDecision* would be merely spurious. Although our estimates are similar in magnitude to the baseline estimates, indicating that the sample selection is not serious in our case, the results should be handled with caution.

The second robustness test examines the sensitivity of our estimates under differing definitions for CD in equation (1). By construction, C*ourtDecision* assumes that firms recognize all the precedents in the JIS and that there is no depreciation in their memory. Obviously, these are strong assumption. Firms may not necessarily be aware of all past precedents or previous judicial climates and may omit older precedents from their information set with the passage of time. After all, the definition of the information sets of agents is an open-ended question. To mitigate this concern, we performed robustness checks by dropping precedent reports from our sample after three years. In particular, let *W* denote the number of judicial decisions favouring workers in adjustment dismissal litigations, and let *EM* denote judicial decisions favouring employers. Let R denote the worker

victory ratio. Then, the worker victory ratio of prefecture *p* in year *t* with the precedents in the last 3 years is calculated by

$$R^3_{pt} = \frac{\sum_{i=t-3}^{t} W_{pi}}{\sum_{i=t-3}^{t} W_{pi} + \sum_{i=t-3}^{t} EM_{pi}} \text{ , if } \sum_{i=t-3}^{t} W_{pi} + \sum_{i=t-3}^{t} EM_{pi} > 0$$

$$= 0.5 \text{ , otherwise.} \qquad (3)$$

Note that in some prefectures, in particular years, no adjustment dismissal litigations are reported in the JIS database, and 0.5 is assigned in such cases. Panel C in Table 2 presents summary statistics for this new variable.

Panel A in Table 6 presents the estimation results using R^3_{pt} instead of CD in equation (1). We found that our conclusion was valid even after we relaxed the previous assumption. In particular, an increase of 10 percentage points in the worker victory ratio significantly decreases the TFP growth rate by approximately 0.2%, while it significantly decreases the growth rate in labour productivity by 0.4%. Interestingly, we obtained a moderately significant positive effect for workers' judicial victories on the growth rate in capital deepening in Column 2, while we obtained a significant negative effect on the change in the investment-sales ratio in Column 4. These results imply that the increase in labour costs has engendered both positive substitution and scale effects on capital inputs. Because our results are not sensitive to the alternative definition of CD, we conclude that the validity

of our baseline conclusion survives the robustness tests.

Our last robustness test examines the robustness of our result against endogeneity in a firm's location decisions. In particular, we restrict our sample in two ways: by excluding firms that relocated their headquarters to other prefectures at least once during the sample period and by limiting firms to those in Tokyo or Osaka only. Results are shown in Panel B of Table 6. In all the specifications, we obtained fairly significant and consistent estimates, which support the robustness of our baseline models.

V. Conclusion

Recent developments in EPL literature have revealed that changing the stringency of employment protection can lead to extensive consequence outside of the labour market, by creating a wedge or distorting the commitment mechanism in the employment contract. This paper aims to empirically evaluate this comprehensive effect of EPL in Japan, focusing on firm productivity. We draw on the firm survey and estimate the impacts on our productivity measure by using the prefecture-level variations in the enforcement level of the doctrine of four prerequisites. The employment protection index is taken from Okudaira (2008).

Our results are similar to the previous findings. We found that the one unit change in *CourtDecision* or a judgment lenient to workers significantly reduces the growth rate in total factor productivity as well as labour productivity of a firm, given the covariates fixed. We observed no clear effect on capital, but we obtained modest evidence that an increase in firing costs induces a negative scale effect. These results are robust to some conservative estimations where we restrict our observations to firms whose management functions are likely to be centralized at their headquarters. Our results suggest that the effect of employment protection is ubiquitous in Japan, even outside of labour markets. Policy makers should be cautious with this influential impact of court discretion regarding the EPL in revising the laws.

Appendix: Construction of the TFP

We define the productivity level of firm *i* in year *t* in a certain industry in comparison with the productivity level of a hypothetical representative firm in base year 0 in that industry.[24] Let Q_{it} denote the output of firm *i* in year *t*, S_{itf} denote the cost share of input factor *f* for firm *i* in year *t*, and X_{itf} denote firm *i*'s input factor *f* in year *t*. Our measure of TFP level is defined as follows:

[24] The instruction in this section is adapted from Fukao et al. (2006).

$$\ln TFP_{it} = (\ln Q_{it} - \ln \overline{Q}_t) - \sum_{f=1}^{n} \frac{1}{2}(S_{itf} + \overline{S}_{tf})(\ln X_{itf} - \ln \overline{X}_{tf})$$
$$+ \sum_{s=1}^{t} (\ln Q_s - \ln \overline{Q}_{s-1}) - \sum_{s=1}^{t} \sum_{f=1}^{n} \frac{1}{2}(S_{sf} + \overline{S}_{s-1f})(\ln \overline{X}_{sf} - \ln \overline{X}_{s-1f}) \quad (2)$$

where variables with an upper bar indicate the industry average of that variable. The first two terms measure a firm's TFP level as a comparison with that for a hypothetical firm, and the last two terms indicate the industry-specific augmentation of TFP level from the base year.

Output (*Q*): Except for the commercial sector, gross output is defined as firms' total sales. For the commerce sector, gross output is measured as sales minus expenses for purchased materials. Gross output is deflated by the output deflator derived from the JIP 2006 (Japan Industrial Productivity Database).[25]

Intermediate inputs (*X*): For the commerce sector, intermediate inputs are calculated as (Cost of sales + Operating costs) - (Wages + Depreciation costs + Expenses for purchased materials). The intermediate inputs of other sectors are defined as (Cost of sales + Operating costs) - (Wages + Depreciation costs). Intermediate inputs are deflated by the intermediate input deflator provided in the JIP 2006.

Labour Input (*X*): As with labour input, we used each firm's total number of workers multiplied by

[25] English instruction is available at http://www.rieti.go.jp/en/database/d05.html.

the sectoral working hours from the JIP 2006.

Capital Stock (*X*): For capital stock, the only data available are the nominal book values of tangible fixed assets. Using these data, we calculated the net capital stock of firm *i* in industry *j* in constant 1995 prices as follows:

$$K_{it} = BV_{it} * (INK_{jt} / IBV_{jt})$$

where BV_{it} represents the book value of firm *i*'s tangible fixed capital in year *t*, INK_{jt} stands for the net capital stock of industry *j* in constant 1995 prices, and IBV_{jt} denotes the book value of industry *j*'s capital. INK_{jt} was calculated as follows. First, as a benchmark, we took the data on the book value of tangible fixed assets in 1975 from the Financial Statements Statistics of Corporations published by Ministry of Finance. We then converted the book value of year 1975 into the real value in constant 1995 prices using the investment deflator provided in the JIP 2006. Second, the net capital stock of industry *j*, INK_{jt}, for succeeding years was calculated using the perpetual inventory method. We used the investment deflator in the JIP 2006. The sectoral depreciation rate used is taken from the JIP 2006.

Cost Shares (*S*): The total cost of labour is measured as total wages. We used nominal intermediate input as the intermediate input cost. Capital cost was calculated by multiplying the real net capital

stock by the user cost of capital. The latter was estimated as follows:

$$c_k = \frac{1-z}{1-u} p_k \left\{ \lambda r + (1-u)(1-\lambda) i + \delta_i - \left(\frac{\dot{p}_k}{p_k} \right) \right\}$$

where p_k is the price of investment goods, i is the interest rate, δ is the depreciation rate, u is the corporate tax rate, λ is the equity ratio, and z is the present value of depreciation deduction on a unit of nominal investment. Data on the prices of investment goods, interest rates, and corporate tax rates were taken from the JIP 2006, the Bank of Japan's website, and the Ministry of Finance Statistics Monthly, respectively. The depreciation rate for each sector was taken from the JIP 2006. We calculated the cost shares of each factor by dividing the cost of each factor by total costs, which consist of the sum of labour costs, intermediate inputs costs, and capital costs.

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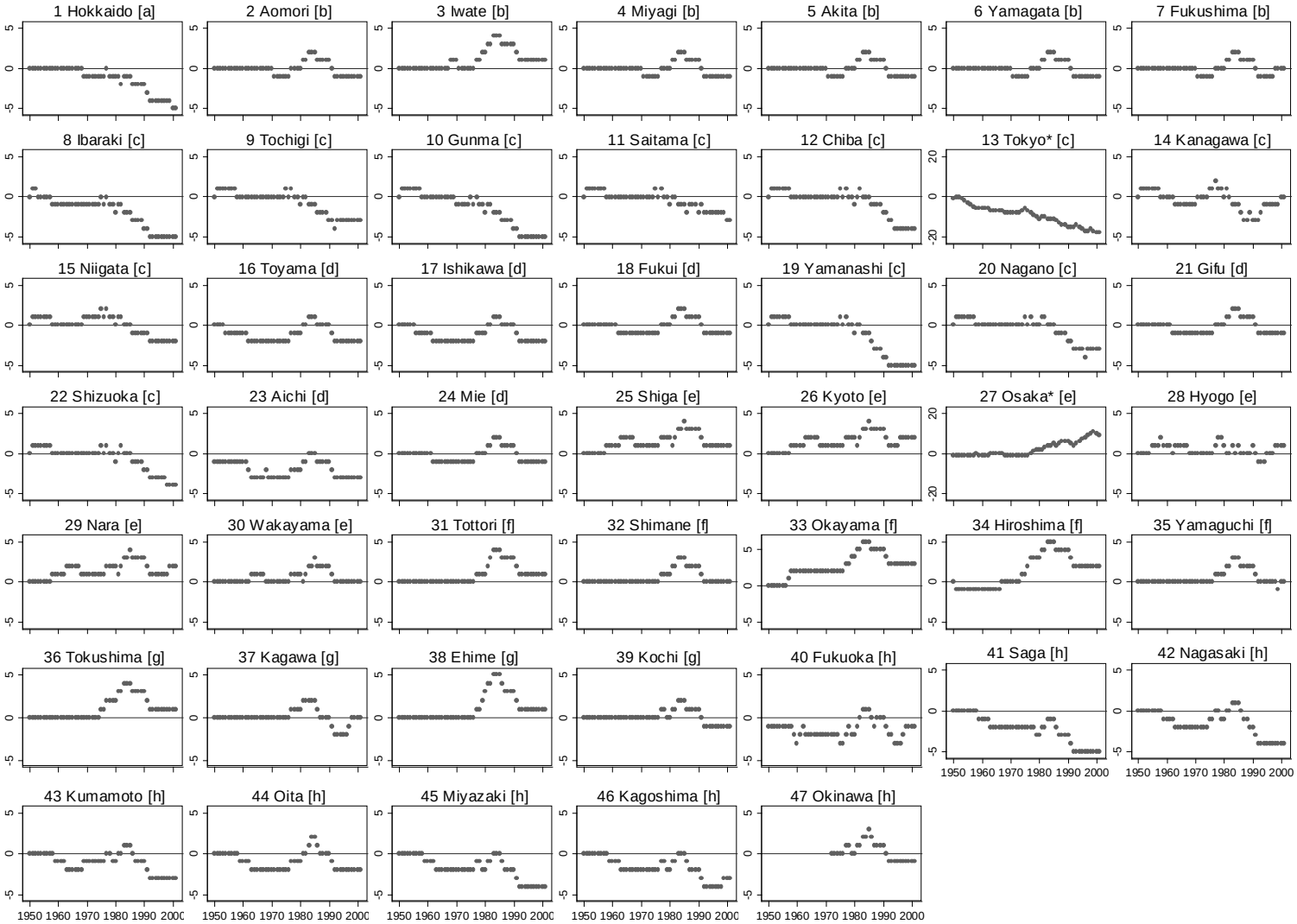

Fig.1. *Direction of Accumulated Judgments (Court Decisions) by Prefecture*

Source: Okudaira (2008) Figure 2.

Note: Tokyo (No.13) and Osaka (No.27) account for 48% of the total cases, and different vertical scales are used for those two prefectures. Letters in brackets denotes High Court jurisdiction: [a] under Hokkaido (Sapporo) H.C., [b] under Miyagi (Sendai) H.C., [c] under Tokyo H.C., [d] under Aichi (Nagoya) H.C., [e] under Osaka H.C., [f] under Hiroshima H.C., [g] under Kagawa (Takamatsu) H.C., and [h] under Fukuoka H.C.

Table 1. ***Worker Victory Ratio for Adjustment Dismissal Litigations***

year	**1950-2000**	1950-60	1961-70	1971-80	1981-90	1991-2000
Tokyo High and District Court	**0.30**	0.20	0.00	0.38	0.10	0.40
Osaka High and District Court	**0.80**	0.50	0.50	0.86	0.88	0.82
All High and District Courts	**0.52**	0.28	0.39	0.58	0.52	0.61

Source: Table 1, Okudaira (2008). Original data source comes from *Judicial Information System* (Hanrei Taikei).

Note: The worker victory ratio is calculated by dividing the number court cases that were decided in favor of workers by the total number of court cases. The sample is limited to litigation that involves adjustment dismissals. The original dataset has been taken from Ohtake (2004). The third row shows the victory ratio for every high and district court of all 47 prefectures, including Tokyo and Osaka Prefecture.

Table 2. ***Summary Statistics***

A. Firm Characteristics	No. of Observations	Standard Deviation	Min.	Mean	Max.
log TFP	58277	0.21	-5.6	0.0	4.0
log capital-deepening （K/L)	58277	1.31	-6.9	1.5	7.3
log labor productivity (Y/L)	58277	0.82	-0.8	3.5	9.1
ROA	58277	0.08	-9.3	0.0	4.0
Log (total employmees)	58277	1.00	3.9	5.3	11.3
Firm age	58277	15.77	0	37.22	114
Proportion of female employees	58277	0.20	0	0.31	0.999
R&D intensity	58277	0.03	0	0.01	2.23
Proportion of employees in research division	58277	0.03	0	0.01	0.67
Number of patents	58277	773.29	0	50.01	58262
Export intensity	58277	0.08	0	0.02	1
Cost-asset ratio	58277	2.02	0.03	1.63	346.38
Wage-asset ratio	58277	0.22	0.00	0.24	4.64
Sales growth rate	58277	0.17	-5.85	-0.03	5.68
Capital-asset ratio	58277	0.27	-7.10	0.27	0.98
Proportion of part-time employees	58277	0.18	0	0.11	1.00
Proportion of employees in a headquarter	58277	0.35	0	0.53	1.00
Log (investment)	47118	2.03	0.0	4.60	12.9
B. Industry Characteristics					
Herfindahl-Hirschman index	1229	2644.36	38.27	2023.40	10000
C. Prefecture Characteristics					
Court Decision	423	3.33	-18	-1.57	11
Ratio of worker victory in the last 3 years	423	0.29	0	0.39	1
Leftist governor	423	0.18	0	0.03	1
Governor from Ministry of Internal Affairs and Communications (MIAC)	423	0.44	0	0.25	1
Log public investment per capita, 2000 price	423	0.31	11.7	12.7	13.4
Jobs-to-applicants ratio	423	0.24	0.2	0.7	1.4
Unionization index	423	0.03	0.1	0.2	0.3
Uncertainty in real gross product	423	0.0049	0.0042	0.0142	0.0295
D. Common Characteristics					
Diffusion index	9	26.27	11.0	55.9	76.9

Note. This table lists the control variables used in the estimation equation (1).

Table 3. ***The Impact of Pro-Worker Court Decision on TFP***

	lnTFP[t+1] - lnTFP[t]				
	(1)	(2)	(3)	(4) Manufacturing Only	(5) Wholesale and Retail Only
CourtDecision	-0.0005 ***	-0.0006 ***	-0.0005 ***	-0.0004 *	-0.0005 **
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0024)
Capital-asset ratio	0.0154 ***	0.0125 ***	0.0168 ***	0.0136 ***	0.0151 ***
	(0.0039)	(0.0046)	(0.0037)	(0.0026)	(0.0038)
lnTFP[t]	-0.3440 ***	-0.3665 ***	-0.3407 ***	-0.2287 ***	-0.3900 ***
	(0.0112)	(0.0094)	(0.0113)	(0.0110)	(0.0150)
ROA	-0.0652 *	-0.0604	-0.0662 *	-0.0791 ***	-0.1036
	(0.0364)	(0.0411)	(0.0371)	(0.0228)	(0.1073)
Log (total employmees)	0.0053 ***	0.0041 **	0.0030 *	0.0091 ***	-0.0010
	(0.0018)	(0.0017)	(0.0016)	(0.0011)	(0.0036)
Firm age	-0.0004 ***	-0.0003 ***	-0.0003 ***	-0.0005 ***	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0002)
Proportion of female employees	-0.0559 ***	-0.0697 ***	-0.0933 ***	-0.0054	-0.1367 ***
	(0.0050)	(0.0048)	(0.0052)	(0.0042)	(0.0240)
Proportion of part-time employees	-0.0731 ***	-0.0969 ***		-0.0480 ***	-0.0743 ***
	(0.0062)	(0.0068)		(0.0042)	(0.0110)
R&D intensity	0.0684 ***		0.0809 ***	0.1400 ***	0.0322
	(0.0174)		(0.0186)	(0.0198)	(0.1833)
Proportion of employees in research division	-0.0241		-0.0110	-0.0056	-0.0826
	(0.0169)		(0.0164)	(0.0156)	(0.0497)
Number of patents	-0.0000005		-0.0000001	-0.0000011 ***	-0.0000024
	(>0.000)		(>0.000)	(>0.000)	(>0.000)
Export intensity	0.0242 **	0.0233 *	0.0297 **	0.0186 ***	0.0767 ***
	(0.0118)	(0.0124)	(0.0116)	(0.0057)	(0.0218)
Cost-asset ratio	0.0015 **	0.0014 **	0.0013 ***	0.0068 ***	-0.0018
	(0.0006)	(0.0006)	(0.0004)	(0.0011)	(0.0014)
Wage-asset ratio	-0.0250 ***	-0.0201 ***	-0.0270 ***	-0.0265 ***	0.0016
	(0.0058)	(0.0064)	(0.0047)	(0.0047)	(0.0056)
Sales growth rate	-0.0198 ***	-0.0173 ***	-0.0219 ***	-0.0307 ***	0.0243
	(0.0059)	(0.0049)	(0.0058)	(0.0045)	(0.0017)
Adjusted R-sq.	0.1604	0.1795	0.1607	0.1445	0.1799
No. of observations	58277	70089	58277	32292	20887

Note: Robust standard errors are given in paretheses. All estimation except column (5) controls for prefecture characteristics (log public investment, indicator variables for leftist governor, and governor from Ministry of Internal Affairs and Communications, unionization index, jobs-to-applicants ratio, uncertainty in gross product), diffusion index, and Herfindahl-Hirschman index. Column (5) controls for the same set of control variables except uncertainty in gross product, jobs-to-applicants ratio and diffusion index. "Wholesale and Retail Trade" sector includes drinking and eating places.

*** Significant at the 1 % level (two-tailed test).

** Idem., 5%.

* Idem., 10%.

Table 4. ***The Impact of Pro-Worker Court Decision on Capital and Labour Productivity***

	(1) ln(K/L)[t+1] -ln(K/L)[t]	(2) ln(Y/L)[t+1] -ln(Y/L)[t]	(3) ln(I)[t+1] −ln(I)[t]
CourtDecision	0.0002	-0.0009 **	-0.0048 ***
	(0.0001)	(0.0003)	(0.0010)
Capital-asset ratio	0.0077	-0.0148 ***	0.1767 ***
	(0.0067)	(0.0040)	(0.0512)
ln(K/L)[t]	-0.0360 ***		
	(0.0017)		
ln(I)[t]			-0.4596 ***
			(0.0110)
ln(Y/L)[t]		-0.0369 ***	
		(0.0047)	
ROA	0.0117	-0.0574 **	1.0632 **
	(0.0219)	(0.0267)	(0.4728)
Log (total employmees)	0.0153 ***	0.0183 ***	0.6019 ***
	(0.0012)	(0.0015)	(0.0161)
Firm age	0.0007 ***	-0.0003 ***	-0.0016 ***
	(0.0001)	(0.0001)	(0.0006)
Proportion of female employees	0.0008	-0.0109	-0.5002 ***
	(0.0149)	(0.0067)	(0.0438)
Proportion of part-time employees	-0.0484 ***	-0.0393 ***	-0.1712 ***
	(0.0131)	(0.0103)	(0.0499)
R&D intensity	0.1587 *	0.0540	1.1431 ***
	(0.0838)	(0.0451)	(0.3835)
Proportion of employees in research division	0.0935 ***	0.0786 ***	1.1099 ***
	(0.0236)	(0.0185)	(0.1506)
Number of patents	-0.0000041 ***	-0.0000021 ***	0.0000015
	(>0.000)	(>0.000)	(0.000003)
Export Intensity	0.0464 ***	0.0441 ***	0.1638 **
	(0.0166)	(0.0119)	(0.0615)
Cost-asset ratio	-0.0028 **	-0.0005	-0.0375 ***
	(0.0014)	(0.0019)	(0.0066)
Wage-asset ratio	-0.0538 ***	-0.0315 ***	-0.5919 ***
	(0.0107)	(0.0079)	(0.0391)
Sales growth rate	-0.0381 ***	-0.1462 ***	0.2869 ***
	(0.0106)	(0.0096)	(0.0387)
Adjusted R-sq.	0.0339	0.0688	0.2259
No. of observations	58277	58277	47118

Note: Robust standard errors are given in paretheses. All estimation controls for prefecture characteristics (log public investment, indicator variables for leftist governor, and governor from Ministry of Internal Affairs and Communications, unionization index, jobs-to-applicants ratio, uncertainty in gross product), diffusion index, and Herfindahl-Hirschman index.

*** Significant at the 1 % level (two-tailed test).

** Idem., 5%.

* Idem., 10%.

Table 5. ***Robustness Check: Estimates by Headquarters Size***

	(1)	(2)	(3)		(4)	
	lnTFP[t+1] −lnTFP[t]	ln(K/L)[t+1] −ln(K/L)[t]	ln(Y/L)[t+1] −ln(Y/L)[t]	No. of observations	ln(I)[t+1] −ln(I)[t]	No. of observations
A. Baseline (adapted from tables 3 and 4)						
	-0.0005 ***	0.0002	-0.0009 ***	58277	-0.0048 ***	47118
	(0.0002)	(0.00019)	(0.0003)		(0.0010)	
B. Number of employees in a headquarter/ number of total employees						
> 0.3	-0.0006 ***	0.0002	-0.0010 ***	37759	-0.0020	30077
	(0.0002)	(0.0003)	(0.0003)		(0.0017)	
> 0.5	-0.0006 ***	0.0003	-0.0009 ***	29116	-0.0002	23228
	(0.0002)	(0.0003)	(0.0003)		(0.0021)	
> 0.6	-0.0007 ***	0.0004	-0.0007 **	25342	0.0003	20330
	(0.0002)	(0.0004)	(0.0003)		(0.0019)	
C. Number of part-time employees/ number of total employees						
< 0.075	-0.0006 ***	-0.0001	-0.0011 ***	37295	-0.0050 ***	30529
	(0.0002)	(0.0002)	(0.0004)		(0.0011)	
< 0.05	-0.0006 **	-0.0002	-0.0011 ***	33122	-0.0051 ***	27119
	(0.0002)	(0.0002)	(0.0004)		(0.0011)	
< 0.025	-0.0006 **	-0.0001	-0.0011 ***	27233	-0.0046 ***	22209
	(0.0002)	(0.0002)	(0.0004)		(0.0014)	

Note: Each cell presents the estimated coefficient for Court Decision from a separate regresssion. Robust standard errors are given in paretheses. All estimation controls for the same set of control variables used in baseline specifications in tables 3 and 4, except that we exclude 'proportion of part-time workers' from our list of controls in Panel C.

*** Significant at the 1 % level (two-tailed test).

** Idem., 5%.

* Idem., 10%.

Table 6. ***Robustness Check: Alternative Definition of CourtDecision and Endogeneity in Firm's Location***

	(1)	(2)	(3)		(4)	
	lnTFP[t+1] −lnTFP[t]	ln(K/L)[t+1] −ln(K/L)[t]	ln(Y/L)[t+1] −ln(Y/L)[t]	No. of observations	ln(I)[t+1] −ln(I)[t]	No. of observations
A. Alternative definition						
Ratio of worker victory in the last 3 years	-0.0205 **	0.0171 *	-0.0413 **	58277	-0.0740 *	47118
	(0.0095)	(0.0096)	(0.0163)		(0.0424)	
B. Restricting the sample to firms that did not relocate their headquarters to other prefectures						
I. All	-0.0005 ***	0.0002	-0.0009 ***	55872	-0.0045 ***	44983
	(0.0002)	(0.0002)	(0.0003)		(0.0011)	
II. Tokyo and Osaka only	-0.0023 ***	0.0041 ***	-0.0049 ***	19408	-0.0067 ***	15394
	(>0.000)	(>0.000)	(>0.000)		(>0.000)	

Note: In panel A, each cell presents the estimated coefficient for the ratio of worker victory in the last 3 years from a separate regresssion. In panel B, each cell presents the estimated coefficient for Court Decision from a separate regresssion. Robust standard errors are given in paretheses. All estimation controls for the same set of control variables used in baseline specifications in tables 3 and 4, except that we had to drop leftist governor dummy, MIAC-governor dummy, and unionization index from row II of panel B, due to collinearity.

*** Significant at the 1 % level (two-tailed test).

** Idem., 5%.

* Idem., 10%.

Appendix Table 1. ***Data Source and Variable Construction***

Variable		Source	Construction
Total Factor Productivity	firm-year	Fukao et al. (2006), originally from the Basic Survey on Firm's Activity	See section 3.2 And appendix.
Capital-deepening (K/L)	firm-year	The Basic Survey on Firm's Activity	obtained by dividing capital by annual total labor-hours
Log (Investment)	firm-year	The Basic Survey on Firm's Activity	
Labor Productivity (Y/L)	firm-year	The Basic Survey on Firm's Activity	obtained by dividing total revenue by annual total labor-hours.
ROA	firm-year	The Basic Survey on Firm's Activity	obtained by dividing current profit by total revenue.
Log (total employmees)	firm-year	The Basic Survey on Firm's Activity	
Firm age	firm-year	The Basic Survey on Firm's Activity	
Proportion of female employees	firm-year	The Basic Survey on Firm's Activity	
Proportion of part-time employees	firm-year	The Basic Survey on Firm's Activity	
R&D intensity	firm-year	The Basic Survey on Firm's Activity	obtained by dividing R&D cost by total asset.
Proportion of employees in research division	firm-year	The Basic Survey on Firm's Activity	
Number of patents	firm-year	The Basic Survey on Firm's Activity	
Export intensity	firm-year	The Basic Survey on Firm's Activity	obtained by dividing amont of direct exports by total revenue.
Cost-asset ratio	firm-year	The Basic Survey on Firm's Activity	obtained by dividing total operating cost by total asset.
Wage-asset ratio	firm-year	The Basic Survey on Firm's Activity	obtained by dividing total wage bill by total asset.
Sales growth rate	firm-year	The Basic Survey on Firm's Activity	obtained by taking a log-difference in sales from previous year.
Capital-asset ratio	firm-year	The Basic Survey on Firm's Activity	obtained by dividing total capital bill by total asset.
Herfindahl-Hirschman index	industry-year	The Basic Survey on Firm's Activity	defined as a sum of squares of each firm's sales share(%) in the industry
Court Decision	prefecture-year	Okudaira (2008), originally from Judicial Information System, (*Hanrei Taikei, by Dai Ichi Hoki*)	positive if pro-worker judgments have been accumulated; negative if pro-employer judgments have been accumulated. The original dataset is provided by Ohtake (2004), which contains 260 adjsutment dismissal litigation records from 1950 to 2001. See section 3.3 for a construction of the variable.
Governor from Ministry of Internal Affairs and Communications (MIAC)	prefecture-year	Okudaira (2008), originally from the Biographic Dictionary of Politicians, (*Seijika Jinmei Jiten, by Nichigai Associate*)	equals one if a governer is from MIAC, zero if not.
Leftist governor	prefecture-year	Okudaira (2008), originally from the Biographic Dictionary of Politicians, (*Seijika Jinmei Jiten, by Nichigai Associate*)	equals one if leftist governor, zero if not.
Log public investment per capita, 2000 price	prefecture-year	System of Prefecture Account, Consumer Price Index, Pupulation Estimates	public investment is obtained from prefecture public gross fixed capital formation in "System of Prefecture Account".
Jobs-to-applicants ratio	prefecture-year	Survey on Job Placements (Syokugyo Antei Gyomu Tokei)	excludes new-graduates, but includes part-time jobs. Monthly averages are used in this paper.
Unionization index	prefecture-year	System of Prefecture Account, Basic Survey on Labuor Unions	obtained by dividing number of union members by number of workers (*Shu Gyosha*).
Uncertainty in real gross product	prefecture-year	System of Prefecture Account	obtained by calculating the standard error of regression, which is estimated by a rolling regression of AR(1) model of real gross product. See footnote 15 for an estimation procedure.
Diffusion Index	year	Indexes of Business Conditions	Coincident index is used.