Employment protection and investment opportunities

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Abstract

Even though firms' innovation efforts dwindle in reaction to weaker employment protection legislation (EPL), we show that the value of their investment opportunities actually increases. The reason is that weaker EPL discourages innovation efforts only in firms with little comparative advantage at innovation. At the same time, however, weaker EPL increases the financial and operating flexibility of firms. This flexibility gain can explain why Tobin's q increases in reaction to weaker EPL.

Keywords: employment protection, innovation, investment opportunities, financial flexibility, operating flexibility

JEL Classifications: G30, L20

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Even though firms' innovation efforts dwindle in reaction to weaker employment protection legislation (EPL), we show that the value of their investment opportunities actually increases. The reason is that weaker EPL discourages innovation efforts only in firms with little comparative advantage at innovation. At the same time, however, weaker EPL increases the financial and operating flexibility of firms. This flexibility gain can explain why Tobin's q increases in reaction to weaker EPL.

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1. Introduction

Recent studies show that laws that limit firms' ability to hold up employees foster corporate innovation efforts (see Acharya, Baghai, and Subramanian (2013, 2014); Gao and Zhang (2015)). Other studies report that innovation effort is an important source of investment opportunities (see, among many others, Lev and Sougiannis (1996); Hall (1999)). The purpose of this paper is to test whether the innovation efforts spurred by stricter employment protection legislation (EPL) magnify the value of firms' Tobin's q.

The empirical investigation is based on a large international sample of individual firms in 16 countries during 1985–2010. To exploit intertemporal variation in EPL across countries, we rely on the EPL-indicator developed by Simintzi, Vig, and Volpin (2015). However, our results are robust to alternative EPL measures. Our sample includes 6 increases and 10 decreases in EPL. Increases typically occur in the earlier sample years whereas decreases are more or less evenly spread across the sample period. Since our sample differs considerably from the one used by Acharya et al. (2013), we first test whether the positive relation between EPL and innovation effort that they find for the United States, United Kingdom, Germany, and France extends to the 12 additional countries covered by our sample.[1] We find that to be the case. A closer look at the data reveals, however, that the strength of that relation depends on the direction of the EPL change. According to our estimates, *reductions* in EPL induce firms to cut their innovation effort, as measured by the R&D-to-sales ratio, by 24%, on average, whereas *increases* in EPL leave innovation effort unaffected. The evidence therefore suggests that weaker EPL aggravates potential hold-up problems between firms and employees and thereby discourages innovation efforts. Alternatively, weaker EPL allows firms to refocus their innovation efforts.

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[1] These countries are Australia, Belgium, Canada, Denmark, Finland, Italy, Japan, Netherlands, Norway, Spain, Sweden, and Switzerland.

To the extent that innovation efforts translate into valuable investment opportunities, the value of the firm's investment opportunities should also drop when EPL weakens. Contrary to our expectations, however, we find that Tobin's q actually *increases* significantly in reaction to weaker EPL. The effect is robust and economically tangible. Weaker EPL is associated with a 16% *higher* Tobin's q, on average. Stricter EPL, in contrast, does not affect Tobin's q. We also find that the strength of the negative relation between EPL and Tobin's q is unrelated to any EPL-induced changes in innovation efforts.

These findings pose two puzzling questions: Why does the substantial drop in innovation effort that weaker EPL brings about not harm the value of investment opportunities? And what, if not changes in innovation efforts, is responsible for the strong negative relation between EPL and Tobin's q? The remainder of the paper is dedicated to answering these two questions.

The theory of Acharya, Baghai, and Subramanian (2014) predicts that the EPL-sensitivity of innovation effort is stronger for firms with larger potential hold-up problems. To shed light on the relation between EPL-induced innovation effort and Tobin's q, we identify these firms and ask whether they have a comparative advantage at innovation. If not, that could be the reason why Tobin's q ratios are unaffected by EPL-induced changes in innovation efforts. The evidence in Loderer, Stulz, and Waelchli (2016) suggests that mature firms are those more susceptible to hold-up problems. The reason is that firms, over time, trim their organizations to be efficient managers of core assets. To this end, they assume structures and processes that become increasingly inflexible, and adopt incentive systems that reward operational excellence rather than innovative breakthroughs (see Holmstrom (1989), Kaplan and Henderson (2005), and Manso (2011), among others). These incentive systems compromise the ability to protect potential innovators from hold-up in mature firms. We would therefore expect that the innovation efforts of mature firms are more sensitive to changes in EPL. At the same time, Loderer et al.

(2016) and Berchtold, Loderer, and Waelchli (2015) show that mature firms do not have a comparative advantage at sizable innovation. Their Tobin's q should therefore be less sensitive to changes in innovation efforts than that of their younger peers.

To test these predictions, we split the sample into young and mature firms and estimate separate regressions for these two subsamples. As predicted, we find a strong positive relation between EPL and innovation efforts in the subsample of mature firms. Our estimates imply a drop in innovation efforts by 36% in reaction to reductions in EPL. In contrast, the innovation efforts of the average young firm are statistically unrelated to the degree of employment protection. Moreover, for the average mature firm, our estimates also imply that innovation efforts are a value-neutral activity, as we find no statistical relation between innovation efforts and Tobin's q. This is in line with the claim that mature firms have a tougher time motivating people to focus on value enhancing research projects. Only for young firms do we find a positive relation between innovation effort and Tobin's q, which is consistent with the hypothesis that young firms have a comparative advantage at innovation. Together, these findings can therefore explain why EPL-induced changes in innovation effort leave the strength of the negative relation between EPL and Tobin's q unaffected: On average, only firms with little if any comparative advantage at innovation scale down their innovation effort in reaction to weaker EPL.

Next, we turn to the question of what, if not changes in innovation efforts, is responsible for the strong negative relation between EPL and Tobin's q. More binding EPL should make restructurings more costly (see also Simintzi et al. (2015), Dessaint, Golubov, and Volpin (2015), Fairhurst and Serfling (2015) and the literature cited therein). Simintzi et al. (2015) show that the increase in the fixed-claim component of labor contracts that is associated with stricter EPL crowds out financial leverage. We find that to be the case as well. To the extent that financial flexibility is valuable (see, for example, Graham and Harvey (2001)), we contend that loss of borrowing capacity is comparatively costlier for firms that are financially constrained. The Tobin's q of financially constrained firms should therefore be more sensitive to changes in EPL.

To test this prediction, we use two common measures of financing constraints, namely dividend payout (see, for example, Fazzari, Hubbard, and Petersen (1988)) and, as a robustness test, firm size and firm age (Hadlock and Pierce (2010)). In line with our prediction, and regardless of how we measure financing constraints, we find that the Tobin's q of financially constrained firms is considerably more sensitive to changes in EPL than that of less constrained firms. According to our estimates, the Tobin's q of the average financially constrained firm increases by more than 20% in reaction to a reduction in EPL. The corresponding effect in financially unconstrained firms is only about 10%, though statistically significant at conventional confidence levels. Loss in financial flexibility therefore can induce the negative relation between EPL and Tobin's q.

Higher restructuring costs should discourage firms from hiring employees at the margin. We would therefore expect labor-to-capital ratios to decrease in reaction to weaker EPL. That is what we find. However, reluctance to hire employees compromises the operating flexibility of firms (see also the arguments by Chen, Kacperczyk, and Ortiz-Molina (2011) and the literature cited therein). We contend that this flexibility is comparatively more valuable to firms with a single product line than to firms with a more broadly diversified product pipelines. The reason is that firms with multiple products in place have competencies in different fields that they can tap when needed to adjust to tighter EPL. Single product firms do not have the same abilities. We would therefore expect that the EPL-sensitivity of Tobin's q is higher in single-product firms than in multi-product firms.

To find out, we test whether single-product firms react more strongly to changes in EPL. We find that to be the case. Single-product firms are significantly more likely to expand the scope of their operations and diversify into multiple product lines when EPL is relaxed. More moderate EPL also stimulates employment growth and capital expenditures in single-product firms. According to our estimates, the labor force of the average single-product firm grows by 6.2% in reaction to weaker EPL; capital expenditures more than double. There is no corresponding effect of EPL on employment growth or capital expenditures in multi-product firms. The evidence is therefore consistent with the hypothesis that single-product firms are more sensitive to changes in operating flexibility than multi-product firms.

Having shown that changes in EPL affect the operating flexibility of single-product firms, we investigate whether that contributes to the negative relation between EPL and Tobin's q. The prediction we test is that the relation is steeper in single-product than in multi-product firms as well as in firms with a higher labor-to-capital ratio, an alternative proxy for exposure to operational flexibility. We find strong empirical support for these predictions. The q of the average single-product firms, for example, increases by 22% in reaction to a reduction in EPL. For the average multi-product firm, the corresponding effect is less than half (9%) and statistically only marginally different from zero.

The data therefore show that financial and operating flexibility individually contribute to the negative relation between EPL and Tobin's q. In the last step of the investigation, we study the joint impact of the two flexibilities. We would expect the EPL-sensitivity of Tobin's q to be particularly pronounced in firms for which both types of flexibility are valuable. We find strong empirical support for this prediction. In the subsample of financially constrained single-product firms, the relation between EPL and Tobin's q is negative and significant with confidence 0.99 and applies to both increases and decreases in EPL. According to our estimates, the q of the average firm in this subsample increases (drops) by approximately 20% (16%) in reaction to weaker (stronger) EPL. In contrast, the q of financially unconstrained multi-product firms does not respond to changes in employment protection. The results are similar when we compare financially constrained firms with high labor-to-capital ratios with financially unconstrained firms that have low labor-to-capital ratios. We therefore conclude that, together, EPL-induced changes in financial and operating flexibility can explain the negative relation between EPL and Tobin's q.

This paper makes five main contributions to the literature. First, we show that there is a strong negative relation between EPL and Tobin's q. Second, we find that the strength of this relation is unaffected by EPL-induced changes in innovation effort. This result is somewhat puzzling given the previous literature that reports a positive relation between EPL and innovation efforts. The explanation we propose is that only firms with no comparative advantage at innovation adjust their innovation efforts in reaction to changes in EPL. That is the third contribution of the paper. Fourth, we show that the negative relation between EPL and Tobin's q can be explained by the changes in financial and operating flexibility that these laws bring about. Taken together, our results should contribute to a better understanding of how labor market regulation affects innovation and firm value. There is considerable evidence at the macro level that increased employment protection is generally bad for economic growth (see, among others, Hopenhayn and Rogerson (1993); Saint-Paul (2002a, b)). We extend these findings at the firm level.

2. Data and summary statistics

2.1 Sample

The sample contains the 16 countries with the largest stock market capitalizations in the world according to the World Federation of Exchanges (December 2010). Our sample period starts in 1985, the year when OECD began its systematic coverage of employment regulation, and ends in

2010. We gather firm-specific data from *WorldScope*. To ensure comparable fiscal years, we ignore all firm-years that do not last between 361 and 371 days. Moreover, we disregard all financial firms (SIC 6), regulated utilities (SIC 49), as well as firm-years with negative assets, sales, and book values of equity. Finally, we drop all firms younger than 5 years since listing, since these firms might not be representative (Fama and French (2004); Loderer et al. (2016)). This omission, however, does not alter our conclusions.

Across all years, the sample contains 27,292 firms and 241,775 firm-years. During the sample period, the coverage increases from 3,675 firms in 1985 to 12,828 firms in 2010. This increase is not uniform over time. Prior to 1995, the increase equaled an annual 9%, on average. Thereafter, the annual increase is only 3%. Leaving out the years prior to 1995 in the analysis, yields consistent results. The following two subsections describe the main variables. Appendix A contains detailed definitions and Table 1 shows summary statistics.

2.2 Innovation effort, investment opportunities, and firm-level controls

Our measure of innovation effort is the ratio of R&D-expenditures to sales (*R&D*). We rely on R&D-data from *WorldScope* because we are not aware of any comprehensive database with global coverage of firm-specific information about patent filings or citations. Moreover, as pointed out by Lerner and Seru (2015), the analysis of patent data can be problematic. More importantly, since we want to investigate the impact of EPL on innovation *effort*, *R&D* is probably the more appropriate variable. Patent filings do not necessarily capture changes in innovation effort; moreover, not all innovations are patented. In untabulated tests, we replicate our innovation regressions at the country level using “number of patent applications” as well as “number of patents per million population” as dependent variable. Patent data at the country level are from OECD. The results remain qualitatively the same.

In line with the extant literature (e.g., Adam and Goyal (2008); Loderer et al. (2016)), our proxy for the value of the firms' investment opportunity set is Tobin's *q* (defined as market value of the firm's assets divided by total assets). Our regressions control for a broad set of firm-level variables that could simultaneously correlate with our dependent variable (in most cases *R&D* and Tobin's *q*) and the changes in EPL. They include firm age (number of years since the IPO) as a proxy for the firm's organizational and operational rigidities; profitability (the firm's return on assets), dividend payout (a binary variable that identifies dividend payers), and financial leverage (ratio of debt to total assets) as proxies for the availability of internal funds; capital expenditures (divided by total assets) as proxies for the firm's current investment activities; firm size (logarithm of the market value of assets in USD) and strategic focus (binary variable that identifies firms with operations in a single SIC-2digit industry) as proxies for the scope of the firm's operations; and volatility (standard deviation of the firm's stock return over the past 24 months) as a proxy for uncertainty. To reduce the influence of outliers, we winsorize all continuous and unbounded firm-level variables at the 1st and the 99th percentile of their country-specific distribution.

2.3 Employment protection and country-level controls

To analyze the impact of EPL on innovation and firm value, we exploit the time-series variation of changes in these laws, as summarized by the employment protection indicator of Simintzi et al. (2015); EPL^{SVV}). In all countries, as described in detail on p. 568 as well as in Appendix B of Simintzi et al. (2015), the indicator is set to zero in 1985. In subsequent country years, the indicator increases (decreases) by 1 every time labor law reforms lead to a significant increase (decrease) in employment protection.

The literature proposes various alternative measures of employment protection. First, there is the EPL index compiled by the OECD, which has been used by Pagano and Volpin (2005), Bassanini and Garnero (2013), and Bassanini, Nunziata, and Venn (2009), among others. OECD (2013) provides a detailed overview of the method and the data collection procedures of this index. We use it as a robustness check and find consistent evidence. Second, there is the index compiled by Botero, Djankov, Porta, Lopez-de-Silanes, and Shleifer (2004) that measures labor protection in 85 countries. This index, however, is available only for 1997. Third, there is the labor law index calculated by Deakin, Lele, and Siems (2007), which reflects the evolution of EPL across countries from 1970 to 2005 (*Deakin index)*. When we replicate the analysis with this index, we find consistent evidence.

We also include a number of time-varying, country-level control variables that could simultaneously affect our dependent variables and the changes in EPL. First, as suggested by Acharya et al. (2013) and Saint-Paul (2002b), low economic growth compromises growth opportunities and increases the political support for employment protection. To control for this possibility, we include real *Per-capita GDP growth* in the analysis. Second, as suggested by Subramanian and Megginson (2012), trade liberalization may boost Tobin's q and at the same time induce governments to enact more stringent EPL following trade liberalization to offset the associated job losses. To control for this effect, we include the country-level aggregate of imports and exports (*Trade openness*) as a proxy for trade reforms. A third concern is that changes in EPL and growth opportunities could be correlated with government changes. As documented by Botero et al. (2004), left-leaning governments tend to have more stringent labor laws. At the same time, the laws likely affect a given country's growth opportunities. We therefore include the *Government orientation* index from Armingeon, Weisstanner, Engler, Potolidis, and Gerber (2012), which captures the balance of power between left and right-leaning parties in a given country's parliament. Fourth, increases in unemployment insurance benefits could correlate with changes in EPL and at the same time affect the growth opportunities of firms in the economy. Since this effect could also bias the results, we control for the annual expenditures for *Labor market programs* in any given country. Finally, in more unionized countries, employees exert considerable political pressure to legislate employment protection. At the same time, poorly performing managers are more likely to retain their jobs when unions are strong (Atanassov and Kim (2009)). Therefore, the regression arguments include the degree of unionization in a given country, as measured by the annual *Fraction of union members* among wage and salary earners. Finally, for robustness tests, we also use measures of bankruptcy codes (*Creditor rights)*, financial development (*Stock market in % of GDP*), and education data (*Tertiary enrolment*).

3. Employment protection and innovation effort

This section studies the relation between employment protection and innovation effort. We employ a difference-in-difference method to exploit time-series variation in employment protection across countries. We estimate the following baseline regression equation:

$$R\&D_{i,t} = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \lambda_i + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}. \qquad (1)$$

Except for the addition of a vector of country-level control variables, $K_{k,t-1}$, this equation is formally identical to the one Simintzi et al. (2015) use to investigate the relation between EPL and leverage. In the equation, *i* identifies the firm, *t* identifies the year, *j* identifies the industry, and *k* identifies the country. The dependent variable is the firm's R&D-to-sales ratio; EPL is the employment protection indicator; $X_{i,t-1}$ is a vector of firm-level control variables; $K_{k,t-1}$is the vector of country-level control variables; λ_i is a firm fixed effect; $\alpha_j \cdot \gamma_t$ is an industry-year fixed effect; and $\varepsilon_{i,t}$ is the error term. The firm-level controls included in $X_{i,t-1}$ are the lagged values of *ln(Firm age)*, *ROA*, *Capital expenditures*, *Dividend dummy*, *Focus*, *Leverage*, *MTB-equity*, *Size*, and *Volatility*. The country-level controls include the lagged values of *GDP growth*, *ln(Trade openness)*, *Government orientation*, *Labor market programs*, *Union membership*, and *Tertiary education*. Standard errors are clustered at the country level. The impact of changes in EPL on R&D expenditures is measured by the coefficient δ. As in Simintzi et al. (2015), the implicit assumption is that the impact of an increase or decrease in EPL is similar across countries regardless of the original level of EPL in 1985.

Table 2 shows the results. Column 1 estimates equation (1) for the full sample. In column 2 we omit the firm-level control variables $X_{i,t-1}$, and in column 3 we limit the sample to the four countries covered by Acharya et al. (2013). Finally, column 4 splits the EPL^{SVV}- indicator into the two components that identify increases (EPL^{Up}) and decreases (EPL^{Down}) in employment protection, respectively. EPL^{Up} is a variable that is equal to EPL^{SVV} if EPL^{SVV} is larger than zero. Otherwise, the value of EPL^{Up} is set equal to zero. Similarly, EPL^{Down} is a variable that is equal to the *negative* of EPL^{SVV} if EPL^{SVV} is negative. Otherwise, the EPL^{Down} is set equal to zero.

Across all specifications, we find a positive and significant relation between EPL and innovation effort. The coefficient estimates in column 1 imply that a unit change in EPL^{SVV} is associated with a 1.5% change in *R&D* in the same direction. Given a sample average R&D-to-sales ratio of 10.5%, this corresponds to a 14% change in innovation effort. The coefficient of EPL^{SVV} is statistically the same when we drop the firm-level control variables in column 2. Therefore, EPL changes do not appear to be proxies for firm-level characteristics. Moreover, when we limit our attention to the four countries covered by Acharya et al. (2013), the coefficient of EPL^{SVV} becomes numerically smaller but remains statistically significant at the 10% significance level. Finally, column 4 reveals that increases and decreases in EPL do not have a symmetrical effect on innovation effort. While the coefficient of EPL^{Down} is negative and significant with confidence 0.99, the coefficient of EPL^{Up} is statistically zero. The relation between EPL and innovation effort is therefore driven by reductions in EPL. Our estimates imply that firms decrease their innovation effort by approximately 24% in reaction to lower EPL. Since the asymmetry in the impact of EPL can be observed later in the analysis also in the case of Tobin's q and other variables, it could be that the reforms that, according to Simintzi et al. (2015), led to a significant increase in employment protection were actually not very significant– either because they truly had only a minor impact or because they were offset by other legislative changes domestically or abroad.

This first part of the investigation confirms the positive relation between employment protection and innovation effort documented by Acharya et al. (2013) and extends their findings in two ways. First, we show that the relation holds when we extend the investigation from 4 to 16 countries. Second, our estimates imply that, at least in our sample, the effect is driven by *decreases* in EPL and that *increases* in EPL do not affect innovation effort. The next step is to investigate how these dynamics affect the value of the firms' growth opportunities.

4. Employment protection, innovation, and Tobin's q

This section inquires into the relation between employment protection and Tobin's q and asks how that relation is moderated by the firms' innovation efforts. The baseline specification to estimate the relation between EPL and q is as follows:

$$ln(q_{i,t}) = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \lambda_i + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}, \tag{2}$$

where all variables and identifiers are defined as in equation (1). The dependent variable is Tobin's q. To limit skewness, we use the log of q, *ln(q)*, even though this choice does not affect the conclusions. The control variables are the same as in equation (1), except that we drop *MTB-equity* from the list of firm-level controls $X_{i,t-1}$.

Table 3 shows the results. Column 1 looks at the full sample of firms whereas column 2 estimates the equation for the subsample of firms with non-missing information on *R&D* (in column 1, missing R&D observations are set equal to zero). In this regression, sample size drops by about half. Column 3 then extends the specification with *R&D* as an additional control and column 4 adds an interaction term between *R&D* and EPL. In all four regressions, the measure of employment protection is EPL^{SVV}. Regression 5 then estimates the baseline regression with EPL^{Up} and EPL^{Down} instead of EPL^{SVV}, and regressions 6 and 7 extend that regression with *R&D* as well as an interaction term between *R&D* and EPL^{Down}.[2]

Across specifications, we find a strong *negative* relation between EPL and Tobin's q. The coefficient estimate *of* $EPL^{SVV}{}_{t=-1}$ in column 2 is –0.1. This estimate implies that Tobin's q drops by 9.5% [$=e^{-0.1}-1$] in reaction to an increase in employment protection by 1 and increases by 10.5% [$=e^{0.1}-1$] if employment protection goes down by 1.

The coefficient of EPL^{SVV} does not change when we extend the specification with *R&D* and the interaction term (columns 3 and 4). In these regressions, *R&D* takes on a positive and significant coefficient, consistent with the extant literature. The interaction term, however, is statistically zero and its inclusion does not alter the main EPL effect. Therefore, the strength of the negative relation between EPL and Tobin's q appears to be unaffected by any EPL-induced changes in innovation effort. Moreover, when we distinguish between EPL increases and

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2 In untabulated regressions, we exclude the firm-level controls $X_{i,t-1}$ and find almost identical coefficients for EPL. Changes in EPL therefore appear to be random at the firm level.

decreases, we find that the negative relation between EPL and Tobin's q is driven by EPL decreases rather than increases (columns 5 and 6). According to our estimates, Tobin's q goes up by roughly 16% [$=e^{0.15}-1$], on average, in reaction to a decrease in EPL. In contrast, stricter EPL does not hurt Tobin's q. In these regressions, *R&D* maintains a positive and significant coefficient and its interaction term with $EPL^{Down}_{t=-1}$ maintains a coefficient that is statistically zero.

These findings confront us with two puzzles. First, despite the fact that weaker EPL lower firms' innovation effort, the value of their growth opportunities actually *increases* considerably. Second, the strength of the relation between EPL and Tobin's q appears to be unaffected by any EPL-induced changes in innovation effort. In what follows, we first investigate why the drop in innovation effort leaves the strength of the relation between EPL and Tobin's q unaffected. Then, we turn to the question of what, if not changes in innovation effort, drives the relation between EPL and Tobin's q.

5. Young vs. mature firms

This section performs two main tests. First, we identify firms with potentially larger hold-up problems and test whether their innovation effort is more sensitive to changes in EPL. Second, we test whether these firms have a comparative advantage at innovation. If not, that would explain why Tobin's q does not respond, on average, to EPL-induced changes in innovation efforts.

5.1 EPL and innovation: Young vs. mature firms

As argued in the introduction, the evidence in Loderer et al. (2016) implies that structure, processes, and incentive systems make mature firms more susceptible to hold-up problems. To find out, we split the sample into young and mature firms. We expect that the innovation efforts in mature firms are comparatively more sensitive to changes in EPL.

Panel A of Table 4 tests this prediction. To distinguish between young and mature firms, we use the median listing age in any given country as the cutoff value. Alternative definitions, including the median incorporation age and the median industry age, yield similar results. In columns 1 and to 2 (3 and 4) we replicate regressions 1 and 4 of Table 2 for the subsample of young (mature) firms. For reading convenience the table reports only the coefficients of the EPL variables.

The data show that innovation effort is unrelated to EPL in the subsample of young firms. This result holds regardless of whether we use the indicator EPL^{SVV} (column 1) or distinguish between increases and decreases in EPL (column 2). For mature firms, in contrast, we confirm the negative and significant coefficient observed in Table 2 for the case of reductions in EPL^{SVV}– decreases in the EPL indicator are associated with lower R&D expenditures. The coefficient estimates imply that a reduction in EPL is associated with a 2 percentage point-decrease in *R&D*. Given a sample average R&D-to-sales ratio of 5.6% in mature firms, this corresponds to a hefty decline in innovation effort by 36% for the average mature firm.

5.2 Implications for Tobin's q

Panel B of Table 4 studies the implications of these dynamics for Tobin's q. We distinguish again between young (columns 1 to 4) and mature firms (columns 5 to 8). The dependent variable is *ln(q)*. As before, all regressions include the firm-level and country-level control variables even though we do not report their coefficients for convenience. The first regression for each age subsample investigates how innovation effort (*R&D*) translates into growth opportunities (Tobin's *q*); in the second regression, we add the two variables EPL^{Up} and EPL^{Down}; the third regression is the same except that it includes also an interaction term between *R&D* and EPL^{Down}; finally, the last regression drops all variables involving *R&D*.[3]

For young firms, the main effect of *R&D* on Tobin's *q* is positive and significant with confidence 0.99 in column 1. This is so in all the specifications. Hence, innovation efforts in young firms seem to boost q. Controlling for EPL and interacting it with *R&D* does not alter this conclusion in any of the regressions. There is consequently no evidence that EPL boosts Tobin's q by encouraging R&D effort. The next three columns show that the overall effect of EPL on growth opportunities is negative, and it is driven by EPL relaxations. Weaker EPL seems to boost Tobin's q. In contrast, an apparent tightening of EPL does not have any effect. According to our estimates, a reduction in EPL brings about a 26%-increase in Tobin's q [= $e^{0.23}$–1].

Turning to the subsample of mature firms, we find no statistical relation between *R&D* and Tobin's q (column 5). Controlling for employment protection (column 6) does not alter this finding. However, the coefficient of *R&D* becomes positive and significant when we add the interaction term between EPL^{Down} and *R&D* (column 7). In that regression, however, the interaction term is negative and significant and fully absorbs the main effect of *R&D*. To see this more clearly, consider a mature firm that cuts its innovation effort by 2 percentage points, the impact of more moderate EPL according to column 4 of Panel A. Our estimates imply that the firm's q will drop only by 0.15% if the reduction in *R&D* is not in reaction to weaker EPL.[4] Though statistically significant, this effect is economically negligible. In contrast, if the reduction in *R&D* occurs in reaction to weaker EPL, the marginal impact of *R&D* is indistinguishable from zero, namely only –0.03%.[5] Hence, *R&D* expenditures, alone or induced by EPL, have essentially no impact on Tobin's q. As in the subsample of young firms, the effect of EPL on q alone is at

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3 In untabulated regressions, we use EPL^{SVV} instead of EPL^{Up} and EPL^{Down} and find consistent evidence.
4 A 2% decline in R&D changes ln(q) by –0.02×0.073 = –0.0015. Hence, Q drops by 0.15% [= $e^{-0.0015}$ –1].
5 $e^{-0.02\times0.073 +1\times(-0.02)\times(-0.058)}$ –1 = 0.03%.

the margin detrimental, since the coefficient of EPL^{Down} is positive and significant with confidence 0.99 across specifications (remember the definition of EPL^{Down}: it equals +1 if the EPL^{SVV} indicator declines to –1). According to our estimates, a decrease in EPL increases the Tobin's q of a mature firm by 11%, on average [= $e^{0.10}$ – 1]. Interestingly, this effect is less than half of what we observe in young firms (26%). EPL is therefore unfavorable to growth opportunities, especially in younger firms.

Overall, the evidence in Table 4 implies that EPL-reductions affect the innovation effort of only mature firms. This effect, however, appears to be value neutral. That explains why tighter üEPL is not associated with higher q even though it boosts innovation effort. We also find that EPL is detrimental to Tobin's q across firms, particularly for young firms. In what follows, we investigate what, if not changes in innovation effort, could be responsible for this negative effect.

6. Employment protection, financial flexibility, and Tobin's q

Previous studies show that EPL has implications for firms' policies other than innovation. In particular, Simintzi et al. (2015) argue that stricter EPL increases the fixed financial claims of labor, which reduces the operating and the financial flexibility of firms. They document that the increase in operating leverage crowds out financial leverage. We hypothesize that the impact of EPL on the financial and operating flexibility of firms is particularly costly to firms that have lower flexibilities to begin with. These costs could be responsible for the negative relation between Tobin's q and EPL. To test this, we first examine whether stricter EPL reduces financial leverage in our sample firms. Then, we investigate whether firms more likely to depend on financial flexibility bear the biggest impact of EPL on Tobin's q. Finally, in Section 7, we conduct a similar investigation with respect to operational flexibility.

6.1 Employment protection and financial leverage

Since the fixed financial claims of labor compete with the fixed financial claims of debt, we expect EPL to contribute to lower financial leverage. We perform the analysis in Panel A of Table 5, where we replicate the baseline regression of Simintzi et al. (2015) (p. 573):

$$Leverage = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \lambda_i + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}, \tag{3}$$

All variables and identifiers are defined as before. As in Simintzi et al. (2015), the dependent variable is the firm's debt-to-assets ratio (*Leverage*); the firm-level control variables $X_{i,t-1}$ include the lagged values of profitability, investment opportunities, firm size, and asset tangibility; and the country-level control variables $K_{k,t-1}$ are GDP growth, GDP per capita, and creditor rights.

The evidence is consistent with Simintzi et al. (2015). EPL crowds out financial leverage also in our sample, which is slightly different from theirs with respect to the number of countries covered (16 vs. 21) and firms considered (we exclude all firms younger than 5 years). In fact, our coefficient estimate of EPL^{SVV} in Panel A (–0.0184) is almost identical to what they report in their second specification of Table 3 (–0.0187) and the confidence level is the same (0.95). Also most of the control variables have similar coefficients and significance levels.

6.2 Financial flexibility and Tobin's q

If loss of financial flexibility is at least partially responsible for the negative relation between EPL and Tobin's q, we would expect that firms that are financially more constrained to begin with exhibit a stronger EPL-sensitivity of q than financially less constrained firms. To test this prediction, we assume that dividend payments are an indication of financial constraints (see, for example, Fazzari et al. (1988)) and rerun our baseline regression 2 for the subsamples of dividend payers and non-payers, separately.

Panel B of Table 5 has the results. As predicted, the q-sensitivity of EPL is significantly stronger for financially constrained firms. Specifically, the coefficient of the EPL indicator is negative and significant with confidence 0.99 for firms that do not pay dividends (column 1). In contrast, in the subsample of firms that do pay dividends (column 3), the coefficient is also negative but numerically much smaller (0.032 vs. 0.17) and statistically significant only in a one-sided test against zero. When we distinguish between increases and decreases in EPL, the data show that the effect of a decrease in EPL on q is more than twice as strong in financially constrained firms (0.186; column 2) than in unconstrained firms (0.088; column 4). Both effects are significantly different from zero with confidence 0.99. Increases in EPL, in turn, leave the Tobin's q of financially constrained firms unaffected. For the unconstrained firms, however, we find that q *increases* significantly in reaction to stricter EPL. Firms with sufficient initial financial flexibility seem to benefit.

Hadlock and Pierce (2010) use firm age and size as proxies for financial constraints. As a robustness test, Panel C of Table 5 therefore identifies young and small firms (column 1) and compares their EPL-sensitivity of Tobin's q with that of mature and large firms (column 3). For completeness, column 2 includes the complement of young and small firms, i.e., firms that are either young or small but not both. As in the previous panel, we find that the EPL-sensitivity of q increases with financial constraints. According to our estimates, in financially constrained firms, the marginal impact of EPL^{Down} is to increase q by twice the amount we observe in unconstrained firms (0.202 vs. 0.099, both statistically significantly different from zero). There is a difference also when EPL becomes tighter. In financially constrained firms, the effect is to reduce q (statistical significance with confidence 0.9). In contrast, and consistent with Panel B, the effect in unconstrained firms is to increase q (statistical significance with confidence 0.9).

In sum, the evidence so far is that EPL has two effects: it fosters innovation effort and reduces financial flexibility. The latter effect seems to dominate—and it can explain why stricter EPL is generally bad for the value of the growth opportunities of the treated firms. While the increase in innovation effort is statistically and economically significant, it fails to counteract the negative value implications of the loss of financial flexibility.

7. Employment protection, operating flexibility, and Tobin's q

The purpose of this section is to test whether firms react to the increased operational flexibility that more moderate EPL grants them, and whether Tobin's q is affected as well.

7.1 Employment protection and labor-to-capital ratios

According to Chen et al. (2011) and Dessaint et al. (2015), among others, labor market rigidities make operating restructurings more costly and thereby discourage firms from hiring employees. Consequently, the firms' labor-to-capital ratio should be negatively related to the degree of EPL. To test this prediction, Table 6 estimates the following regression:

$$Labor\text{-}to\text{-}capital = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \lambda_i + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}. \tag{4}$$

The dependent variable in regression (4) is the firm's labor-to-capital ratio (defined as staff costs divided by book value of property, plant, and equipment); the firm-level and the country-level control variables are the same as in equation (2). According to the results, EPL is associated with lower labor-to-capital ratios, although the coefficient in question is significant with confidence 0.90 only in a one-sided test. When we split the EPL indicator into its up- and down-components, however, we see that increases have no impact, whereas decreases do indeed encourage firms to raise their labor-to-capital ratios in a significant way.

7.2 Employment protection and operating flexibility

Firms more affected by changes in labor market rigidities, EPL in particular, should be firms less able to adapt. We hypothesize that single-product firms have less operational flexibility than multi-product firms to accommodate these changes—multi-product can do whatever single-product firms can, but they can also engage in restructuring options that are unavailable to single-product firms.

The WorldScope tapes contain information about up to ten product segments (and the associated SIC codes). Reasonable coverage for most countries starts in 1990, which is why we limit the sample period for this part of the analysis to the years 1990 – 2010. We classify all firms that report positive sales for more than one product segment as multi-product firms. All other firms are classified as single-product firms.

If operating flexibility is comparatively more valuable to single product firms than to multi-product firms, we would expect them to react more strongly to weaker EPL. Table 7 tests this prediction. Panel A, compares the reaction of single-product and multiproduct firms to less binding EPL in terms of changes in workforce and capital expenditures. In columns 1 and 2, we estimate the following regression:

$$Employment\ growth_{t+1} = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \lambda_i + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}. \qquad (5)$$

The dependent variable in regression (5) is the one-year forward *Employment growth* (defined as the relative increase in the number of employees from year *t* to year *t+1*); the firm-level and the country-level control variables are the same as in equation (2).

Column 1 in the panel focuses on single-product firms and column 2 on multi-product firms. In line with our predictions, the coefficient of EPL^{Down} is positive and significant for single-product firms. The estimates imply that these firms take advantage of more moderate EPL by increasing their labor force by 6.2%. There is no corresponding increase in the workforce of multi-product firms. The reaction to a tightening of EPL is statistically zero in both firm subsamples.

Columns 3 and 4 of the panel look at capital expenditures and estimate the following regression:

$$Capital\ expenditures_t = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \lambda_i + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}. \qquad (6)$$

All variables and identifiers are the same as before, except that we drop the lagged capital expenditures from the list of firm-level controls. The results are qualitatively identical to those in columns (1) and (3). As predicted, single-product firms significantly scale up their capital expenditures in reaction to weaker EPL. The coefficient of EPL^{Down} is positive and significant with confidence 0.99 and its estimate implies that single-product firms more than double their capital expenditures in reaction to weaker EPL. There is no corresponding effect in multi-product firms.

Panel B of Table 7 tests whether weaker EPL also induces single-product firms to diversify and engage in different lines of business. The investigation takes the form of a conditional logistic regression with a binary variable that identifies firms that increase their number of product lines beyond one as the dependent variable (*Multi-segment firm*):

$$Multi\text{-}segment\ firm_{t+1} = \delta \cdot EPL_{k,t-1} + \beta \cdot X_{i,t-1} + \gamma \cdot K_{k,t-1} + \alpha_j \cdot \gamma_t + \varepsilon_{i,t}. \qquad (7)$$

The firm-level and country-level control variables are the same as in Panel A. The regression also includes industry-year fixed effects and computes robust standard errors. Because of insufficient variation in the dependent variable, we do not include firm-fixed effects λ in the regression.

The results are as follows. The coefficient of EPL^{Down} is positive and significant with confidence 0.99. The coefficient estimate of EPL^{Down} implies that single-segment firms that are treated with lower EPL are 1.6 times as likely to diversify into new products as untreated firms. This is consistent with the hypothesis that firms that are operationally more constrained are more likely to take advantage of a relaxation of those constraints.

7.3 Operating flexibility and Tobin's q

We want to ultimately test whether increased operating flexibility can explain the EPL-sensitivity of Tobin's q. The results of these tests are in Table 8. In Panel A, we split the sample into single-product firms (column 1) and multi-product firms (column 2). We expect the Tobin's q of single-product firms to be more sensitive to changes in EPL. The data support this prediction. In column 1, the coefficient of EPL^{Down} is positive and significant with confidence 0.99 whereas in column 2, it is only marginally different from zero (confidence 0.9). Our estimates imply that the q of the average single-product firm increases by 22% in reaction to more moderate EPL; the corresponding effect in multi-product firms is less than half (9%).

We reach similar conclusions when we split the sample by their labor-to-capital ratio, a measure of the importance of operational flexibility to firms. The results show that firms with a high labor-to-capital ratio relative to the median labor-to-capital ratio in any given industry year seem to benefit most from a relaxation of EPL. However, we also find that a tightening of EPL does not seem to have any impact in either subsample.

7.4 Financial flexibility, operating flexibility, and Tobin's q

Together with the results from Table 5, the evidence is that changes in EPL affect mainly firms that are financially or operationally constrained. In the last step of the investigation, we identify firms that are both financially constrained *and* operationally less flexible. The Tobin's q of these firms should be particularly sensitive to changes in EPL.

Panel B of Table 8 tests this prediction. The first column focuses on single-product firms that do not pay dividends. Column 2, in contrast, looks at multi-product firms that do pay dividends. If the relation between EPL and Tobin's q is the result of the presence of these two types of constraints, then firms in column 1 should exhibit a stronger EPL-sensitivity of q than firms in column 2. This prediction is strongly supported by the data. In column 1, the coefficient of EPL^{Up} is negative and significant with confidence 0.95 and the coefficient of EPL^{Down} is positive and significant with confidence 0.99. The estimates imply that financially and operationally more constrained firms experience a 16% decline in Tobin's q in reaction to stricter EPL and a 20% increase in Tobin's q in reaction to softer EPL. In contrast, the Tobin's q of financially unconstrained multi-product firms is unrelated to changes in EPL, as manifested by the fact that the coefficients of both EPL^{Up} and EPL^{Down} are statistically zero.

The results are very similar when we compare firms with a high labor-to-capital ratio that do not pay dividends with firms with a low labor-to-capital ratio that do pay dividends. Firms with limited financial and operational flexibility benefit from softer EPL. With this partitioning of the sample, however, there is no evidence that more restrictive EPL affects firms.

8. Robustness test: Employment protection as a proxy for product market regulation

EPL typically does not come alone. As it turns out, employment protection is highly correlated with product market regulation (PMR) across OECD countries (Nicoletti, Haffner, Nickell, Scarpetta, and Zoega (2001)). This positive correlation could come about because, according to Koeniger and Vindigni (2003), employment protection imposes costs on firms that product market regulation might be used to compensate.[6] This section tests whether employment protection is a proxy for product market regulation (PMR) in our regressions.

We use data on indicators of PMR that the OECD has published in 34 OECD countries in four different years (1998, 2003, 2008, and 2013). These indicators measure the degree to which public policies promote or inhibit product market competition. This regulation includes state controls (public ownership and public involvement in business operations, such as price controls); barriers to entrepreneurship (licenses and permits, and administrative burdens); and barriers to trade and investment (for example, tariffs). To increase sample size, we assume that PMR did not change in the years between the four years for which we have data.

Table 9 re-estimates equation (2) with *PMR* as an additional control variable. The sample period starts in 1998, i.e., the first year for which we have data on *PMR*. Note that, according to Simintzi et al. (2015), none of our sample countries have experienced a significant increase in EPL since 1998. Therefore, the regression is estimated only for EPL-reductions. Moreover, we omit *R&D* from the list of control variables. Since data on *R&D* are only available for about half

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[6] Another possibility that Koeniger and Vindigni (2003) offer is that product market regulation decreases employment and makes workers' outside options relatively worse, which could induce them to ask for employment protection.

of the observations, excluding this variable leads to a considerable increase in sample size. This exclusion should not bias the coefficient of EPL since, as we have seen, EPL does not affect Tobin's q via *R&D*. However, all results remain qualitatively and quantitatively the same when we do include *R&D* (not tabulated).

The first regression replicates the baseline regression for the subsample of firms with available data on PMR. The coefficient estimate of EPL^{Down} is 0.151. It is statistically the same as in Table 3 for the full sample period, which suggests that the subsample in question is representative of the full sample. More important, the magnitude and statistical significance of EPL^{Down} remains the same when we include *PMR* in column 2. Therefore, EPL does not seem to be a proxy for PMR. The coefficient of *PMR* itself is negative and significant with confidence 0.99. Stricter PMR therefore seems to hurt the average firm. In columns 3 and 4 we split the sample into young and mature firms. The coefficient of EPL^{Down} remains positive and significant in both regressions. Interestingly, and consistent with the view that product market regulation shields incumbent firms against new entrants, we find that the negative impact of PMR on Tobin's q is particularly pronounced for young firms, whereas it is statistically insignificant at conventional levels for mature firms. Taken together, we conclude that the positive impact of EPL reductions on Tobin's q does not reflect product market regulation.

9. Conclusions

This paper investigates how changes in EPL affect the value of firms' growth opportunities of treated firms. Previous studies show contradicting effects in this respect. One the one hand, they suggest that EPL might benefit firms because it resolves potential hold-up problems and thereby encourages innovation (Acharya et al. (2013, 2014)). On the other hand, however, the extant literature suggests that EPL could be detrimental to growth opportunities because it reduces operational and financial flexibility (Simintzi et al. (2015), Dessaint et al. (2015)). We show that the relation between Tobin's q and EPL is actually negative. The strength of this relation is unaffected by the innovation efforts that EPL brings about. The reason is that EPL seems to affect the innovation incentives of firms with little comparative advantage at innovating, namely mature firms. The data indicate that the negative effect of EPL on Tobin's q does indeed derive from the loss of operational and financial flexibility that EPL brings forth.

Appendix A: Variable definitions

Panel A: Employment protection variables

EPL^{SVV}	The employment protection indicator developed by Simintzi et al. (2015). See their p. 568 and Appendix B for a detailed description of the indicator construction;
EPL^{Up}	A variable that captures increases in EPL^{SVV}. It takes on the value of EPL^{SVV} if EPL^{SVV} is positive. Otherwise, the value is set equal to 0;
EPL^{Down}	A variable that captures decreases in EPL^{SVV}. It takes on the negative value of EPL^{SVV} if EPL^{SVV} is negative. Otherwise, the value is set equal to 0.

Panel B: Firm-level variables

Age	IPO age, computed as one plus the difference between the year under investigation and the firm's IPO year. The IPO year is computed as (a), for the US, the minimum value of: (1) the first year the firm appears on the CRSP tapes; (2) the first year the firm appears on the COMPUSTAT tapes; and (3) the first year for which we find a link between the CRSP and the COMPUSTAT tapes, (b) WorldScope item 00000; the footnote contains information about "the date when the company became publicly held", (c) Compustat, (d) Osiris from Bureau van Djik, (e) SDC Platinum, (f) Zephyr from Bureau van Djik, (f) CRSP, (g) official websites from stock exchanges, (h) personal email to Investor Relations Manager, (i) corporate websites, (j) Thomson Reuters, and (k) online encyclopedias, filled up in this order;
Capital expenditures	The firm's capital expenditures (WorldScope item 04601) net of depreciation and amortization (WorldScope item 01151), divided by the market value of the firm's assets (*Size*);
Dividend payer	Binary variable that identifies firms with positive cash payouts to shareholders (WorldScope item 04551);
Dividend non-payer	1 – *Dividend payer*;
Focus	Borrowing from Mitton (2002), a binary variable equal to 1 if the number of two-digit SIC level industries in which a firm operates is less than the median in a given country and year, using the higher number of reported industries in WorldScope items 07021 to 07028 and 19506 to 19596, respectively, and 0 otherwise;
Labor-to-capital ratio	The firm's labor-to-capital ratio, calculated as the staff costs (WorldScope item 01084) divided by the book value of property, plant, and equipment net of depreciation (WorldScope item 02501);
Large firm	1 – *Small firm*;
Leverage	The firm's book leverage, calculated as the book value of debt (WorldScope item 03255) divided by the book value of assets (WorldScope item 02999);
Mature firm	1 – *Young firm*;
MTB-equity	The firm's market-to-book ratio, calculated as the market value of the firm's equity (WorldScope item 08001) divided by the book value of the firm's equity (WorldScope item 03501);
Multi-product firm	Binary variable that identifies firm-years with positive sales for more than 1 product segment, according to Worldscope;
q	Tobin's Q, computed as the market value of the firm's assets (*Size*) divided by the book value of the firm's assets (WorldScope item 02999);
R&D	The firm's R&D expenditures (WorldScope item 01201) divided by the firm's net sales (WorldScope item 01001);
ROA	The firm's return on assets, calculated as the ratio of the firm's earnings before interest and taxes (WorldScope item 18191) divided by the book value of the firm's assets (WorldScope item 02999);
Single-product firm	1 – *Multi-product firm*;
Size	The logarithm of the firm's size is the market value of the firm's assets, calculated

	as the book value of the firm's assets (WorldScope item 02999) minus the book value of the firm's equity (WorldScope item 03501) plus the market value of the firm's equity (WorldScope item 08001) minus deferred taxes (WorldScope item 03263);
Small firm	Binary variable that identifies firm-years with *Size* lower than the median *Size* of all sample firms in the country where the firm is listed;
Tangibility	The firm's asset tangibility, calcuated as property, plant, and equipment net of depreciation (WorldScope item 02501) divided by the book value of assets (WorldScope item 02999);
Volatility	The volatility of the firm's monthly stock return, calculated over a two-year window and including all firm-years with at least 12 monthly returns. The returns are continuously compounded and all padded zero-return records at the end of each stock's time series are removed, as defined in Ince and Porter (2006);
Young firm	Binary variable that identifies firm with *Age* smaller than the median *Age* of all sample firms in the country where the firm is listed.

Panel C: Country-level variables

Creditor rights	Djankov, McLiesh, and Shleifer's 2007) index aggregating creditor rights. The index ranges from 0 (weak creditor rights) to 4 (strong creditor rights);
GDP growth	The country's change in gross domestic product (GDP) relative to the previous year. GDP is expressed in constant national currency per person. Data are derived by dividing constant price GDP by total population. The data is from World Economic Outlook database;
GDP per capita	The country's per-capita gross domestic product (GDP). GDP is expressed in constant national currency per person. Data are derived by dividing constant price GDP by total population. The data is from World Economic Outlook database;
Government orientation	Cabinet composition index ranging from 1 (hegemony of right-wing (and center) parties) to 5 (hegemony of social-democratic and other left parties). The data is from Comparative political data set I 1960-2010 (item govparty) from Armingeon et al. 2012);
LMP	Grubb and Puymoyen's 2008) annual public expenditure on labor market programs as a percentage of GDP;
PMR	The OECD indicator of product market, which is available in four different years (1998, 2003, 2008, and 2013). The indicator measure the degree to which public policies promote or inhibit product market competition. This regulation includes state controls (public ownership and public involvement in business operations, such as price controls); barriers to entrepreneurship (licenses and permits, and administrative burdens); and barriers to trade and investment (for example, tariffs);
Tertiary education	The log of the total number of students enrolled at public and private tertiary education institutions. Data is from the UNESCO Institute for Statistics;
Trade openness	Openness of the economy, measured as total trade (sum of import and export) as a percentage of GDP. The data is from Comparative political data set I 1960-2010 (item *openc*) from Armingeon et al. 2012);
Union membership	Net union membership as a proportion of wage and salary earners in employment. The data is from Comparative political data set we 1960-2010 (item *ud*) from Armingeon et al. 2012).

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Table 1: Summary statistics

	Mean	Median	SD	25^{th} percentile	75^{th} percentile
Panel A: Employment protection					
EPL^{SVV}	0.255	0.000	0.736	0.000	1.000
EPL^{Down}	0.377	0.000	0.550	0.000	1.000
EPL^{Up}	0.122	0.000	0.383	0.000	0.000
Panel B: Main firm-level variables					
Age	19.912	14.000	16.588	8.000	28.000
Capital expenditures	1.141	0.013	6.058	-1.133	1.845
Focus	0.302	–	–	–	–
Leverage	0.212	0.185	0.184	0.040	0.336
MTB-equity	2.198	1.353	3.318	0.955	2.190
q	1.755	1.226	1.986	0.964	1.774
R&D	0.120	0.015	0.500	0.001	0.057
ROA	0.002	0.054	0.273	0.002	0.105
Size	12.161	12.154	2.168	10.788	13.547
Tangibility	0.305	0.263	0.227	0.123	0.435
Volatility	0.489	0.407	0.297	0.288	0.599
Panel C: Country-level variables					
Creditor rights	2.025	2.000	1.169	1.000	3.000
GDP growth	0.016	0.018	0.022	0.008	0.029
GDP per capita	0.023	0.025	0.023	0.014	0.037
Government orientation	1.677	1.000	1.314	1.000	2.000
LMP	1.103	0.720	0.957	0.520	1.180
PMR	1.577	1.501	0.339	1.312	1.707
Tertiary education	4337.695	4171.025	1387.934	3184.897	5550.842
Trade openness	3.546	3.369	0.521	3.148	3.986
Union membership	22.462	18.800	13.597	12.840	27.710

Table 2: Employment protection and innovation effort

The table shows the results of regressions of *R&D* on EPL. Columns 1, 2, and 4 are estimated for the full sample, column 3 is restricted to the four countries covered by Acharya et al. (2013), namely the United States, United Kingdom, France, and Germany. Variables are defined in Appendix A. All controls are lagged by one year. The regressions include firm and industry-year fixed effects. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

	Dependent variable: *R&D*			
	Full sample		ABS (2013) countries	Full sample
	(1)	(2)	(3)	(4)
$EPL^{SVV}_{t=-1}$	0.015***	0.015**	0.007*	
	(0.006)	(0.006)	(0.004)	
$EPL^{Up}_{t=-1}$				–0.002
				(–0.004)
$EPL^{Down}_{t=-1}$				–0.025***
				(–0.009)
Ln(Age) $_{t=-1}$	–0.036*		–0.054***	–0.036*
	(0.020)		(0.010)	(0.021)
ROA $_{t=-1}$	–0.162***		–0.172***	–0.162***
	(0.019)		(0.015)	(0.019)
Capital expenditures $_{t=-1}$	0.001		0.001***	0.001
	(0.001)		(0.000)	(0.001)
Dividend dummy $_{t=-1}$	0.007***		0.008***	0.007***
	(0.001)		(0.002)	(0.001)
Focus $_{t=-1}$	0.006		0.010	0.005
	(0.004)		(0.008)	(0.004)
Leverage $_{t=-1}$	–0.086***		–0.114***	–0.086***
	(0.024)		(0.001)	(0.024)
MTB-equity $_{t=-1}$	–0.002**		–0.002***	–0.002**
	(0.001)		(0.000)	(0.001)
Size $_{t=-1}$	0.002		0.005***	0.002
	(0.003)		(0.002)	(0.003)
Volatility $_{t=-1}$	0.035***		0.041***	0.035***
	(0.009)		(0.004)	(0.009)
GDP growth $_{t=-1}$	–0.030	–0.088	–0.049	–0.015
	(0.120)	(0.128)	(0.069)	(0.124)
Ln(Trade openness) $_{t=-1}$	0.013	0.041**	0.093***	0.012
	(0.021)	(0.018)	(0.035)	(0.022)
Government orientation $_{t=-1}$	0.003**	0.003**	–0.004***	0.002**
	(0.001)	(0.001)	(0.000)	(0.001)
Labor market programs $_{t=-1}$	–0.007	–0.001	–0.033***	–0.007
	(0.007)	(0.005)	(0.005)	(0.007)
Union membership $_{t=-1}$	0.002***	0.002***	0.001	0.002***
	(0.000)	(0.001)	(0.001)	(0.000)
Tertiary education $_{t=-1}$	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Firm FE	YES		YES	YES
Industry-year FE	YES		YES	YES
Observations	69,848	69,848	42,683	69,848
R^2	0.810	0.808	0.818	0.810

Table 3: Employment protection, innovation effort, and Tobin's q

The table shows the results of regressions of Tobin's q on EPL and innovation effort. Column 1 is estimated for the full sample; all other columns only include firm-year observations with non-missing data on *R&D*. Variables are defined in Appendix A. All controls are lagged by one year. The regressions include firm and industry-year fixed effects. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

	Dependent variable: *ln(q)*						
	All firms	Firms with non-missing *R&D*					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$EPL^{SVV}_{t=-1}$	–0.069**	–0.100**	–0.100**	–0.100**			
	(0.033)	(0.039)	(0.039)	(0.040)			
$EPL^{Up}_{t=-1}$					0.003	0.003	0.003
					(0.032)	(0.032)	(0.032)
$EPL^{Down}_{t=-1}$					0.153***	0.154***	0.154***
					(0.037)	(0.037)	(0.037)
R&D			0.040***	0.040***		0.040***	0.040***
			(0.006)	(0.005)		(0.006)	(0.008)
$EPL^{SVV}_{t=-1}$ × R&D				0.005			
				(0.011)			
$EPL^{Down}_{t=-1}$ × R&D							0.006
							(0.006)
Ln(Age) $_{t=-1}$	–0.049***	–0.087***	–0.086***	–0.086***	–0.089***	–0.087***	–0.087***
	(0.015)	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)	(0.015)
ROA $_{t=-1}$	0.121*	0.165***	0.172***	0.172***	0.165***	0.171***	0.171***
	(0.066)	(0.021)	(0.022)	(0.022)	(0.021)	(0.022)	(0.022)
Capital expenditures $_{t=-1}$	0.002***	0.003***	0.003***	0.003***	0.003***	0.003***	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Dividend dummy $_{t=-1}$	0.036**	0.031**	0.031**	0.031**	0.031**	0.031**	0.031**
	(0.014)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Focus $_{t=-1}$	0.002	–0.008*	–0.009*	–0.009*	–0.007*	–0.008*	–0.008*
	(0.008)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Leverage $_{t=-1}$	–0.053	–0.075	–0.072	–0.072	–0.074	–0.071	–0.071
	(0.041)	(0.046)	(0.045)	(0.045)	(0.046)	(0.045)	(0.045)
Size $_{t=-1}$	–0.161***	–0.190***	–0.190***	–0.190***	–0.190***	–0.190***	–0.190***
	(0.015)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Volatility $_{t=-1}$	0.041	0.042	0.040	0.040	0.040	0.039	0.039
	(0.032)	(0.037)	(0.038)	(0.038)	(0.037)	(0.037)	(0.037)
GDP growth $_{t=-1}$	0.801*	0.793*	0.794*	0.795*	0.705	0.706	0.706
	(0.432)	(0.473)	(0.475)	(0.475)	(0.512)	(0.515)	(0.515)
Ln(Trade openness) $_{t=-1}$	–0.317***	–0.324***	–0.324***	–0.324***	–0.314***	–0.314***	–0.314***
	(0.101)	(0.066)	(0.066)	(0.066)	(0.063)	(0.063)	(0.063)
Gov. orientation $_{t=-1}$	–0.015**	–0.026***	–0.026***	–0.026***	–0.025***	–0.025***	–0.025***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
LMP $_{t=-1}$	–0.012	–0.028	–0.028	–0.028	–0.026	–0.025	–0.025
	(0.028)	(0.032)	(0.032)	(0.032)	(0.031)	(0.031)	(0.031)
Union membership $_{t=-1}$	0.005	0.010***	0.009***	0.009***	0.008***	0.008***	0.008***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.003)	(0.003)	(0.003)
Tertiary education $_{t=-1}$	–0.000	–0.000	–0.000	–0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm FE	YES	YES	YES	YES	YES	YES	YES
Industry-year FE	YES	YES	YES	YES	YES	YES	YES
Observations	124,817	69'838	69'838	69'838	69'838	69'838	69'838
R^2	0.743	0.764	0.764	0.764	0.764	0.764	0.764

Table 4: Young vs. mature firms

Panel A of the table reports the results of separate regressions of *R&D* on EPL for young and mature firms. A firm is classified as young if its listing age is smaller than the median listing age in the country where the firm is listed. Variables are defined in Appendix A. The lagged firm-level controls included in the regression but not reported in the Panel are the same as in Table 2, namely *ROA*, *Capital expenditures*, *Dividend dummy*, *Focus*, *Leverage*, *MTB-equity*, *Size*, and *Volatility*. The lagged (included but not reported) country level controls include *GDP growth*, *ln(Trade openness)*, *Government orientation*, *LMP*, *Union membership*, and *Tertiary education*. Similarly, Panel B reports the results of separate regressions of Tobin's q on EPL for young and mature firms. With the exception of *MTB-equity*, these regressions include (but do not tabulate) the same lagged firm-level and country-level controls as the regressions in Panel A. All regressions also include firm and industry-year fixed effects. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

Panel A: EPL and innovation effort in young and mature firms

	Dependent variable: *R&D*			
	Young firms		Mature firms	
	(1)	(2)	(3)	(4)
$EPL^{SVV}_{t=-1}$	0.013		0.010*	
	(0.009)		(0.006)	
$EPL^{Up}_{t=-1}$		0.017		–0.004
		(0.017)		(0.005)
$EPL^{Down}_{t=-1}$		–0.013		–0.020***
		(0.009)		(0.007)
Firm-level controls	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES
Observations	36,123	36,123	33,725	33,725
R2	0.841	0.841	0.783	0.783

Panel B: EPL and Tobin's q in young and mature firms

	Dependent variable: *ln(q)*							
	Young firms				Mature firms			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R&D	0.034***	0.034***	0.035***		0.059	0.060	0.073**	
	(0.008)	(0.009)	(0.007)		(0.041)	(0.041)	(0.031)	
$EPL^{Up}_{t=-1}$		–0.073	–0.073	–0.073		0.020	0.021	0.020
		(0.064)	(0.064)	(0.064)		(0.030)	(0.030)	(0.029)
$EPL^{Down}_{t=-1}$		0.232***	0.234***	0.231***		0.105***	0.108***	0.104***
		(0.034)	(0.030)	(0.039)		(0.029)	(0.032)	(0.029)
$EPL^{Down}_{t=-1} \times$ R&D			–0.009				–0.058**	
			(0.032)				(0.023)	
Firm-level controls	YES	YES	YES	YES	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	36,125	36,125	36,125	36,125	33,737	33,737	33,737	33,737
R2	0.803	0.804	0.804	0.804	0.772	0.773	0.783	0.772

Table 5: EPL and loss of financial flexibility

Panel A of the table replicates the baseline regression of Simintzi et al. (2015). Variable definitions are in Appendix A. The dependent variable is *Leverage*. The lagged firm-level controls are *Tangibility*, *Size*, *ROA*, and *MTB-equity*. The lagged country-level controls are *GDP growth*, *GDP per capita*, and *Creditor rights*. Panel B splits the sample firms in dividend payers and non-payers and replicates the main regressions of Table 3 for the respective subsample. Similarly, Panel C of the table replicates the main regressions of Table 3 for different subsamples that are built based on the listing age and the size of the sample firms. Young (small) firms are identified as firms that are younger (smaller) than the median listing age (Size) of all firms listed in the same country. All regressions include firm and industry-year fixed effects. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

Panel A: Replication of Simintzi et al.'s (2015) baseline regression

	Dependent variable: *Leverage*
$EPL^{SVV}_{t=-1}$	–0.018**
	(0.009)
Tangibility $_{t=-1}$	0.124***
	(0.013)
Size $_{t=-1}$	0.044***
	(0.004)
ROA $_{t=-1}$	–0.089***
	(0.015)
MTB-equity $_{t=-1}$	–0.003***
	(0.001)
GDP growth $_{t=-1}$	–0.000
	(0.000)
GDP per capita $_{t=-1}$	–0.110**
	(0.051)
Creditor rights $_{t=-1}$	0.014*
	(0.008)
Firm FE	YES
Industry-year FE	YES
Observations	126,407
R^2	0.786

Panel B: Dividend payers vs. non-payers

	Dependent variable: *ln(q)*			
	Dividend non-payers$_{t=-1}$		Dividend payers$_{t=-1}$	
	(1)	(2)	(3)	(4)
$EPL^{SVV}_{t=-1}$	–0.170***		–0.032	
	(0.040)		(0.020)	
$EPL^{Up}_{t=-1}$		–0.036		0.042**
		(0.085)		(0.021)
$EPL^{Down}_{t=-1}$		0.186***		0.088***
		(0.042)		(0.022)
Firm-level controls	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES
Observations	53,912	53,912	70,905	70,905
R2	0.731	0.731	0.818	0.818

Panel C: Age/Size-cohorts

	Dependent variable: *ln(q)*		
	Young and small firms	Either young or small firms	Old and large firms
	(1)	(2)	(3)
$EPL^{Up}_{t=-1}$	–0.026*	0.015	0.035*
	(0.015)	(0.017)	(0.021)
$EPL^{Down}_{t=-1}$	0.202***	0.146***	0.099***
	(0.045)	(0.040)	(0.028)
R&D			
$EPL^{Up}_{t=-1}$× R&D			
Firm-level controls	YES	YES	YES
Country-level controls	YES	YES	YES
Firm fixed effects	YES	YES	YES
Industry-year fixed effects	YES	YES	YES
Observations	31,219	70,208	31,915
R2	0.820	0.781	0.804

Table 6: EPL and labor-to-capital ratios

The table investigates the impact of EPL labor-to-capital ratios. Variable definitions are in Appendix A. The dependent variable is *Labor-to-capital ratio*. The lagged firm-level controls are the same as in Table 3. All regressions include firm and industry-year fixed effects. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

	Dependent variable: *Labor-to-capital ratio*	
$EPL^{SVV}_{t=-1}$	–0.431	
	(0.277)	
$EPL^{Up}_{t=-1}$		0.386
		(0.301)
$EPL^{Down}_{t=-1}$		0.713**
		(0.318)
Firm FE	YES	YES
Industry-year FE	YES	YES
Observations	40,173	40,173
R^2	0.805	0.805

Table 7: EPL and loss of operating flexibility

The table tests whether EPL affects the operating flexibility of firms. Variable definitions are in Appendix A. Columns 1 and 2 of Panel A report the results of regressions of employment growth on EPL. Regression 1 looks at firms with a single product line whereas regression 2 looks at firms with multiple product lines. The regressions include but do not report the same lagged firm-level and country-level controls as in Table 2, namely *ROA*, *Capital expenditures*, *Dividend dummy*, *Focus*, *Leverage*, *MTB-equity*, *Size*, *Volatility*, *GDP growth*, *ln(Trade openness)*, *Government orientation*, *LMP*, *Union membership*, and *Tertiary education*. The regressions also include firm and industry-year fixed effects. Columns 2 and 3 of Panel A report the results of regressions of capital expenditures on EPL. The control variables are the same as in regressions 1 and 2, except that we drop the lagged *Capital expenditures* from the list of country-level controls. Standard errors are clustered at the country level and reported in parentheses. Panel B estimates a conditional logit regression with *Multi-product firm* as the dependent variable. The sample is limited to firms that were single-product firms in the previous year. The lagged firm-level and country level controls are the same as in Panel A. The regression also includes industry-year fixed effects. Robust standard errors are reported in parenthesis. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

Panel A: Employment growth

	Dependent variable: *Employment growth*$_{t=+1}$		Dependent variable: *Capital expenditures*	
	Single-product firms	Multi-product firms	Single-product firms	Multi-product firms
	(1)	(2)	(3)	(4)
$EPL^{Up}_{t=-1}$	0.010	–0.008	–0.002	0.003
	(0.024)	(0.021)	(0.003)	(0.002)
$EPL^{Down}_{t=-1}$	0.064***	0.030	0.011***	0.003
	(0.020)	(0.020)	(0.003)	(0.003)
Firm-level controls	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES
Observations	19,806	43,782	25,651	51,827
R2	0.472	0.370	0.614	0.563

Panel B: Propensity to diversify

	Dependent variable: *Multi-segment firm*
$EPL^{Up}_{t=-1}$	0.072
	(0.082)
$EPL^{Down}_{t=-1}$	0.440***
	(0.074)
Firm-level controls	YES
Country-level controls	YES
Firm fixed effects	NO
Industry-year fixed effects	YES
Observations	22,957
Pseudo R2	0.023

Table 8: EPL, flexibility, and Tobin's q

The table reports the results of regressions of Tobin's q on EPL. Variable definitions are in Appendix A. Regressions 1 and 2 of Panel A split the sample in single-product and multi-product firms. Regressions 2 and 3 split the sample into firms with a high (low) labor-to-capital ratio relative to the median labor-to-capital ratio in any given industry year. In addition, Panel B also distinguishes between dividend payers and non-payers. The lagged firm-level and country-level control variables are the same as in Table 3. The regressions include firm and industry-year fixed effects. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries over the years 1985 – 2010.

Panel A: Operating flexibility and Tobin's q

	Dependent variable: *Tobin's q*			
	Single-product firms	Multi-product firms	Firms with a high labor-to-capital ratio	Firms with a low labor-to-capital ratio
	(1)	(2)	(3)	(4)
$EPL^{Up}_{t=-1}$	–0.002	0.005	0.002	0.012
	(0.032)	(0.021)	(0.027)	(0.041)
$EPL^{Down}_{t=-1}$	0.195***	0.086*	0.098*	0.053
	(0.037)	(0.051)	(0.051)	(0.039)
Firm-level controls	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES
Observations	25,689	51,870	19,629	18,253
R2	0.791	0.817	0.796	0.789

Panel B: Operating flexibility, financial flexibility and Tobin's q

	Dependent variable: *ln(q)*			
	Single-product firms that do not pay dividends	Multi-product firms that pay dividends	Firms with a high labor-to-capital ratio that do not pay dividends	Firms with a low labor-to-capital ratio that pay dividends
	(1)	(2)	(3)	(4)
$EPL^{Up}_{t=-1}$	–0.173**	0.012	0.005	0.003
	(0.072)	(0.044)	(0.066)	(0.034)
$EPL^{Down}_{t=-1}$	0.183***	0.064	0.173**	0.006
	(0.053)	(0.043)	(0.075)	(0.032)
Firm-level controls	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES
Observations	15,018	34,733	7,763	12,583
R2	0.789	0.863	0.813	0.838

Table 9: EPL as a proxy for product market competition

The table reports the results of regressions that control for product market competition (*PMR*) in the relation between EPL and Tobin's q. Variable definitions are in Appendix A. The regressions include (but do not report) the same lagged firm-level and country-level controls as the regressions in in Table 3. The regressions also include firm and industry-year fixed effects. Columns 1 and 2 include the full sample of firms whereas columns 3 and 4 focus on young and mature firms, respectively. Young firms have a listing age smaller than the median listing age of all sample firms in the country in which they are listed. Standard errors are clustered at the country level and reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level, respectively. The sample covers firms listed in 16 countries. Since data on PMR are only available starting in 1998, the sample period is 1998 – 2010.

	Dependent variable: *ln(q)*			
	Full sample		Young firms	Mature firms
	(1)	(2)	(3)	(4)
$EPL^{Down}_{t=-1}$	0.151***	0.146***	0.199***	0.156***
	(0.044)	(0.042)	(0.040)	(0.040)
$PMR_{t=-1}$		–0.143***	–0.181***	–0.076
		(0.042)	(0.040)	(0.049)
Firm-level controls	YES	YES	YES	YES
Country-level controls	YES	YES	YES	YES
Firm fixed effects	YES	YES	YES	YES
Industry-year fixed effects	YES	YES	YES	YES
Observations	93,316	93,316	48,814	44,502
R2	0.776	0.777	0.808	0.787

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