Employment Protection, Productivity and Debt Reduction†

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Abstract

We exploit the adoption of U.S. state-level employment protection laws to study the effect of increased firing costs on the productivity of US exchange listed firms. We find that an exogenous increase in firing cost increases productivity and reduces inefficiency for those firms where financial leverage is crowded out by increased operating leverage. Firms achieve higher productivity by reducing capital expenditures, reducing employment and refocussing on innovation. Ultimately, we show that employment protection can boost productivity growth conditional. Firms that trade-off their financial leverage in favour of operating leverage and are able to reorganise their production process are likely to experience the largest productivity gains.

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'Productivity isn't everything, but in the long run it is almost everything. A country's ability to improve its standard of living over time depends almost entirely on its ability to raise its output per worker'

Paul Krugman

The Age of Diminishing Expectations, 1994

I. Introduction

Productivity growth has slowed down in the US. Considering the tremendous productivity growth of the 1990s in the US, the current slowdown in productivity growth has long been a source of is a concern. Labour productivity grew at a meagre rate of 0.8% over the period of 2010 to 2018 (Sprague, 2021). The total factor productivity (TFP) growth in the US has also suffered during recent years. In contrast to a 2% TFP growth per year over the period of 1992 to 2004, there was a decline in TFP at an average rate of 0.3% per year over the period of 2004 to 2016 (Brill et al., 2018). The historically low rates of productivity growth in the recent years have limited potential gains in worker compensation and living standards (Sprague, 2017). Previous studies show that providing employees with job security can increase productivity (Belot et al., 2007, Autor et. al., 2007, Griffith & Macartney, 2014, Acharya et al., 2014).

In this study, we examine the effect of employment protection on productivity. We do this by examining the productivity gains (or losses) for U.S. exchange listed firms following state-level staggered adoption of Wrongful Discharge Laws (WDLs) by U.S. state courts. WDLs matured into three common law exceptions to "at-will employment" in an effort to protect employees against wrongful termination. We study the impact of the largest and most far-reaching deviation from the employment-at-will doctrine – good faith exception (Dertouzos and Karoly, 1992; Kugler and Saint-Paul, 2004; Serfling, 2016). This law reads a covenant of good faith and fair dealing into every employment relationship (Muhl, 2001). In its broadest sense, this exception applies when a court determines that an employer discharged a worker out of bad faith, malice, or retaliation. In these cases, employees can recover contractual losses and punitive damages.[1] Fundamentally, employment protection laws represent increased firing costs for firms, increasing the permanence of the labour component in the firm's operating cost (Miles, 2000; Autor, 2003).

[1] For an extensive overview of the employment-at-will doctrine see Feinman (1976), Morriss (1994, 1995), Ballam (1999), Muhl (2001), Autor (2003), Kugler and Saint Paul (2004) and Autor et al. (2006).

From a theoretical perspective, the effect of the adoption of employment protection laws on firm productivity is ambiguous, and previous empirical evidence is inconclusive. Increased employment protection can increase productivity. Employment protection lowers the threat of dismissal among workers. Such job security could increase workers' efforts towards innovation and acquiring firm specific skills, leading to an increase in productivity (Belot et al., 2007, Griffith & Macartney, 2014, Acharya et al., 2014). Increased employment protection can also incentivize workers to invest more in firm-specific capital, leading to higher investment rates (Bai et al., 2020). Autor et al. (2007) find that enhanced employment protection spurs an increase in capital investment and employment, leading to a rise in labour productivity.[2] On the other hand, increased employment protection can cause workers to indulge in opportunistic behaviour, such as shirking, reduced employee effort, resulting in lower productivity (Besley & Burgess, 2004, Autor et al., 2007, Francis et al., 2018) and labour market rigidity (Simintzi et al., 2015).[3]

Previous literature has already highlighted that increased labour protection has substantial firm-level effects. Labour protection laws have significant effects on wages (Van der Wiel, 2010), employment (David et al., 2004, Autor et al., 2006), barriers to entry (Dertouzos and Karoly, 1992), investment (Bai et. al., 2020), innovation (Bena et al., 2021), human capital (Conti and Sulis, 2016), firm entry/exit (Koeniger and Prat, 2007) and financing (Simintzi et al., 2015, Serfling, 2016; Bai et al., 2020). Furthermore, following the adoption of WDLs, firms experience negative cumulative abnormal stock returns (Serfling, 2016). In particular, firms that are more indebted are bound to suffer the ill effects of stringent labour protection (Calcagnini et al., 2009). Following an increase in employment protection, indebted firms face higher adjustment costs in reshaping their production process.

Debt financing plays a strategic role in determining how increased employment protection laws affects productivity (Hennessy and Livdan, 2009; Matsa, 2010). Aghion et al. (2010) find that financial flexibility allows firms to stimulate long-term productivity enhancement. Moreover, firm-level innovation and productivity growth are sensitive to cost of financing and this sensitivity increases as financing becomes costlier (Levine and Warusawitharana, 2021). Simintzi et al. (2015) and Serfling (2016) argue that firms react to an

[2] Autor et al. (2007) study establishment level data and provide direct evidence on the impact of WDLs on employment adjustments. They examine establishment-level production choices and realized productivity, however due to two puzzles (adoption of the good faith exception after an investment downturn and larger than plausible employment growth) their results remain inconclusive. To the best of our knowledge our study is the first that examines the effect of WDLs on productivity for large exchange listed US firms.

[3] In section II we provide a more detailed discussion of the theoretical considerations with regards to the ambiguous effect of WDLs on productivity.

increase in employment protection by reducing financial leverage. Higher firing costs reduce optimal leverage ratios by increasing a firm's likelihood of becoming financially distressed through higher operating leverage. Serfling (2016) shows that firms offset the increased chances of financial distress by reducing their financial leverage. Ultimately, the consequence of increased labour protection and increased firing costs is that financial leverage is crowded out by increased operating leverage.

Similar to previous studies, we utilize the quasi-natural experiment created by the staggered adoption of the good faith exception in the US states to test the competing theories regarding the effect of WDLs on productivity. For our tests, we utilize a difference-indifference research design in which we contrast firms that are headquartered in states that have and have not adopted the good faith exception. Additionally, we identify a treatment and control group depending on whether or not firms reduce their debt levels following the state-level adoption of the good faith exception. Our treatment group is comprised of "debt-reduction" firms; these firms reduce their debt levels to offset the increased operational leverage (Serfling, 2016). We argue that firms that absorb the increased firing costs by reducing their debt will not suffer the negative consequences of increased labour protection and hence face lower adjustment costs in reshaping their production processes (Calcagnini et al., 2009). Firms that have reduced their financial leverage are expected to experience higher productivity gains compared to those that are unable to absorb the higher firing costs. We identify two primary channels through which firms can then achieve higher productivity outcomes. Firms that reduce their debt following the introduction of state-level WDLs can either adjust their production process by altering their capital and labour inputs or focus their efforts on innovative avenues.

We use firm-level data for US exchange listed firms over the period 1978-2003. We begin our analysis by estimating production functions at the firm-level using the semi-parametric method by Olley and Pakes (1995) and Rovigatti and Mollisi (2018) to construct a panel of TFP estimates for US exchange-listed firms (as in İmrohoroğlu and Tuzel, 2014). As an alternative to TFP, we use an inefficiency proxy obtained by estimating stochastic frontier functions (Kumbhakar et al., 2014). Additionally, we use standard measures of labour and capital productivity. We then exploit temporal- and cross-sectional variation to understand the impact of WDLs on productivity outcomes. All estimations control for firm fixed effects, age fixed effects, state fixed effects and industry-year fixed effects and contain additional state-year control variables. We cluster our standard errors at the firm level to account for the variation in WDLs at the state level (following Bertrand et al., 2004; Serfling, 2016).

We find that the adoption of the good faith exception only has a limited effect when debt reductions are left unaddressed in the analysis. Increased employment protection has a significant positive effect on labour productivity. Our results show that the adoption of good faith exception boosts labour productivity by 2.1 percent. We find that the majority of this boost in productivity is realized approximately 3 to 5 years after the introduction of the good faith exception. When distinguishing between firms that reduce their debt following the good faith introduction and those who do not, we find that firms that reduce their debt have a TFP gain of approximately 4 percent. These firms reduce their inefficiency by approximately 3.3 percent, increase their labour productivity by approximately 3.5 percent and raise their capital productivity by approximately 3 percent. We find that "debt reduction" firms realize these productivity gains by reducing capital expenditures, reducing employment and increasing R&D expenses. We show that it is firms with limited growth opportunities significantly reduce employment and refocus their production on more innovative ventures.

To draw causal claims from our analysis, our experiment must satisfy the assumption that in the absence of WDL adoption, the average change in productivity would have been the same for all firms. We show that our results are robust to several econometric concerns. Firstly, the adoption of the good faith exception could be spuriously correlated with underlying economic factors. Therefore our analysis corrects for state-level macro-economic factors such as state-level GDP, state-level unemployment shocks and labour force shocks. We also correct for state-level political balance, union coverage and union membership. To further address this concern and mitigate any omitted variable bias, we show that our results are robust to the inclusion of state-year fixed effects.

Secondly, a problem for our analysis could be the potential lobbying activities that could influence a state's court decision to recognize these laws. This concern is not likely a large problem because the recognition of WDLs is based on judicial rather than legislative decisions (Autor 2003; Acharya, Baghai, and Subramanian 2014; Bai et al., 2019). Additionally, we find that the impacts on our productivity outcomes appear only after and not before the adoption of the good faith exception, this alleviates any concern of reverse causality. A third concern is that firms headquartered in states that adopt the good faith exception are fundamentally different from those headquartered in states that do not adopt the exception. We eliminate potential disparities by using an entropy balancing methodology following Hainmueller (2012).

A fourth concern is that our findings for "debt reduction" firms are driven by some random chance. To alleviate this concern, we conduct a placebo test in which we randomly select firms that reduce their debt following the state-level adoption of employment protection. We find that it is highly unlikely that our results are driven by random chance. A fifth and final concern might be that our identification of debt reductions is only an indirect measure of the degree to which firms offset the increased operating leverage. To alleviate this concern we construct an alternative treatment group comprised of firms that (a) reduce their debt and (b) increase their operating leverage following the state-level adoption of the good faith exception. We find that all our results hold.

Overall, this paper makes four contributions. First, we contribute to the literature that studies the effect of WDLs on productivity. This literature documents a tentative negative relation between employment protection and productivity (Autor et al., 2007, Okudaira et al., 2013). The closest related study is Autor et al. (2007) who find that the adoption of WDLs increases dismissal costs and reduces plant-level productivity. However, their findings are nuanced by a strong contemporaneous growth in employment leading to inconclusive results. We show that at the firm-level, productivity increases conditional on the degree to which increased operational leverage is offset by debt reductions. Ultimately, our results highlight that for large exchange-listed US firms WDLs can spur productivity and force firms to adjust their production process. Second, we contribute to the literature that studies corporate outcomes following the introduction of WDLs (Van der Wiel, 2010; David et al., 2004; Autor et al., 2006; Autor et al., 2007; Bai et. al., 2020; Bena et al., 2021; Koeniger, 2005; Simintzi et al., 2015, Serfling, 2016; Bai et al., 2020). Third, we contribute to the literature showing the adverse effects of excessive indebtedness on firm-level growth (Berger and Di Patti, 2006, Coricelli et al., 2012). We show that debt reductions following an exogenous increase in firing (dismissal) costs can aid firms to spur productivity, by restructuring their production process and reducing inefficiencies. Fourth, our findings provide insights for policy makers regarding the net productivity effect of increasing employment protection. Obviously, employment protection laws benefit workers by protecting them from unexpected or unjust dismissal; however, our analysis shows that the broader economic advantages such as productivity increases and inefficiency reductions may be substantial.

II. Theoretical considerations

A. Wrongful Discharge Laws

Historically, the US had a long tradition and legal presumption that workers and employers can terminate their employment relationship at any time. This legal doctrine is usually referred to as employment-at-will, allowing the employment relationship to be terminated without notification, financial penalty or demonstration of cause by the employer. Between 1972 and 1992, the vast majority of US states adopted one or more common-law exceptions to the "at-will" doctrine, these exceptions are traditionally classified into three categories; (a) the good faith exception; (b) the public policy exception; and (c) the implied contract exception.[4] In our subsequent discussion we will solely focus on the importance and impact of the good faith exception.[5] We choose to focus on the good faith exception as this constitutes the most significant departure from the "at-will" doctrine (e.g., Dertouzos and Karoly 1992; Kugler and Saint-Paul 2004).

The good faith exception reads a covenant of good faith and fair dealing into every employment relationship (Muhl, 2001). The law comes into play when a court finds that an employer has unjustly discharged a worker. This means that employees have both a contract and tort cause of action under the good faith exception. Employees can thus recover compensation for punitive damages and emotional distress when fired without cause, with malice or out of retaliation. The monetary consequence for employers of an unjust firing can be significant, as punitive damages tend to be a large percentage of settlement awards. More importantly, punitive damages exposes firms to a significantly larger liability as a jury determines these damage awards without a clear formula. Table 1 provides an overview of the staggered adoption of the good faith, public policy and implied contract exception.

That the introduction of WDLs such as the good faith exception is costly for firms is evidenced on multiple fronts. Jung (1997) shows that, on average, successful plaintiffs recovered $1.29 million through court awarded settlements. Boxold (2008) documents plaintiffs recovering a maximum of $5.4 million over the period 2001-2007. Overall, WDLs prompt filing of tens of thousands lawsuits every year and can cost firms hundreds of thousands of dollars (Jung, 1997; Dertouzos et al., 1988). However, there are also indirect costs that result from these laws. For example, following the adoption of these laws firms face higher firing costs, resulting in lower employment levels (Autor, 2003; Autor et al., 2007), higher labour expenses (Bird and Knopf, 2009), increased capital costs (Li et al., 2022), reduced investment (Bai et al., 2019) and reduced sales growth (Bai et al., 2019). Summarizing the adverse effects,

[4] For detailed discussion of the evolution of the employment-at-will doctrine, see Morriss (1994, 1995), Autor (2003), Kugler and Saint Paul (2004), Autor et al. (2006) and Autor et al. (2007)

[5] See Dertouzos and Karoly (1992), Miles (2000), and Autor, Donohue, and Schwab (2006) for a more in-depth discussion of the implied contract and public policy exceptions.

Serfling (2016) reports that firms, on average, lose 4.3 -5.0 million dollars of their market value following the state-level adoption of the good faith exception.

[Insert Table 1]

B. Employment protection and productivity

Given that employment protection laws can be very costly for firms, the question is how these laws affect firm-level productivity. Broadly, the literature distinguishes two strands through which employment protection can affect productivity. First, in the *standard competitive model* of the labour market, employment protection can be equated to mandated employment benefits. These benefits raise the cost of employing workers, as future dismissal costs increase. When workers are dismissed employment protection in its simplest form requires the employer to pay for the dismissal. This increased hiring and firing cost, causes an inward shift in labour demand (ceteris paribus). If workers value the employment protection at its marginal costs then labour supply shifts to offset the reduced demand, causing wage reductions (Summers, 1989; Lazear 1990).

The aforementioned mechanism assumes that the introduction of employment protection induces Coasian bargaining (i.e. there are no efficiency costs). However, if workers value the employment protection at less than the marginal costs a deadweight loss is increased. In this case, an inefficient situation will arise in which workers and employers continue the relationship as long as the present value of the worker's productivity short-fall is less than the deadweight loss. On the other hand, more efficient employment protection – that is, protection that workers value at more than its costs – can allow for more efficient labour markets. That is, employment protection can be efficiency-enhancing. In the Coasian model, this would imply that employment protection can prompt employers to hire more productive labour. The standard competitive model has ambiguous predictions about employment protection and productivity. If employment protection causes firms to retain unproductive workers, this will cause a decline in labour productivity. On the other hand, firms hiring more productive workers and firms redesigning their production process and changing their capital-labour ratios may offset this.

A second strand – of macroeconomic literature – views employment protection through the Diamond-Mortensen-Pissarides *equilibrium unemployment model* (Mortensen and Pissarides, 1994; Kugler and Saint Paul, 2004). Similar to the competitive model, increased firing costs limit efficient separation between employers and workers as employers reduce the threshold productivity at which firms are willing to dismiss workers. However, in an equilibrium unemployment setting, worker-firm matches will generate quasi-rents and the deadweight loss from the employment protection will be exacerbated. As increased firing cost reduce the firms' hiring, wage demands tend to increase, increasing the threshold productivity at which firms are willing to hire. This induced rise in reservation productivity then leads to an increase in productivity since less productive matches are crowded out (Autor et al., 2007). Again, in this model the net effects are ambiguous. Ultimately, with increased firing costs, firms have to decide between firing unproductive workers and pay dismissal costs or to keep losing money by retaining them (Saint-Paul, 2002).

The empirical literature examining the effect of employment protection on productivity is inconclusive. Previous studies find that an exogenous increase in firing costs reduce efficiency and adversely affect productivity at the industry level (Autor et al., 2007, Bassanini et al., 2009). Across the board, studies have shown that employment protection reduces hiring (e.g. Autor et al., 2007) and can motivate workers to file more wrongful termination lawsuits, discrimination claims, increasing the legal liability and implicit costs for firms (Dang et al., 2021). As a result, higher employee discharge costs run the risk of making labour adjustment costs more fixed in nature and increase distress risk (Serfling, 2016). It also becomes costlier for firms to divest from poorly performing projects (Bertola and Caballero, 1994, Abel et al., 1996, Bai et al., 2020). If firms choose to continue the employment relationship to avoid incurring dismissal costs, employment levels adjust at a lower speed and productivity suffers (Bassanini et al., 2009).

Other studies have also documented productivity enhancing effects of employment protection legislation. Lower threat of dismissal could increase workers' efforts, leading to an increase in productivity (Belot et al., 2007, Griffith & Macartney, 2014, Acharya et al., 2014). On the other hand, recent literature finds that some firms when faced with stringent labour protection laws adjust their production methods to invest more in innovative technologies and boost their productivity (Belot et al., 2007, Bai et al., 2020, Bena et al., 2021). Even though firms may be forced to retain some unproductive workers to prevent paying dismissal costs automatically leading to a decline in labour productivity, it can be offset by the possibility of firms screening new hires stringently, leading to a favourable compositional shift in the productivity of the employed workforce (Autor et al., 2007). Another important channel through which Employment protection laws can increase productivity growth is by spurring productivity enhancing investments (Koeniger, 2005). For a sample of OECD countries, Nickell and Layard (1999) and Koeniger (2005) find a weak positive relation between employment protection laws and TFP and R&D intensity. Bena et al. (2021) show that increased firing costs increase firms' incentive to innovate and to restructure their production process.

The effect of the adoption of WDLs on productivity remains largely ambiguous. Autor et al. (2007), who look at the effect of employment protection on job flows and productivity for establishment-level data, call the increased dismissal costs a tax on firing, which prevents workers from getting fired, but also reduces hiring. These laws could also motivate workers to file more wrongful termination lawsuits, discrimination claims etc., increasing the legal liability and implicit costs for firms (Dang et al., 2021). As a result, higher employee discharge costs run the risk of making labour adjustment costs more fixed in nature and increase distress risk (Serfling, 2016). Indebted firms that find it difficult to adjust their production process, by adjusting capital and labour inputs, are thus more sensitive to the adverse consequence of the introduction of the stringent employment protection. Such firms are less likely to adjust their workforce in response to prevailing economic conditions, e.g., discharging employees during economic downturns (Serfling, 2016). The adverse effect on productivity of mandatory dismissal regulations and increased adjustment costs is more pronounced for industries with stricter layoff restrictions (Bassanini et al., 2009, Calcagnini et al., 2009).

C. Debt reduction, employment protection and productivity

Now that we know that the theoretical relation between employment protection and productivity is at the very least ambiguous, it is important to examine the role of debt and financial leverage reductions in this matter. Labour protection increases the hiring and firing costs that firms face and debt financing plays a strategic role in determining how increased employment protection laws affects productivity (Hennessy and Livdan, 2009; Matsa, 2010). Aghion et al. (2010) find that financial flexibility allows firms to stimulate long-term productivity enhancement. Moreover, firm-level innovation and productivity growth are sensitive to cost of financing and this sensitivity increases as financing becomes costlier (Levine and Warusawitharana, 2021). Ultimately, the firms that are more indebted are bound to suffer the ill effects of stringent labour protection (Calcagnini et al., 2009). Following an increase in employment protection, indebted firms face higher adjustment costs in reshaping their production process.

Highly levered firms are more focused on generating cash flows to service their debt, reducing their incentive to invest anew in productive investments (Coricelli et al., 2012). For indebted firms, that depend more on external capital to fund investments, the greater investment irreversibility and low recovery value of non-profitable projects (Bai et al., 2020). Even though investing in new technologies may enhance productivity, for highly indebted firms already suffering from a debt overhang problem, higher firing costs serve to increase distress risk (Bartelsman et al., 2004, Kahl et al., 2014, Serfling, 2016). According to the trade-off theory, there are benefits of debt including interest tax shields and mitigation of agency problems, when correctly balanced against bankruptcy costs but these net benefits decline as leverage becomes high (Kraus and Litzenberger, 1973, Jensen, 1986). Coricelli et al., (2012) finds that there exists an optimal leverage level that maximises firm-level productivity gains. They show that TFP growth increases with leverage until the latter reaches a critical threshold beyond which leverage lowers TFP growth. Simintzi et al. (2015) and Serfling (2016) argue that firms react to an increase in employment protection by reducing financial leverage. Higher firing costs reduce optimal leverage ratios by increasing a firm's likelihood of becoming financially distressed through higher operating leverage. Serfling (2016) shows that firms off-set the increased chances of financial distress by reducing their financial leverage.

Ultimately, the consequence of increased labour protection and increased firing costs is that financial leverage is crowded out by increased operating leverage. When firms reduce their debt following the introduction of employment protection legislation the debt-reduction lowers the debt overhang, reduces (potential) distress risk (costs) and allow firms to absorb the higher firing cost. The implication here is that when financial leverage is crowded out by increased operating leverage, firms effectively reduce their risk. These firms are then more flexible to adjust their production process by altering their capital-to-labour ratios and focus more on innovative avenues. As such we predict that "*debt-reduction*" firms will exhibit higher productivity gains in the wake of the introduction of employment protection laws.

III. Data and Empirical Strategy

A. Sample selection

We use CRSP/Compustat Merged data for firms headquartered in the United States for the years 1969 to 2003. Similar to Bai et al. (2019), we begin our sample period 5 years before the earliest enactment of the good faith exception by New Hampshire in 1974 and end 5 years after the last event when Louisiana adopted the good faith exception in 1998. We then exclude utility firms (SIC codes 4900–4999) and financial firms (SIC codes 6000–6999). We further require that firms have at least 2 years of data to include fixed effects and that 3-digit SIC industries have at least two observations in a given year to estimate the industry-year fixed effects.

We then further restrict our sample to have all the necessary information for our variables of interest. We observe treated firms (those headquartered in states that adopt the good faith exception) only five years before until five years after the adoption, we do this to make sure that our results are not driven by long-run dynamics that may affect productivity outcomes. We observe our control group throughout the period. The most significant sample restriction is imposed by the requirement of data availability in Compustat for the number of employees to estimate total factor productivity, labour productivity and inefficiency. Ultimately, our main sample for analysis spans the period 1978 to 2003. In our sample, the states of Connecticut and California are then the first states to adopt the good faith exception in June and October 1980 respectively (Bai et al., 2019). As a consequence of data limitations, our sample excludes Massachusetts (insufficient data availability) and New Hampshire (the 1974 good faith adoption was overturned in 1980, see Muhl (2001)). Our final sample consists of 50,861 firm-year observations and 5,977 unique firms. Appendix A lists all our variables and definitions.

B. Empirical strategy

We utilize a quasi-natural experiment and using the state-level staggered adoption of the good faith exception, we employ a difference-in-difference design. Specifically, we are interested in the productivity outcomes - following the adoption of good faith exception - on "debt-reduction" firms. We estimate the following panel regression model:

$$y_{i,s,t} = \alpha_1 GF_{st} + \alpha_2 GF_{st} * (DR_i) + \alpha_3 IC_{st} + \alpha_4 PP_{st} + \beta X_{ist} + \upsilon_i + \varepsilon_{ist} \quad (1)$$

where $y_{i,s,t}$ is a specific measure of productivity at firm *i* in state *s* and at time *t* and GF_{st}, IC_{st}, PP_{st} are indicator variables for whether the state in which a firm is head quartered has adopted an employment-at-will exception. The regression model also includes a set of firm-specific and state-specific control variables (X_{ist}), firm-fixed effects, time-fixed effects, industry-year fixed effects and age-decile fixed effects (all absorbed in υ_i for brevity). The firm fixed effects control for time-invariant omitted firm characteristics and ensure that estimates of α_2 reflect average additional within-firm changes in productivity outcomes after the adoption of the good faith exception (for "debt-reduction" firms). The year fixed effects account for transitory nationwide factors such as macroeconomic conditions that could affect debt ratios and the likelihood that a state adopts the good faith exception. The age-decile fixed effect account for the relative position of a firm in its life-cycle compared to other firms, ensuring that our analysis is not driven by business maturity. Industry-year fixed effects account for transitory industry specific conditions.[6]

We include standard control variables in our estimations, controlling for leverage levels (debt to total assets), firm size (total assets), growth opportunities (market to book), distress risk (Altman's Z-score), profitability (cash flow to total assets), cash (cash and short-term investments), tangibility (net property, plant and equipment). We then also include state-level control variables that can affect our productivity outcome variables or the good faith adoption. We include political balance (fraction of a state's Congress members in the U.S. House of Representatives that belong to the Democratic Party in a given year); union coverage (percentage of workers unionized in a state), state GDP; a binominal indicator for the presence of an unemployment shock (equal to one if and only if the change in unemployment is larger than two times the five-year average change in unemployment); and a binominal indicator for the presence of a labour force shock (equal to one if and only if the change in labour force is larger than two times the five-year average change in labour force). We correct for labour force and unemployment shocks to ensure our findings are not driven by sudden changes in state-level labour market changes other than the good faith adoption. All variables except for the state-level control variables are winsorized at the one-percent level.

For our mechanism variables that we use to understand the source of the documented productivity effects we use the following: capital expenditures (divided by total assets and winsorized at the two-percent level), employment (log-transformed, winsorized at the one-percent level), R&D expenses (log-transformed, winsorized at the first percentile and 95th percentile) and the number of patents (as obtained from the USPTO patents, from Bena et al., 2021). In the next sections, we describe how we calculate our dependent variables and variables of interest. Table 2 shows the descriptive statistics of our sample. All continuous control variables and dependent variables have been winsorized at their 1st and 99th percentile. For this sample, the average leverage ratio is 26.2 percent, and approximately 44 percent of the observations in our sample are classified as "debt-reduction" firms. Table 2B compares variable means for firms headquartered in states that adopt the good faith exception with those in states that do not adopt the exception. We find that all the variables except for leverage changes, cash holdings and unemployment shocks are significantly different between the two groups. In an ideal setting, the two groups would be similar along the dimensions of these

[6] In a robustness test we also include state-year fixed effects to mitigate the problem that the adoption of the good faith exception could be spuriously correlated with underlying economic factors, we find that all results hold.

variables. We remedy this in two ways, first we control for all these factors in our regressions, and second, for robustness we use an entropy balancing method to correct for this covariate imbalance.

[Insert Table 2A and 2B]

C. Measuring productivity

We use three measures of productivity and one measure of technical inefficiency. We calculate standard measures of labour productivity (sales per employee, log-transformed) and capital productivity (sales per unit of net property plant and equipment, log transformed). We supplement our data with measures of total factor productivity and technical inefficiency.

Total factor productivity, also known as multi-factor productivity, is a measure of how efficiently a set of inputs are used in a production process to produce goods and services. It is a residual and captures the variation in output that cannot be explained by the capital and labour employed in a production process. TFP offers a broad gauge of productivity, especially when measured at the firm-level. We follow İmrohoroğlu and Tuzel (2014) and employ the semiparametric approach suggested by Olley and Pakes (1996). In the first step we estimate the production function in:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \omega_{it} + \eta_{it} \tag{2}$$

where, y_{it} is the log of value added for firm i in period t; l_{it} and k_{it} are log values of labour and capital of the firm, respectively; ω_{it} is the productivity; and η_{it} is the unknown error term. In our first stage estimation, we take into account all industry-year variation (İmrohoroğlu and Tuzel, 2014). The two-stage semi-parametric approach has the advantage that we are able to control for simultaneity biases and correct for firm-level serial correlation (Bournakis and Mallick, 2018). Given that the investment is strictly monotonic, we obtain the inverse investment function:

$$\omega_{it} = h(k_{it}, i_{it})\; with\; h = i^{-1}() \tag{3}$$

Substituting the investment function (3) into the standard production function (2), we obtain:

$$y_{it} = \beta_0 + \phi(k_{it}, i_{it}) + \beta_l l_{it} + \epsilon_{it} \tag{4}$$

where $\phi(k_{it}, i_{it}) = \alpha_0 + \alpha_k k_{it} + h(k_{it}, i_{it})$. The first stage thus gives us the labour coefficient β_l. The function $\phi(k_{it}, i_{it})$ is approximated by a higher order polynomial in investments and capital. In the second stage we regress $y_{it} - \widehat{\beta_l} l_{it}$ on $\hat{\phi}(k_{it}, i_{it})$ to obtain estimates for β_k. In this second stage, we correct for potential attrition, as firms in every period have the option to exit the market. We then assume that productivity follows a first order Markov process $\omega_{it} = E[\omega_{it}|\omega_{it-1}] + \theta_{it}$, where θ_{it} is a firm-specific and time-varying error term (the productivity shock term). Productivity can then be defined as:

$$\omega_{it} = E[\omega_{it}|\omega_{it-1}] + \theta_{it} = f(\omega_{it-1}) + \theta_{it} \quad (5)$$
$$= f(\phi_{it-1}(i_{it-1}, k_{it-1}) - \beta_0 - \beta_k k_{it-1}) + \theta_{it}$$

More explicitly, equation 5 shows that unobserved productivity at time t is a function of observed productivity t-1. We then substitute (5) into (2)

$$y_{it} - \beta_l l_{it} = \beta_k k_{it} + f(\hat{\phi}_{i,t-1}(i_{i,t-1}, k_{i,t-1}) - \beta_0 - \beta_k k_{i,t-1}) + \theta_{it} + \eta_{it} \quad (6)$$

As β_k appears twice in the above equation, a non-linear estimation method is used to estimate the production parameter β_k (Rovigatti & Mollisi, 2018). Equation 2.8 shows that the capital input for year *t* is pre-determined at time *t-1*. And thus, capital input cannot be affected by current productivity. By estimating (4), k_{it} is exogenous to θ_{it} and cannot be affected by productivity. This way the our semi-parametric approach addresses the simultaneity bias between productivity and capital, assuming that labour is perfectly flexible. For the purpose of this study, the production function parameters ($\widehat{\beta_0}, \widehat{\beta_k}$ and $\widehat{\beta_l}$) are estimated every year using the data available until that year, to prevent any lookahead bias. Once the production function parameters are estimated, firm-level productivity (log TFP) can be backed out using $\omega_{it} = y_{it} - \widehat{\beta_0} + \widehat{\beta_k} k_{it} + \widehat{\beta_l} l_{it}$.[7]

To measure firm-level inefficiency we estimate a stochastic frontier model following Kumbhakar et al. (2014). More specifically we estimate firm-specific and time-varying residual inefficiency using the Kumbhakar-Heshmati model specified as:

$$y_{it} = \alpha + f(x_{it}, \beta) + v_{it} - \eta_i - u_{it} \quad (7)$$

where y_{it} is the log of added value from i at time t; α is a common intercept and $f(x_{it}, \beta)$ is the production function, with x_{it}as the vector of log inputs (capital and labour); β as the associated vector of technology parameters. v_{it} is a random two-sided noise term (capturing exogenous production shocks), η_{it} represents persistent technical inefficiency, u_{it} is the non-negative one-sided inefficiency term and is time-varying.

For estimation purposes, we rewrite (7) as:

[7] For additional information on our estimation method, we would refer the reader to İmrohoroğlu and Tuzel (2014) who have published the estimation procedure and data. For more technical details, we would refer to the reader to Olley and Pakes (1996), and Ericson and Pakes (1995).

$$y_{it} = \alpha^* + f(x_{it}, \beta) + v_{it}^* - \eta_i^* - u_{it}^* \quad (8)$$

Where $\alpha^* = \alpha_0 - E(\eta_i) - E(u_{it})$; $u_{it}^* = u_{it} - E(u_{it})$; and $\eta_i^* = \eta_i - E(\eta_i)$. We then estimate the model in three steps using a standard random effects regression, yielding consistent betas. In the second step, we estimate the persistent technical efficiency using the predicted values of η_i^* as: $\widehat{\eta_i} = \exp(-(Max(\widehat{\eta_i^*}) - \widehat{\eta_i^*}))$. In the third step we estimate the residual technical efficiency and by assuming that v_{it} is idd $N(0, \sigma_v^2)$ and u_{it} is idd $N^+(0, \sigma^2)$ we can maximimze the log-likelihood function for the following standard normal-half stochastic frontier model for pooled panel data:

$$r_{it} = \alpha_0 + v_{it} + u_{it} \quad (9)$$

where $r_{it} = y_{it} - f(x_{it}; \beta) + \eta_i$. We can then estimate α_0, σ_v^2 and σ^2. Following Jondrow et al. (1982) we obtain the residual technical efficiency $\widehat{u_{it}}$, conditional on the estimated residuals, $(v_{it} - u_{it})$. Where the firm-specific and time-varying residual technical inefficiency can then be defined as $\exp(-\widehat{u_{it}})$.

IV. Empirical Results

A. Employment protection and productivity

To examine the impact of increased employment protection, we measure productivity in four different ways. We measure total factor productivity, transitory efficiency, labour productivity and capital productivity. Table 3 shows the results of our basic difference-in-difference approach. We find that across the board the adoption of the good faith has no effect on productivity. We find that labour productivity increases by 2.5 percent at most. Notable is the positive (negative) sign of leverage in explaining productivity (inefficiency). We find that large firms, while more productive (along all dimensions) also exhibit higher levels of transitory inefficiencies. Firms with more growth opportunities are more productive, as are more risky firms. We also find that firms in states that have experienced an unemployment shock are less efficient, although they exhibit slightly higher labour productivity.

[Insert Table 3]

To alleviate the concern that the absence of statistically significant results are related to a reverse causality problem (or pre-treatment trend existence), we examine the timing of productivity changes relative to the timing of the passage of the good faith exception. If any reverse causality (or pre-treatment trends) exists, then there would be a positive or declining trends in productivity before the enactment of the exception. We replace good faith variable with six indicator variables, set to one if the firm is headquartered in a state that (1) will pass the good faith exception in the next two years, (2) next year, (3) in the current year, (4) one year ago, (5) two years ago or (6) three or more years ago.

[Insert Table 4]

The results in Table 4 imply that there are no trends of increasing (or decreasing) productivity before the good faith exception is adopted. We find that our previous result for labour productivity occurs in the year of adoption and the majority of the effect is concentrated beyond two years.[8] Overall, the findings suggest that our results are not driven by reverse causality and that there are no pre-treatment trends. We then continue to examine the importance of debt-reductions that – as discussed – can obscure the productivity effects.

B. Employment protection, debt reduction and productivity

The first step in demonstrating that debt reductions can be of important consequence for firms in the wake of an exogenous shock to their labour costs is to demonstrate two things. First, we show that firms (both that reduce debt after the adoption and those who do not) follow a similar pre-trend in terms of their productivity. Second, we show that the two groups differ following the adoption of the good faith exception.

[Insert Figure 1]

In the first step, we provide a univariate descriptive in Figure 1. We estimate kernel-weighted local polynomial regression (first-degree) for which we show the smoothed estimation results with 90 percent confidence intervals. We find that the pre-trends for all our productivity variables are very similar. Second, we find that firms that decrease their debt following the adoption of the good faith exception exhibit significantly higher productivity. This effect is primarily driven by increased labour productivity. Striking here is that firms that increase their debt following the adoption become significantly more inefficient. This suggests that firms that have limited financial flexibility, are unable to restructure their production process following a rise in labour costs. Our univariate analysis reveals no statistically significant effect for capital expenditures.

[Insert Table 5]

In the second step, we estimate a double difference-in-difference. Our treatment group are firms headquartered in a state that adopts the good faith exception and reduce their debt in the wake of this adoption. Our control group consists of all other firms. Table 5 shows the results. We find that "debt-reduction" firms headquartered in a state that adopts the good faith exception experience a significant increase in productivity. We find that these firms, have

[8] These effects are robust to the inclusion of a continuous state specific time-trend.

approximately 5.7 percent higher total factor productivity, are 4.1 percent less inefficient, exhibit 3.1 percent higher labour productivity and show a 3.4 percent increase in capital productivity (albeit not significant). When we then control for the fact that firms that operate above their target leverage prior to the adoption of the good faith exception (as these firms have a particularly strong incentive to reduce their debt) we find that debt-reduction firms exhibit even higher productivity benefits in terms of total factor productivity. All other results remain the same.

[Insert Table 6]

Ultimately, our analysis shows that stronger employment protection can significantly increase productivity. To illustrate that these effects are economically significant we compare our regression coefficients to the sample standard deviation. We find that total factor productivity increases significantly by approximately 15 percent of the standard deviation, inefficiency reduces by approximately 27 percent and labour productivity increases by approximately 4 percent. This seems to imply that the productivity gains are in part due to efficiency gains and increased worker deployment. To illustrate the mechanisms underlying these effects we examine how “debt-reduction” firms change their capital expenditures, employment, R&D expenses and patenting behaviour following the state’s adoption of the good faith exception. Table 6 shows the results. We find that firms that reduce their debt following the adoption of the good faith exception decrease their capital expenditures, reduce their net hiring and increase their R&D expenses. This tells us that the increased productivity does not only come from increased efficiency, it is also driven by a reorientation of the firm’s production process. That is, “debt-reduction” firms have the ability to shift their production processes, to reduce investment and to rely less on workers and focus on more innovative avenues.

C. Eliminating covariate imbalance and robustness tests

We then examine the robustness of the positive relation between productivity, the adoption of the good faith exception and debt reductions to controlling for differences in firm characteristics between adoption and non-adoption firms, since Panel B of Table 2 shows significant covariate imbalance. To do this, we use an entropy balancing method, following Hainmueller (2012). We balance our groups (firms in states that adopt and do not adopt the good faith exception) based on all firm-level controls, state-level controls, three-digit industries, age-deciles. Additionally, we include as a balancing variable the firm’s leverage prior to the adoption of the good faith exception. For firms headquartered in a state that adopts the good faith exception we measure the four-year average leverage prior to the adoption. For firms in a state that does never adopt the exception we calculate a lifetime average. By balancing on pre-adoption leverage levels we ensure that we are comparing similar companies with similar ex-ante motives to engage in leverage reductions, irrespective of the introduction of the good faith exception.

[Insert Table 7 and Figure 2]

Table 7 shows the result of this balancing procedure. We find that eliminating the covariate imbalances significantly strengthens our results. We find that after this correction, debt-reduction firms not only exhibit an increase in TFP, a reduction in inefficiency, increase in labour productivity but also an increase in capital productivity. Again we find that this effect is prompted by a reduction in capital expenditure, a shift away from labour as production input and an increase in R&D expenditures and increased patenting behaviour. Ultimately, our conclusion is that our results are not driven by any covariate imbalances. If anything, eliminating inter-group differences strengthen our conclusions. Subsequent analysis and robustness test all use the entropy balancing as a basis for the estimations.

Another concern might be that our effects are non-linear. To alleviate this, we use a continuous treatment to capture the firm's debt changes following the adoption of the good faith exception and plot the predicted values of our productivity measures. Figure 2 shows that all effects are (a) linear and (b) exhibit a negative slope (positive for inefficiency) when it comes to firms in a state that adopts the good faith exception. Similarly, our effect might be driven by firm's choices to temporarily operate above their target debt. The adoption of the good faith exception then reduces the firm's target debt, inducing firms to reduce their leverage mechanically. We then include a triple interaction term where we identify firms that operate above their target leverage prior to the adoption of the good faith exception. Table 8 shows the results. We find that the majority of our results hold.

[Insert Table 8 and 9]

What does emerge is that firms that operated above their target debt prior to the adoption of the good faith exception and were able to reduce their debt afterwards increase their capital expenditures and increase their patenting activity. However, this does not seem to translate into productivity gains. We also find that our effect on employment appears to no longer be significant when we take into account the firm's target debt. This suggests that in fact operating leverage is crowding out financial leverage. If operating leverage increases, we should observe that firms are more likely to reduce employment following the adoption of the law. We then follow Hanka (1998), Serfling (2016) and Autor et al. (2007) and test the impact of the good faith adoption by looking at changes in employment. We measure the percentage decline in the number of firm employees over the previous year, with employment gains set to zero. We also measure net employment flows, which is the absolute value of the percentage change in the number of employees. Table 9 shows the results. We find that there is no statistically significant change in the percentage decline in the number of employees. However, we find that following the adoption of the good faith exception, net employee flows do change significantly. Consistent with previous literature we document a decline in hiring, with debt-reduction firms hiring approximately 2.5 percent less. Firms operating above their target prior to the adoption and able to reduce their debt seem to experience a net increase of employees relative to other firms. Again this finding is consistent with our results from Table 8, where firms restructure their production process by investing more, and increasing their patenting activity. The observation that there is no associated productivity gain could be because firms are unable to achieve productive matches when hiring.

[Insert Table 10 and 11]

Tables 10 and 11 then show examinations of the cross-sectional variation along dimensions of growth opportunities (as measured by market-to-book) and cash holdings (as a proxy for the amount of slack in the business). We find that our results hold for these additional controls and show that especially debt-reduction firms with sufficient growth opportunities will increase their patenting less in comparison to those with insufficient growth opportunities. Similarly, firms with significant slack on their balance sheet will be relatively more inefficient following the good faith adoption and will expend less on their R&D. Ultimately these results suggest that the productivity effect of the good faith adoption is not conditional on growth opportunities (observed by investors), nor is it conditional on the firm's cash holders. The effects we document here are likely due to the increased firing costs and financial leverage being crowded out by increased operating leverage.

[Insert Table 12]

To substantiate this argument further, we change our empirical set up where we identify debt-reduction firms (DR) and firms that increase their operating leverage following the adoption of the good faith exception. We measure the operating leverage following Novy-Marx (2011) and calculate the ratio of operating costs divided by total assets, where operating costs is costs of goods sold plus SG&A. Similar as to our other variables we then identify the firms who increase their operating leverage following the adoption of the good faith exception. For firms that are not headquartered in a state that adopts the exception we measure the average lifetime change in operating leverage. As such, this setup allows a more direct measure of the extent to which operating leverage crowds out financial leverage. We are thus interested in the productivity effects for those firms who exhibit debt reductions and operating leverage increases. Table 12 shows the results. We find that the results using our alternative identification are very similar to the results presented in Table 5, Table 7 and Table 9. We find that for those firms where it is likely that operating leverage crowds out financial leverage, TFP increases, inefficiency decreases and labour (and capital) productivity increase. We find that these effects are primarily driven by reduced investments and a stronger focus on innovative ventures such as R&D and patenting. We find that firms where the crowding out is more likely to take hold the net flow of employees actually increases. That is, firms that are willing to bear the increased firing costs and shoulder the increased operating leverage stand to gain the most productivity advantages.

[Insert Figure 3]

Finally, three concerns remain. First, it is possible that our results are driven by unobserved time-varying state specific effect. In an unreported robustness test, we find that all our results hold when we include state-year fixed effects or correct for a continuous state time trend. Second, it could be that debt-reduction firms and non-debt reduction firms do not follow similar trends prior to the adoption of the good faith exception. While Figure 1 seems to suggest this is not the case, we assess this in a multivariate setting. We find that there is no violation of the parallel-trend assumption and that all previous reported results hold. A third and final concern is that our identification of debt-reduction firms is purely based on chance and that our results are a result of randomness. To alleviate this concern, we execute a placebo test in which we randomly assign to reduce their debt following the state-level adoption of the good faith exception. Using a thousand replications of Table 5, we are able to assess the likelihood that our results are driven by change. Figure 3 shows our results. We find that our placebo effect is significantly different (and on average equal to zero) from the observed effect of debt-reduction firms after the adoption of the good faith exception. This finding holds for all measures of productivity.

V. Conclusion

In this study, we have examined the relation between employment protection and corporate productivity outcomes. To identify the causal effect of increased firing cost on productivity measures, we exploit the adoption of the good faith exception by U.S. states. This exception reads a covenant of good faith and fair dealing into every employment relationship (Muhl, 2001). In its broadest sense, this exception applies when a court determines that an employer discharged a worker out of bad faith, malice, or retaliation. In these cases, employees can recover contractual losses and punitive damages. Following Serfling (2016), we then identify debt-reduction firms as those firms who are most likely to suffer the crowding out of financial leverage by increased operating leverage due to the increased firing costs. We compare changes in productivity outcomes of firms headquartered in states that adopt the good faith exception and those headquartered in states that do not adopt the exception.

We document a significant increase in productivity following the adoption of the good faith exception and the results of several robustness tests support the causal interpretation of this finding. We find that this positive effect primarily occurs for debt-reduction firms, these firms offset increased distress costs by lowering their leverage. To realize these productivity gains, debt-reduction firms reduce capital expenditures, reduce the number of employees (yet increase the net employment flows) and focus more heavily on R&D and patenting. These findings seem to suggest that firms that are able to reduce their debt do not suffer the ill effects of stringent labour protection (Calcagnini et al., 2009).

These findings are consistent with theories predicting that increased firing costs crowds out financial leverage in favour of operating leverage, reduces investments and enhances innovation. It is through these channels that increased employment protection can have significant positive effects on productivity outcomes.

VI. References

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AI. Tables and Figures

Table 1: State-level adoption of employment-at-will exceptions

State	Good Faith Month/year	Implied Contract Month/year	Public Policy Month/year
Alabama		07/1987	
Alaska	05/1983	05/1983	02/1986
Arizona	06/1985	06/1983 (rev. 04/1984)	06/1985
Arkansas		06/1984	03/1980
California	10/1980	03/1972	09/1959
Colorado		10/1983	09/1985
Connecticut	06/1980	10/1985	01/1980
Delaware	04/1992		03/1992
Florida			
Georgia			
Hawaii		08/1986	10/1982
Idaho	08/1989	04/1977	04/1977
Illinois		12/1974	12/1978
Indiana		08/1987	05/1973
Iowa		11/1987	07/1985
Kansas		08/1984	06/1981
Kentucky		08/1983	08/1983
Louisiana	01/1998		
Maine		11/1977	
Maryland		01/1985	07/1981
Massachusetts	07/1977	05/1988	05/1980
Michigan		06/1980	06/1976
Minnesota		04/1983	11/1986
Mississippi		06/1992	07/1987
Missouri		01/1983 (rev. 02/1988)	11/1985
Montana	01/1982	06/1987	01/1980
Nebraska		11/1983	11/1987
Nevada	02/1987	08/1983	01/1984
New Hampshire	02/1974 (rev. 05/1980)	08/1988	02/1974
New Jersey		05/1985	07/1980
New Mexico		02/1980	07/1983
New York		11/1982	
North Carolina			05/1985
North Dakota		02/1984	11/1987
Ohio		04/1982	03/1990
Oklahoma	05/1985 (rev. 02/1989)	12/1976	02/1989
Oregon		03/1978	06/1975
Pennsylvania			03/1974
Rhode Island			
South Carolina		06/1987	11/1985
South Dakota		04/1983	12/1988
Tennessee		11/1981	08/1984
Texas		04/1985	06/1984
Utah	03/1989	05/1986	03/1989
Vermont		08/1985	09/1986
Virginia		09/1983	06/1985
Washington		08/1977	07/1984
West Virginia		04/1986	07/1978
Wisconsin		06/1985	01/1980
Wyoming	01/1994	08/1985	07/1989

Table 2A: Descriptive statistics

Dependent variables	*Mean*	*Median*	*P25*	*P75*	*SD*	*Count*
Total Factor Productivity	-0.346	-0.326	-0.524	-0.138	0.378	50,861
Transitory inefficiency	0.269	0.240	0.196	0.296	0.150	50,837
Labour Productivity	4.730	4.690	4.236	5.154	0.742	50,861
Capital productivity	1.603	1.610	1.036	2.184	0.992	50,861
Mechanism variables						
Capital deepening	0.081	0.058	0.031	0.103	0.074	50,861
Capital expenditures	3.127	3.007	2.378	3.736	1.173	50,861
Total Employment (ln)	0.587	0.419	-0.722	1.686	1.666	50,861
Total R&D expenses (ln)	0.649	0.000	0.000	0.984	1.561	50,861
Total number of patents (ln)	0.376	0.000	0.000	0.000	1.003	50,861
Wrongful discharge						
Good Faith	0.053	0.000	0.000	0.000	0.224	50,861
Implied Contract	0.640	1.000	0.000	1.000	0.480	50,861
Public Policy	0.641	1.000	0.000	1.000	0.480	50,861
Variables of interest						
Leverage	0.262	0.238	0.106	0.375	0.213	50,861
Change in leverage	0.003	-0.001	-0.034	0.037	0.116	50,739
Deficit (0/1)	0.717	1.000	0.000	1.000	0.450	50,846
Leverage (pre-adoption)	0.265	0.241	0.152	0.344	0.177	50,641
Post-adoption leverage change	0.002	0.001	-0.006	0.008	0.035	50,613
Debt reduction (post-adoption) (0/1)	0.441	0.000	0.000	1.000	0.497	50,613
Above target debt (pre-adoption) (0/1)	0.345	0.000	0.000	1.000	0.475	50,466
Control Variables						
Firm Size(ln)	4.964	4.775	3.589	6.151	1.848	50,861
Market-to-book (ln)	0.274	0.174	-0.061	0.518	0.487	50,861
Altman's Z	2.331	2.395	1.611	3.131	1.472	50,861
Profitability	0.077	0.090	0.050	0.130	0.132	50,861
Cash	0.101	0.051	0.018	0.134	0.125	50,861
Tangibility	0.328	0.289	0.173	0.446	0.202	50,861
State-level control variables						
Political balance	0.571	0.548	0.429	0.688	0.182	50,861
Union coverage	20.314	21.000	11.400	27.300	8.925	50,861
Union membership	18.182	19.500	9.400	25.000	8.625	50,861
State GDP (log)	10.959	10.904	10.155	11.734	1.104	50,861
Unemployment shock	0.455	0.000	0.000	1.000	0.498	50,861
Labour force shock	0.589	1.000	0.000	1.000	0.492	50,861

Table 2B: Covariate imbalance

Variable	Good faith adoption (N = 3,696)	Control group (N = 47,165)	T-statistic
Total Factor Productivity	-0.336	-0.347	1.655*
Transitory inefficiency	0.283	0.268	5.405***
Labour Productivity	4.400	4.755	-29.992***
Capital productivity	1.494	1.611	-6.939***
Capital deepening	0.100	0.079	14.312***
Capital expenditures	2.906	3.145	-11.9***
Total Employment (ln)	0.416	0.600	-6.68***
Total R&D expenses (ln)	0.545	0.657	-4.377***
Total number of patents (ln)	0.300	0.382	-5.115***
Leverage	0.270	0.261	2.398**
Change in leverage	0.003	0.003	-0.152
Deficit (0/1)	0.796	0.711	12.163***
Leverage (pre-adoption)	0.266	0.265	0.184
Post-adoption leverage change	-0.003	0.002	-4.746***
Debt reduction (post-adoption) (0/1)	0.528	0.435	10.497***
Above target debt (pre-adoption) (0/1)	0.289	0.349	-7.246***
Leverage	0.270	0.261	2.398**
Firm Size(ln)	4.447	5.004	-18.034***
Market-to-book (ln)	0.228	0.278	-6.274***
Altman's Z	2.430	2.323	4.447***
Profitability	0.084	0.076	4.273***
Cash	0.099	0.101	-0.92
Tangibility	0.346	0.327	5.557***
Political balance	0.552	0.572	-5.85***
Union coverage	23.513	20.063	29.673***
Union membership	20.327	18.014	21.315***
State GDP (log)	10.523	10.993	-26.179***
Unemployment shock	0.446	0.456	-1.24
Labour force shock	0.710	0.580	16.675***

Table 3: The Good Faith Exception and Productivity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total Factor Productivity		Transitory inefficiency		Labour Productivity		Capital Productivity	
Good Faith	0.009	0.013	-0.005	-0.008	0.020	0.021*	-0.037	-0.016
	(0.539)	(0.848)	(-0.646)	(-1.010)	(1.476)	(1.747)	(-1.659)	(-0.912)
Implied Contract	-0.005	-0.002	0.003	0.002	0.006	0.010	0.000	0.005
	(-0.504)	(-0.214)	(0.503)	(0.387)	(0.640)	(1.043)	(0.008)	(0.505)
Public Policy	0.004	-0.001	-0.001	0.002	-0.023***	-0.025***	0.009	0.001
	(0.382)	(-0.144)	(-0.139)	(0.403)	(-3.735)	(-3.599)	(0.514)	(0.112)
Leverage		0.060***		-0.038***		0.107***		0.220***
		(3.129)		(-2.946)		(3.972)		(8.047)
Firm Size(ln)		0.030***		0.013***		0.066***		-0.166***
		(5.631)		(4.272)		(11.687)		(-28.504)
Market-to-book (ln)		0.223***		-0.087***		0.062***		0.034***
		(23.655)		(-19.744)		(8.397)		(3.494)
Altman's Z		0.033***		-0.014***		0.042***		0.071***
		(7.783)		(-6.537)		(10.155)		(8.550)
Profitability		0.234***		-0.115***		-0.078***		-0.228***
		(3.275)		(-3.132)		(-4.096)		(-4.815)
Cash		0.033		-0.014		-0.192***		-0.673***
		(1.231)		(-0.821)		(-5.504)		(-24.250)
Tangibility		-0.265***		0.115***		-0.304***		-2.478***
		(-5.769)		(4.611)		(-6.159)		(-33.430)
Political balance		0.004		-0.002		-0.001		-0.000
		(0.785)		(-0.761)		(-0.358)		(-0.023)
Union coverage		-0.000		0.000		0.002		0.003
		(-0.108)		(0.004)		(0.709)		(1.259)
Union membership		0.001		-0.000		-0.001		-0.005
		(0.389)		(-0.146)		(-0.488)		(-1.284)
State GDP (log)		0.001*		-0.000		-0.000		-0.001
		(1.710)		(-0.590)		(-0.021)		(-0.811)
Unemployment shock		-0.013***		0.006**		0.006*		-0.001
		(-2.972)		(2.439)		(1.942)		(-0.272)
Labour force shock		-0.003		0.002		-0.001		0.000
		(-1.115)		(1.038)		(-0.568)		(0.164)
Firm FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	50,861	50,861	50,833	50,833	50,861	50,861	50,861	50,861
R-squared	63%	67%	31%	35%	92%	93%	91%	94%

Table 4: The Good Faith Exception and the Timing of Productivity Changes

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	Labour productivity	Capital productivity
Good Faith(-2)	0.022	-0.011	0.022	0.007
	(0.786)	(-0.701)	(1.056)	(0.173)
Good Faith(-1)	0.009	-0.002	0.022	-0.006
	(0.286)	(-0.129)	(1.086)	(-0.157)
Good Faith(0)	0.025	-0.013	0.034*	0.003
	(0.906)	(-0.819)	(1.834)	(0.080)
Good Faith(+1)	0.018	-0.010	0.032	-0.014
	(0.634)	(-0.574)	(1.262)	(-0.299)
Good Faith(+2)	0.015	-0.005	0.018	-0.044
	(0.512)	(-0.333)	(0.784)	(-0.827)
Good Faith(≥ +3)	0.035	-0.019	0.056**	-0.017
	(1.147)	(-1.125)	(2.120)	(-0.343)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,861	50,833	50,861	50,861
R-squared	67%	35%	93%	94%

Figure 1: Debt Reductions, Good Faith Adoption and Timing of Productivity Changes

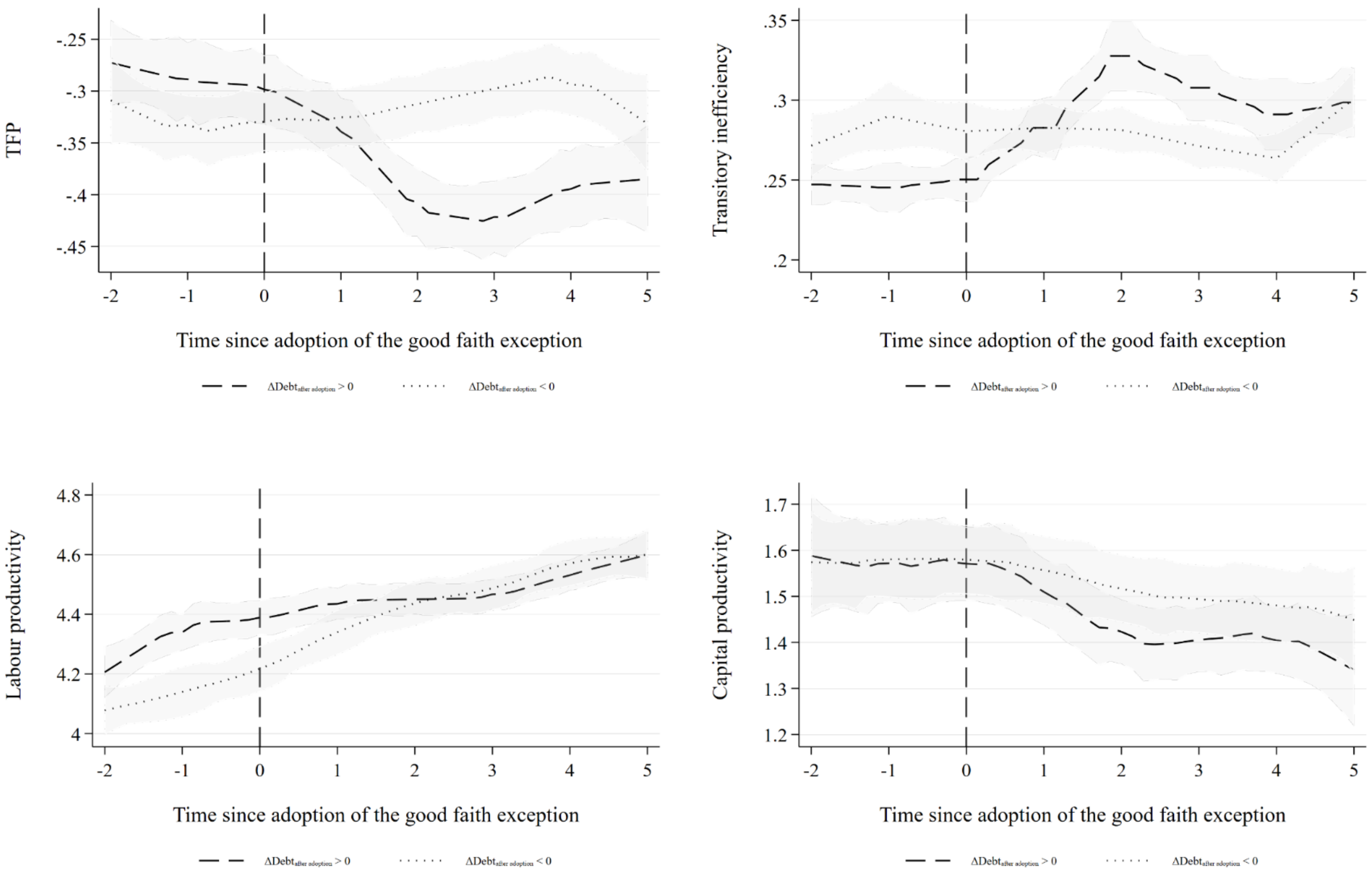

Table 5: Debt Reduction, Good Faith Exception and Productivity

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	Labour Productivity	Capital Productivity
Good Faith	-0.016	0.013	0.003	-0.035
	(-0.720)	(1.174)	(0.195)	(-1.414)
Good Faith x debt reduction	0.057***	-0.041***	0.031**	0.034
	(3.911)	(-5.422)	(2.111)	(1.147)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,613	50,585	50,613	50,613
R-squared	67%	35%	93%	94%

Table 6: Mechanisms, Good Faith and Productivity

	(1)	(2)	(3)	(4)
	Capital expenditures	Employment	R&D expenses	Patent count
Good Faith	0.001	-0.027*	-0.040	-0.106
	(0.335)	(-1.928)	(-1.486)	(-1.169)
Good Faith x debt reduction	-0.008*	-0.035**	0.121***	0.100
	(-1.813)	(-2.085)	(3.531)	(0.980)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,613	50,613	50,613	50,613
R-squared	66%	98%	93%	85%

Table 7: Eliminating covariate imbalance, entropy balancing

Panel A: Productivity

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	Labour Productivity	Capital Productivity
Good Faith	-0.039**	0.023**	-0.018	-0.114**
	(-2.049)	(2.530)	(-1.325)	(-2.324)
Good Faith x debt reduction	0.083***	-0.048***	0.055***	0.046***
	(9.344)	(-14.017)	(3.083)	(4.728)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,401	50,373	50,401	50,401
R-squared	81%	61%	96%	96%

Panel B: Mechanisms

	(1)	(2)	(3)	(4)
	Capital expenditures	Employment	R&D Expenses	Patent count
Good Faith	0.009	-0.032	-0.081**	-0.179*
	(1.634)	(-1.174)	(-2.329)	(-1.811)
Good Faith x debt reduction	-0.014***	-0.048**	0.220***	0.275***
	(-4.079)	(-2.648)	(6.952)	(4.465)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,401	50,401	50,401	50,401
R-squared	78%	99%	96%	89%

Figure 2: Linear predictions

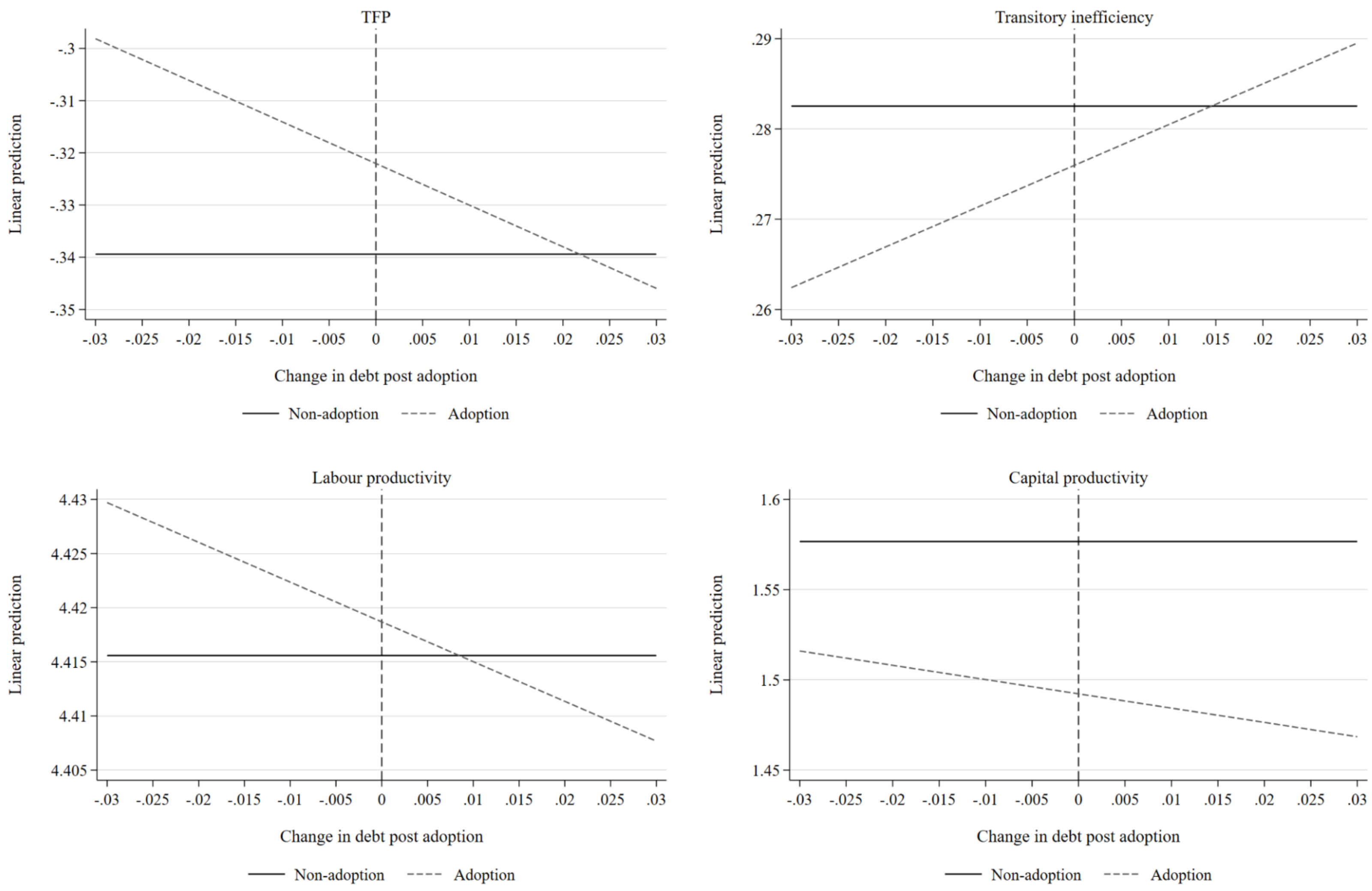

Table 8: Cross-sectional variation in target debt

Panel A: Productivity

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	Labour Productivity	Capital Productivity
Good Faith	-0.044*	0.035**	-0.030	-0.149***
	(-1.764)	(2.372)	(-1.638)	(-2.846)
Good Faith x debt reduction	0.066***	-0.035***	0.056***	0.070***
	(6.946)	(-6.262)	(2.802)	(3.209)
Good Faith x Above target	0.027	-0.050	0.056*	0.161**
	(0.774)	(-1.648)	(1.886)	(2.416)
Good Faith x Above target x debt reduction	0.027	-0.009	-0.033	-0.143
	(1.072)	(-0.712)	(-1.017)	(-1.500)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,229	50,201	50,229	50,229
R-squared	81%	62%	96%	96%

Panel B: Mechanisms

	(1)	(2)	(3)	(4)
	Capital expenditures	Employment	R&D Expenses	Patent count
Good Faith	0.012**	-0.040	-0.097	-0.217**
	(2.166)	(-0.976)	(-1.573)	(-2.227)
Good Faith x debt reduction	-0.024***	-0.045	0.265***	0.148**
	(-7.219)	(-1.218)	(5.738)	(2.133)
Good Faith x Above target	-0.010*	0.038	0.104	0.135***
	(-1.986)	(0.488)	(0.614)	(4.597)
Good Faith x Above target x debt reduction	0.031***	-0.031	-0.186	0.278***
	(5.478)	(-0.336)	(-1.275)	(5.986)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,229	50,229	50,229	50,229
R-squared	78%	99%	96%	89%

Table 9: Good Faith, Debt Reduction and Employment Flows

	(1)	(2)	(3)	(4)
	% Decline in # of employees		abs(% change in # of Employees)	
Good Faith	-0.008	-0.007	-0.031***	-0.019*
	(-1.405)	(-1.116)	(-2.876)	(-1.804)
Good Faith x debt reduction	-0.008	-0.004	0.006	-0.024**
	(-1.032)	(-0.480)	(0.990)	(-2.048)
Good Faith x Above target		0.002		-0.060**
		(0.273)		(-2.301)
Good Faith x Above target x debt reduction		-0.013		0.107**
		(-1.632)		(2.670)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,401	50,229	50,401	50,229
R-squared	56%	57%	66%	66%

Table 10: Cross-sectional variation in growth opportunities

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	R&D Expenses	Patent count
Good Faith	-0.050**	0.031***	-0.127***	-0.196*
	(-2.405)	(3.277)	(-3.922)	(-1.948)
Good Faith x debt reduction	0.104***	-0.055***	0.279***	0.336***
	(6.901)	(-7.556)	(5.432)	(4.682)
High Q	0.018	-0.002	-0.069	-0.081**
	(1.174)	(-0.163)	(-1.379)	(-2.119)
Good faith x High Q	0.023	-0.020**	0.083	0.019
	(1.439)	(-2.519)	(1.316)	(0.766)
Debt reduction x High Q	0.001	0.001	0.111**	0.120***
	(0.044)	(0.166)	(2.383)	(3.230)
Good faith x debt reduction x high Q	-0.038	0.016	-0.098	-0.096***
	(-1.526)	(1.131)	(-1.311)	(-3.270)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,401	50,373	50,401	50,401
R-squared	81%	61%	0.958	0.888

Table 11: Cross-sectional variation in cash holdings

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	Capital expenditures	R&D Expenses
Good Faith	-0.039**	0.027***	0.006	-0.111***
	(-2.551)	(3.203)	(1.075)	(-3.381)
Good Faith x debt reduction	0.098***	-0.060***	-0.012***	0.262***
	(9.517)	(-14.141)	(-3.094)	(7.257)
High cash	0.013	-0.009	-0.001	0.010
	(1.042)	(-0.897)	(-0.458)	(0.525)
Good faith x High cash	0.002	-0.013	0.006**	0.078***
	(0.098)	(-1.046)	(2.133)	(3.954)
Debt reduction x High cash	0.029***	-0.010	0.003	0.044
	(3.110)	(-1.403)	(1.033)	(1.627)
Good faith x debt reduction x High cash	-0.037	0.030**	-0.004	-0.104***
	(-1.474)	(2.413)	(-0.830)	(-4.963)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	50,401	50,373	50,401	50,401
R-squared	81%	61%	0.784	0.958

Table 12: Debt reductions and increased operating leverage

Panel A: Productivity

	(1)	(2)	(3)	(4)
	Total Factor Productivity	Transitory inefficiency	Labour Productivity	Capital Productivity
Good Faith	-0.014	0.007	-0.005	-0.130**
	(-0.682)	(0.730)	(-0.457)	(-2.359)
Good Faith x (DR & OCI)	0.106***	-0.054***	0.032***	0.101***
	(4.743)	(-3.970)	(3.332)	(6.897)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	48,968	48,940	48,968	48,968
R-squared	82%	61%	96%	96%

Panel B: Mechanisms

	(1)	(2)	(3)	(4)
	Capital expenditures	abs(% change in # of Employees)	R&D Expenses	Patent count
Good Faith	0.008	-0.039***	-0.003	-0.113
	(1.374)	(-3.170)	(-0.064)	(-1.043)
Good Faith x (DR & OCI)	-0.017***	0.032***	0.176***	0.332***
	(-5.941)	(3.677)	(10.630)	(4.757)
Controls	Yes	Yes	Yes	Yes
Firm FEs	Yes	Yes	Yes	Yes
Industry x Year FEs	Yes	Yes	Yes	Yes
Firm age FEs	Yes	Yes	Yes	Yes
State FEs	Yes	Yes	Yes	Yes
Observations	48,968	48,968	48,968	48,968
R-squared	80%	68%	96%	89%

Figure 3: Placebo-test