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Temporary Employment Legislation and Capital Structure

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Abstract

In this paper, we examine the effect of changes in temporary employment legislation on leverage for Norwegian firms in the period 1997-2013. Adopting a difference-in-differences research design, in which we use labor intensity as an indicator of treatment, we find robust evidence that firms decrease their use of leverage following more stringent temporary employment legislation. Our explanation of these findings is that stringent temporary employment legislation makes labor cost more rigid in nature, which in turn increases financial distress cost and the likelihood of underinvestment, each of which are associated with reductions in leverage. Lastly, we find that small firms reduce their leverage ratios by more in response to more stringent temporary employment legislation, which can be explained by a greater sensitivity to increasing financial distress cost.

1. Introduction

Financial economists have attempted, over the past decades, to explain how firms make financing decisions, but the picture remains convoluted and some aspects, such as the effect of labor market frictions, remains an enigma. The scope of this paper is to shed light on a particular labor market friction that has been largely unexplored, namely the effect of temporary employment legislation on firm's use of leverage.

Using firm-level data for the universe of firms in Norway from 1997 to 2013, and adopting a difference-in-differences research design, in which labor intensity indicates the degree of treatment, we investigate the effect of temporary employment legislation on leverage. We find that labor-intensive firms reduce their leverage by 41 basis points relative to non-labor-intensive firms, following a one unit increase temporary employment. Moreover, by comparing the most and least labor-intensive industries, educational services and agriculture respectively, we find that educational services respond ten times as aggressively to such laws. These results are robust to different definitions of leverage and treatments of labor intensity and after accounting for serial correlation. Overall, our findings show that stringent temporary employment legislation has a causal and negative effect on leverage.

We explain these findings by the nature of labor cost becoming more rigid, as laying-off employees gets costlier, following increases in temporary employment legislation. This means that firms cannot rely as heavily on making employees redundant to cover temporary cash flow shortfalls, which increases financial distress cost. Instead, they may forgo profitable investments as a means of cutting cost in the short term, which increases the likelihood of underinvestment. Higher financial distress cost and greater likelihood of underinvestment both contribute to firms using less leverage (Bjuggren 1995; DeAngelo, DeAngelo and Whited 2011; Denis and McKeon 2012). Phrased in terms of the trade-off theory of capital structure, the marginal cost of leverage increases with financial distress cost and with the likelihood of underinvestment, and as a result firms reduce their use of leverage in response to more stringent temporary employment legislation.

The difference-in-differences methodology provides an empirical identification that allows us to estimate the causal effect of temporary employment legislation on leverage. The underlying intention is that after controlling for important factors in capital structure decisions (profitability, growth, size and tangibility) and absorbing both the aggregate trends in the economy (through year fixed effects) and the time-invariant firm characteristics (through firm fixed effects), firms should only differ in labor intensity. By doing so, we are able to estimate the differential effects of temporary employment legislation on labor-intensive firms (treatment group) relative non-labor-intensive firms (control group).

The central contribution of this paper is to provide further empirical evidence of the effects of labor market frictions, in particular labor reforms, on firms' use of leverage. Our paper contributes to the recent strand of literature examining this interplay (most notably Simintzi, Vig and Volpin 2015 and Serfling 2015), but differs in several ways. Firstly, this is, to the best of our knowledge, the first paper to solely examine the effects of temporary employment legislation on leverage. As such, our analysis provides insight into whether previous findings carry over to temporary employment legislation or if, for instance, opposing effects on unemployment risk can lead to different results.[1] Secondly, previous papers have examined "major labor reforms with significant impact on employment protection" (Simintzi, Vig and Volpin 2015, 15) and wrongful discharge laws (Serfling 2015), which are likely to produce a unique and substantial increase in the expected cost of lawsuits. The changes in temporary employment legislation in Norway, on the other hand, have been fairly minor[2] and consequently, are expected to have lesser influence on firm behavior. Our study therefore further substantiates the characteristics and robustness of earlier findings. Thirdly, we include the whole universe of firms headquartered in Norway in our study, while previous papers only examine public firms. As such, we can conclude whether the application of earlier findings extends to private firms. Lastly, we extend our

[1] The reduction in leverage following more stringent labor reforms has been explained by firms wanting to dampen the increase in unemployment risk associated with higher financial distress cost (Serfling 2015). However, if temporary employment legislation is designed such that temporary employees are hired permanently, this should decrease the unemployment risk and therefore have an opposite effect on leverage.

[2] The changes in temporary employment legislation only induced incremental changes on the OECD indicator of temporary employment protection.

analysis to also test for a size effect, under the assumption that small firms are more financially constrained and therefore more sensitive to increases in financial distress cost.

The rest of the paper is organized as follows: Section 2 provides an overview of relevant literature. Sections 3 and 4 discuss the underlying theory and the difference-in-differences methodology respectively. Section 5 describes our data set and the sampling process we have used. Section 6 reports our findings and the economic intuition underpinning these results. Finally, Section 7 presents our conclusions.

2. Background and Literature Review

Modigliani and Miller's (1958) irrelevance preposition marks the starting point to decades of vigorous research and the proliferation of theories into the way firms undertake financing decisions. The irrelevance preposition postulates that under a restrictive set of assumptions, a firm's market value is determined by the firm's cash flows and not by how it finances its operations. In other words, the level of financial leverage within a firm should be independent of market value. As financial economists have relaxed these assumptions, more realistic albeit incomplete theories[3] on capital structure have developed. We begin this section by briefly discussing the influential papers leading to the traditional theories on capital structure, before turning to more contemporary work exploring the interplay between labor market frictions and capital structure.

2.1 Trade-off theory of Capital Structure

An influential article by Modigliani and Miller (1963) illustrates how the use of debt can boost the value of a firm. In a Modigliani and Miller world with taxes, a levered firm is more valuable than an unlevered – but otherwise identical – firm. The value of leverage demonstrated here stems from the tax benefits associated with the use of debt. Since then, several papers have weighted this benefit against the deadweight costs of bankruptcy (Kraus and Litzenberger 1973; Myers 1984),

[3] For instance, Myers (2003) argues that the traditional theories on capital structure are conditional and not universal theories. They may help explain the capital structure for some firms under some circumstances, but in other cases be completely redundant.

making a compelling argument as to how firms can maximize their overall value by choosing the specific debt level at which the marginal value of the tax benefits equates the marginal cost of financial distress. Jensen (1986) offers a different perspective on the trade-off between debt and equity by examining the agency problems inherent between managers and shareholders. He argues that debt is used as a measure to discipline managers who may be incentivized to spend free cash flows on negative NPV projects. Firms can weigh this benefit of leverage against other sources of agency cost, such as shareholder-debtholder conflicts, that increase in leverage (Stulz 1990). The implication from both these perspectives on the trade-off theory is that every firm has an optimal leverage ratio and makes financing decisions accordingly.

The flexibility of the trade-off framework creates ample room for further investigation into additional factors affecting firms' capital structure decisions. For instance, Maksimovic and Titman (1991) examine how leverage affects a firm's ability to credibly offer high-quality products. They find that, under certain circumstances, debt hinders such activity while in other cases, most notably when a firm has assets with high salvage value in liquidation, debt increases a firm's ability to satisfactorily offer high-quality products. The trade-off framework is also prevalent in papers on employment protection and leverage (Serfling 2015; Simintzi Vig and Volpin 2015), in which the strategic use of debt by firms to lower the bargaining power of employees is weighted against the increase in fixed cost of labor associated with more stringent labor laws. We adopt similar terminology when we examine the effect of changes in temporary employment legislation on capital structure decisions.

2.2 Pecking Order and Market Timing

The pecking order theory of capital structure, as articulated by Myers and Majluf (1984), states that firms strictly prefer to use retained earnings to external financing, debt to equity (should external financing be required), and equity only when all other sources of funding has been depleted. The underlying idea is that the cost of financing increases with information asymmetry. Equity is the least preferred source of financing as it exhibits considerable adverse selection (Frank and Goyal 2008). Outside investors, unable to verify the quality of firms, will

lower their valuation of stock issuances due to the participation of less valuable firms (lemons) in the market. As a consequence, highly valuable firms (peaches) receive worse terms than they would have, had their quality been observable, and in some cases, they are penalized to such an extent that they withdraw from the market (Cadsby, Frank and Maksimovic 1990).[4] Moreover, existing investors of the firm will prefer retained earnings to debt issuance, as retained earnings are inherently less risky (Frank and Goyal 2008). Together, the firms' preferences form the pecking order theory of capital structure, which, in contrast to the trade-off theory, implies that firms do not make financing decisions based on an optimal leverage ratio.

The market timing theory of capital structure offers a simple and practical explanation as to how firms finance their operations. Managers examine the conditions of the debt and equity markets and choose the market that seems most favorable (Myers 1984). For instance, if a firm experiences a stock price run-up, managers may want to capitalize on this by issuing equity. Managers may even choose to defer issuances if neither market is favorable, or conversely, raise capital when a particular market is favorable even though the firm has no immediate need for funds (Frank and Goyal 2009). Graham and Harvey (2001) surveyed 392 Chief Financial Officers (CFOs) about capital structure decision-making, and did find moderate support of the market timing theory. CFOs tend to time debt issuances to coincide with low interest rates and examine stock appreciation when considering equity issuances. Nonetheless, while the theory may be intriguing, it lacks a sufficiently sophisticated theoretical framework and coherence when considered in conjunction with other factors important to capital structure decisions (Frank and Goyal 2009)

2.3 Labor Market Frictions and Capital Structure

The traditional theories of capital structure discussed above partially explains the factors affecting firms' financing decisions, but many aspects, such as the effect of labor market frictions, remain a puzzle. A more recent line of thinking looks alternately at the tie between employment protection and capital structure decisions. Our paper contributes to the work of Simintzi, Vig and Volpin (2015),

[4] We draw on the terminology from Akerlof (1970).

who examine the effect of labor reforms on capital structure decisions for a sample of manufacturing firms across countries. Here, labor reforms cover a broad range of employment protection including laws governing individual dismissal of regular workers, temporary employment and collective dismissals. Through the use of a difference-in-differences research design, they find that reforms increasing employment protection are associated with a 187 basis points reduction in leverage. More specifically, when comparing the median leverage for firms that are subject to more stringent labor laws with a set of control firms that are located in countries without any changes in labor laws, these reforms correspond to a 10 percent reduction in leverage. Simintzi, Vig and Volpin (2015) assign this reduction to increased operating leverage associated with stronger employment protection, which crowds out financial leverage.

Our paper also contributes to Serfling's (2015) investigation into the effect of state-level wrongful discharge laws on firms' capital structure in the United States. Wrongful discharge laws sidestep the at-will-employment principle and provide workers with the right to sue the employer for unjust dismissal. Serfling (2015) hypothesizes that the adoption of wrongful discharge laws constitutes an exogenous increase in labor adjustment costs and finds, through the use of a difference-in-differences approach, that firms reduce financial leverage following the passage of such laws. Namely, for every dollar of book assets, firms operating under wrongful discharge laws reduce their financial leverage ratios by 160 basis points in response to the state adopting such laws to protect employees. Serfling (2015) argues that the reduction in leverage stems from lower debt capacity due to lower profitability, higher financial distress costs and higher unemployment risk.

More broadly, our paper relates to other research regarding the effect of labor market frictions on firm financing, such as Matsa's (2010) investigation into the strategic use of debt to lower the bargaining power of employees and Kim's (2012) examination of how the employment of workers with specific human capital affects capital structure decisions. Furthermore, our paper builds on the literature examining the linkage between underinvestment and leverage (DeAngelo, DeAngelo and Whited 2011; Denis and McKeon 2012) and the works examining the interplay of unemployment risk and leverage (Berk, Stanton and Zechner 2010; Agrawal and Matsa 2013). To the extent that employment

protection leads to higher operating leverage, our study also reinforces Kahl, Jason and Nilsson's (2012) contribution to the body of literature delving into the connection between operating leverage and capital structure, and their inference that operating leverage is a key factor in explaining firms' low leverage ratio.

3. Theory

Our theoretical framework features two firms that are identical across a range of variables, but differs with respect to the factors used in production. One firm is highly labor intensive, while the other firm relies more heavily on other inputs, such as capital. For illustrative purposes, the labor-intensive firm could be an educational institution, in which a large portion of the production costs go towards staff salaries and associated costs, while the capital-intensive firm could be from the agriculture sector, which has been heavily industrialized over the past decades. In response to changes in the legislation on temporary employment, we hypothesize that the labor-intensive firm will make considerable changes to its capital structure while the capital-intensive firm will not. That labor-intensive firms are more heavily impacted by labor reforms follow naturally from their cost structure, but how it plays out for capital structure decisions is less discernible. We develop our hypothesis in the step-by-step progression outlined below, diving into each contributory factor and ultimately culminating in a bespoke trade-off theory framework.

One factor that could motivate firms to increase leverage, in response to more stringent labor laws, is dampening the positive effect of such laws on the bargaining power of employees. For temporary workers, their bargaining power could for instance be improved if the required notice of termination is lengthened or the amount of time they work before being entitled to a permanent position is shortened.[5] As the cost associated with laying off workers increases for firms, this ought to have a positive effect on the bargaining power of employees (Manzini and Snower 2005). A large body of literature delving into the effect of labor claims on capital structure has demonstrated that debt is used strategically to offset improvements in employees' bargaining power (see Baldwin 1983; Perotti

[5] "Fireårsregelen", which sets a ceiling on the duration of temporary work contracts to four years, is an example of a law that is likely to improve the bargaining power of temporary employees.

and Spier 1993; Hennessy and Livdan 2009; Matsa 2010). As employees with improved bargaining power are likely to demand higher wages, this literature argues that firms respond by tying up more future cash flows to debt service. By straining their liquidity, firms improve their bargaining position relative to employees and offset much of the effect that strengthened employment protection may have on wages. This illustrates that leverage, in addition to being a disciplinary mechanism to discourage managers from wasting cash on negative NPV investments, empire building or perks, can be a valuable tool in labor negotiations (Jensen 1986; Matsa 2010). Other than keeping wages low, the use of leverage may also mitigate the underinvestment problem caused by labor holdout power (Simintzi, Vig and Volpin 2015). Examining this factor in isolation, we therefore hypothesize that firms increase the use of leverage in response to more stringent temporary employment legislation. When framed according to the simple static trade-off theory of capital structure, we infer that the marginal value of debt increases with employment protection.

An alternative channel that affects firms' capital structure is the impact of stronger employment protection on financial distress cost. In times when firms struggle to meet their financial obligations, redundancies are often utilized as a means of cutting costs (Ofek 1993; Kang and Shivdasani 1997). However, if the cost associated with terminating employees surges, this may no longer be a viable cost-saving strategy. For instance, should temporary employment regulations tighten, firms that have traditionally relied heavily on temporary workers may be forced to hire a larger proportion of their employees on open-ended contracts. Assuming that it is costlier to lay off permanent than temporary employees, these firms will be less equipped to respond to cash flow shortfalls as the ratio of permanent to temporary employees increases. Following this line of thinking, the financial distress cost would thereby increase with the increases in the stringency of temporary employment legislation. Higher financial distress cost lowers the debt capacity – the point at which any further increase in debt would decrease the firm's market value of debt (Myers 1977) – with a presumably negative carryover effect on firms' debt level. Moreover, if redundancies are too costly to effectuate for firms combatting financial distress, they may pursue other cost-saving avenues, such as forgoing profitable investments (Mohapatra 1999). This in turn may induce further reductions in firms' use of leverage, as firms tend to keep their

debt level below target if the probability of underinvestment is high, in the hopes that such debt capacity can be used to fund profitable investments in the future (DeAngelo, DeAngelo and Whited 2011; Denis and McKeon 2012).

We note a caveat here. Under most circumstances, the higher financial distress cost, resulting in higher bankruptcy risk, would also increase the risk of unemployment, for which employees would demand higher wages as compensation (Berk, Stanton and Zechner 2010).[6] Firms prefer to choose a conservative approach to financial policy in order to lower their employees' exposure to unemployment risk (Agrawal and Matsa 2013) and Serfling (2015) therefore presents this as an additional factor driving firms to lower their leverage ratios in response to stringent labor reforms. However, we find this argument less relevant in the case of legislation that induces firms to move temporary employees onto open-ended contracts (i.e. become permanent employees) rather than continuing to hire temporary employees. Temporary employees would then experience a reduction in unemployment risk. This represents a competing effect on unemployment risk, and thus no definite conclusion can be reached about the overall effect.

Negative effects on leverage stemming from increased financial distress cost can also be viewed in light of higher operating leverage (Simintzi, Vig and Volpin 2015). As temporary employment legislation becomes more stringent, firms will hire a larger proportion of their employees on a permanent basis and thus, labor cost will become more fixed in nature. Simintzi, Vig and Volpin (2015) argue that stronger employment protection convert labor claims into a debt-like contract that results in higher operating leverage. Kahl, Lunn and Nilsson (2012) show that in turn, higher operating leverage reduces the debt capacity of firms, which then leads to a reduction in the use of leverage. Hence, more stringent temporary employment legislation can reduce firms' debt level due to higher operating leverage caused by more rigid labor cost.

Overall, the ex-ante effects of new temporary employment legislation are ambiguous. Firms weigh the increased marginal value of debt as a means of

[6] Berk, Stanton and Zechner (2009) show theoretically that workers will require more compensation if the firm is levered due to greater likelihood of bankruptcy.

improving bargaining power relative to employees, against the increased marginal cost of debt arising from more inflexible labor costs, causing higher financial distress cost and greater likelihood of underinvestment. The resulting imbalance from these competing forces determines how firms respond to new laws affecting the use of temporary employment.

4. Difference-in-differences approach

Our panel data consists of firm, industry and country data. We adopt a difference-in-differences research design with Equation 1 as our baseline regression:

$$lev_{i,t} = \gamma(laws_{t-1} * intensity_{j,}) + \mathbf{\beta X_{i,t-1}} + \theta_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

where i denotes a firm, t denotes a year and j is an industry. The dependent variable, $lev_{i,t}$, is our measure of leverage. In the baseline model, we use total liabilities over total assets, but we report the results for other definitions of leverage as an additional robustness check. The interaction term comprises the OECD indicator for employment protection specific to temporary employment, $laws_{t-1}$, and a measure for labor intensity across 30 industries, $intensity_j$, derived from Boustanifar (2014). $\mathbf{X_{i,t-1}}$ is a vector of control variables commonly used in capital structure regressions (see Titman and Wessels 1988; Zeitun and Tian 2007; Frank and Goyal 2009; Margaritis and Psillaki 2010; Alkhatib 2012). All continuous variables are winsorized at their 1st and 99th percentiles, which is done to reduce the effect of outliers. The firm fixed effects, θ_i, control for time-invariant firm characteristics not embodied in the vector of control variables and ensure that the estimate of γ does not suffer from omitted variable bias caused by unobservable factors being correlated with the explanatory variables used in Equation 1 (Kurtulus and Tomaskovic-Devey 2012). In other words, the estimate of γ will measure the actual effect of temporary employment legislation on capital structure rather than cross-sectional correlations (Serfling 2015). Year fixed effects, μ_t, capture the influence of aggregate trends in the economy, such as macroeconomic conditions, that could impact firms' use of debt and equity or the probability of Norway adopting new labor reforms. $\varepsilon_{i,t}$ is the error term. We use one-period lagged observations of the explanatory variables as this mitigates some

of the endogeneity concerns associated with simultaneity problems (Frydenberg 2011).

The difference-in-differences technique is typically used for estimating the effects of new laws and has frequently been drawn upon in papers examining labor market frictions (see Acharya, Baghai and Subramanian 2013; Acharya, Baghai and Subramanian 2014; Simintzi, Vig and Volpin 2015; Serfling 2015;). The technique contrasts the outcomes pre and post-treatment for both control and treatment groups in order to determine the ex-post effects of a particular policy (Ashenfelter 1978; Ashenfelter and Card 1985). To further clarify, suppose that two industries – agriculture and education – will be subject to new laws in year 1 and 2, respectively. In year 1, a prohibitive law regarding the use of antibiotics on domestic livestock is adopted and the agriculture industry will serve as the treatment group while education will be the control group; and vice versa in year 2, when a law prohibiting tuition fees is approved. In subsequent years, both industries will be in the control group. Typically, a binary variable is used to distinguish between the treatment and control groups. However, it is possible to estimate the same effects using a variable that accounts for different treatment intensities (Angrist and Pischke 2009). Such is the case for our model, in which all industries are subject to the same laws, but differs in the degree to which they are affected by these selfsame laws. The industries are not equally affected by changes in temporary employment legislation due to different labor intensities, with the hypothesis being that labor-intensive industries will be more heavily affected.

In our structure, the coefficients estimate the differential effects of changes in temporary employment protection on leverage for industries that differ in labor intensity, rather than the aggregate effect on leverage across all industries. It is of note here that a result showing labor-intensive industries reducing their leverage by a greater degree following the introduction of more stringent temporary employment legislation would indicate that such legislation has a causal and negative impact on leverage. This is due to the empirical identification of our difference-in-differences research design that controls for time-varying firm characteristics (control variables), time-invariant firm characteristics (firm fixed effects) and aggregate trends in the economy (year fixed effects). Contingent on

these controls, firms should only differ in their labor intensity, which allows us to estimate the causal effect of temporary employment legislation on leverage. The difference-in-differences technique is robust in a variety of settings. Given our assumption that labor intensity is constant throughout our sample period[7], of particular pertinence is the lack of distortion in the estimated results despite some industries remaining in the control group throughout the sample period. Moreover, it is robust to using a discrete variable as measure of the treatment, as is the case for our variable, laws_{t-1} (Simintzi, Vig and Volpin 2015).

A key assumption of the difference-in-differences approach, as outlined by O'Neill et al. (2016), is that the treatment and control groups would follow a parallel trend in the absence of treatment. We provide a graphical representation of the changes in leverage around the law changes in 2001 and 2006 in Exhibit 2.[8] Figure A shows parallel trends for control and treatment group prior to 2001 and then a visible positive response by the treatment group in the years following the decrease in temporary employment legislation. Similarly, Figure B shows parallel trends prior to 2006 and then a visible negative response by the treatment group in the years following the increase in temporary employment legislation. Overall, Exhibit 3 provides visual evidence that treatment and control groups did follow parallel trends prior to law changes and that labor-intensive industries responded more aggressively to such changes.

As the difference-in-differences research design has gained popularity among economists, concerns have been raised about the validity of the results it yields. Most notably, Bertrand, Duflo and Mullainathan (2004) argue that the technique is prone to severe serial correlation problem that may lead to heavily understated standard errors and, correspondingly, highly significant but invalid coefficients. In support of their claim, they found that the difference-in-differences technique yielded significant results in response to placebo laws, i.e. fictional laws in 45 percent of the cases examined. To overcome this issue, we re-estimate each regression with clustering at industry-level. While there is no consensus on exactly how to cluster the standard errors, using larger and fewer clusters is a

[7] Boustanifar (2014) notes that the ranking of labor intensity across industries did not change much across time for his sample of US industries.

[8] For simplicity, we have split up labor intensity in two subsamples – above and below – the median for this particular exercise.

conservative approach used by many practitioners (Cameron and Miller 2013). Clustering at the industry level satisfies this principle and controls for any time-varying correlations in omitted factors that impact different firms within the same industry (Bertrand, Duflo and Mullainathan 2004).[9]

5. Data

We draw upon several sources of data for our analysis: (1) firm financial data, (2) industry-level data and (3) country-level data pertaining to temporary employment legislation in Norway. In Exhibit 1, we provide definitions and summary statistics for all variables used.

5.1 Firm data

Our firm-level data source is the Centre for Corporate Governance Research (CCGR). The CCGR database contains accounting and financial variables for the universe of firms in Norway dating back to 1994. Starting with the complete population of limited liability firms (amounting to 3,855,714 firm years) we filter the data in several ways to ensure that our sample comprises a robust set of operative firms free of severe financial distress. Firstly, we delete firm years that contain either missing values, nonsensical values (i.e. negative values for variables that should be strictly non-negative, such as assets) or values suggesting that the firm is under financial distress (i.e. liabilities exceeding assets). The variables considered are industry codes, company age, return on assets (ROA), total fixed tangible assets, total equity and book leverage, and amounted to 390,454 deletions. Moreover, we delete organizations that are not undertaking business and trade in the traditional sense, which includes housing co-operations ("borettslag"), foundations and sole proprietorships ("enkeltmannsforetak"). In addition, in order to avoid non-operative firms and firms with a strong resemblance to sole proprietorships, we put lower bounds on total assets (greater than 10 million NOK) and number of employees (more than 15). Lastly, we require a minimum of 4 data entries per firm. This produces a sample of 3,334-9,473 firm years spanning the period from 1997 to 2013. We make two notes to this sample: (1) The number of firm years increases consistently as we progress

[9] The critical values are slightly adjusted when we cluster at industry-level. For a two-sided test with 29 degrees of freedom the critical values are: 2.708, 2.045 and 1.699 for 1%, 5% and 10%, respectively.

through the sample period, suggesting that the data has become more reliable over time (fewer missing or nonsensical values), and (2) We start in 1997 as the filtering produce only a few observations in previous years.

The baseline dependent variable used here is book leverage, defined as total debt over total assets. We use book value under the assumption that managers focus more heavily on this measure of leverage when they make capital structure decisions (Graham and Harvey 2012). This may be due to a stronger linkage between debt and fixed assets than between debt and growth opportunities, or due to strong market fluctuations making market leverage an unreliable reference point for capital structure decisions (Myers 1977; Frank and Goyal 2009). As a robustness check, we rerun each regression using total debt over total equity and long-term debt over total assets as measures for leverage.

For firm-level control variables, we use profitability (measured as ROA), growth (defined as the change in the logarithm of total assets per year), tangibility (defined as total fixed tangible assets over total assets) and size (defined as the logarithm of total assets), all of which have been vigorously tested and evidenced to impact firms' capital structure decisions (see Titman and Wessels 1988; Zeitun and Tian 2007; Frank and Goyal 2009; Margaritis and Psillaki 2010; Alkhatib 2012). Profitability indicates the availability of internal funds, with profitable firms tending to use less leverage; growth serving as a proxy for growth opportunities, with high-growth firms tending to have lower leverage; tangibility indicates the ease with which firms can raise debt, with "tangible" firms typically possessing more leverage; and size serves as a proxy for default risk (through the level of diversification), with large firms tending to have higher leverage (Frank and Goyal, 2009).

In Exhibit 1, we provide means, medians, standard deviations as well as the first and third quartiles for all our firm-level variables. Leverage (defined as total debt over total assets) has a median of 0.70, while it is 0.07 for long-term debt over assets. The summary statistics for the last definition of leverage (total debt over equity) looks quite unusual with median of 2.49 and mean of 7.81, but this is due to the fact that we include private firms, some of which have a negligible equity component. The average ROA is seven percent and the annual growth per firm is

half a percent. Tangibility has a mean of 21 percent and the median firm has 31.6m NOK in assets.

5.2 Industry-level data

For labor intensity, we draw upon the data compiled by Boustanifar (2014, 347-349), in which the labor intensities for U.S. industries are determined by dividing the industry's aggregate wage bill by the value added. This means that we use the labor intensities across industries in the U.S. as a proxy for the labor intensities in the same industries in Norway. The justification for using this proxy is that the ranking of labor intensities should be identical across countries in spite of differing factor endowments due to the fact that the intrinsic technological characteristics of industries do not vary considerably across countries (Lin, Sun and Wu 2015). Further substantiating use of the proxy is Boustanifar's (2014) comment that the ranking of the labor intensities he compiled did not change greatly whether he aggregated at the country or state level, or if he changed the reference year. Moreover, Jinjarak and Naknoi (2013) find rather minute variations in labor intensities for industries across countries, in particular for countries with similar characteristics. In Exhibit 3, we provide the labor intensities for each industry. Educational services is the most labor intensive industry while agriculture is the least, with scores of .0995 and .908 respectively. The median score for all industries is .64.

5.3 Country-level data

In measuring the stringency of temporary employment legislation in Norway, we use the OECD indicators of employment protection legislation specific to temporary employment. OECD measures employment protection based on 21 items covering essential aspects regarding employee-employer relations. Most relevant items for temporary employment include, but are not limited to, the type of work that warrants the use of fixed-term contracts, the duration of temporary work that entitles a permanent position by law and the ease with which firms can hire through temporary work agencies. Norway has had three changes – decreases in stringency in 2000 and 2001 and an increase in 2006 – throughout the sample period of 1997-2013.

Although the assessment and scoring of employment protection is done at the discretion of the OECD Secretariat, based on the Secretariat's own interpretation

of statutory laws, collective bargaining agreements and case law as well as contributions and advice from country experts, it is safe to assume that the changes in 2000, 2001 and 2006 stem from three distinctive events. In 2000, the restrictions on the use of temporary work agencies were relaxed so that workers of all proficiencies could be hired through such agencies.[10] In 2001, the Supreme Court of Norway gave further clarity to the law stating that in order for firms to hire temporary employees, the nature of the work needs to differ from that usually conducted by the firm.[11] Previously, this had been interpreted as needing to give different work assignments to temporary employees, but the clarification by the Supreme Court states that the work assignments can in fact be similar, but the nature of work itself needs to be different. In 2006, the maximum duration of work entitling temporary employees to the same rights as permanent employees was set to four years ("fireårsregelen").[12]

6. Findings

6.1 Baseline results

In Exhibit 4, we report the results of the baseline specifications of Equation 1. Leverage is defined as total debt over total assets in columns 1 and 2, total debt over total equity in columns 3 and 4 and long-term debt over assets in columns 5 and 6. In columns 1, 3 and 5 we regress leverage only on the interaction term (temporary employment legislation and labor intensity) and firm and year fixed effects, which control for time-invariant firm characteristics and aggregate country-level trends respectively. In columns 2, 4 and 6 we regress leverage on the interaction term, a set of control variables specified in section 5 and firm and year fixed effects.

The variable of interest is the interaction of temporary employment protection and labor intensity, $\text{laws}_{t-1} * \text{intensity}_j$. γ, the coefficient for this variables, is statistically significant at the one percent level for the specifications in columns 1, 2, 5 and 6 and significant at the five percent level for specifications in columns 3 and 4. Moreover, γ is negative for all specifications. We focus our discussion on

[10] Ministry of Labour and Social Affairs 2014.
[11] Rt. 2001 p. 1413, "Norsk Folkehjelp".
[12] Ministry of Labour and Social Affairs, 2006.

the results from columns 2 and 6 that are both significant at the one percent level and account for additional factors impacting leverage. As our measure of labor intensity is calculated as a ratio, i.e. the industries differ in treatment intensity, rather than as a binary variable we are not presently able to estimate the aggregate effects of stringent temporary employment legislation on leverage. Instead, we can compare the differences in responses to law changes across industries that differ in labor-intensity. Therefore, we interpret the coefficient, γ, in column 1 as follows: For one unit increase in the stringency of temporary employment legislation, firms in the least labor intensive industry, agriculture, reduces their leverage by eight basis points while firms in the most labor intensive industry, educational services, reduces their leverage by 74 basis points.[13]

This result substantiates our hypothesis that labor-intensive firms are likely to respond more aggressively to changes in temporary employment legislation. In this particular example of educational services, the magnitude by which it responds is ten times greater than the degree to which agriculture firms reduce their leverage. It should be noted, however, that for other industries not at the extreme ends of the labor intensity scale, the magnitude of their reduction in leverage is lower than that of educational services firms. Similarly, for column 6, in which leverage is defined as long-term debt over assets, the responses are 4 and 35 basis points reductions for educational services and agriculture, respectively.

The control variables we use – profitability, growth, tangibility and size – are statistically significant at the one percent level for both the specification in columns 2 and in 6. The signs of the coefficients are, for the most part, consistent with the empirical research carried out by Frank and Goyal (2009). We find that leverage decreases in profitability, increases with the proportion of tangible assets and in growth while the sign for size differs between column 2 and 6. Kayhan and Titman (2007) suggest that the negative sign for profitability is due to the fact that firms accumulate profits passively. Tangible assets lower financial distress cost and therefore increase firms' debt capacity. Correspondingly, the amount of leverage used also increases (Deesomsak, Paudyal and Pescetto 2004). Growth may increase the use of leverage, as firms with significant growth opportunities

[13] The industry effect is calculating by multiplying he coefficient, γ, with each industry's labor intensity.

will resort to leverage to finance new investments when retained earnings are depleted (Cassar and Holmes 2003). Lastly, size may alternately increase leverage, as large firms typically have lower financial distress costs and therefore enjoy more favorable terms in the debt market (trade-off theory); or, it may decrease leverage as larger firms are better equipped to draw upon retained earnings for financing (pecking order theory) (Frank and Goyal 2008).

To address the serial correlation concerns associated with the difference-in-differences methodology, we cluster the standard errors at industry level and re-estimate Equation 1. These results are shown in Exhibit 5, which is structured similarly to Exhibit 4. Of interest here is whether the coefficients – in particular the interaction term, γ – retain significance when we account for serial correlation. γ is statistically significant at the five percent level for the specifications in columns 3, 4 and 5, and marginally insignificant for the specifications in columns 1, 2 and 6. Our control variables are highly significant in columns 2 and 6, and mostly insignificant in column 4. Comparing these results to that of our baseline model, some significance has clearly been lost when serial correlation is taken into account. Nevertheless, strong support remains for labor-intensive firms responding more negatively to greater stringency in temporary employment legislation.

6.2 Labor intensity as dummy

The following step is estimating Equation 1 using a binary variable for labor intensity, in which industries with above median labor-intensity take the value of one (treatment group) and below median industries take the value of zero (control group). This serves two purposes. Firstly, it allows us to ascertain whether our results can hold in a simplified theoretical framework that is a closer fit to our quasi-natural experiment. Secondly, instead of merely comparing industries with differing labor intensity, broader conclusions can be made as to how treatment firms respond differently to changes in temporary employment legislation when compared to the control firms. We report the results from this regression without clustering in Exhibit 6 and with clustering at industry-level in Exhibit 7, both of which are undertaken as outlined previously. In Exhibit 6, the interaction term of temporary employment legislation and the labor intensity dummy, γ, is

statistically significant at the one percent level for the specifications in columns 1, 2, 5 and 6 and significant at the five percent level for the specifications in columns 3 and 4. Furthermore, the coefficients for our control variables are statistically significant at the one percent level for columns 2 and 6, and insignificant for column 4. For Exhibit 7, γ is statistically significant at the one percent level for the specifications in columns 1 and 2, at the five percent level for columns 3, 4 and 5, and at the ten percent level for column 6. We get similar significance for our control variables as in Exhibit 6. We interpret the coefficient for the interaction term, γ, in column 2 as follows: For one unit increase in temporary employment legislation, labor-intensive firms (treatment group) reduce their leverage by 41 basis points relative to non-labor-intensive firms (control group). The estimated effect is smaller in this specification relative to our baseline model as in this case, we examine the average differential effect between control and treatment group rather than comparing industries on the extreme ends on the labor intensity scale. These results do not differ sizably from our previous results, when a continuous variable for labor intensity was used, thereby substantiating our results holding in a simplified setting. Interestingly, for this treatment of labor intensity, γ is highly significant even when clustered at the industry-level providing further evidence of a causal and negative relationship between temporary employment legislation and leverage.

6.3 Implications

Overall, these tests show that labor-intensive industries react more negatively to increases in temporary employment legislation. As noted previously, this by definition means that more stringent temporary employment legislation has a causal and negative impact on firms' use of leverage. This conclusion is robust to different definitions of leverage and different treatments of labor intensity. Our interpretation of this finding is that more severe temporary employment legislation causes the nature of labor costs to change from variable to fixed. Emblematic of this change is, for instance, the so-called 'four-year rule' ("fireårsregelen"), the legislations that sets a ceiling on fixed-term contracts of four years, after which the employee is entitled to a permanent position. Firms can no longer hire people on open-ended contracts, and prematurely terminating contracts may result in loss of valuable knowledge, thereby changing the nature of

temporary labor costs to 'fixed'. Thus, firms can no longer rely as heavily on laying off workers in response to cash flow short falls and, consequently, the financial distress cost increases. As an alternative cost saving strategy, firms may forgo profitable investments to reserve cash for a 'rainy day', whereby the likelihood of underinvestment surges.

These factors – higher financial distress cost and greater likelihood of underinvestment – are both associated with lower levels of financial leverage (Bjuggren 1995; DeAngelo, DeAngelo and Whited 2011; Denis and McKeon 2012; Agrawal and Matsa 2013). In the terminology of the trade-off theory of capital structure, the large hike in the marginal cost of leverage due to these two factors overshadows any increase in the marginal value of leverage associated with the strategic use of debt, and subsequently, firms respond to more stringent temporary employment legislation by reducing their use of leverage.

6.4 Extension

Having established that firms decrease their leverage following increases in temporary employment legislation, an area of further exploration is whether the effect is larger on smaller firms. It could be supposed that smaller firms, on average are more financially constrained than larger firms, and therefore more sensitive to increases in their financial distress cost. In order to test this hypothesis, we estimate the triple differential effect based on Equation 2:

$$lev_{i,t} = \gamma\left(laws_{t-1} * intensity_j * small_{i,t-1}\right) + \alpha_1\left(laws_{t-1} * intensity_j\right) + \alpha_2\left(laws_{t-1} * small_{i,t-1}\right) + \alpha_3\left(intensity_j * small_{i,t-1}\right) + \mathbf{\beta X_{i,t-1}} + \theta_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

where γ is the coefficient for the triple interaction term of temporary employment legislation, labor intensity across industries and a dummy indicating whether the firm is small. Firms with less than 50 employees are defined as small firms and take the value of 1. The α's are the coefficient for the double interaction terms and all other notation is identical to Equation 1. We present the results from regressing Equation 2 without clustering in Exhibit 8 and with clustering at industry-level in Exhibit 9. Of interest here, are the sign and significance of the coefficient for the triple interaction term, γ. The sign is negative for every specification and significant either at the one or five percent level for the vast majority of

specifications. These findings show that small firms respond more negatively to increases in the stringency of temporary employment legislation, and, therefore, substantiate our hypothesis that small firms are more sensitive to increasing financial distress cost.

7. Conclusion

In this paper we examine the effect of temporary employment legislation on the use of leverage for the universe of firms in Norway spanning the period 1997 to 2013. Adopting a difference-in-differences research design, in which labor intensity indicates the degree of treatment, we find that labor-intensive firms reduce their leverage by 41 basis points relative to non-labor-intensive firms following an one unit increase in the stringency of temporary employment legislation. Moreover, we find that highly labor-intensive firms respond 10 times as aggressively to such law changes compared to low labor-intensive firms, and that small firms reduce their leverage ratios by more than large firms following increases in the stringency of temporary employment legislation. Robust to different definitions of leverage and different treatments of labor intensity and accounting for serial correlation, our findings presents evidence that more stringent temporary employment legislation has a causal and negative effect on firms' use of leverage.

We assign this reduction in use of leverage to two key factors. Firstly, higher financial distress cost resulting from the nature of labor costs being more fixed than variable, and firms' decreased power to lay off employees in a time expedient and cost-efficient manner. Secondly, the greater likelihood of underinvestment associated with retaining rather than investing free cash flow, in case of a 'rainy day'. Our finding that small firms reduce their leverage ratios by more following increases in the stringency of temporary employment legislation indicate that these firms are more sensitive to increases in financial distress cost.

Public discourse on temporary employment legislation often centers around how workers can be best protected against unemployment and financial difficulties, while the effect on firms is largely untouched. We argue here that such laws have a negative impact on firms through higher financial distress cost and greater

likelihood of underinvestment. These factors, as well how temporary employment legislation affects the use of leverage, are worthwhile to consider for policy makers engaged in enhancing employer-employee labor relations. A limitation of our study, and a suggestion for further investigation, is that we do not identify the degree to which different types of laws affect firms. A more thorough understanding of this would further aid policy makers in implementing legislation that find the delicate balance between improving the work rights of temporary employees while minimizing negative impacts to firms.

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Exhibit 1: Summary Statistics

The table presents summary statistics for the dependent variables, the main variable of interest (both independently and for the interaction) and the control variables used in our regression model. Our sample covers the period between 1997 and 2013 and consists of 3,334-9,473 firm years. We have required that companies have at least 15 employees and NOK 10 million in assets. The firm-level data is from the CCGR database. The data on temporary employment legislation is from the OECD Indicators of Employment Protection specific to temporary employment. Throughout the sample period there are three changes in temporary employment legislation: decreases in 2000 and 2001 and an increase in 2006. The data on labor intensity is from Boustanifar (2014), in which a score for labor intensity is determined by dividing the aggregate wage bill with the value added for each industry. The control variables we use are PROFITABILITY (measured as ROA), GROWTH (defined as the yearly change in log total assets), TANGIBILITY defined as the ratio of total fixed tangible assets over total assets and SIZE defined as log total assets. The continuous variables are winsorized at the 1st and 99th percentile. LAWSxINTENSITY is the main variable of interest and is the product of temporary employment legislation (from OECD) and labor intensity per industry.

	Mean	**Std.Dev.**	**25th percentile**	**Median**	**75th percentile**
Dependent Variables					
TOTAL DEBT/ASSETS	0.66	0.19	0.54	0.70	0.82
TOTAL DEBT/EQUITY	7.81	318.51	1.26	2.49	4.90
LONG-TERM DEBT/ASSETS	0.16	0.20	0	0.07	0.27
Main Explanatory Variables					
LAWSxINTENSITY	1.98	0.42	1.65	1.92	2.25
LAWS	2.96	0.13	3	3	3
INTENSITY	0.66	0.14	0.56	0.64	0.76
Control Variables					
PROFITABILITY	7.00	10.55	1.20	2.26	10.96
GROWTH	0.005	0.014	-0.002	0.003	0.01
TANGIBILITY	0.21	0.23	0.04	0.11	0.32
SIZE	17.64	1.33	16.65	17.27	18.23

Exhibit 2: Leverage around changes in temporary employment legislation

Figure A: A decrease in temporary employment legislation in 2001
The figure shows how firm leverage evolves before and after the decrease in temporary employment legislation in 2001. We have created a binary variable for labor intensity in which firms above or equal to the median labor intensity of 0.64 takes the value 1 and firms with below median labor intensity take the value 0. Hence, industries with labor intensity 1 will be the treatment group and industries with intensity 0 will be the control group. We have defined leverage as total debt over total assets, and the graph represents median leverage for treated and control firms per year. t=0 represents the time of the decrease in temporary employment legislation (i.e. 2001), while t=-3 to t=3 indicates three years prior to and three years after the law change.

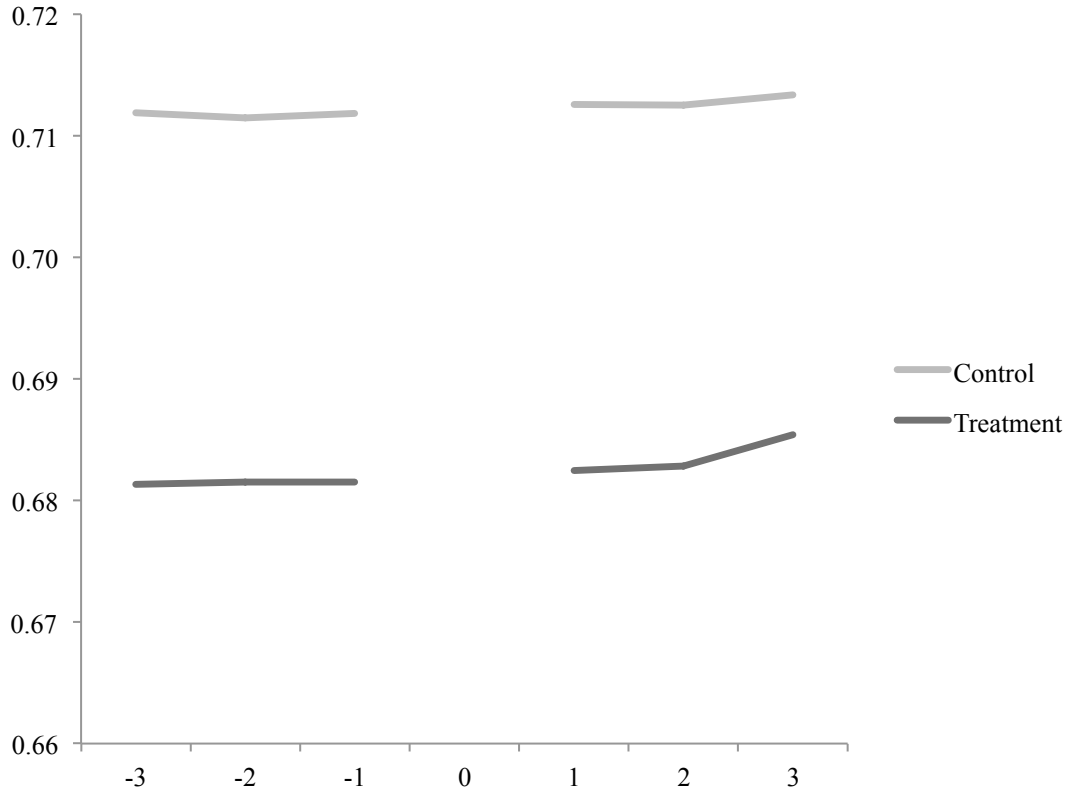

Exhibit 2: Leverage around changes in temporary employment legislation
(Continued)

Figure B: An increase in temporary employment legislation in 2006
The figure shows how firm leverage evolves before and after the increase in temporary employment legislation in 2006. We have created a binary variable for labor intensity in which firms above or equal to the median labor intensity of 0.64 takes the value 1 and firms with below median labor intensity take the value 0. Hence, industries with labor intensity 1 will be the treatment group and industries with intensity 0 will be the control group. We have defined leverage as total debt over total assets, and the graph represents median leverage for treated and control firms per year. t=0 represents the time of the increase in temporary employment legislation (i.e. 2006), while t=-3 to t=3 indicates three years prior to and three years after the law change.

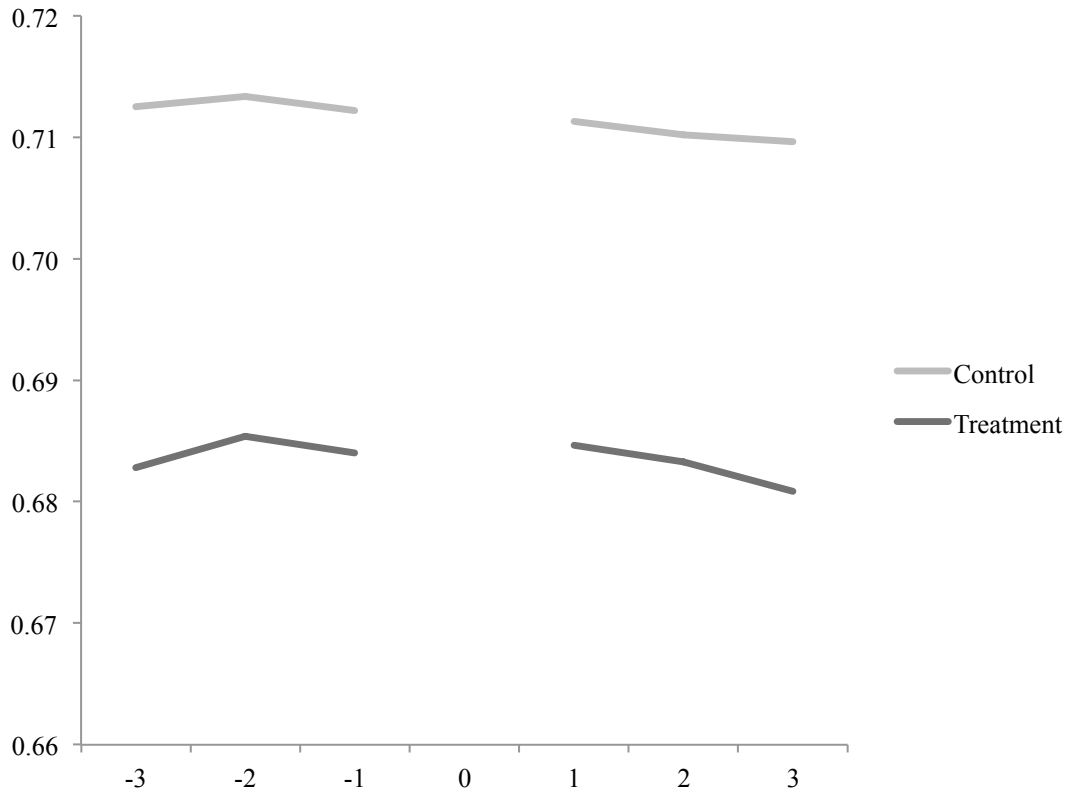

Exhibit 3: Labor intensity by industry

The data on labor intensity is from Boustanifar (2014). The score for labor intensity is determined by dividing the industry aggregate wage bill by the value added. We use the labor intensities for industries in U.S. as a proxy for the labor intensities in Norway since the intrinsic technological characteristics of the industries will be similar in Norway and the United States. This means that the ranking of labor intensities do not change much across countries even though factor endowments may differ. We provide further justification in Section 5.2. We have used a binary variable for labor intensity for some tests, and in these cases we have split up the industries based on whether or not they are above the median labor intensity.

Industry	**Labor intensity**
Agriculture, forestry and fishing	.0995
Petroleum and coal products	.419
Legal services	.434
Personal services	.492
Mining	.501
Transportation and public utilities	.518
Wholesale trade	.563
Hotels and equivalents	.579
Business services	.614
Lumber and wood products	.631
Chemical and allied products	.633
Retail trade	.641
Food products	.697
Construction	.701
Paper	.716
Primary metal industries	.742
Printing and publishing	.745
Industry machinery and equipment	.749
Stone, clay and glass products	.756
Miscellaneous manufacturing	.756
Leather and leather products	.758
Health services	.767
Electronic and other electric equipment	.780
Instruments and related products	.786
Robber and misc. plastic products	.808
Furniture and fixtures	.817
Textile mill products	.832
Apparel and other textile products	.854
Motor vehicles and equipment	.878
Educational services	.908

Exhibit 4: Baseline model for temporary employment legislation and leverage

Exhibit 4 presents the results from regressing Equation 1. For columns 1 and 2 leverage is defined as total debt/ total assets. For columns 3-4 and 5-6 the definitions of leverage are total debt/total equity and long-term debt/total assets, respectively. In columns 1, 3 and 5 we regress leverage on the interaction term (the interaction of temporary employment legislation and labor intensity) and include firm and year fixed effects. In columns 2, 4 and 6 we also include control variables. Labor intensity is defined as the ratio of industry aggregate wage bill over value added. PROFITABILITY is measures as ROA. GROWTH is defined as the annual change in log total assets. TANGIBILITY is the ratio of total fixed intangible assets over total assets. SIZE is defined as log total assets. We use one-year lag for all explanatory variables. All continuous variables are winsorized at the 1st and 99th percentile. The table provides the coefficients and t-statistics (in parentheses) from different specifications of Equation 1. ***, ** and * shows coefficients that are statistically significant at 1%, 5% and 10%, respectively.

	Dependent Variable: LEVEVERAGE					
	total debt/assets		total debt/equity		long-term debt/assets	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
$LAWSxINTENSITY_{t-1}$	-0.0074***	-0.0081***	-10.7552**	-10.6663**	-0.0056***	-0.0038***
	(-4.58)	(-4.97)	(-2.37)	(-2.35)	(-3.77)	(-2.66)
$PROFITABILITY_{t-1}$		-0.0007***		-0.1309		-0.0010***
		(-13.01)		(-0.92)		(-23.09)
$GROWTH_{t-1}$		0.5661***		-31.9407		0.3096***
		(18.82)		(-0.38)		(11.72)
$TANGIBILITY_{t-1}$		0.1047***		4.7868		0.2462***
		(22.03)		(0.36)		(59.03)
$SIZE_{t-1}$		-0.0061***		-0.8686		0.0379***
		(-4.73)		(-0.24)		(33.42)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	94,283	94,283	94,283	94,283	94,283	94,283
Within R^2	0.032	0.044	0.0002	0.0003	0.027	0.096

Exhibit 5: Baseline model for temporary employment legislation and leverage with clustering at industry-level

Exhibit 5 presents the results from regressing Equation 1 when the standard errors are clustered at the industry-level. For columns 1 and 2 leverage is defined as total debt/ total assets. For columns 3-4 and 5-6 the definitions of leverage are total debt/total equity and long-term debt/total assets, respectively. In columns 1, 3 and 5 we regress leverage on the interaction term (the interaction of temporary employment legislation and labor intensity) and include firm and year fixed effects. In columns 2, 4 and 6 we also include control variables. Labor intensity is defined as the ratio of industry aggregate wage bill over value added. PROFITABILITY is measures as ROA. GROWTH is defined as the annual change in log total assets. TANGIBILITY is the ratio of total fixed intangible assets over total assets. SIZE is defined as log total assets. We use one-year lag for all explanatory variables. All continuous variables are winsorized at the 1st and 99th percentile. The table provides the coefficients and t-statistics (in parentheses) from different specifications of Equation 1. ***, ** and * shows coefficients that are statistically significant at 1%, 5% and 10%, respectively.

	Dependent Variable: LEVERAGE					
	total debt/assets		total debt/equity		long-term debt/assets	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
$LAWSxINTENSITY_{t-1}$	-0.0074	-0.0081	-10.7552**	-10.6663**	-0.0056**	-0.0038
	(-1.56)	(-1.63)	(-2.38)	(-2.34)	(-2.44)	(-1.44)
$PROFITABILITY_{t-1}$		-0.0007***		-0.1309*		-0.0010***
		(-5.34)		(-1.97)		(-15.53)
$GROWTH_{t-1}$		0.5666***		-31.9407		0.3096***
		(14.28)		(-1.19)		(10.54)
$TANGIBILITY_{t-1}$		0.1047***		4.7868		0.2462***
		(10.06)		(0.64)		(19.54)
$SIZE_{t-1}$		-0.0061**		-0.8686		0.0379***
		(-2.06)		(-0.37)		(15.87)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	94,283	94,283	94,283	94,283	94,283	94,283
Within R^2	0.032	0.044	0.0002	0.0003	0.027	0.096

Exhibit 6: Temporary employment legislation and leverage with labor intensity as a dummy variable

Exhibit 6 presents the results from regressing Equation 1 using a dummy variable for labor intensity. Here, industries with labor intensity above the median take the value 1, and industries below the median labor intensity take the value 0. For columns 1 and 2 leverage is defined as total debt/ total assets. For columns 3-4 and 5-6 the definitions of leverage are total debt/total equity and long-term debt/total assets, respectively. In columns 1, 3 and 5 we regress leverage on the interaction term (the interaction of temporary employment legislation and labor intensity) and include firm and year fixed effects. In columns 2, 4 and 6 we also include control variables. Labor intensity is defined as the ratio of industry aggregate wage bill over value added. PROFITABILITY is measures as ROA. GROWTH is defined as the annual change in log total assets. TANGIBILITY is the ratio of total fixed intangible assets over total assets. SIZE is defined as log total assets. We use one-year lag for all explanatory variables. All continuous variables are winsorized at the 1st and 99th percentile. The table provides the coefficients and t-statistics (in parentheses) from different specifications of Equation 1. ***, ** and * shows coefficients that are statistically significant at 1%, 5% and 10%, respectively.

	Dependent Variable: LEVERAGE					
	total debt/assets		total debt/equity		long-term debt/assets	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
$LAWSxINTENSITY_{t-1}$	-0.0041***	-0.0041***	-3.0130**	-2.9898**	-0.0019***	-0.0017***
	(-7.51)	(-7.48)	(-1.99)	(-2.35)	(-3.78)	(-3.52)
$PROFITABILITY_{t-1}$		-0.0007***		-0.1349		-0.0010***
		(-13.02)		(-0.94)		(-23.10)
$GROWTH_{t-1}$		0.5633***		-36.7624		0.3080***
		(18.72)		(-0.44)		(11.66)
$TANGIBILITY_{t-1}$		0.1045***		4.3857		0.2461***
		(21.99)		(0.33)		(59.01)
$SIZE_{t-1}$		-0.0059***		-0.5312		0.0380***
		(-4.73)		(-0.15)		(33.55)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	94,283	94,283	94,283	94,283	94,283	94,283
Within R^2	0.033	0.044	0.0002	0.0002	0.027	0.096

Exhibit 7: Temporary employment legislation and leverage with labor intensity as a dummy variable and clustering at industry-level

Exhibit 7 presents the results from regressing Equation 1 using a dummy variable for labor intensity. Here, industries with labor intensity above the median take the value 1, and industries below the median labor intensity take the value 0. We cluster the standard errors at the industry-level. For columns 1 and 2 leverage is defined as total debt/ total assets. For columns 3-4 and 5-6 the definitions of leverage are total debt/total equity and long-term debt/total assets, respectively. In columns 1, 3 and 5 we regress leverage on the interaction term (the interaction of temporary employment legislation and labor intensity) and include firm and year fixed effects. In columns 2, 4 and 6 we also include control variables. Labor intensity is defined as the ratio of industry aggregate wage bill over value added. PROFITABILITY is measures as ROA. GROWTH is defined as the annual change in log total assets. TANGIBILITY is the ratio of total fixed intangible assets over total assets. SIZE is defined as log total assets. We use one-year lag for all explanatory variables. All continuous variables are winsorized at the 1st and 99th percentile. The table provides the coefficients and t-statistics (in parentheses) from different specifications of Equation 1. ***, ** and * shows coefficients that are statistically significant at 1%, 5% and 10%, respectively.

	Dependent Variable: LEVERAGE					
	total debt/assets		total debt/equity		long-term debt/assets	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
$LAWSxINTENSITY_{t-1}$	-0.0041***	-0.0041***	-3.0130**	-2.9898**	-0.0019**	-0.0017*
	(-3.50)	(-3.44)	(-2.36)	(-2.34)	(-2.24)	(-2.02)
$PROFITABILITY_{t-1}$		-0.0007***		-0.1349*		-0.0010***
		(-5.32)		(-1.99)		(-15.55)
$GROWTH_{t-1}$		0.5633***		-36.7624		0.3080***
		(13.87)		(-1.28)		(10.62)
$TANGIBILITY_{t-1}$		0.1045***		4.3857		0.2461***
		(10.05)		(0.58)		(19.46)
$SIZE_{t-1}$		-0.0059*		-0.5312		0.0380***
		(-1.96)		(-0.24)		(15.91)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	94,283	94,283	94,283	94,283	94,283	94,283
Within R^2	0.033	0.044	0.0002	0.0002	0.027	0.096

Exhibit 8: Test for size effect on leverage

Exhibit 8 and 9 present the result from regressing Equation 2 using a triple interaction of temporary employment legislation, labor intensity and a dummy indicating that the firm is small. For columns 1 and 2 leverage is defined as total debt/ total assets. For columns 3-4 and 5-6 the definitions of leverage are total debt/total equity and long-term debt/total assets, respectively. In columns 1, 3 and 5 we regress leverage on the triple interaction term as well as the all the double interaction terms (the interactions of temporary employment legislation, labor intensity and SMALL) and include firm and year fixed effects. In columns 2, 4 and 6 we also include control variables. Labor intensity is defined as the ratio of industry aggregate wage bill over value added. SMALL is defined as a dummy variable that takes value 1 for firms with lower than 50 employees. PROFITABILITY is measures as ROA. GROWTH is defined as the annual change in log total assets. TANGIBILITY is the ratio of total fixed intangible assets over total assets. SIZE is defined as log total assets. We use one-year lag for all explanatory variables. All continuous variables are winsorized at the 1st and 99th percentile. The table provides the coefficients and t-statistics (in parentheses) from different specifications of Equation 1. ***, ** and * shows coefficients that are statistically significant at 1%, 5% and 10%, respectively.

	Dependent Variable: LEVEVERAGE					
	total debt/assets		total debt/equity		long-term debt/assets	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
$LAWSxINTENSITYxSMALL_{t-1}$	-0.1081***	-0.1071***	-22.9108	-23.1835	-0.0373***	-0.0390***
	(-11.78)	(-11.74)	(-0.90)	(-0.91)	(-4.49)	(-4.87)
$LAWSxINTENSITY_{t-1}$	-0.0100***	-0.0107***	-8.2972	-8.2871	-0.0034	-0.0018
	(-4.12)	(-4.44)	(-1.23)	(-1.23)	(-1.54)	(-0.87)
$LAWSxSMALL_{t-1}$	-0.0065***	-0.0069***	2.8693	2.7681	-0.0006	0.0056***
	(-3.30)	(-3.49)	(0.52)	(0.50)	(-0.33)	(3.26)
$INTENSITYxSMALL_{t-1}$	0.3332***	0.3302***	56.4092	57.6381	0.1013***	0.1063***
	(12.94)	(12.89)	(0.79)	(0.80)	(4.34)	(4.73)
$PROFITABILITY_{t-1}$		-0.0007***		-0.1325		-0.0010***
		(-13.18)		(-0.93)		(-23.27)
$GROWTH_{t-1}$		0.5822***		-33.1330		0.2943***
		(19.29)		(-0.39)		(11.07)
$TANGIBILITY_{t-1}$		0.1034***		4.7158		0.2464***
		(21.79)		(0.35)		(59.09)
$SIZE_{t-1}$		-0.0087***		-0.7084		0.0401***
		(-6.48)		(-0.19)		(34.05)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	94,283	94,283	94,283	94,283	94,283	94,283
Within R^2	0.035	0.047	0.0002	0.0003	0.028	0.097

Exhibit 9: Test for size effect on leverage with clustering at industry-level

Exhibit 8 and 9 present the result from regressing Equation 2 using a triple interaction of temporary employment legislation, labor intensity and a dummy indicating that the firm is small. We cluster the standard errors at the industry-level. For columns 1 and 2 leverage is defined as total debt/ total assets. For columns 3-4 and 5-6 the definitions of leverage are total debt/total equity and long-term debt/total assets, respectively. In columns 1, 3 and 5 we regress leverage on the triple interaction term as well as the all the double interaction terms (the interactions of temporary employment legislation, labor intensity and SMALL) and include firm and year fixed effects. In columns 2, 4 and 6 we also include control variables. Labor intensity is defined as the ratio of industry aggregate wage bill over value added. SMALL is defined as a dummy variable that takes value 1 for firms with lower than 50 employees. PROFITABILITY is measures as ROA. GROWTH is defined as the annual change in log total assets. TANGIBILITY is the ratio of total fixed intangible assets over total assets. SIZE is defined as log total assets. We use one-year lag for all explanatory variables. All continuous variables are winsorized at the 1st and 99th percentile. The table provides the coefficients and t-statistics (in parentheses) from different specifications of Equation 1. ***, ** and * shows coefficients that are statistically significant at 1%, 5% and 10%, respectively.

	Dependent Variable: LEVEVERAGE					
	total debt/assets		total debt/equity		long-term debt/assets	
Variables	**1**	**2**	**3**	**4**	**5**	**6**
$LAWSxINTENSITYxSMALL_{t-1}$	-0.1081***	-0.1071***	-22.9108	-23.1835	-0.0373**	-0.0390***
	(-7.48)	(-7.28)	(-1.36)	(-1.37)	(-2.62)	(-2.96)
$LAWSxINTENSITY_{t-1}$	-0.0100**	-0.0107**	-8.2972***	-8.2871***	-0.0034	-0.0018
	(-2.62)	(-2.66)	(-2.93)	(-2.87)	(-1.11)	(-0.48)
$LAWSxSMALL_{t-1}$	-0.0065	-0.0069	2.8693	2.7681	-0.0006	0.0056***
	(-1.62)	(-1.64)	(1.49)	(1.55)	(-0.29)	(2.92)
$INTENSITYxSMALL_{t-1}$	0.3332***	0.3302***	56.4092	57.6381	0.1013***	0.1063**
	(7.17)	(7.00)	(1.33)	(1.35)	(2.47)	(2.77)
$PROFITABILITY_{t-1}$		-0.0007***		-0.1325*		-0.0010***
		(-5.40)		(-1.97)		(-15.79)
$GROWTH_{t-1}$		0.5822***		-33.1330		0.2943***
		(15.00)		(-1.26)		(10.84)
$TANGIBILITY_{t-1}$		0.1034***		4.7158		0.2464***
		(9.89)		(0.62)		(19.55)
$SIZE_{t-1}$		-0.0087**		-0.7084		0.0401***
		(-2.70)		(-0.29)		(15.37)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Number of obs.	94,283	94,283	94,283	94,283	94,283	94,283
Within R^2	0.035	0.047	0.0002	0.0003	0.028	0.097

Appendix: Preliminary Thesis

LABOR LAW DESIGN AND FIRM OUTCOME

1. INTRODUCTION

The ex-ante effects of changes in labor protection laws on firms are ambiguous. On one hand, more stringent laws make it more difficult for firms to make changes in their work force and as such increase the fixed costs of labor. Hence, the costs associated with failure increase and firm risk-taking should decrease. On the other hand, greater job security induces stronger efforts by workers and may even spur more commitment towards and innovation in a particular project. Following this line of reasoning, stronger labor laws should have a positive effect on firm risk-taking. The aggregate of these competing effects have implication for a firm's risk level. In the final report, we use entry and exit of firms and number of patent listings as proxies for firm risk-taking in order to examine these hypotheses:

1. More stringent labor protection laws lead to higher firm entry rates and lower exit rates
2. More stringent labor protection laws spur innovation and hence increase the number of filed patents.

Of particular interest is the degree to which labor law changes affect a firm's capital structure. Modigliani and Miller's (1958) capital structure irrelevance proposition postulates that under a restrictive set of assumptions, a firm's market value is determined by the firm's assets rather than how it finances its operations. In other words, the level of financial leverage within a firm should be independent of market value. However, in a world in which Modigliani and Miller's assumptions are consistently violated, more severe labor protection laws have arguably significant effects on a firm's capital structure, with flow-on effects to a firm's value. Simintzi, Vig and Volpin (2014) argues that rigid labor laws increase operating leverage and that firms aim to offset this effect by lowering their financial leverage. In the final report, we aim to test this hypothesis for Norwegian firms.

The theory of endogenous growth Romer (1990), Grossman and Helpman, (1991) explains that risk-taking and innovation are fundamental attributes in driving technological progress and thereby, macroeconomic growth. Understanding if and how labor protection laws can be designed to facilitate those inputs is crucial. In the span of just a few years, Norway has witnessed growing unemployment levels alongside low levels of economic growth (SSB). The oil industry, typically accounting for 20 percent of Norway's GDP (SSB), is undergoing heavy restructuring while highly skilled workers are facing redundancies across the industry. This prompts the question of whether new labor protection laws can assist in ensuring that both highly skilled workers and capital are effectively deployed powering innovative technological growth.

Governments often utilize stronger labor protection laws in times of economic turmoil. Judging by the coverage in media, the rationale is to offer greater job security to individuals during times of uncertainty, with less emphasis on the impact to a firm's operations. Even in the academic literature, the unintended effects of changing labor protection laws are not explored in-depth on firm level. In the final report, we shed more light on this topic by investigating the effects of labor protection law changes on firm risk-taking and capital structure.

The rest of the paper is organized as follows. In the next section we relate our study to the extant literature. Section 3 describes the theory with which we want to test the hypotheses outlined above. Section 4 discusses the methodology, while finally; Section 5 provides a brief description of the data that will be used in the final report.

2. LITERATURE REVIEW

Academics have carried out extensive research on the effects of laws governing labor protection (see Botero et al. 2004, Atanassov and Kim, 2009) and demonstrated, by and large, the negative effects of rigid labor protection. However, in a more recent strand of research Acharya, Baghai and Subramanian (2013) show that stringent dismissal laws have a positive effect on innovation. In their report *Wrongful Discharge Laws and Innovation* (2013) they show that innovation among US firms has increased in wake of the adoption of exceptions to the at-will employment principle. Furthermore, in *Labor Laws and Innovation*

(2013) they broaden the scope and find that the same result holds for the France, Germany and UK. Our study extends the work by Acharya, Baghai and Subramanian (2013) by also examining the implications of greater innovation on entry and exit rates of firms.

More broadly, our paper relates to Menezes-Filho and Van Reenen (2003) who finds some positive effects on innovation associated with unionizing. Several papers have also looked at how contracts can be designed to foster innovation and economic growth. Manso (2011) provides a theoretical argument for why the optimal contract exhibits a tolerance for short-term failure in order to facilitate long-term innovation. Moreover, Tian and Wang (2014) show that this result – failure-tolerant contracts nurture innovation- holds empirically for early-stage start-ups. If contracts are incomplete, labor protection laws may offer workers the failure-tolerance required to boost innovation (more on this in section 3).

The body of literature on labor claims on leverage has demonstrated the strategic role of debt (see Baldwin, 1983; Hennessy and Livdan 2009). Matsa (2010) shows that firms have a strategic interest in keeping cash flow demands of debt service high to lower the bargaining power of workers and consequently wage demands. Our study relates to Simintzi, Vig and Volpin (2014) who predict that employment protection raises labor bargaining power and that firms level the playing field by increasing their financial leverage. By contraries, their findings indicate that financial leverage decreases in response to greater employment protection. Simintzi, Vig and Volpin (2014) explain these surprising results by emphasizing the increase in fixed cost of labor associated with more stringent labor protection laws. This effect increases operating leverage and may crowd out financial leverage. Alternatively, Berk, Stanton and Zechner (2010) show that leverage adversely affects the human costs of bankruptcy and that workers will require higher wages to compensate for higher financial distress costs. Thus, firms may find it beneficial to lower their financial leverage to keep wages constant. In the final report, we test whether Simintzi, Vig and Volpin (2014) surprising result also holds for Norwegian firms.

3. THEORY

3.1 Nature of labor protection

Labor protection laws govern the ease with which firms can hire and fire workers, and also includes any legislation on temporary employment. Stronger laws increase employees' bargaining power relative to firms. It can take two forms (Deakin, Lele and Siems 2007): formal laws and regulatory mechanisms (such as collective agreements). For the purpose of this report, both are treated as equal. Botero et al. (2004) demonstrate that a country's political orientation often is instrumental in the design of labor protection laws. That is, historically left-leaning countries typically have stronger employment protection. For instance, Deakin, Lele and Siems (2007) points to the heavy de-regulation of the labor market in UK following the inauguration of conservative governments during the 1980's and early 1990's. This feature of labor protection laws is also evident for Norway, in which waves of de-regulation have coincided with conservative governments.

Saint-Paul (2002) also demonstrates that employment protection co-varies with the level of economic growth. The political support for labor protection laws tends to decline in periods of economic growth. Conversely, when the economy slugs and unemployment is on the rise, workers fear for the jobs and the political support for stricter dismissal laws increases.

3.2 Labor protection laws and innovation

The ex-ante effects of changes in dismissal laws on firm outcome are ambiguous. The flexibility of labor contracts determines the extent to which firms can allocate resources efficiently, through the cost of hiring and firing. In isolation, we predict that more flexible labor contracts increase the profitability of any given project and as a result firm entry rates increase and exit rates decrease. Furthermore, firms should be motivated to take on more innovative and risky projects if labor contracts are flexible since the exit costs associated with failure are lower. This analysis, however, ignores the effect labor contract has on workers' effort level and innovation. More flexible dismissal laws imply that workers face a greater probability of being fired, and as illustrated by Shapiro and Stiglitz efficiency model (1984), lower workers incentive to exert effort. Moreover, if contracts are incomplete a hold-up problem can arise in which firms fire innovative workers

after a successful project in order to capture a greater share of the profit. Lastly, if labor contracts are flexible firms may be less tolerant to short-term failures, by firing employees, which has proven detrimental to innovation and thereby the success of the project (Manso 2011; Tian and Wang 2014). If the latter effects are dominant, firms should be better off from stronger labor protection.

Our model follows from that developed by Acharya, Baghai and Subramanian (2013). The firm is risk neutral and faced with the choice of investing in two mutually exclusive projects with different risk characteristics. One project is low risk, low reward while the other project exhibit greater risk but higher terminal payoffs upon success. The employee is risk averse and is particularly averse towards the risk of being dismissed. A distinctive feature of the model is that contracts are incomplete which potentially could lead to a hold-up problem (Grossman and Hart 1986; Hart and Moore 1990). The hold-up problem illustrates how two parties are unable to commit to a contract prohibiting bad faith in the future if the contract involves prior non-contractible investments and uncertain outcome. Contingent on flexible labor laws and successful project, the firm can at any time ex-post fire the employee in order to capture a greater share of the project's profit. The employee knows this ex-ante and exerts less effort and is less innovative than she otherwise would have been.

We hypothesize that more stringent labor laws can substitute for complete contracts, and thereby eliminate the hold-up problem. Furthermore, we predict that more stringent labor laws also have a positive effect on effort level by workers and failure tolerance by firms. In the final report, we therefore test whether these effects dominate the negative effects, as described above, on firm risk-taking following stronger employment protection.

3.3 Labor protection laws and leverage

It follows from the argument above that if firm risk-taking increases with employment protection, firms should also be more inclined to increase its risk through leverage when employment protection increases. For instance, the tradeoff theory of capital structure predicts that the marginal benefit of debt increases with employment protection Simintzi, Vig and Volpin (2014). Firms typically use leverage strategically to lower the bargaining power of workers in

order to keep wages low (Baldwin, 1983; Hennessy and Livdan 2009). We predict that employees' bargaining power relative to firms' increases with employment protection and that firms respond strategically by increasing their financial leverage. This result, however, is contested by Simintzi, Vig and Volpin (2014) who found the opposite result when they examined this relationship for several different countries. They argue that stronger employment protection increases the fixed cost of labor and thereby the operating leverage of firms. Furthermore, they argue that the increase in the marginal benefit of debt is more than offset by the increase in the marginal cost of debt associated with an increase in employment protection.

4. METHODOLOGY

To test whether changes in labor protection laws affect firm entry and exit we intend to estimate the following OLS regression:

$$y_t = \beta_1 + \beta_2 * \text{Employment protection}_{t-1} + \beta_3 * X_t + \epsilon_t$$

The dependent variable, y_t, is a measure of the net entry of new firms within an industry. β_2 measures the impact of the one year lagged employment protection on net firm entry. X_t measures a set of control variables such as GDP growth and unemployment. Finally, ϵ_t is the error term. Here we test the hypothesis generally, but we could also test the hypothesis against specific law changes by using dummy variables. For instance, we could estimate

$$y_t = \beta_1 + \beta_2 * \Delta\text{Employment protection}_{t-1} + \beta_3 * X_t + \epsilon_t$$

where $\Delta\text{Employment protection}_{t-1}$ takes the value 1 if a change in labor laws occurred last period and zero otherwise. The methodology for the effect of employment protection on the number of patent applications follows a similar approach, however, here we need to control for the structural break in applications that occurred in 2008. The nature of this break is explained in detail in section 5. We intend to run two separate regressions, one before and one after the break.

To test for possibility of reversed causality we examine the dynamic effects of employment protection on firm entry and exit as outlined by Acharya, Baghai and Subramanian (2013). We include current level of employment protection as well

as three lags and three forward values of the employment protection index. Furthermore, we examine the persistence of the effect of employment protection by including a later lag. We intend to examine the following model:

$$y_t = \beta_0 + \sum \beta_k * employment\ protection_{t+3-k} + \beta_7 * X_t + \beta_8 * employment\ protection_{t-6} + \epsilon_t$$

To test for the effect of employment protection on firms' capital structure we adopt a difference-in-difference approach as outlined by Bertrand and Mullainathan (2003). Here we compare the effect on Norwegian firms' capital structure against a control group. Furthermore, to strengthen the analysis we intend to check the sensitivity of employment protection to key macroeconomic variables such as economic growth and unemployment.

5. DATA DESCRIPTION

In our final report we intend to utilize financial data on Norwegian firms compiled by the Centre for Corporate Governance Research (CCGR) together with OECD's indicators of employment protection. We will also employ country level data for Norway, primarily from Statistics Norway (SSB), to neutralize the effect GDP growth and unemployment rates have on employment protection. Lastly, we will use patent statistics obtained from the Norwegian Industrial Property Office.

The data from CCGR contains data on accounting as well as financial variables for the universe of firms in Norway from the 1990's up to more recent years. The key variables we will use measures firm leverage and risk. Since the variation in the data on employment protection is low, we might have to broaden the scope and also look at other countries. A possible source to retrieve this data from would be Worldscope.

The OECD indicators of employment protection display the strictness of regulation on labor protection. The statistics quantify the process and the costs of firing workers and the process of engaging workers on temporary or permanent contracts. The data is derived from carefully examining 21 items concerning employment protection (OECD 2016). Moreover, it contains summary indicators representing individual and collective dismissal laws, as well as temporary

employment contracts from 1985 until 2013. Norway does not have any major fluctuations in the strictness of employment protecting apart from some changes concerning temporary employment contracts. This could become a problem for measuring the impact of changes in labor protection in Norway. Thus, we might have to examine countries that have experienced significant more variation in labor dismissal laws such as Sweden and Australia.

The patent statistics from the Norwegian Industrial Property Office contains data on the number of patent applications from 2002 up to more recent years. The data shows a dramatic dip in the amount of filed patents after Norway became apart of the European Patent Office in 2008. This exogenous shift in patent applications needs to be addressed in the final report.