Learning from an Apparent Surprise: When Can Stronger Labor Protection Improve Productivity?

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Preliminary version: Sept 17, 2013

The paper aims to provide some novel insight on the effect of stronger regulation on firm profit and aggregate productivity. While a majority of existing empirical studies suggests that stronger labor protection raises labor costs and reduces firm profit, we start with an apparent puzzle: the adoption of the 2007 Chinese Labor Contract Law appears to have raised the stock prices of more labor intensive firms relative to those of less labor intensive firms. We consider two possible explanations: (a) Stronger enforcement provides firms with a commitment device to treat workers well, which can induce the latter to make more firm-specific investments that are beneficial to firms. (b) If non-compliance of labor protection in a weak enforcement environment is prevalent and especially more likely by smaller and less efficient firms, stronger enforcement may benefit larger and more efficient firms. Our series of evidence supports the second explanation. One implication is that, conditional on having the legal/regulatory requirement, a strong and uniform enforcement can raise overall productivity.

Key words: commitment, compliance, connections, competitiveness

We thank David Autor, Hanming Fang, Ray Fisman, Wouter Dessein, and participants at an NBER Beijng conference for helpful comments, and Dr. Rongru Zheng for arranging interviews with heads of human resources departments of several companies. All errors are our responsibilities.

I. Introduction

Does a stronger enforcement of labor regulation raise returns to capital and improve aggregate productivity? If a majority of the existing empirical studies on the topic is a good guide, the answer should be "no". In this paper, we first present a surprising result from an event study on the stock price response to the passage of the 2007 Chinese Labor Contract Law, which is widely reported as having strengthened the labor rights relative to capital owners and firm managers. The data shows a significant rise in the stock prices of more labor-intensive firms relative to those of less labor-intensive firms. How can this be?

We consider two main possible stories. The first is that stronger regulation provides useful commitment for firms. If firms individually could not credibly commit to treating their workers well in the absence of a strong regulation, and workers under-invest in firm-specific skills in the absence of employer commitment, then a stronger regulation could improve returns to capital by providing firms a commitment device and inducing workers to make firm-specific investment. This story is consistent with the theories of Acemoglu (2001) and of MacLeod and Nakavachara (2007).

The second is a story in which better enforcement disproportionately benefits larger and potentially more productive firms. If evasion of previous labor regulation is not only rampant, but systematically more like to be undertaken by smaller and less efficient firms, then a stronger and more uniform enforcement would disproportionately raise the cost of these smaller firms, then the puzzle can be understood. Larger (and listed) firms were more likely to be in compliance beforehand, and therefore benefit disproportionately from the new law. Hence, their prices rise in return. If larger firms are more efficient on average, the reallocation of resources from previously smaller firms to larger ones can also improve the aggregate productivity.

We investigate a number of data patterns and interpret our evidence as consistent with the second story. We also consider two additional stories (political connection and market power, respectively) that could in principle confound our interpretation, but provide evidence suggesting that they do not overturn our story. We also provide evidence that the aggregate productivity has increased from 2006 (the last year before

the new law) to 2008 (the first year after the law) due to a better alliance between firm level productivity and firm level market shares. This is not to say that any labor regulation always improves efficiency. Rather, conditional on a regulation in place and given the higher likelihood of evasion, a strengthening of the regulation could improve the returns to capital in large firms, and to improve the aggregate productivity by reducing resource misallocation due to systematic non-compliance by less efficient firms. Our paper appears to be the first one that provides empirical evidence for this idea.

The paper is organized in the following way. In Section II, we provide two types of background information. First, we review the relevant literature and highlight the contributions of our paper to the literature. Second, we supply a succinct description of the 2007 Labor Contract Law of China. In Section III, we provide the empirical findings. In the final section, we provide concluding remarks. A set of appendices report a series of extensions and robustness checks, as well as descriptions of the key variables and their sources.

II. Literature Review and Background Information

We discuss two topics in this section. The first is a review of relevant literature. The second is a summary of the background information regarding the 2007 Chinese labor contract law.

2.1 Existing Literature

This paper is related to a literature on the economic consequences of labor market regulation, which is too large to be comprehensively surveyed here. Generally speaking, in theory, the effects of stronger protection on aggregate employment and productivity are expected to be negative. The primary exception is a commitment story to be explained below. In terms of empirical results, the research overwhelmingly reports a negative effect of labor regulation on these outcome variables, although there are some important exceptions.

We start with a review of the theoretical results. Hopenhayn and Rogerson (1993) state that the increased firing cost reduce employment and productivity. In comparison, the model of Bentolila and Bertola (1990) predicts a nuanced result from a higher firing cost: it reduces hiring in good times (as marginal cost of hiring goes up), but

may reduce firing in bad times (as shedding workers is more costly). While these papers do not directly study the effects of labor laws on returns to capital or firm profit, the effects are presumably negative in both good and bad times.

Acemoglu (2001) develops a search-based model in which higher minimum wages or unemployment benefits can induce firms to create more high-wage jobs (instead of low-wage jobs), therefore increase average labor productivity (due to a shift in the composition of jobs). In this setting, a well-enforced labor regulation serves as a commitment device for firms, inducing them to shift from an equilibrium in which not enough high-wage jobs are created to one in which more high-wage jobs are created. As firms and workers share the rent associated with any increase in productivity, both can benefit from such a law. This theory has the potential to explain the apparent puzzle we report below. As all employers are ex ante identical, the theory does not have predictions on which subset of firms will benefit more in relative terms.

MacLeod and Nakavachara (2007) motivate their theory by a review of several court cases on labor disputes in the United States involving employment terminations. They interpret the court cases as suggesting labor regulations can address egregious mistreatment of workers. They build a model in which relationship specific investment is important (as well as firms' screening of workers). In the model, imposing restrictions on employer's ability to dismiss workers can induce workers to make more firm-specific investment. The model does assume that firms cannot compensate workers for making firm-specific investments. They report some evidence that, across US states, enactments of implied contract exceptions or good will exceptions to the norm of employment-at-will are associated with an increase in the employment of those workers in occupations that may require high investment. While the paper does not directly study effect on returns to capital, one may presume that returns to capital in firms that hire many workers that need to make firm-specific investments also rise. As the authors acknowledge, the nature of their panel data does not allow them to go from correlation to causality.

As we will see, we will argue that the most likely explanation of our puzzle is that stronger enforcement corrects previous non-random evasion of the regulation by less efficient small firms. As a result, stronger enforcement leads to reallocation from less to more efficient firms, leading to an increase in the aggregate productivity. This explanation is different from any of these theoretical models.

We now review empirical results. Cross country evidence provided by Botero et al.

(2004) report evidence that stronger labor regulations in terms of employment protection, collective bargaining, and social security are associated with lower labor force participation and higher unemployment rates.

Similar evidence is reported across states in the United States. Holmes (1998) finds that those US states that have a more pro-labor framework tends to see substantially less manufacturing activities than other states with a more pro-employer legal framework (with the so-called right-to-work law). Autor et al. (2007) studies spatial variations in the imposition of restrictions on employers' ability to dismiss workers (i.e., the wrongful-discharge law) by US states, and concludes that they reduce employment flows and reduce firm entry rates. (Their more rigorous methodology overturns the previous insignificance result of Miles (2000)). Bird and Knopf (2009) confirm the finding of Autor et al with a different sample - eighteen thousand commercial banks - and conclude that the adoption of the wrongful discharge laws has a significantly negative impact on overall profitability[1]. These studies imply firm profits are generally hurt by these laws. However, as mentioned earlier, MacLeod and Nakavachara (2007) suggest that the evidence on employment can be more nuanced, while at the same time, they acknowledge that the nature of the data does not allow them to prove causality.

Lazear (1990) exploits variations in labor laws across 22 European countries over 29 years, and finds that stricter severance pay requirements reduce employment. Using variations in regulations on temporary contracts in nine European countries from 1996 to 2001, Kahn (2010) concludes that restrictions tend to reduce temporary jobs although the effect on overall employment is not clear. Comparing the United States and Portugal, Blanchard and Portugal (2001) find that stronger labor protection produces more durable unemployment. By logical extension, these papers would imply that labor regulations tend to hurt firm profits.

Empirical papers on developing countries also tend to find negative effects. Across regions in India, Besley and Burgess (2004) show that pro-labor laws tend to reduce output, employment, investment and productivity in the formal sector. Also across Indian states, Dutta Roy (2004) and Ahsan and Pages (2009) confirm these basic findings by considering adjustment lags and additional types of labor regulations, respectively. Across cities in Brazil, Almeida and Carneiro (2009a) find that stricter

1 Autor (2003) finds that stronger labor protection encourages firms to outsource some of their activities, mitigating though not overturning the negative effects on firm profits.

labor regulation constrains firm size and increases unemployment. Across South and Central America, stricter labor regulations are found to raise labor costs (Heckman & Pages, 2004), and to lead firms to hire less workers. These papers also imply that labor regulations reduce firm profits.

The only paper that rigorously studies the Chinese Labor Contract Law is by Park, Giles, and Du (2012). The authors utilize a survey of 1644 firms conducted in the fall of 2009 that asked the respondents to recall strictness of enforcement of the prevailing labor regulations at four time points in the past: December 2007, June 2008, December 2008, and June 2009. Through cross-sectional regressions, they reach two main conclusions. First, regions that had a more lax initial enforcement before the 2007 law experienced a greater increase in the enforcement. This suggests that the new law is more strictly and uniformly enforced than the previous labor regime. Second, regions with a greater increase in enforcement exhibit a slower growth in employment during 2007-2009. Our paper differs from theirs in terms of both objectives and methodology. Their objective is to check in the Chinese context a near-consensus conclusion in the literature: stricter labor regulation increases firms' costs and hurts employment. In comparison, we aim to make a point that is more distinct from the existing literature: conditional on having a regulation in place, stronger enforcement can induce beneficial resource reallocation from less to more efficient firms, potentially resulting in a higher aggregate productivity. Our methodologies are also different. While they principally rely on cross–sectional regressions on firm employment, which do not allow them to pin down causality, we employ an event study approach based on stock price reactions within a relatively narrow time window around the passage of the labor contract law on June 29, 2007. As long as there are no other major events in the same narrow window that differentially affect labor intensive and non-labor intensive firms, the event study result can be interpreted as reflecting a causal effect. (We will also look into the actual employment and firm profit data before and after the new law.)

When distinguishing sectors by labor intensity, the existing literature generally and unsurprisingly finds a greater negative impact in more labor intensive sectors (Ahsan and Pages, 2009) or sectors with a more volatile labor supply or demand (Micco and Pages (2007). When distinguishing firms by formal versus informal sectors, the literature unsurprisingly finds that the effect is present or greater in the formal sector that is covered by the law (see Kugler and Pica, 2008, on Italy; Fallon and Lucas,

2003, Besley and Burgess, 2004, and Amin, 2009, on India; Almeida & Carneiro, 2009b, on Brazil; and Djankov and Ramalho, 2009, and Caballero, et al., 2013, on general cross-country evidence).

To sum up, existing theories predict a negative effect from a stronger labor regulation except for a commitment story. In comparison, while some empirical papers report a positive effect on employment, most report a negative effect on firm profitability and overall employment.

2.2 The Chinese Labor Contract Law of 2007

The key event we study is the adoption of the Labor Contract Law by the Standing Committee of the Chinese National People's Congress on June 29, 2007. The law came into effect on January 1，2008. The legal framework governing the prevailing labor protection regime up to then was the Labor Law that was enacted in 1994 and took effect in 1995. The two laws formally have different legal standings in the Chinese civil law system. The 1994 law is a general law, while the 2007 law is a special law that does not replace but is explicitly meant to strengthen the enforcement of the 1994 law.

Interestingly, the larger social backgrounds surrounding the passage of the two laws are somewhat different. When the 1994 law was being formulated, China was still in the early stage of dismantling a centrally planned socialist economic model, and the majority of the urban labor force was working in state-owned enterprises (SOEs). While formal employment contracts were uncommon then, SOEs were notorious with being saturated with redundant workers that they cannot fire. The 1994 law was meant to end such a de factor life-time employment guarantee and to facilitate reallocation of labor from non-performing firms to more profitable ones. Firing workers now had a new-found legal basis in the 1994 law (Gallagher, 2004), whereas protecting labor rights was not the most important objective of the law. By mid-2000s, however, sufficient numbers of de jure or de facto privations had taken place and 70% of the urban labor force was already working at privately owned firms (including foreign invested firms).

Two features of the Chinese labor regime before the 2007 law are worth emphasizing. First, because the 1994 law often copied provisions commonly found in the labor laws of Western countries, the letters of the law appear to accord plenty of

labor rights. For example, when Botero et al. (2004) coded the letters of the employment laws in 1997 for 85 countries, they reported that the Chinese labor law was somewhat more stringent than those of the United States, Japan, and the United Kingdom and was similar to the median of the sample (which included many Western European countries). Second, compliance and enforcement were spotty in practice. For example, although the 1994 Labor Law stipulates that an employment contract is needed when a firm hires a worker, it didn't specify the penalty for non-compliance. Employment without a labor contract was pervasive, especially among small firms, in the decade after the adoption of the 1994 Labor Law. Given the over-arching objective of the government to increase labor market flexibility throughout the 1990s and early 2000s, non-compliance was not aggressively pursued.

It is important to note for our later analysis that non-compliance was systematically more prevalent among small and medium sized firms. It is reported that only 20% of small and medium firms outside the public sector and 12% of firms in coastal areas had labor contracts (Liu, 2007). Even when there were contracts, many were informal or temporary. Some report that temporary contracts account for 60% of all contracts signed, which were widely used by small and medium firms and typically ended within a year (Xiu, 2007).

By mid-2000s, with widespread complaints of both rising income inequality and abusive labor practices in some firms, the political pressure to tighten the enforcement of labor regulation was building strong, especially when the government felt not particularly capable of turning around the trend of rising inequality any time soon. The 2007 Labor Contract Law was born in such a context.

Although the 2007 law has a small number of new obligations on firms, much of the focus was on tightening the enforcement of existing regulations. First, this is achieved by adding specifics to the legal requirements and specifying explicit penalties for non-compliance. For example, while having an employment contract was a legal requirement in the old regime, the 2007 law now specifies an explicit financial penalty (i.e., doubling the pay) on non-complying firms. As another example, while employer contributions to a social insurance fund (covering pensions, medical insurance, workplace injury insurance, etc) were legally required even in the pre-2007 regime, the new law now specifies for the first time a hefty penalty on firms for non-compliance. Second, the 2007 has increased the incentive for workers to monitor firm's compliance and report non-compliance. This is achieved primarily by awarding

the penalty on non-complying firms to workers whose relevant legal rights were violated (as opposed to be collected by a local government as an administrative fine). (Reported court cases[1] also suggest that the Chinese courts follow through as the law intended.) Third, the new law explicitly expands the coverage to all employers in the economy whereas the previous regulation was only applied to registered firms. In other words, even for unregistered firms, illegally or otherwise, non-compliance of labor regulations is a ground for workers to sue the firm and obtain both the penalty on the firm and the pay owed to them. These measures have greatly improved the compliance with labor regulations.

Another noteworthy feature of the 2007 law is that it has converted many implicit common-sense norms to be explicit legal obligations. For example, keeping a complete list of all employees and not withholding a worker's identification documents were always considered the right things to do but were not explicitly mentioned in the 1994 law. Large Chinese firms and multinational firms typically had a complete roster of workers anyway and did not withhold an employee's ID card. But it is reported that many smaller firms sometimes intentionally kept some workers out of its employee roster in order to avoid making full contributions to the social insurance fund, and withheld workers' identification documents in order to prevent them from quitting their jobs. The new law states explicitly that it is illegal to do such things and non-observance will be liable for a fine (to be awarded to the affected workers).

We have conducted interviews with heads of human resources departments and Chief Financial Officers in five companies in different parts of the country, and concluded that the 2007 law is generally regarded as providing a stronger and more uniform enforcement of existing labor regulations as opposed to adding new legal obligations. A (separate) survey of 1644 manufacturing firms by the Chinese central bank in 2009 reports that 95.9% of the responding firms say that the 2007 Labor Contract Law is strictly or very strictly enforced (Park, Giles, & Du, 2012).

Interestingly, some news reports recorded heterogeneity in firm response to the new

[1] Among many other cases in other provinces, Chongqing court reported that after the new law taking into effect, the employees won 95% of the labor disputes cases, which provide the workers the right against informal contracts, delayed wages, illegal firings, or lack of social insurance. (Data source: http://news.xinhuanet.com/politics/2011-05/01/c_121368554.htm) Besides, after the new law, employees do have more incentives to sue their illegal employers. A Judge of a court in Jiangsu Province told the news agency that in the first 3 months after the new law's effectiveness, the court received 27 labor dispute cases, which is increased by 68% compared to that of the same period in previous year. (Data source: http://www.legaldaily.com.cn/legal_case/content/2010-04/19/content_2118138.htm?node=22953)

law. The president of the US-China Business Council stated that, while the new law imposed new restrictions on those domestic firms which had failed to comply with the existing labor law and regulations, U.S. companies have always been in compliance with local laws (Frisbie, 2007). China Daily (2008) also predicted that the new law will bring new growth opportunities to firms that have always been in compliance while adding labor costs to previous non-complying firms. The report contrasted a top manager of Anta, a large domestic shoe producer, who welcomed the 2007 law as good news for his firm, to the owner of a small textile factory who complained loudly about the higher costs of doing business resulting from the new law.

III. One Puzzle and Two Possible Solutions

3.1 An apparent puzzle

From the review of the literature, we may expect to see a relative decline of stock prices of more labor intensive firms in China compared to less labor intensive firms after the adoption of the 2007 labor contract law. Yet, we find an opposite result from a straightforward event study.

To implement the event study, we need to have an event, a treatment group, and a control group. Our event is the adoption of the labor contract law. Interestingly, the event date has some ambiguity. While the law was formally adopted on June 29, 2007, the last day of a five-day meeting of the Standing Committee of the People's Congress, a draft that substantially resembles the final version was circulated to all members for debates on the first day of the meeting. In addition, as other studies (references?) that apply an event study methodology have found, the stock market reaction is often not instantaneous and sometimes come with a considerable delay possibly due to uncertainty about a law's implementation or investors' rational inattention. For this reason, we define June 29, 2007 as date zero, but use (-5, 10) as our benchmark event window. We will do robustness checks by varying event windows later.

Our treatment group consists of all relatively more labor-intensive firms that are listed on the Shanghai and Shenzhen Stock Exchanges.[1] Our control group consists of all relatively less labor-intensive firms on the same two exchanges. To measure labor

[1] When the Chinese government re-introduce stock exchanges in the early 1990s (after a four-decade gap), they decided to set up two for regional balance. Both exchanges subsequently competed to have companies listed in their places, though the overall number of IPOs in any year is tightly controlled by the Chinese Securities Regulatory Commission, a ministry in the central government.

intensity, we first use China's Input Output Table in 2005[1] and classify each of the 42 sectors into two baskets, based on whether a sector's labor intensity (total labor compensation as a share of total inputs) is above or below the median. We then classify all 1319 listed firms in our sample into two groups: more or less intensive types based on the labor intensity of the sector that characterizes a firm's main line of business. (Because financial statements of listed firms lack information on the value of intermediate goods, they are not suitable for directly calculating the labor share in total inputs.)

The event study is essentially a difference-in-differences exercise. The periods before and after the event window correspond to two regimes with weaker and stronger enforcement of labor protection, respectively. The use of a control group is to absorb other developments in the economy across the two regimes, such as changes in macroeconomic policies, transport infrastructure, global commodity prices, or political leadership that may have an impact on firm performance in ways that are unrelated to firm level intensity in labor usage and labor protection. The double differencing is designed to pick up the impact of a change in the enforcement of labor protection on expected streams of firm future cash flows after accounting for other factors that may also affect firm performance but are unrelated to labor usage.

Table 1 presents the summary statistics on sector level labor intensity and Appendix Table 1 tabulates all sectors in terms of labor intensity, which is quite consistent with the common sense. All firms in a sector are assigned the labor intensity of the sector its main line of business belongs to. We classify all firms into two approximately equal-sized bins: one with labor intensity above the median, and other with labor intensity below the median.

In Figure 1, we present the value weighted mean of cumulative abnormal returns of all firms in the treatment and control groups from 40 trading days before June 29, 2007 to 40 trading days after. Data from the 250 trading days prior to the start of the event window are used to estimate the beta's. The solid line represents the more labor intensive firms (the treatment group), and the broken line the less labor intensive firms (the control group). As we can see, the two lines are reasonably close before the adoption of the labor contract law, but become visible divergent five days after the adoption of the law and stay so 40 days later.

[1] Input-output tables are not published on a yearly basis. The date of the 2005 table is closest to our event date and is also pre-determined with respect to our event.

This result represents an apparent puzzle relative to the extant empirical literature. The law is supposed to have raised the cost of using labor and therefore, if the existing empirical studies are taken as a guide, should be expected to reduce the returns to investors in more labor intensive firms relative to those in less labor intensive firms. Why do we get an opposite result? Can a resolution to the puzzle speak to a larger issue of the effect of regulations on allocative efficiency in ways that may have been missed by the existing studies on labor regulations?

3.2 Possible resolutions to the puzzle

We consider two main possible stories that may explain the puzzle (additional stories will be discussed later). The first possible explanation is that strong labor regulation provides a commitment device for firms to treat workers appropriately which in the end is good for firm's financial performance and therefore good for firm owners. More precisely, suppose workers can make firm-specific investments that would raise the productivity in the firm they work for but will do so only if they believe that they are treated well and their investment will be properly rewarded by the firm. Suppose further that before a strong labor regulatory regime is in place, firms are not able to commit to treating their workers well. In this case, the adoption of a stronger labor protection regime (or a stricter enforcement of existing requirements) provides firms a commitment device to treat workers well. Consequently, workers will undertake more firm-specific productivity and returns to capital will increase. This is consistent with the theories of Acemoglu (2001) and MacLeod and Nakavachara (2007).

The second possible explanation is that a stricter and more uniform enforcement of labor protections disproportionately benefit firms that were previously in compliance with labor protection. More concretely, before a strong enforcement regime of labor protection is put in place (by the 2007 law), non-compliance is widespread. Importantly, non-compliance is not random, but is systematically more likely among smaller, non-listed firms. Once a stronger enforcement is enacted, previously non-compliant firms need to incur a greater cost to be in compliance. As a result, previously compliant firm benefit from a cost shock to their previously non-compliant competitors in the same sector. If listed firms as a group are more likely to be in compliance before the 2007 law than non-listed firms as a group, the new law would benefit the listed (and labor-intensive) firms. (Note that for non-labor

intensive firms, the 2007 law was not an economically significant event. In that sense, the stock price movement of the control group is interpreted as reflecting the effects of other factors that affect the performance of all firms, such as monetary policies, commodity prices or political uncertainty, which are not directly related to the change in labor protection.)

A testable (and potentially falsifiable) implication of the two hypotheses is that proxies for previous ability to commit by firms and proxies for previous level of compliance[1] should predict stock price performance in an event study surrounding the adoption of the 2007 law.

As we do not have sufficient information about non-listed firms, we explore the possibility that not all publicly listed firms are equally in compliance before the 2007 law. Among listed firms, we consider two proxies for previous level of compliance: firm size and use of top-ranked auditing firms (including the top four global accounting firms). The idea is that within listed firms, large firms are more likely to be in compliance before the new law than their smaller counterparts, and those firms that use top-ranked auditing firms are more likely to be in compliance before the new labor law.

If the second (compliance) hypothesis is true, we should expect that within labor-intensive sectors, large firms or firms that use top-ranked auditing firms should exhibit a stock price increase relative to smaller firms or those that do not use a top-ranked auditor. To make sure large versus small firms, and user versus non-users of top auditing firms are not differentially affected by other factors in the economy before and after the new law, we track possible effects of size or use of auditor firms on stock price in the control group (firms in less labor intensive sectors) and use that as a benchmark for comparison. In other words, the test is done in the context of an event study with triple differencing (more or less previous compliance, more or less labor intensity, and before and after the 2007 law).

A testable (and potentially falsifiable) implication of the first hypothesis is that firms with a stronger ability to commit to treating workers well before the 2007 law should benefit less from the adoption of the law, and consequently should exhibit a

[1] While precise information on which firms were in compliance is not directly available, we use firm size and the use of a top global accounting firm as a proxy for likely prior compliance. Our interviews with heads of human resource departments and CFOs as well as media reports suggest they are good proxies. A report prepared by Standing Committee of the National People's Congress pointed out that smaller private firms are more likely to be in non-compliance before 2007. (www.npc.gov.cn/npc/xinwen/jdgz/zfjc/2008-12/25/content_1464552.htm)

stock price decline relative to those firms with a weaker ability to commit without the labor contract law. If, among publicly listed firms, larger firms or majority state-owned firms are more likely to be able to commit to treating workers well even before the 2007, then they are predicted to exhibit a stock price decline relative smaller or non-state-owned firms after the adoption of the labor contract law. Again, this test can be implemented in a triple differencing framework in which the changes in stock prices in the control group are used as a benchmark.

Accounting firms are asked to audit only the veracity of financial numbers in a firm's financial statement, and not whether a firm treats its workers properly. As a result, users and non-users of top-ranked accounting firms are not expected to exhibit differential stock price performance under the second hypothesis.

These hypotheses have larger implications for understanding the effects on economic efficiency of economic regulations. Suppose the second (compliance) hypothesis is correct. Then, conditional on a regulation being in place, if evasion is systematically more prevalent by less efficient (and smaller) firms, then a stronger (or a more uniform) enforcement induces a reallocation of resources from previously non-compliant firms to previously more compliant firms. In such a scenario, stronger enforcement of labor (or other) regulations not only raises returns to financial investors but raises the overall productivity and efficiency level of the economy.

In this section, we report various triple-differencing results in an event study setting. The event is still the adoption of the 2007 Labor Contract Law. The two of the three differencing are similar to what were done in Section 3.1, namely before and after the adoption of the law, and between the treatment (more labor intensive firms) and control (less labor intensive firms) groups. The third differencing is meant to explore the testable predictions of the possible resolutions to the apparent puzzle laid out in the previous section. It will be done in a number of different ways, which we will discuss in turn.

3.2.1 Do large labor intensive firms exhibit a relative stock price increase?

First, we will separate firms into large versus small categories (where size is measured by asset, revenue, net income, or employee count). We can contrast the predictions from the two stories. Let us first consider the commitment story. If there is heterogeneity in firms' ability to commit to treating workers well, we presume that smaller firms have a weaker ability to commit since they have less a reputation to

protect. (Recall that non-observance has been reported to be more prevalent by small firms.) In this case, the commitment story would imply that the 2007 law benefit smaller firms disproportionately. In the triple-differencing setting, we would expect larger labor-intensive firms to exhibit a relative stock price decline.

Let us next consider the compliance story. If there is heterogeneity in the compliance of the norms and laws on labor regulation before 2007, we presume, as the news media reports indicated, that smaller firms are more likely to be in non-compliance, perhaps because the cost of compliance per unit of output is higher for them than for their larger counterparts. In this case, the 2007 law, by raising the strictness in enforcement, disproportionately raises the compliance costs for smaller firms, benefiting the larger firms as their competitors. In the triple-differencing setting, we would expect larger labor-intensive firms to experience a relative stock increase, which is the opposite prediction from the commitment story.

Table 1 presents the summary statistics of firm size variables. In the main body of our empirical work, we use a size dummy indicating whether a firm's relevant size variable is above or below the median value. As robust checks, we also use a continuous measure of size in a regression framework. We note that the mean values (in Column 2) tend to be far from the median values (in Column 3). This suggests that the size distribution is very skewed with a small number of very large firms. Indeed, from the minimum and maximum values of these variables reported in Column 5 and 6 in Table 1, we note that the extreme values are very far from the median. As sorting firms into large and small baskets is more robust to outliers than measuring firm size by a continuous variable, we use the size dummy in our benchmark case.

To reduce the influence of potential outliers, we can winsorize[1] the top and bottom 1% of the observations and re-compute the mean. The trimmed mean is reported in Column 8. We can also be more aggressive and winsorize the top and bottom 5% of the observations. The resulting trimmed mean is reported in Column 11 of Table 1. Naturally, the trimmed means are closer to the medians than the raw means. In our subsequent analyses, we will report robustness checks that winsorize those variables that likely have a skewed distribution.

Benchmark: [-5,10] and Dummy for Assets (Above Median)

[1] Winsorizing at x% level means that replacing the highest and lowest x% values with the next value counting inwards from the extremes.

We implement the triple differencing in the following regression framework.

CAR(j,k) = b0 + b1 D_labor + b2 D_big_firms + b3 D_labor × D_size + fixed effects + error term

The dependent variables of all these three regressions are cumulative abnormal return from 5 trading days before to 10 trading days after the adoption (CAR [-5, 10]). The regression framework allows us to control a long list of fixed effects. In particular, we control for which stock exchange (Shenzhen or Shanghai) a company is listed, which industry it is in, and which province it is located. D_labor is a dummy for firms whose labor intensity is above the median, and D_big_firms is a dummy for firms whose size (measured by assets) is greater than the median. We are mainly interested in parameter b3, which captures the relative stock price of those firms that are simultaneously big and labor intensive after the passage of the law when benchmarked to other firms.

In the first column of Table 2, the insignificant coefficients on the first two regressors indicate that being labor intensive or being large per se does not generate abnormal returns. The third coefficient on the interaction between being large and being labor intensive is positive and statistically significant. This suggests after the enactment of the 2007 Labor Contract Law, those firms that are simultaneously large and labor-intensive exhibit a relative increase in stock prices. This pattern is consistent with the compliance story, but inconsistent with the commitment story.

In the next two columns, we split the sample into firms whose labor intensity is above the median and those whose labor intensity is below the median. On each subsample, we can implement a double differencing test. This specification is in principle less restrictive than the one in the first column, as it does not require the coefficients on the constant and all the fixed effects to be the same for the two subsamples. In any case, for more labor intensive firms, we find larger firms exhibit a relative stock price increase (Column 2). In comparison, for less labor intensive firms, firm size doesn't matter. Again, this pattern supports the compliance story.

Alternative measures of firm size and labor intensity

We perform a number of robustness checks. We start with different ways to

measure firm size and labor intensity. In Column 1 of Table 3, we measure size by the continuous value of log assets (rather than using a dummy for large firms). The key coefficient on the interaction between firm size and labor intensity is still positive and statistically significant, indicating again that firms that are simultaneously large and labor intensive experience a stock price increase relative to other firms.

Because the continuous measure of firm size is more vulnerable to potential outliers, we also adopt a measure of firm size for which the log asset is winsorized at the top and bottom 5% of the distribution. The result is presented in Column 2 of Table 3 and is qualitatively unchanged. If anything, the coefficient on the intensity between firm size and labor intensity becomes bigger.

In Column 3 of Table 3, we replace the dichotomous measure of labor intensity by a continuous measure (i.e., share of labor compensation in total inputs) while retaining a dichotomous measure of firm size. Because the regression includes sector fixed effects, we exclude sectors with a small number of firms to avoid collinearity. We also exclude the agriculture sector as its labor share value appears to be an outlier relative to all other sectors. The coefficient on the interaction between firm size and labor intensity is positive and statistically significant[1]. In Column 4 of Table 3, we measure both firm size and labor intensity by a continuous variable. In this case, the coefficient on the interaction term is positive and statistically significant.

Asset value is not the only way to measure firm size. In Table 4, we experiment six other ways to measure firm size. They are the continuous and dichotomous measures by log revenue, log net income, and log employee, respectively. In all cases, the coefficients on the interaction between firm size and labor intensity are positive; in five out of six cases, the coefficients are statistically significant. (The lone case in which the coefficient is not significant is likely due to presence of outliers in the distribution of employee count across firms. In any case, a dummy measure based on whether the employee count is above or below the median still works as all other measures.)

Alternative benchmarks for computing abnormal returns

In Tables 2 and 3, we use Hushen 300 – the most commonly used stock price index

[1] If we do not exclude the agriculture sector or sectors with a small number of firms, the coefficient on the interaction term is positive but marginally not significant. However, if we do not include sector fixed effects, the coefficient on the interaction term is again positive and significant.

for China based on almost 300 largest stocks on the Shanghai and Shenzhen Stock Exchanges to compute the market return and use a market model (i.e., a one factor model) to compute abnormal returns. We now consider several ways to depart from this baseline case.

First, we use the prices of all firms in our sample, not just those in the Hushen 300 index, to compute the market returns. In Column 1 of Table 5, we report results where a value-weighted average return of all stocks in our sample is used as the market return. In Column 2, an equal-weighted average return of all stocks is used as the market return. In both cases, the coefficients on the interaction between firm size and labor intensity are positive and statistically significant at the 1% level. In fact, the point estimates are close to the corresponding coefficient in Column 1 of Table 2.

Second, we change the market model to a three factor model (i.e., adding the size factor and book-to-market factor as two new factors in addition to the market factor) and a four factor model (i.e., also adding a momentum factor). The results are reported in Columns 3 and 4 of Table 5, respectively. Again, the coefficients on the interaction between size and labor intensity are positive, statistically significant, and numerically close to the corresponding coefficient in Column 1 of Table 2. These results are supportive of the compliance story we have articulated earlier.

3.2.2 An Alternative Proxy for Prior Compliance

It is useful to look for a proxy for the likelihood of compliance with previous labor regulation before 2007 other than firm size. In this context, those firms that use top-ranked auditing firms are more likely to be in compliance all laws and government regulations including labor regulations. As it turns out, out of over 5000 accounting/auditing firms in China (Hong, 2006)., the top four in the country in terms of revenue, staff size and others are also the same four in the world. They are PricewaterhouseCoopers (PwC for short), Deloitte, Ernst & Young, and KPMG. Since these are global accounting firms that have a global reputation to protect, one presumes that their client firms are also more likely to obey laws and regulations. While, on average, users of the top-ranked accounting firms are large firms, there are exceptions in both directions. Some users of top accounting firms are not the largest firms in the country; some very large firms choose to use a local accounting firm.

Suppose the use of a top-ranked international accounting firm is a proxy for the prior compliance, we can check if these client firms in the labor intensive sectors

exhibit a relative stock price increase after the passage of the law. We report the results in Table 6. In Column 1 of Table 6, we employ a specification very similar to Column 1 of Table 2, except that the use of a top global accounting firm rather than firm size is used a proxy for prior compliance. Interestingly, we find the coefficient on being labor intensive and that on using a top global accounting firms are both not different from zero statistically speaking. In other words, using a top accounting firm or being labor intensive per se does not generate a significantly different stock price trajectory from the market. However, the coefficient on the interaction term between users of a top auditor firm and being labor intensive is positive and significant. This is again supportive of the compliance story.

In Columns 2 and 3 of Table 6, we split the sample into those firms whose labor intensity is above the median and those whose labor intensity is below the median. When we run separate regressions, we again find that using a top global accounting firm produces a relative stock price increase only if the firms are in the labor intensive sectors.

3.2.3 State ownership, firm size, and use of a top accounting firm: A horse race

It is sometimes suggested that majority state-owned firms may follow laws and government regulations faithfully, since top officers of those firms are quasi-bureaucrats who do not consider profit maximization as their sole objective. By this view, state-ownership could also be a proxy for likely compliance with labor regulations prior to the passage of the 2007 labor contract law. On the other hand, a political connection view yields the opposite prediction. If state-owned firms are on average better connected politically to judges and government officials (as they are the former and likely future colleagues of the officers of the firms) than private firms, they are also more likely to get away from violating labor regulations. By this view, some state-owned firms could be more egregious violators of the labor regulations than non-state-owned firms. These two possibilities suggest that whether state-ownership could be a reliable proxy for prior compliance is ambiguous.

Do majority state-owned firms in labor intensive sectors exhibit a stock price increase relative to other firms after the passage of the labor law? We formally examine this in Column 1 of Table 7. To add some richness to the investigation, we separate those SOEs that are owned by the central government from those owned by

provincial, city, or other local governments[1]. None of the coefficients in Column 1 are statistically different from zero. This suggests that the 2007 labor law does not differentially affect majority state owned firms and non-state-owned firms on average, whether they are in the labor intensive sectors or not.

We can also run a horse race among ownership, firm size, and use of top-ranked auditor firms. A pooled regression with four different interaction terms is reported in Column 3 of Table 7. In this case, only the interaction between firm size and labor intensity is positive and significant. In Columns 3 and 4, we split the sample into half of the firms whose labor intensity exceeds the median and another half of the firms whose labor intensity is below the median. While splitting the sample loses some efficiency, it could avoid some biases in the estimation resulting from forcing the coefficients on all the fixed effects to be the same between the two sub-samples. In any case, we now find both large firms and users of a top auditor exhibit a relative stock price increase after the new labor law, if they are in the more labor intensive sectors, but not if they are in the less labor intensive sectors. On the other hand, government ownership does not exhibit abnormal stock returns regardless of sector-level labor intensity.

3.3 From Stock Market Expectation to Real Outcomes

The stock price reactions in the event study approach reflect investors' expectation on the effect of a stronger labor law. We now check whether these expectations are translated in the actual change in real variables from 2006 (the last year before the law passed) to 2008 (the first year after the law implemented). In particular, do firms that are simultaneously larger and labor intensive in 2006 subsequently also expand more in terms of sales, staff size, and profits?

We consider the following specification:

Growth(06,08) = b0 + b1 D_size + b2 D_labor + b3 D_labor × D_size + b4 Growth(03, 06) + industry fixed effects + location fixed effects + exchange fixed effects+ error term

[1] State ownership is identified by the controlling shareholder reported in Control Owner Code, which is more informative than the firm ownership information recorded when a firm is first registered. The latter tends not be updated in a timely manner even when the controlling shareholder changes. A cross tabulation among government ownership, firm size, and use of a top auditor is reported in Appendix Table 5.

We consider three different outcome variables. They are the growth rate from 2006 to 2008 of the following items respectively: employee count, revenue, and net income. The data for all these variables are collected from firm-level financial reports in the relevant years. In addition to separate industry, location, and stock exchange fixed effects, we also control for the average growth rate of the outcome variable from 2003 to 2006 in order to account for a possible pre-event trend.

We report the regression results in Table 8. The parameter of our main interest is on the interaction between firm size and labor intensity, reported in the second row in the table. As we see, these coefficients are uniformly positive and statistically significant. This means that firms that are simultaneously labor intensive and big in 2006 also hire more people, expand more sales, and experience a faster growth in profit when compared to other firms. It is noteworthy that large labor intensive firms actually increased hiring by close to 10% than their non-labor intensive counterparts after the passage of a law that raised the strictness of labor regulation. As demonstrated by the last column of Table 8, the stock investors' expectation during the days immediately following the passage of the Labor Contract Law on June 29, 2007 is materialized when one examines changes in net income.

3.4 Does the stronger labor regulation raise productivity?

3.4.1 Firm Productivity and Compliance

Are previously non-compliant firms systematically less productive? If so, the re-allocation of resources from previously non-compliant to more compliant firms induced by the stronger enforcement can lead to an increase in overall productivity.

To check whether proxies for prior compliance also predict productivity, we need to measure the latter. We consider two measures of productivity. The first is labor productivity, or the ratio of firm value added to firm employee count. The advantage of this measure is its simplicity, using two variables in a firm's financial statement. The disadvantage is that labor productivity is not total factor productivity; its valuation can also reflect variations in firm capital stock.

Our second measure is total factor productivity (TFP). The advantage of the TFP measure is that it purges the effect of capital. A potential disadvantage is that its calculation is more involved and the recorded capital stock information is endogenously chosen by firm conditional on its productivity level. In our context, some of the information needed (such as the amount of intermediate inputs) is not

directly available from financial statements of listed firms (but can be available from other sources). Our computation procedure (explained below) forces us to only focus on manufacturing firms when we look at TFP.

We measure TFP by applying the Levinsohn-Petrin (2003) method which makes use of the insight that observable amount of intermediate inputs is a function of both unobserved TFP and observable capital stock. (We have also considered the index number approach to estimating TFP. But that approach assumes constant returns to scale, an assumption we test and reject. The test is reported in Appendix Table 11.)

Following Levinsohn and Petrin (2003) method, we are estimating total factor productivity (hereafter referred to as the LP productivity) using intermediate input as a proxy to control for correlation problem between input levels and unobserved firm-specific productivity shocks.

To be specific, consider the Cobb-Douglas production function in logs:

$$y_t = \beta_l l_t + \beta_k k_t + \omega_t + \eta_t.$$

y_t is the log of value-added, l_t is the log of labor compensation and benefits, k_t is the log of capital input[1]. Both ω_t and η_t are unobservable to the econometrician[2], but ω_t are the predictable or observable shocks by firms and could impact the firms' decision. This leads to a simultaneity problem in production function estimation. An OLS regression that ignores the correlation between inputs and the unobservable would give inconsistent results. LP use intermediate input level m_t to address this problem. Suppose the demand function of intermediate input is given by $m_t = m_t(\omega_t, k_t)$. Under a monotonicity assumption, the unobservable can be inverted out as $\omega_t = \omega_t(m_t, k_t)$. In this way, the unobservable factor is shown as a function of two observable variables. Therefore, y_t can be written as $y_t = \beta_l l_t + \beta_k k_t + \omega_t(m_t, k_t) + \eta_t$ instead. Following the LP procedure, $\hat{\beta}_l$ and $\hat{\beta}_k$ can be consistently estimated step by step, and the productivity (in logs) can be predicted as $\widehat{\omega}_t = \exp\left(y_t - \hat{\beta}_l l_t - \hat{\beta}_k k_t\right)$.

Since the survey data of Chinese manufacturing firms (hereafter survey data)[3] stop at 2006 and no data on intermediate materials are reported in the financial statements

[1] Deflators and other details in data processing follows Brandt, Van Biesebroeck and Zhang (2012).

[2] The constant term in production function (sometimes, referred to as β_0) is subsumed to the productivity term ω_t .

[3] The survey of Chinese manufacturing firms is firm-level data for the period 1998-2007 (what we have access to is from 2000 to 2006), and is conducted by the National Bureau of Statistics in China. The survey includes all firms in manufacturing industries which have sale basically above 5 million RMB.

of the listed company data, we compute LP productivity using the available data via a two-step procedure.

In the first step, we use the firm level data from surveys of Chinese manufacturing firms over 2003-2006 (which includes intermediate material variable), and compute a set of parameters, $\hat{\beta}_l$ and $\hat{\beta}_k$, for each industry. In the second step, we turn to the listed company data, and assume the parameters on capital and labor are the same as estimated in the first step for all listed firms in the same industry and applicable to 2004, 2006, 2008, and 2010. Together with the realized values of y_t, l_t and k_t, at the firm-year level from the financial reports of the relevant firm and year, we can back out each firm's TFP level $\widehat{\omega}_t$ in these years.

In estimating $\hat{\beta}_l$ and $\hat{\beta}_k$, we attempt to choose a subset of firms in the firm survey that are comparable to listed firms. Appendix Table 8 compares the basic statistics between the firms in the survey and the listed firms during the overlapping years. This comparison suggests that the listed firms are more like the top 10% of the firms in the survey in terms of asset. For this reason, we pick the top 10% of the firms by asset in each industry in the survey.

In Table 9, we regress both labor productivity and TFP at the firm level during 2004-2006 (i.e., before the passage of the labor contract law) on proxies for prior compliance: firm size, use of top global auditing firms, and state ownership. There is clear evidence that both size and use of top auditors matter. Larger firms and users of top auditors are more productive than other firms.

Government ownership exhibits mixed results. Ownership by the central government is also associated with higher productivity, though the effect is weaker economically than either size or use of top auditors. Ownership by local governments does not matter.

The results in this table are not meant to prove causality. Instead, they simply suggest a correlation: proxies for compliance are correlated with productivity. Less productive firms are more likely to be in non-compliance.

3.4.2 Productivity Decomposition: Resource Reallocation Effect

If less productive firms are more likely to be in non-compliance in a weak enforcement environment, then stronger enforcement can improve overall efficiency by inducing a reallocation of resources from less to more productive firms. We will

regard as supportive evidence if we find an increase in the association between firm level productivity and market share after the law was enacted. We will do this via a difference-in-differences approach, i.e., comparing the productivity-market share association for more and less labor intensive firms before and after the 2007 law was enacted.

Evidence on reallocation of market shares from less to more productive firms

We now quantify the pattern of resource reallocation from 2006 (the last year before the adoption of the 2007 Labor Contract Law) to 2008 (the first whole year after the implementation of the law) by using an Olley-Pakes productivity decomposition that has been modified by Melitz and Polanec (2012) to take into account of firm entries and exits. In a nutshell, the overall increase in productivity during these two years is decomposed into four parts: improvement due to an increase in a given firm's average productivity (a within-firm term), improvement due to reallocation across firms (a between-firm term), change due to firm entries, and change due to firm exits. We are especially interested in the second term – changes in overall productivity due to reallocation across firms. We now summarize the detailed calculation process in the following equations.

Aggregate productivity level Φ_t in each period t can be decomposed as: $\Phi_t = \sum_i s_{it}\varphi_{it} = \overline{\varphi}_t + \sum_i (s_{it} - \overline{s}_t)\left(\varphi_{it} - \overline{\varphi}_t\right) = \overline{\varphi}_t + cov(s_{it}, \varphi_{it})$, where $\overline{\varphi}_t$ and $\overline{s}_t$ are non-weighted means of firm productivity and employee share. Besides, cov here is just a symbol (actually equals to n_t×corresponding covariance).

Firms in each year are classified into survivors (S), entrants (E) and exiters (X):

$$\Phi_1 = s_{S1}\Phi_{S1} + s_{X1}\Phi_{X1} = \Phi_{S1} + s_{X1}(\Phi_{X1} - \Phi_{S1}),$$
$$\Phi_2 = s_{S2}\Phi_{S2} + s_{E2}\Phi_{E2} = \Phi_{S2} + s_{E2}(\Phi_{E2} - \Phi_{S2}).$$

In these two equations, $\Phi_{St} = \sum_{i \in S}(s_{it}/s_{St})\varphi_{it}$ and $s_{St} = \sum_{i \in S} s_{it}$.

Therefore, aggregate productivity change can be decomposed into four parts:

$$\Delta\,\Phi = (\Phi_{S2} - \Phi_{S1}) + s_{E2}(\Phi_{E2} - \Phi_{S2}) + s_{X1}(\Phi_{S1} - \Phi_{X1})$$
$$= \Delta\,\overline{\varphi}_S + \Delta\, cov_S + s_{E2}(\Phi_{E2} - \Phi_{S2}) + s_{X1}(\Phi_{S1} - \Phi_{X1}).$$

We work with listed firms[1], and start with labor productivity but will also report results with total factor productivity. For labor productivity, we use employee share as

[1] The survey of Chinese manufacturing firms data that we have access to stops at 2006. Therefore, for this exercise, we work with data on listed firms which are available for 2008 as well as 2006.

the measure of market share, while for total factor productivity, we adopt value added instead (Melitz & Polanec, 2012).

We use a difference-in-differences framework. That is, we do a similar decomposition for both labor intensive firms (the treatment group) and less labor intensive firms (the control group) for productivity increase from 2006 to 2008. We use the pattern in the control group to capture the effects of other factors in the economy (such as changes in monetary and fiscal policies or changes in other laws that are not related to labor protection). We are therefore primarily interested in the difference between the treatment and control groups.

The results are presented in Table 10. From 2006 to 2008, the overall increase in labor productivity for all labor intensive firms (the treatment group) is 30.3%, which is higher than the 22.5% increase recorded for the control group.

We note that, without benchmarking to the control group (the first panel), the reallocation term (or the between-firm effect) yields 9.0% increase in productivity for the labor intensive sectors, accounting for 29.5% (=9.0/30.3) of the overall increase in productivity.

The within-firm term is the biggest contributor to the overall productivity increase. The terms related to firm entries and exits are relatively minor, especially if one looks at their net effect by summing them up.

To account for effects from factors unrelated to the labor law, it is useful to pay attention to the decomposition patterns for the control group (the middle panel). There, we see that the within-firm contribution is also very important, similar to the treatment group. In addition, the contribution from the firm entry effect to the overall productivity is more important for the control group than for the treatment group. That is, on average, the new entrants in the control group tend to be more productive than the incumbents. We note that the contributions from the firm exit term to overall group productivity change are comparable between the two groups of firms. Interesting, the contribution from the reallocation term is negative (-42%) for the control group.

The differences between the treatment and the control groups are reported in the bottom panel. As noted, the overall productivity increase in the treatment group exceeds that of the control group by 7.8 percentage points (30.3% relative to 22.5%). Of this differential increase in total group productivity, the difference in the reallocation term (the between-firm effect) is the single biggest contributor,

accounting for 236.71% of the total differential. That is, when benchmarking to the control group, it is striking that the reallocation effect in the treatment really stands out. This supports the notion that market shares – reflecting underlying resource allocation - within labor intensive sectors are reallocated from less productive to more productive firms from 2006 to 2008. The relative importance of resource reallocation is especially pronounced when benchmarked to a control group of less labor intensive sectors.

We now decompose the growth of TFP from 2006 to 2008, and report similar decompositions for the treatment group (the top panel of Table 11), the control group (the middle panel), and the difference between the two groups (the bottom panel of Table 11). For firms in labor intensive sectors (the treatment group), the overall increase in TFP during the period is 71%. Interestingly, reallocation from less to more productive firms accounts for 70% of that increase, making it the largest contributor.

In comparison, for the control group, the contribution from the reallocation effect to overall group TFP is negative. This means that, on average, firms with a lower TFP in the control group actually gain market share.

Unsurprisingly, when we look at the pattern for the treatment group relative to the control group, the role of reallocation from less to more productive firms stands out even more, contributing 93.8% to the difference in the overall TFP increase between the two groups.

Placebo tests

One might wonder if the treatment and control groups are always different even in time periods with no major changes in labor protection. For this reason, we now check for possible presence of a "pre-trend" and a "post-trend." More precisely, we will perform two similar decomposition exercises for the productivity increases during 2004-2006 and during 2008-2010. They can be thought of as placebo tests.

The results for the 2004-2006 period are reported in the upper half of Table 12. To save space, we focus our discussion on the bottom panel. When benchmarked to the control group, the reallocation effect (the between term) provides a small contribution (3.58%) to the overall difference in the productivity increase of the treatment group over the control group. This shows that the role of reallocation during the 2006-2008 period is very different from the 2004-2006 period.

We now turn to the 2008-2010 period, reported in the lower half of Table 12. For

this period, when benchmarked to the control group (in the bottom panel), the reallocation's contribution to the difference in the overall productivity increase between the two groups is not just small, but negative. Again, this shows that the role of reallocation from less to more productive firms in the labor intensive sectors during the 2006-2008 period is quite unique when compared to the 2008-2010 period.

We conduct similar placebo tests for the TFP decomposition. The results are reported in Table 13. In the "pre-trend" results (the upper part of Table 13), we note that the difference in the reallocation terms between the treatment and control groups (0.193) during 2004-2006 is substantially smaller than the corresponding term for the 2006-2008 period (0.563). In the post-trend results (the lower half of Table 13), the reallocation effect for the labor intensive group is smaller than that for the control group (10.5% versus 24.3%). In fact, the difference in the reallocation effects between the two groups is the single biggest reason for why the overall TFP increase in the labor intensive group lags behind that in the control group.

To summarize, for both labor productivity and TFP, we see relatively massive reallocation of market shares from less to more productive firms in labor intensive sectors from 2006-2008, especially when benchmarked to a control group of less labor intensive during the same period. Our confidence in this interpretation is bolstered by the fact that no similar pattern is found during two placebo periods of 2004-2006 and 2008-2010.

A pictorial representation of resource reallocation

If previously more productive firms systematically gain market share (relative to previously less productive firms), the change can correspond to an increase in the aggregate productivity.

We can also graphically track whether the association between firm level productivity and market share becomes stronger from 2006 to 2008. What's more, we want to further show that the between-firms reallocation reported in previous two sections is likely from non-compliant firms to compliant firms. To do this, we classify all firms into four portfolios of firms: (a) firms that simultaneously are labor intensive and either are large or using a top-4 account firm (which we will call "compliant firms" for short), (b) firms that are in labor intensive sectors but non-compliant firms, (c) firms that are not labor intensive but compliant firms, and (d) firms that are neither labor intensive nor compliant firms. We will trace the changes in Relative Ratio of

Compliant Portfolio Productivity Share,

$$\frac{Productivity\ (a)/[Productivity\ (a) + Productivity\ (b)]}{Productivity\ (c)/[Productivity\ (c) + Productivity\ (d)]}$$

together with changes in Relative Ratio of Compliant Portfolio Market Share,

$$\frac{Market\ Share\ (a)/[Market\ Share\ (a) + Market\ Share\ (b)]}{Market\ Share\ (c)/[Market\ Share\ (c) + Market\ Share\ (d)]}$$

In the upper graph of Figure 2, we plot the Relative Ratio of Compliant Portfolio (labor) Productivity Share against the Relative Ratio of Compliant Portfolio Market Share. The movement from lower left to upper right indicates a stronger coherence between relative share of compliant portfolio productivity and that of compliant portfolio market shares from 2006 to 2008.

To see if the movement from 2006-2008 is dramatic or commonplace, we also track the same movements in the two placebo periods, 2004-2006, and 2008-2010, respectively. It turns out the movement from 2004 to 2006 goes in the wrong way; the coherence between relative share of compliant portfolio productivity and that of compliant portfolio market share become weaker over this two-year period. The movement from 2008 to 2010 does go in the same direction. However, the magnitude of the change during this period is smaller than during 2006-2008 period.

In the lower graph of Figure 2, we plot the same set of variables, except now we look at the ratio of TFPs rather than the ratio of labor productivities of compliant versus non-compliant firms. We reach the same conclusion, namely, that there is a significant increase in the coherence between the relative share of compliant portfolio TFP and that of compliant portfolio market shares from 2006 to 2008. Firms with larger TFPs tend to gain market shares; this produces an increase in the aggregate TFP. The type of changes observed for the 2006-2008 period is larger than any of the two placebo periods of 2004-2006 and 2008-2010.

3.5 Further Evidence

3.5.1 Exploring regional variations in the social security contribution rates

One of the requirements on firms that have been greatly tightened by the 2007 law is on the mandatory payment by firms into the government organized social security insurance scheme. It was widely reported that small firms often under-pay social security under the old regime, in part by intentionally under-counting the number of

employees. Interestingly, while the law requires firms to contribute to the social security fund, the exact contribution rates are set in part by local governments as a significant portion of the fund is locally managed. (Note the 2007 law didn't change the contribute rates, only that the payment will be better enforced.)

This suggests another way to verify the compliance story. In particular, it suggests a positive effect from a combination of three factors (a) being located in a region with a high contribution rate, (b) being large, and (c) being labor intensive.

We hand-collect the social security contribution rates by reading government documents on the website of individual local governments (typically the capital city of a province). This allows us to compile contribution rates by province.

This regression is reported in Column 1 of Table 14. The coefficient on the triple interaction is indeed positive (0.071) and significant at the 5%. This provides further corroboration for the compliance story.

To relax some of the implicit parameter restrictions, we can also do separate regressions on two sub-samples: those firms in regions with an above-the-median social security contribute rate, and those firms in regions with a lower contribution rate. For the regression in each sub-sample, our key parameter of interest is the coefficient on the double interaction between firm size and labor intensity. We would expect the coefficient to be positive and bigger for the subsample of firms in regions with a high contribute rate.

The regression results for these two sub-samples are reported in Columns 2 and 5 of Table 14, respectively. We find that the coefficients on the interaction term are positive in both sub-samples and statistically significant for the first sub-sample. Consistent with the compliance story, the coefficient is substantially bigger for the high contribution rate sub-sample.

We can further relax implicit parameter restrictions by splitting the sample into four sub-samples and then run separate regressions. The four sub-samples consists of firms in (a) high rate provinces and more labor intensive sectors, (b) high rate provinces and less labor intensive sectors, (c) low rate provinces and more labor intensive sectors, and (d) low rate provinces and less labor intensive sectors, respectively.

The separate regressions in these four sub-samples are reported in Columns 3, 4, 6, and 7, respectively. We find that the combination of being big and being labor intensive is associated with a positive relative stock price response. This is true for both the high contribution rate provinces and the low rate provinces, but the effect is

much stronger for the high rate provinces. These patterns are again consistent with the compliance story.

3.5.2 Political connections

One alternative story is political connected firms benefit from the new law if they are able to get away from non-compliance and non-political-connected firms are not. Since politically connected firms are more likely to be large, what we have reported as the large firm effect could instead be the political connection effect.

To check this possibility, we identify a subset of firms that are likely to have a strong political connection. Following Fan, Wong and Zhang (2007), we hand-collected the career background information of CEO or Board Chairman from listed companies' annual reports. We consider a broad definition of political connection (based on whether either the CEO or the Board Chairman has previously worked in the central government, the local government or the military, or is a member of the Chinese parliament (People's Congress) or the China People's Political Consultative Committee (CPPCC). This is coded as Political Connection 1. We also consider two narrower definitions of politically connected firms. For Political Connection 2, we exclude from Political Connection 1 those firms whose CEO or Chairman has been only an entry-level civil servant or soldier. For Political Connection 3, we exclude those firms whose CEO or Chairman is a member of the National People's Congress or the CPPCC from those political connected firms based on Political Connection 1. Note that political connected firms in Fan, Wong and Zhang (2007) correspond to our Political Connection 3.

We check not only if the stock prices of politically connected firms behave differently from others, but also after conditional on the potential political connection effect, if the large and labor intensive firms still exhibit an abnormal returns.

The regression results are reported in Table 15. We find some modest evidence that large and politically connected firms – measured by Political Connection 1 or 2 – have exhibited a positive stock price response (Columns 1 and 2, row 6). Other than that, political connection or its interactions with other variables do not seem matter in the context of the labor contract law. More importantly, after controlling for political connections, we continue to find that those firms that are simultaneously labor intensive and large (or use a top-4 accounting firm) continue to have a positive and statistically significant relative stock price increase. Therefore, our results are not

likely driven by a political connection effect.

3.5.3 The market power effect

Another alternative story that may be observationally equivalent to the compliance story in terms of the evidence we have shown so far is market power. In particular, the new law by enforcing compliance also raises the entry barriers for new firms. Large incumbent firms will take advantage of the higher entry barriers to explore their increased market power and realize more profits. This could explain both the patterns of stock price response presented earlier.

To check how important this channel is, our idea is that large firms can exercise market power only in a less competitive environment. Therefore, we can examine if we obtain similar results as before if we restrict the sample to sectors that are intrinsically competitive. We consider four sets of intrinsically competitive sectors: (a) sectors that have a relatively low concentration index (basically by excluding sectors whose HHI value is in the top 30 percentile), (b) those with a consistently low profit margin (below the median) over 2003-2006, (c) those with a relatively high exposure to international trade (with trade/output ratio above the median), and (d) the union of the above.

In Table 16, we report the key coefficients from 24 different regressions. In the four rows, different measures of competitive sectors are used. In Columns 1-3, firm size is used as a proxy for prior compliance; and in Columns 4-6, the use of a top 4 global accounting firm is used as a proxy for prior compliance. All regressions include a full set of industry, location, and stock exchange fixed effects.

In Columns 1 and 4 of Table 16, we use the full sample, and the key coefficient of interest is the interaction between the large firm dummy and labor intensity dummy. We find that the coefficients are always positive but are statistically significant in 5 out of 8 cases.

In Columns 2-3 and 5-6 of Table 16, we relax the restrictions on some nuisance parameters on the fixed effects, and run separate regressions for the more and less labor intensive subsamples. Our key interest is to compare the coefficient on large firms for the subsample of more labor intensive firms to the corresponding coefficient for the subsample of less labor intensive firms. For the more labor intensive subsample, the coefficients on large firms are always positive and are statistically significantly so in 7 out of 8 cases. In contrast, for the less labor intensive subsample,

the coefficients on large firms are uniformly insignificantly different from zero.

Overall, the results strongly suggest that firms that are both labor intensive and large (or use a top global accounting firm) exhibit a positive stock price response even in competitive sectors where their market powers are greatly constrained.

IV. Conclusions

A straightforward event study on the stock price response to China's Labor Contract law appears to present a puzzling evidence relative to the extant empirical literature: investors appear to think the law is good news for labor intensive firms.

We have learned something very interesting in the process of solving this puzzle. We consider two possible solutions to the puzzle: (a) a commitment story – if the law improves the firms' ability to commit to treating workers well, workers may make more firm-specific investment, which is good for both the firms and the workers. (b) a compliance story – if previous non-compliance is systematically more likely by smaller and less efficient firms, the law could induce resource reallocation that favor larger and more efficient firms.

We present a series of evidence and interpret them as supporting the compliance story. If the compliance story is right, there are some important implications. In particular, conditional on having labor regulations in place, stronger and more uniform enforcement could improve resource allocation and raise the aggregate productivity. This point is in principle applicable for other types of regulations or laws.

Appendix

Compliance and Productivity: From Survey Data

In this part, we use the data from survey of Chinese manufacturing firms to further test the relationship between compliance and productivity. Since the survey data includes the intermediate material variable, it provides us the opportunity to use the LP productivity except for labor productivity. However, there is a drawback with the survey data: it does not include auditor information. Therefore, we can only check firm size and firm ownership as proxies for compliance.

Appendix Table 6 reports both LP productivity and labor productivity. In Column 1, the coefficient of firm size (assets in log form) is 0.154, significant at 1% level. This means bigger firms are more productive after controlling export, year fixed effect, province fixed effect and industry fixed effect. But in Column 2, the coefficient of SOEs is negative. This means in general SOEs are less productive. Furthermore, Column 3 classifies all SOEs into central SOEs, provincial/municipal SOEs and other SOEs and the coefficient of central SOEs is positive and significant at 1% level. This means within all SOEs, central SOEs are more productive. Another point worth mentioning in Column 2 is that the coefficient of foreign firms is positive and significant at 1% level, which indicates foreign firms are more productive. When it turns to Column 4-6, results from labor productivity tell a similar story.

Appendix Table 7 examines all compliance proxies at the same time using both labor productivity and LP productivity. In this table, the variables of interest are the interaction terms. In Column 1, the interaction between assets and SOEs has positive and significant coefficient, which means within SOEs, bigger firms are more productive and within big firms, SOEs are more productive. This echoes the results from Columns 3 and 7 in Table 9 that within listed firms, central SOEs are more productive. Besides, In Column 1 of Appendix Table 7, the interaction term between assets and foreign firms dummy is positive and significant, which means within big firms, foreign firms are more productive. Column 2 shows similar results using LP productivity.

From survey data, we have checked the robustness of choice of productivity measure. It seems that when it comes to the compliance and productivity question, labor productivity and LP productivity present very similar results.

Data Source

Stock data: Daily close prices of both individual stocks and Hushen 300 Index are from Thomson Reuters Database. Data for assets, revenue, and net income of each stock in 2006 are derived from Thomson Reuters Database.

Sector level labor intensity: employee compensation /total inputs, derived from the 2005 Chinese Input Output Table, 42 sectors (China's National Statistics Bureau).

Firm ownership type: based on the identifying of actual controlling shareholder from the CSMAR Database.

Social insurance fee rates: Sum of the mandatory contribution rates for retirement insurance, unemployment insurance, medical insurance, work injury insurance, and birth insurance. Collected by the authors from the website of the government of the provincial capital in June 2013. (The 2007 law did not change the contribution rates.)

Political connected firms: CVs of CEO and Board Chairman for all listed firms in 2006 are collected from CSMAR database. Political Connection 1 =1 for all firms whose CEO or chairman of the board has previously worked in the military or the central or local government, or is a member of the National People's Congress (NPC) or the Chinese People's Political Consultative Committee (CPPCC). Political Connection 2 = Political Connection 1 – firms whose CEO or board chairman has had only an entry-level position in the military or the government. Political Connection 3 = Only firms whose CEO or Board Chairman has had a government or military position.

Low Concentration Industries. Of all non-manufacturing industries, we define finance, mining, and electricity, gas and water production and supply industries, which are dominated by majority state-owned firms, as non-competitive. For manufacturing industries, we compute industry-level HHI concentration index based on the revenue data in the Annual Surveys of Manufacturing Firms (which cover over 90% industrial value added), and define the top 25% of the manufacturing sectors in terms of HHI as non-competitive. Low concentration industries are the sum of low HHI manufacturing industries + competitive non-manufacturing industries.

Industry Level Profit margin: the median value of net incomes/revenue across all firms in a sector during 2003-2006. An industry is defined as having a low profit margin if the industry level profit margin is below the median.

Trade Openness = (exports+imports)/GDP by sector, derived from the 2005 Input Output Table.

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Figures and Tables for

Learning from Stock Price Surprises: When Can Stronger Labor Protection Improve Productivity?

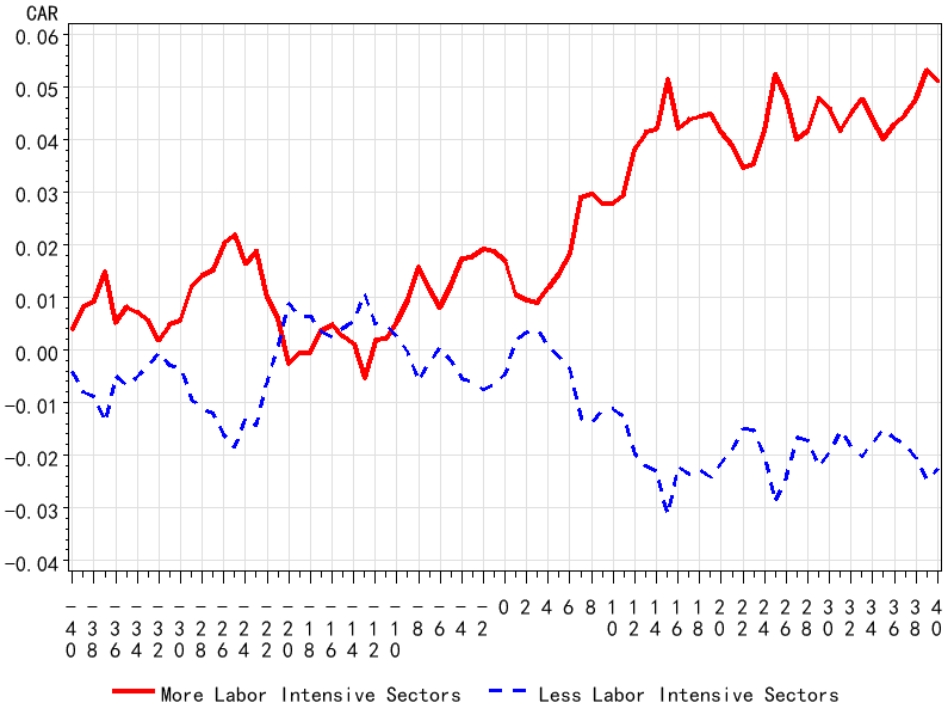
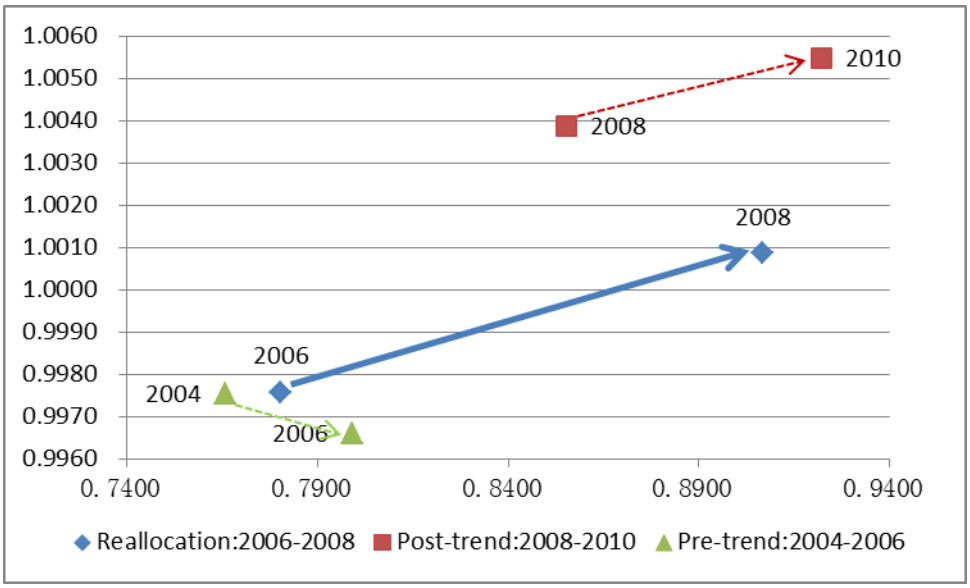


Figure 1. Market Reaction and Labor Intensity. The horizontal axis labels how many trade days away from 29 Jun 2007, the day the new law was adopted. The vertical axis shows the cumulative abnormal return where we use the value weighted return of all companies in our sample as the market return in calculation. Each line in the graph captures the value weighted mean of CAR.



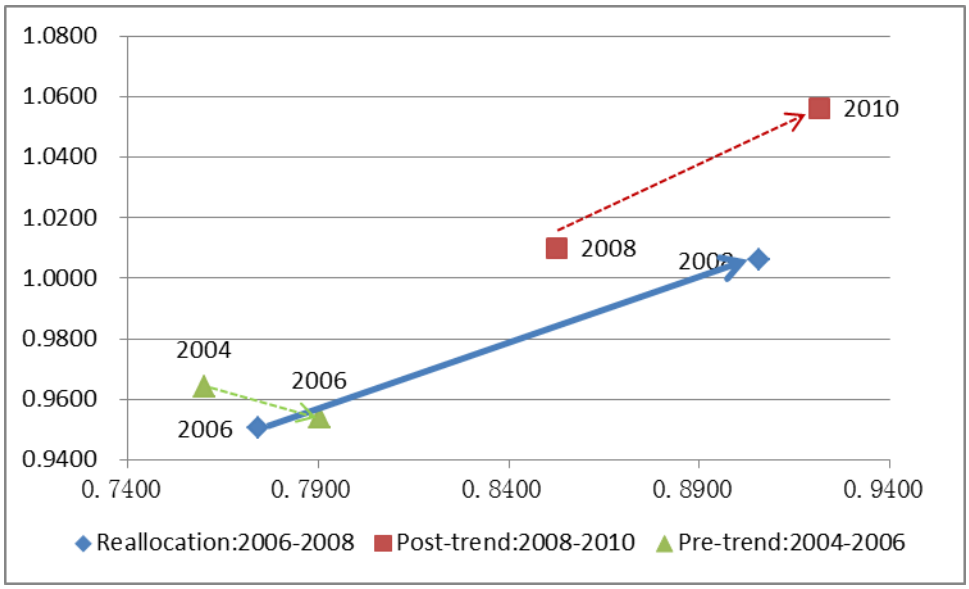


Figure 2. Reallocation Effect: Increasing Correlation between Firm Productivity and Market Share. Labor productivity and employee share are used in the upper graph (Figure 2a). LP productivity and employee share are used in the lower graph (Figure 2b).Only manufacturing industries. The compliant portfolio market share ratio between more and less labor intensive sectors are on the horizontal axis, and the compliant portfolio productivity share ratio between more and less labor intensive sectors are on the vertical axis.

Table 1 Summary Statistics on Listed Firms in the Sample

Sectors	**Variable**	N	Mean	Median	SD	Max	Min	P99	Mean*	P1	P95	Mean**	P5
		（1）	（2）	（3）	（4）	（5）	（6）	（7）	（8）	（9）	（10）	（11）	（12）
All	Assets (in billion RMBs)	1319	6.40	1.66	43.80	934	0.0002	58.40	3.71	0.12	11.40	2.75	0.32
	Revenue (in billion RMBs)	1309	3.53	0.94	29.70	1040	-0.0036	33.20	2.52	0.01	10.80	1.99	0.08
	Net Income (in billion RMBs)	1319	0.17	0.03	1.53	50.7	-2.78	2.76	0.12	-0.67	0.60	0.09	-0.13
	Employee	1307	3639	1692	10958	340886	1	37282	3346	25	12549	2829	106
	Labor Intensity	1269	0.103	0.082	0.078	0.553	0.037	0.553	-	0.037	0.193	-	0.050
	Users Top4Auditors /Non-Users	67/1251	-	-	-	-	-	-	-	-	-	-	-
	Central SOE/Local SOE/Private	232/581/402	-	-	-	-	-	-	-	-	-	-	-
More Labor	Assets	631	8.03	1.49	57.90	934	0.0002	76.20	3.52	0.11	11.10	2.57	0.27
Intensive	Revenue	622	2.12	0.81	5.81	80.5	-0.0036	21.00	1.95	0.01	6.83	1.64	0.05
Sectors	Net Income	631	0.11	0.03	0.50	7.1	-2.78	2.37	0.11	-0.60	0.57	0.08	-0.14
	Employee	623	2869	1264	5396	48086	1	25317	2819	19	11786	2407	74
	Labor Intensity	631	0.141	0.104	0.097	0.553	0.083	0.553	-	0.085	0.243	-	0.086
	Top4/Non-Top4 Auditors Users	37/591	-	-	-	-	-	-	-	-	-	-	-
	Central SOE/Local SOE/Private	104/280/199	-	-	-	-	-	-	-	-	-	-	-
Less Labor	Assets	638	5.06	1.87	25.50	595	0.0204	54.00	3.96	0.19	14.90	2.92	0.38
Intensive	Revenue	637	5.09	1.11	42.20	1040	0.0001	41.30	3.18	0.02	15.80	2.39	0.15
Sectors	Net Income	638	0.24	0.04	2.13	50.7	-1.93	3.62	0.14	-0.53	0.74	0.10	-0.12
	Employee	635	4535	2089	14722	340886	9	38720	3988	45	13834	3326	284
	Labor Intensity	638	0.065	0.065	0.009	0.082	0.037	0.082	-	0.037	0.081	-	0.05
	Top4/Non-Top4 Auditors Users	30/608	-	-	-	-	-	-	-	-	-	-	-
	Central SOE/Local SOE/Private	123/281/185	-	-	-	-	-	-	-	-	-	-	-

Note：Mean* and Mean** are the trimmed means after the sample is winsorized at the 1% and 5% on both ends, respectively.

Table 2: Relative CARs of Large and Labor Intensive Firms
Benchmark Measure, CAR[-5,10]

	Whole Sample	More Labor Intensive Firms	Less Labor Intensive Firms
	(1)	(2)	(3)
Dummy for More Labor Intensive Firms	-0.0207 (0.0491)		
Dummy for Large Firms (Assets above median)	-0.0009 (0.0143)	**0.0487***** **(0.0123)**	**-0.0019** **(0.0168)**
Dummy for Large Firms × Dummy for High Labor Intensity	**0.0481**** **(0.0204)**		
Stock Exchange Fixed Effect	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes
Province Fixed Effect	Yes	Yes	Yes
# Observation	1269	631	638
R-squared	0.088	0.152	0.084

Notes: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively.

Table 3: Continuous Assets or Continuous Labor Intensity

	Continuous Assets	Continuous Assets - Winsorized at 5%	Continuous Labor Intensity	Continuous Assets and Continuous Labor Intensity
	(1)	(2)	(3)	(4)
Labor Intensity	-0.331*	-0.597**	-0.245	-0.795**
	(0.195)	(0.237)	(0.220)	(0.360)
Firm Size by log (Assets)	0.00408	0.00258	0.158**	0.0841**
	(0.00673)	(0.00782)	(0.0771)	(0.0337)
Firm Size×Labor Intensity	**0.0160***	**0.0285*****	**0.0537***	**0.0274****
	(0.00878)	**(0.0108)**	**(0.0310)**	**(0.0137)**
Stock Exchange Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes
Observation	1269	1269	1199	1199
R-sq	0.090	0.093	0.082	0.088

Notes: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively. When continuous labor intensity is used, the agriculture sector is excluded as its labor share value is an obvious outlier; sectors with very few firms in the sample are also excluded to minimize the problem of collinearity. In all columns, continuous assets and continuous labor intensity are in log form. In Column 3 and Column 4, continuous labor intensity is winsorized at 10%. In Column 4, assets are winsorized at 1% level.

Table 4: Alternative Measures of Firm Size

	Dummy Revenue (Above Median)	Revenue (log)	Dummy Net Income (Above Median)	Net Income (log)	Dummy Employee (Above Median)	Employee (log)
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy for More Labor Intensive Firms	-0.0325	-0.388**	-0.00844	-0.366***	-0.0193	-0.0759
	(0.0488)	(0.156)	(0.0483)	(0.135)	(0.0488)	(0.0750)
Large Firms	-0.0133	0.00315	0.0189	0.00659	0.00500	0.00638
	(0.0143)	(0.00526)	(0.0140)	(0.00498)	(0.0147)	(0.00607)
Large firms x D_labor intensive	**0.0597*** **	**0.0192*** **	**0.0567*** **	**0.0217*** **	**0.0369***	**0.0101**
	(0.0206)	**(0.00722)**	**(0.0201)**	**(0.00704)**	**(0.0212)**	**(0.00803)**
Stock Exchange Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observation	1259	1259	1269	1104	1258	1268
R-sq	0.086	0.093	0.102	0.113	0.086	0.088

Notes: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively. The continuous measures of firm size (in Columns 2, 4 and 6) are winsorized at 1% level to filter out extreme values.

Table 5: Alternative Models to Compute CARs

	Models Used in Calculating CAR			
	Market= Value Weighted Average of All Firms	Market= Equal Weighted Average of All Firms	Three-Factor Model	Four-Factor Model
	(1)	(2)	(3)	(4)
Dummy_High Labor Intensity	-0.0302	-0.0389	-0.0204	-0.00920
	(0.0492)	(0.0494)	(0.0474)	(0.0483)
Dummy_Large Firms	-0.000651	-0.00632	-0.0244*	-0.0243*
	(0.0143)	(0.0144)	(0.0138)	(0.0141)
D_High Labor Intensity X D_Large firms	**0.0500****	**0.0488****	**0.0449****	**0.0481****
	(0.0204)	**(0.0205)**	**(0.0197)**	**(0.0201)**
Stock Exchange Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes
Observation	1269	1269	1269	1269
R-sq	0.083	0.073	0.063	0.067

Notes: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively. In Column 1 and 2, a market model is used to computer CARs, where the market is the average of all companies in our sample.

Table 6: Use of a Top Global Auditor as a Proxy for Prior Compliance

	Whole Sample	More Labor Intensive Firms	Less Labor Intensive Firms
	(1)	(2)	(3)
Dummy_High Labor Intensity	-0.0024		
	(0.0477)		
Dummy_ Use of Top Auditors	0.0109	**0.0978*** **	**0.0183**
	(0.0331)	**(0.0250)**	**(0.0386)**
D_use of top auditors × D_ High labor Intensity	**0.0826***		
	(0.0445)		
Stock Exchange Fixed Effects	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes
Observation	1268	630	638
R-sq	0.087	0.151	0.084

Notes: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively.

Table 7: A Horse Race among Ownership, Size, and Use of a Top Auditor

	Whole Sample	Whole Sample	More Labor Intensive Sectors	Less Labor Intensive Sectors
	(1)	(2)	(3)	(4)
Dummy for High Labor Intensity	-0.00553	-0.0162		
	(0.0499)	(0.0505)		
Dummy for Large Firms (by asset)		-0.00233	**0.0419*** **	**-0.00383**
		(0.0148)	**(0.0127)**	**(0.0174)**
D_ large firms × D_high labor intensity		**0.0423** **		
		(0.0211)		
Dummy for Use of Top 4 Auditors		0.0135	**0.0819*** **	**0.0203**
		(0.0336)	**(0.0252)**	**(0.0393)**
D_top auditors × D_ high labor Intensity		**0.0631**		
		(0.0453)		
Dummy for central government SOEs	-0.00288	-0.00329	0.0120	-0.00291
	(0.0207)	(0.0209)	(0.0180)	(0.0248)
D_ Central SOEs × D_high labor Intensity	0.00551	0.0192		
	(0.0159)	(0.0299)		
Dummy for local government SOEs	0.0307	0.00581	-0.00453	0.00478
	(0.0296)	(0.0162)	(0.0136)	(0.0191)
D_local SOEs × D_ high labor Intensity	0.00200	-0.00853		
	(0.0225)	(0.0229)		
Stock Exchange Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes
Observation	1269	1268	630	638
R-sq	0.082	0.094	0.168	0.084

Notes: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table.*, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively.

Table 8: Rates of Growth in Terms of Hiring, Sales and Profits from 2006 to 2008

	Employee	Revenue	Net Income
	(1)	(2)	(3)
Dummy for large firms (by asset)	0.0723**	-0.0117	-0.327
	(0.0339)	(0.0386)	(0.296)
D_large firms X D_ high labor Intensity	**0.101****	**0.103***	**0.853****
	(0.0480)	**(0.0551)**	**(0.421)**
Dummy for High Labor Intensity	0.00782	-0.201	-1.153
	(0.113)	(0.135)	(1.014)
Dependent Variable Past Growth Rate	0.0617	0.00439	0.0276**
Over 2003-2006	(0.0471)	(0.0495)	(0.0117)
N	1208	1253	1269
R-sq	0.092	0.090	0.067

Notes: 1. All dependent variables are the growth rate from 2006 to 2008, and are winsorized at the 5% at the top and the bottom; 2. Standard errors are in parentheses. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively. 3. Separate industry and province fixed effects and the constant are included but not reported. 4. In Column 1, the dependent variable is ln(Employee 2008)-ln(Employee 2006), and the average employee growth rate in past 3 years is (ln(Employee 2006)-ln(Employee2003))/3. Growth rate of revenue in Column 2 is calculated similarly; In Column 3, the dependent variable is Net Income 2008/Net Income 2006-1, and average net income growth rate in past 3 years is (Net Income 2004/Net Income 2003+Net Income 2005/Net Income 2004+Net Income 2006/Net Income 2005)/3-1.

Table 9: Association between Productivity and Proxies for Prior Compliance

	Labor Productivity				LP Productivity			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
D_Large Firms	**0.416*****			**0.398*****	**0.588*****			**0.554*****
(by asset)	**(0.036)**			**(0.038)**	**(0.034)**			**(0.035)**
D_Users of Top 4 Auditors		**0.508*****		**0.365*****		**0.699*****		**0.495****
		(0.077)		**(0.077)**		**(0.078)**		**(0.075)**
D_SOEs (Central			0.184***	0.100*			0.210***	0.109**
government)			(0.055)	(0.054)			(0.055)	(0.051)
D_SOEs (local			0.015	-0.064			0.107**	0.002
Governments)			(0.042)	(0.042)			(0.041)	(0.039)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Exchange Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observation	3662	3662	3662	3662	2143	2143	2143	2143
R-sq	0.289	0.273	0.267	0.296	0.888	0.876	0.873	0.891

Note: 2004-2006 listed company sample. Dependent variable for each column is productivity in log form. Column 1-4 uses listed firms in all industries, while Column 5-8 uses only manufacturing industries, since the LP productivity for listed firms are obtained by imposing procedure. Standard errors in parentheses. Constant is included in the regression but not displayed in the table. * Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Table 10: Decomposing Relative Growth in Labor Productivity over 2006-2008

Surviving Firms		Entering	Exiting	All
Within	Between	Firms	Firms	Firms
		More Labor Intensive Sectors		
0.220	0.090	0.036	-0.043	0.303
72.60%	29.54%	11.91%	-14.05%	100.00%
		Less Labor Intensive Sectors		
0.154	-0.095	0.205	-0.038	0.225
68.29%	-42.13%	90.89%	-17.05%	100.00%
		Difference b/w More and Less Labor Intensive Sectors		
0.066	**0.184**	-0.169	-0.004	0.078
85.05%	**236.71%**	-216.39%	-5.38%	100.00%

Note: Using dynamic Olley-Pakes Decomposition with entries and exits (Melitz and Polanec, 2012); Labor productivity are in logs and weighted by employee shares.

Table 11: Decomposing Relative Growth in TFP from 2006-2008

Surviving Firms		Entering	Exiting	All
Within	Between	Firms	Firms	Firms
		More Labor Intensive Sectors		
0.263	0.500	-0.084	0.032	0.710
36.99%	70.33%	-11.86%	4.54%	100.00%
		Less Labor Intensive Sectors		
0.144	-0.063	0.078	-0.049	0.111
130.30%	-56.82%	70.87%	-44.35%	100.00%
		Difference b/w More and Less Labor Intensive Sectors		
0.119	**0.563**	-0.163	0.081	0.600
19.77%	**93.79%**	-27.13%	13.56%	100.00%

Note: Using dynamic Olley-Pakes Decomposition with Entry and Exit (Melitz and Polanec, 2012); TFPs are computed by the LP method for manufacturing firms. TFPs are in logs and weighted by value added shares.

Table 12: Placebos Tests - Labor Productivity Growth Decomposition

Surviving Firms		Entering	Exiting	All
Within	Between	Firms	Firms	Firms
	Pre-Trend: Growth from 2004-2006			
	More Labor Intensive Sectors			
0.158	0.055	0.400	-0.056	0.557
28.39%	9.80%	71.87%	-10.07%	100.00%
	Less Labor Intensive Sectors			
0.095	0.037	-0.038	-0.031	0.062
153.30%	59.59%	-62.04%	-50.86%	100.00%
	Difference b/w More and Less Labor Intensive Sectors			
0.063	**0.018**	0.439	-0.025	0.495
12.79%	**3.58%**	88.61%	-4.97%	100.00%
	Post-Trend: Growth from 2008-2010			
	More Labor Intensive Sectors			
0.292	0.030	-0.024	-0.004	0.294
99.17%	10.28%	-8.10%	-1.35%	100.00%
	Less Labor Intensive Sectors			
0.261	0.039	-0.076	-0.011	0.213
122.27%	18.39%	-35.56%	-5.10%	100.00%
	Difference b/w More and Less Labor Intensive Sectors			
0.031	**-0.009**	0.052	0.007	0.081
37.99%	**-11.20%**	64.65%	8.56%	100.00%

See footnotes to Table 10.

Table 13: Placebo Tests - TFP Growth Decomposition

Surviving Firms		Entering	Exiting	All
Within	Between	Firms	Firms	Firms
	Pre-Trend: Growth from 2004 to 2006			
	More Labor Intensive Sectors			
0.170	0.189	-0.086	0.058	0.330
51.59%	57.20%	-26.24%	17.46%	100.00%
	Less Labor Intensive Sectors			
0.081	-0.004	0.020	0.014	0.111
72.91%	-3.69%	18.45%	12.32%	100.00%
	Difference b/w More and Less Labor Intensive Sectors			
0.089	**0.193**	-0.107	0.044	0.219
40.78%	**88.07%**	-48.90%	20.06%	100.00%
	Post-Trend: Growth from 2008 to 2010			
	More Labor Intensive Sectors			
0.232	0.105	0.090	0.016	0.443
52.38%	23.65%	20.25%	3.72%	100.00%
	Less Labor Intensive Sectors			
0.272	0.243	-0.048	-0.007	0.461
59.03%	52.84%	-10.32%	-1.55%	100.00%
	Difference b/w More and Less Labor Intensive Sectors			
-0.040	**-0.139**	0.137	0.024	**-0.018**
225.68%	783.88%	-776.05%	-133.52%	100.00%

See footnotes to Table 11.

Table 14: Social Insurance Contribution Rates and Differential Stock Price Reactions

		Provinces with High Social Insurance Rates			Provinces with Low Social Insurance Rates		
	Full Sample	Whole Sample	More Labor Intensive Sectors	Less Labor Intensive Sectors	Whole Sample	More Labor Intensive Sectors	Less Labor Intensive Sectors
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dummy for More Labor Intensive Firms	0.0106	-0.0867			0.0305		
	(0.0507)	(0.0875)			(0.0538)		
Dummy for Large Firms (by assets)	0.0182	-0.0258	**0.0612*** **	-0.0239	0.0247	**0.0364***	0.0267
	(0.0203)	(0.0235)	**(0.0171)**	(0.0289)	(0.0174)	**(0.0186)**	(0.0187)
Dummy for Provinces with High Fee Rates	0.1020**						
	(0.0482)						
D_labor intensive firms x D_large firms	0.0143	**0.0890*** **			**0.0100**		
	(0.0294)	**(0.0330)**			**(0.0255)**		
D_ Labor Intensive×D_High Fee Rates	-0.0707**						
	(0.0287)						
D_large firms×D_High Fee Rates	-0.0415						
	(0.0284)						
Triple Interactions	**0.0708***						
	(0.0403)						
Stock Exchange Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
# Observation	1252	630	323	307	622	304	318
R-squared	0.094	0.091	0.148	0.094	0.153	0.230	0.097

Notes: Standard errors are in parentheses. Constant is included in the regression but not reported. *, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively.

Table 15: Accounting for Political Connections

	Compliance Proxy: Dummy for Large Firms (By Assets)			Compliance Proxy: Dummy for Users of Top 4 Global Auditors		
	Political Connection 1	Political Connection 2	Political Connection 3	Political Connection 1	Political Connection 2	Political Connection 3
	(1)	(2)	(3)	(4)	(5)	(6)
Dummy More Labor Intensive Sectors	-0.0242	-0.0291	-0.0217	-0.00497	-0.00948	-0.00373
	(0.050)	(0.0498)	(0.0499)	(0.0486)	(0.0485)	(0.0485)
Dummy for Larger Firms (or Users of Top Auditors)	-0.0145	-0.0108	-0.00944	-0.00333	0.000323	-0.00251
	(0.0157)	(0.0155)	(0.0154)	(0.0365)	(0.0357)	(0.0364)
Dummy for Politically Connected Firms	-0.0498*	-0.0499*	-0.0395	-0.0127	-0.0172	-0.0111
	(0.026)	(0.0279)	(0.0283)	(0.0180)	(0.0191)	(0.0196)
Dummy for More Labor Intensive Sectors	**0.0541****	**0.0566****	**0.0494****	**0.0916***	**0.0926***	**0.0904***
× Dummy for Large Firms (or Users of Top Auditors)	**(0.023)**	**(0.0226)**	**(0.0227)**	**(0.0492)**	**(0.0482)**	**(0.0492)**
Dummy for More Labor Intensive Sectors	0.0336	0.0532	0.0196	0.0110	0.0280	0.00764
×Dummy for Politically Connected Firms	(0.0341)	(0.037)	(0.0368)	(0.0247)	(0.0263)	(0.0264)
Dummy for Large Firms (or Use of Top	0.0741**	0.0640*	0.0584	0.0787	0.0723	0.0771
Auditors)×Dummy for Political Connections	(0.0354)	(0.0377)	(0.0384)	(0.0876)	(0.0958)	(0.0878)
Triple Interaction Term	-0.0439	-0.057	-0.0266	-0.0495	-0.0595	-0.0467
	(0.0484)	(0.0514)	(0.0514)	(0.116)	(0.125)	(0.116)
Stock Exchange Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
# Observation	1269	1269	1269	1268	1268	1268
R-squared	0.092	0.091	0.091	0.088	0.089	0.088

Notes: Standard errors are in parentheses. Constant is included in the regression but not reported.*, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively.

Table 16: Restricting the Sample to Competitive Sectors

		Compliance Proxy: D. Large Firms (by Assets)			Compliance Proxy: D. Users of Top 4 Auditors		
		All	More Labor Intensive Sectors	Less Labor Intensive Sectors	All	More Labor Intensive Sectors	Less Labor Intensive Sectors
Competitiveness Measures	Selected Regressors	(1)	(2)	(3)	(4)	(5)	(6)
Low Concentration	Dummy for More Compliant Firms	-0.0147	**0.0476*** **	-0.0216	0.0395	**0.0871*** **	0.0548
		(0.0224)	**(0.0128)**	(0.0313)	(0.0480)	**(0.0266)**	(0.0678)
	Dummy for High Labor Intensity	**0.0607** **			**0.0449**		
	X Dummy for Compliant Firms	**(0.0273)**			**(0.0585)**		
Low Profit Margins	Dummy for More Compliant Firms	0.0187	**0.0553*** **	0.0231	-0.0522	**0.0830***	-0.0329
		(0.0195)	**(0.0181)**	(0.0221)	(0.0483)	**(0.0452)**	(0.0534)
	Dummy for High Labor Intensity	**0.0452***			**0.147** **		
	X Dummy for Compliant Firms	**(0.0269)**			**(0.0669)**		
High Trade Openness	Dummy for More Compliant Firms	0.0112	**0.0545** **	0.00355	-0.0245	**0.0326**	-0.0249
		(0.0162)	**(0.0223)**	(0.0166)	(0.0472)	**(0.0556)**	(0.0476)
	Dummy for High Labor Intensity	**0.0376**			**0.0648**		
	X Dummy for Compliant Firms	**(0.0267)**			**(0.0721)**		
Union of the above Three	Dummy for More Compliant Firms	-0.0000524	**0.0465*** **	-0.00262	0.00883	**0.0908*** **	0.0180
		(0.0151)	**(0.0126)**	(0.0181)	(0.0366)	**(0.0253)**	(0.0434)
	Dummy for High Labor Intensity	**0.0470** **			**0.0793***		
	X Dummy for Compliant Firms	**(0.0213)**			**(0.0478)**		

Note: The regression specifications are identical to those in Table 2, except that the regression samples are restricted to competitive sectors only. All regressions include separate industry, location, and stock exchange fixed effects. Definitions of competitiveness proxies are in the Data Source Appendix. Standard errors are in parentheses. Constant is included in the regression but not reported.*, **, and *** denote significant at the 10, 5 and 1 percent levels, respectively.

Data Source

Stock data: Daily close prices of both individual stocks and Hushen 300 Index are from Thomson Reuters Database. Data for assets, revenue, and net income of each stock in 2006 are derived from Thomson Reuters Database.

Sector level labor intensity: employee compensation /total inputs, derived from the 2005 Chinese Input Output Table, 42 sectors (China's National Statistics Bureau).

Firm ownership type: based on the identifying of actual controlling shareholder from the CSMAR Database.

Social insurance fee rates: Sum of the mandatory contribution rates for retirement insurance, unemployment insurance, medical insurance, work injury insurance, and birth insurance. Collected by the authors from the website of the government of the provincial capital in June 2013. (The 2007 law did not change the contribution rates.)

Political connected firms: CVs of CEO and Board Chairman for all listed firms in 2006 are collected from CSMAR database. Political Connection 1 =1 for all firms whose CEO or chairman of the board has previously worked in the military or the central or local government, or is a member of the National People's Congress (NPC) or the Chinese People's Political Consultative Committee (CPPCC). Political Connection 2 = Political Connection 1 – firms whose CEO or board chairman has had only an entry-level position in the military or the government. Political Connection 3 = Only firms whose CEO or Board Chairman has had a government or military position.

Low Concentration Industries. Of all non-manufacturing industries, we define finance, mining, and electricity, gas and water production and supply industries, which are dominated by majority state-owned firms, as non-competitive. For manufacturing industries, we compute industry-level HHI concentration index based on the revenue data in the Annual Surveys of Manufacturing Firms (which cover over 90% industrial value added), and define the top 25% of the manufacturing sectors in terms of HHI as non-competitive. Low concentration industries are the sum of low HHI manufacturing industries + competitive non-manufacturing industries.

Industry Level Profit margin: the median value of net incomes/revenue across all firms in a sector during 2003-2006. An industry is defined as having a low profit margin if the industry level profit margin is below the median.

Trade Openness = (exports+imports)/GDP by sector, derived from the 2005 Input Output Table.

Appendix Table 1: Sector Level Labor Intensity List

Input Output Code	Industry Name	Sector Level Labor Intensity	Number of Firms
1	Agriculture	0.553	27
32	Finance and Insurance	0.243	18
35	Science Research	0.233	1
37	Public Facility Management	0.217	10
40	Public Health, Social Insurance and Social Services	0.203	1
41	Culture, Sports and Entertainment	0.193	17
25	Water Production and Supply	0.171	7
30	Wholesale and Retail Trade	0.170	100
2	Coal Mining and Washing	0.167	18
26	Building	0.130	21
38	Resident Service and Other Service	0.128	15
8	Clothing and leather and feather products	0.119	18
21	Other Manufacturing	0.111	9
27	Transportation and warehousing	0.108	53
31	Hotel and Restaurants	0.104	8
34	Leasing and business services	0.103	4
33	The real estate industry	0.097	120
24	Gas production and supply	0.090	1
13	Non-metallic mineral products	0.088	38
29	Information transmission, computer services and software	0.087	31
16	General and special equipment manufacturing	0.086	84
20	Instrumentation and cultural office machinery manufacturing	0.085	6
10	Paper printing and stationery manufacturing industry	0.085	20
9	Wood processing and furniture manufacturing	0.083	4
4	Metal Mining and Washing	0.082	11
7	Textile	0.081	29
15	Metal Products	0.078	14
17	Transportation equipment manufacturing industry	0.075	62
18	Electrical, machinery and equipment manufacturing	0.074	41
23	Electricity, heat production and supply industry	0.066	58
12	The chemical industry	0.065	210
3	Oil and Gas Extraction	0.063	2
19	Electronic Communication Equipment and Computer Manufacturing	0.061	86
6	Food Manufacturing and Tobacco Products	0.058	60
14	Metal Smelting and Rolling Processing	0.050	52
11	Petroleum Processing, Coking and Nuclear	0.037	13
	Median across all firms	0.082	
	Mean across all firms	0.103	

Note: Authors' calculations based on China's Input Output Table of 2005. Sector level labor intensity is labor compensation divided by total inputs. The last column shows the number of companies in a sector. The sectors are listed in the descending ranking of labor intensity.

Appendix Table 2: Alternative Event Windows

	Event Window				
	[-1,5]	[-1,10]	[-1,20]	[-5,5]	[-5,20]
	(1)	(2)	(3)	(4)	(5)
Dummy Assets (Above Median)	-0.00972	-0.0161	-0.0481***	0.00519	-0.0325**
	(0.0111)	(0.0124)	(0.0132)	(0.0134)	(0.0140)
Dummy Assets × Dummy More Labor Intensive Sectors	0.0276*	0.0323*	0.0445**	0.0431**	0.0609***
	(0.0158)	(0.0176)	(0.0188)	(0.0190)	(0.0200)
Dummy More Labor Intensive Sectors	-0.0129	-0.0219	-0.0357	-0.0119	-0.0351
	(0.0381)	(0.0425)	(0.0452)	(0.0458)	(0.0481)
Stock Exchange Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes
Province Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observation	1269	1269	1269	1269	1269
R-sq	0.054	0.057	0.066	0.088	0.087

Note: Standard errors are in parentheses. Constant is included in the regression but not displayed in the table. * Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Appendix Table 3: Tabulations on Firm Ownership Types

Firm Ownership Type	Number	Percent of Total	Control Code
Central Government Owned Enterprise	232	17.59	2
Provincial Government Owned Enterprise	281	21.30	1
Municipal Government Owned Enterprise	300	22.74	1
Institution	25	1.90	.
Development zone	26	1.97	.
Collectively Owned Enterprise	33	2.50	.
China Mainland Private Firms	402	30.48	0
Hong Kong Private Firms	5	0.38	.
Taiwan-invested Private Firms	2	0.15	.
Foreign-invested Firms	13	0.99	.

Note: Data is derived from CSMAR database. Firm ownership type is based on the actual controller of the firm.

Appendix Table 4: Correlations between Key Regressors

	Sector Level Labor Intensity	Assets (log)	Dummy for Use of a Top 4 Auditor	Firm Ownership Type
Sector Level Labor Intensity	1	-0.05	-0.03	-0.04
Assets (log)		1	0.38*	0.27*
Dummy Top 4 Auditor			1	0.13*
Firm Ownership Type				1

Notes: Sector Level Labor Intensity = Labor Compensation/Total Input (continuous measure). Firm ownership type = 2 if central government SOE; 1 if local government SOEs; and 0 all others. * denotes significant at the 1% level.

Appendix Table 5: Observations by Key Regressors

		Firm Size (by asset)		Use of a top 4 auditor		Ownership		
		Below Median	Above Median	No	Yes	Private Firms	Local Govt SOEs	Central Govt SOEs
Sector Level Labor Intensity	Low	296	342	608	30	185	281	123
	High	339	292	593	37	199	280	104
Firm Size (by asset)	Small			653	5	274	230	99
	Large			598	62	128	351	133
Use of a Top 4 Auditor	No					394	551	209
	Yes					7	30	23

Note: Dummy Sector Level Labor Intensity=1 when a firm is in a more labor intensive sector (above median); Dummy assets=1 when a firm has above median assets; Dummy Top 4 Auditor=1 when hiring a Top 4 Auditor; Central SOE/Local SOE/Private Firm=2 when central SOE; Central SOE/Local SOE/Private Firm=1 when provincial/municipal SOE; Central SOE/Local SOE/Private Firm=0 when ordinary private firm.

Appendix Table 6: Productivity and Firm Characteristics- From Survey Data

	LP Productivity			Labor Productivity		
	(1)	(2)	(3)	(4)	(5)	(6)
Firm Size (log Assets)	0.154***			0.169***		
	(0.000801)			(0.000817)		
Dummy SOE		-0.645***			-0.701***	
		(0.00504)			(0.00513)	
Dummy Foreign Firms		0.0763***			0.275***	
		(0.00364)			(0.00371)	
Dummy HK Macao Taiwan Firms		-0.0483***			0.0154***	
		(0.00371)			(0.00378)	
Dummy Central SOE			0.511***			0.349***
			(0.0215)			(0.0201)
Dummy Provincial/Municipal SOE			0.0984***			-0.0201
			(0.0152)			(0.0143)
Dummy Export	0.0748***	0.170***	0.673***	-0.178***	-0.118***	0.372***
	(0.00251)	(0.00263)	(0.0190)	(0.00256)	(0.00268)	(0.0178)
Year Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Province Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observation	915498	915500	44319	916256	916258	44789
R-sq	0.297	0.282	0.266	0.146	0.130	0.143

Note: 2003-2006 unbalanced sample. Dependent variable for Column 1-3 is LP productivity in log form and for Column 4-5 is labor productivity. In Column 1 and 4, firm size variable is winsorized at 1% level. In Column 3 and 6, the sample used is only SOEs. Standard errors in parentheses. * Significant at the 10 percent level. Constant is included in the regression but not displayed in the table. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Appendix Table 7: Firm Size, Firm Ownership and Productivity: From Survey Data

	Productivity (log)	
	Labor	LP
	(1)	(2)
Assets (log)	0.135***	0.135***
	(0.000983)	(0.000968)
Dummy SOE	-1.462***	-1.726***
	(0.0280)	(0.0277)
Dummy Foreign Firms	-1.639***	-1.161***
	(0.0248)	(0.0244)
Dummy HK Macao Taiwan Firms	-1.179***	-0.964***
	(0.0268)	(0.0264)
Assets × Dummy SOE	0.0687***	0.100***
	(0.00274)	(0.00272)
Assets × Dummy Foreign Firms	0.176***	0.110***
	(0.00240)	(0.00237)
Assets × Dummy HK Macao Taiwan Firms	0.110***	0.0822***
	(0.00264)	(0.00259)
Dummy Export	-0.202***	0.0877***
	(0.00265)	(0.00260)
Year Fixed Effect	Yes	Yes
Industry Fixed Effect	Yes	Yes
Province Fixed Effect	Yes	Yes
Observation	916256	915498
R-sq	0.177	0.317

Note: 2003-2006 unbalanced sample. Firm size variable is winsorized at 1% level. Standard errors in parentheses. Constant is included in the regression but not displayed in the table. * Significant at the 10 percent level. ** Significant at the 5 percent level. *** Significant at the 1 percent level.

Appendix Table 8: Comparison Between Firms in Listed Data and Survey Data

Variables	Obs.	Percentile 1%	Percentile 5%	Percentile 25%	Percentile 50%	Percentile 75%	Percentile 95%	Percentile 99%	Mean
Assets (Listed data)	692	243,926,073	413,562,263	881,967,618	1,621,530,598	3,212,313,616	10,025,803,000	38,002,616,982	3,542,343,066
Assets (Survey data)	266,567	1,290,000	2,514,000	6,510,000	14,321,000	37,575,000	220,091,000	968,333,000	78,387,471
Employee (Listed data)	692	65	378	1,105	2,150	4,251	13,405	31,104	3,882
Employee (Survey data)	266,567	12	21	50	97	200	740	2,285	232
Revenue (Listed data)	692	68,655,538	191,888,841	530,390,762	1,109,033,382	2,534,253,615	12,730,978,381	34,104,906,066	3,141,097,913
Revenue (Survey data)	266,567	2,795,000	5,250,000	10,362,000	22,149,000	54,516,000	266,419,000	1,083,393,000	98,450,228
Value added (Listed data)	692	9,239,095	26,556,286	87,586,338	190,462,184	410,747,436	1,829,032,579	4,862,756,312	500,671,274
Value added (Survey data)	266,567	358,000	1,099,000	2,738,000	6,132,000	15,676,000	77,566,000	297,052,000	26,700,254

Note: All in manufacturing industries. Delete the firms which have value added<=0 or employee<8.

Appendix Table 9: Summary Statistics on Capital to Labor Ratios

Stat	Industry	Year	Obs.	Mean	Median	SD	Percentile 5%	Percentile 25%	Percentile 75%	Percentile 95%
Capital to Labor Ratio	Manufacturing	2006	815	544,797	219,715	3,208,599	47,689	121,308	399,438	1,015,842
Capital to Labor Ratio	Manufacturing	2008	927	540,981	235,192	2,544,008	62,899	135,573	444,262	1,318,646
Capital to Labor Ratio	All	2006	1405	1,136,655	241,199	10,215,501	43,847	124,172	492,457	2,418,676
Capital to Labor Ratio	All	2008	1600	1,460,796	259,142	21,944,331	52,222	137,194	532,510	2,619,417

Appendix Table 10: t-test on Capital to Labor Ratio

Mean 2006 (1)	Mean 2008 (2)	Diff (3)	t-value (4)	p-value (4)
	For All Listed Firms			
1,136,655	1,460,796	-324,140	-0.530	0.598
	For Manufacturing Listed Firms			
544,797	540,981	3,816	0.030	0.978

Note: We also check the compliant (non-compliant) subgroup, more (less) labor intensive subgroup and so on. All of these t-tests are insignificant.

Appendix Table 11: Testing for Constant Returns to Scale
(The null hypothesis: sum of the labor and capital shares = one)

Coefficient on Labor	Coefficient on Capital	Wald test (Chi-Square)	P-value
(1)	(2)	(3)	(4)
For Firms whose Size is Comparable to Listed Firms (Assets above the 90th Percentile)			
0.146	0.013	1299.29	0.000
(0.004)	(0.114)		
For All Firms			
0.201	0.424	1.60E+05	0.000
(0.001)	(0.001)		

Note: Data from 2003-2006 Manufacturing Survey Data. TFP, labor and capital are in logs. For the first two columns, standard errors are in parentheses. In Column 3, Wald test for constant returns to scale is shown. And Column 4 presents the p-value of the Wald test.

Appendix Table 12: Summary Statistics on Social Insurance Fee Rates and Competitiveness Proxies

	Mean	Median	Std Dev	Max	Min	P95	P5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Social Insurance Fee Rates	0.307	0.313	0.035	0.370	0.234	0.370	0.234
Total Trade	0.2678	0.2366	0.2879	2.3699	0.000	1.013	0.000
HHI (for manufacturing industries)	0.0019	0.0017	0.0015	0.0067	0.0007	0.007	0.001
Profit Margin (distribution over median level in each Industry)	0.0404	0.0363	0.0367	0.1852	-0.0993	0.0839	0.0140

Note: The social insurance fee rates are across provinces. The three competitive measures are across sectors.