Research Policy 53 (2024) 105039

Contents lists available at ScienceDirect

Research Policy

journal homepage: www.elsevier.com/locate/respol

Employment protection laws and the commercialization of new products: A cross-country study

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A R T I C L E I N F O

JEL classification:
J24
J53
J83
K31
O31
O38

Keywords:
Innovation
New products
Commercialization
Employment protection laws
Institutions
Small firms

A B S T R A C T

Although there are opposing theoretical arguments on the relationship between the strength of a country's employment protection laws (EPLs) and innovation, empirical evidence tilts towards a positive relationship. However, research has mainly focused on the early stages of the innovation process, such as R&D and patenting. This study examines the role of EPLs in the later stages of the innovation process: the commercialization of new products. In particular, we focus on EPLs' relationship with two different new product commercialization outcomes: the launch and subsequent sales of new products. Using data on small European firms, we find that, controlling for invention, stricter EPLs are *negatively* associated with firms' likelihood of launching new products, but *positively* associated with the sales from new products. We discuss the implications of our results for theory and practice.

1. Introduction

Innovation is a catalyst for the growth of both firms and countries (Cefis and Marsili, 2006; Coad et al., 2016; Coad and Rao, 2008; Romer, 1990; Rubera and Kirca, 2012). As a result, improving innovation across European countries has become a policy priority, with the aim of bolstering international competitiveness, productivity, and job creation (European Commission, 2023). When a country's firms innovate successfully, these country-level goals are more likely to be achieved. However, firms' longer-term gains from innovation hinge upon their successful introduction and sale of innovations in the market.

Extant research highlights how a country's employment protection laws (EPLs) relate to an array of firm strategic actions (e.g., Dessaint et al., 2017; Keum, 2020a; Schneper and Guillén, 2004). Of particular interest in the literature is the relationship between EPLs and firms' innovation activities (Barbosa and Faria, 2011). EPLs regulate the relationship between employees and employers (Botero et al., 2004), where stricter EPLs entail stricter (and more costly) rules related to hiring, working hours, and redundancy (i.e., firing employees) (World Bank, 2010). While there are opposing theoretical arguments on the relationship between the strength of countries' EPLs and firm innovation, the empirical evidence mostly supports a positive relationship (Acharya et al., 2013, 2014), although some studies do demonstrate a negative relationship (Francis et al., 2018).

Moreover, while there is abundant research on the relationship between EPLs and innovation outcomes across the early stages of the innovation process (i.e., invention-related outcomes, such as R&D and patenting) (Acharya et al., 2013, 2014; Francis et al., 2018; Griffith and Macartney, 2014; Keum, 2020b), empirical research focusing on the later stages of the innovation process (i.e., commercialization) is scarce. Earlier studies have primarily looked at commercialization by studying new product launch activity (see Barbosa and Faria, 2011; García-Vega et al., 2021; Hoxha and Kleinknecht, 2020). However, there is no research on the relationship between EPLs and new product

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https://doi.org/10.1016/j.respol.2024.105039
Received 25 April 2023; Received in revised form 24 April 2024; Accepted 29 May 2024

sales—which is striking, given that launching a new product does not necessarily result in significant sales increases.

The lack of research on commercialization is alarming when we consider that invention and commercialization are two distinct stages of the innovation process, and that results from one stage cannot simply be generalized to another. For example, *invention* usually results from the creativity and knowledge recombination carried out by a limited set of "inventors" or employees of the R&D department (e.g., Acharya et al., 2013). Conversely, the *launch* of new products requires active decisions by management (Nerkar and Shane, 2007), while new product *sales* depend on support from all employees across functional domains (Cuijpers et al., 2011; De Luca and Atuahene-Gima, 2007).

We ask two related questions: *What is the relationship between stricter EPLs and (a) firms' probability of launching new products (*i.e.*, goods or services) to the market,* and *(b) the sales subsequently generated by these new product launches?* We examine these questions in the context of small firms, the predominant organizational form around the world (Mayer-Haug et al., 2013; World Bank, 2020). Even though small firms rely heavily on their employees to innovate (Andries and Czarnitzki, 2014; McGuirk et al., 2015), they struggle to transform inventions into a revenue source through commercialization (e.g., Veugelers, 2008), making our focus particularly important.

We use a multi-country, European dataset of 33,689 firm-year observations from the Community Innovation Survey (2012, 2014, and 2016 editions). Our findings indicate that managers are *less* likely to launch new products in countries with stricter EPLs. However, once these products are launched, stricter EPLs relate to *higher* sales. We further show that in countries with stricter EPLs, managers are more likely to abandon innovation projects before completion, which explains firms' lower likelihood of new product launches in these countries. We also show that the relationship between EPLs and new product commercialization is driven by laws governing hiring practices and working hours rather than rules pertaining to dismissal. Taken together, these findings align with the view that EPLs constrain firms' ability to scale in the context of new product commercialization, which influences managers' launch decisions.

Our contributions are threefold. Notably, past research on the relationship between EPLs and innovation has often focused on invention or the early stages of the innovation process (Acharya et al., 2013) and how this relationship is stronger or weaker for some firms (e.g., Keum, 2020b) or industries (e.g., Acharya et al., 2014) than for others. Adding to these studies, our research shows that *within* commercialization—a later stage in the innovation process—EPLs can relate both negatively and positively to distinct outcomes, namely the launch and subsequent sales of new products. Moreover, while prior research on EPLs focused on redundancy alone (Acharya et al., 2013), we present evidence on an overall index of EPLs and all their components, including redundancy, hiring, and working hours (Botero et al., 2004).

Importantly, EPLs can relate to commercialization through their relationship with outcomes at earlier stages of the innovation process (invention) and/or through the efficiency with which these inventions are translated into new products. In our main findings, which control for invention and include the interaction between EPLs and invention, we find an insignificant interaction term, suggesting an "additive model" (e.g., Neter et al., 1996). In other words, EPLs relate to commercialization independent of their relation to invention.

Finally, our study contributes to the literature on the factors that relate to the successful commercialization of new products. Traditionally, researchers have focused on factors at the levels of the individual (e.g., Deeds et al., 2000; Smith et al., 2005), firm (e.g., Stock and Zacharias, 2011), network (e.g., Laursen and Salter, 2006; Leiponen and Helfat, 2010, 2011), and industry (e.g., Pilkington, 2004). These prior studies have considered the country context as a given. We expand the commercialization literature by adopting an institution-based view (e.g., Peng et al., 2009; Van Essen et al., 2012), arguing for opposite relations between countries' regulatory institutions (EPLs in particular) and two distinct outcomes related to firms' new product commercialization, namely launch and sales.

2. Theory

2.1. Background literature: EPLs and innovation

In the innovation literature, multiple theoretical arguments and most empirical research suggest that the implications of EPLs are positive. Accordingly, employees play an essential role throughout the innovation process (Weiss et al., 2022). Stricter EPLs ensure more employee-friendly work environments that are beneficial for innovation (Chen et al., 2016). These environments are more tolerant of failure and encourage employees to exert more effort on demanding and uncertain activities such as innovation (Azoulay et al., 2011; Manso, 2011; Tian and Wang, 2014). Also, stricter EPLs limit possible "hold-up" problems. Acharya et al. (2013, p. 999) highlight a specific hold-up problem, namely that "to appropriate a larger share of the substantial payoff from successful innovation, innovative firms may […] fire employees who contributed to such an innovation." With stricter EPLs, such hold-up problems are less likely, which helps to foster employees' innovation incentives. Consistent with these ideas, Acharya et al. (2013, 2014) find that stricter dismissal laws enhance firms' patenting output, while other aspects of countries' EPLs (e.g., regulation of working time) do not provide incentives that encourage innovative initiatives.

Stricter EPLs and related job security also incentivize employees and employers to invest in firm-specific human capital (e.g., firm-specific training, knowledge-sharing, and learning by doing), which is essential for innovation (Belot et al., 2007; Tang, 2012; Wasmer, 2006). Since stricter EPLs make it more likely that employees stay at the firm for longer, they make the returns to investing in firm-specific human capital more certain. More broadly, Hoxha and Kleinknecht (2020) argue and find that firm-specific knowledge is embodied in employees and that stricter EPLs allow such knowledge to be retained and developed, which is key for innovation in high-tech contexts and where firms need to rely on knowledge accumulated in the past.

However, some theoretical arguments and empirical research suggest that the implications of EPLs for innovation can be negative. In countries with stricter EPLs, the reduced threat of dismissal can have a disincentivizing effect on employees. Well-protected employees may be less inclined to put in extra effort or take risks. For example, Ichino and Riphahn (2005) find that tenured workers—who receive more protection against dismissal than temporary workers—are more likely to "shirk." Building on this argument, Bradley et al. (2017) explain the negative effects of unionization, likely the strongest form of employment protection, on patenting via inventor shirking. In this line, Francis et al. (2018) show that innovation productivity decreases following an increase in job security.

Further, stricter EPLs can distort the job flow in the labor market and decrease employers' flexibility to adjust resources (e.g., Barbosa and Faria, 2011; Francis et al., 2018; Griffith and Macartney, 2014; Keum, 2020a, 2020b). Stricter EPLs lead to employee immobility as they make it more costly for firms to fire (unproductive) employees and make firms reluctant to hire new employees (Autor et al., 2007). Relatedly, when demand is uncertain, stricter EPLs lead to increased costs for firms when it comes to discontinuing or downsizing innovation projects that turn out to be underperforming, making managers ex-ante more risk-averse when considering innovation projects (García-Vega et al., 2021). Bai et al. (2020) show that by making investments more irreversible, stricter EPLs reduce firm investments. Relatedly, the strategy literature also suggests that EPLs can present challenges for (re-)configuring resources (e.g., Keum, 2020a), and by doing so they can have negative consequences for various corporate activities and decisions, such as capital investments, acquisitions, divestitures, CEO turnover, takeover activity, and post-merger integration (e.g., Capron and Guillén, 2009; Dessaint et al., 2017; Keum, 2020a; Schneper and Guillén, 2004). Stricter EPLs can also encourage firms to focus on efficiency gains, allowing them to reduce their reliance on more rigid (and thus costly) labor (Bena et al., 2022).

Some scholars suggest that the various explanations outlined above can coexist at the country level (Bastgen and Holzner, 2017). For example, the relationship between EPLs and innovation activities may be different (i.e., positive versus negative, or stronger versus weaker) for firms in more or less innovative industries (Acharya et al., 2014; Hoxha and Kleinknecht, 2020) or based on firms' competitive position (Keum, 2020b).

Prior research has two limitations that merit further attention. First, most studies have focused on the relation between EPLs and the early stages of the innovation process—R&D and patenting in particular (Acharya et al., 2014; Francis et al., 2018; Griffith and Macartney, 2014; Keum, 2020b). Given that R&D expenditures require a return on investment and that one key path to achieving such returns is through the successful launch *and* diffusion of innovations in the market (Heidenreich and Kraemer, 2016), it is surprising that so few studies have focused on EPLs and new product launch (Barbosa and Faria, 2011; García-Vega et al., 2021; Hoxha and Kleinknecht, 2020). Moreover, to our knowledge, none have focused on EPLs and the sales performance of new product launches.

Second, many studies have focused on just one aspect of EPLs, such as protection against dismissal (e.g., Acharya et al., 2014; Griffith and Macartney, 2014; Keum, 2020a, 2020b). Hence, they neglect the fact that these specific regulations are embedded in a broader set of EPLs (Botero et al., 2004), such as regulations on hiring and working time, which can also relate to innovation. The effectiveness of a single aspect of EPLs can be influenced by other EPL aspects, which makes it essential to also consider EPLs as a "bundle" (e.g., Botero et al., 2004).

We address the above issues by focusing on countries' EPLs as a whole (i.e., covering hiring, firing, and working hours regulations) and by examining both new product launch decisions and subsequent new product sales. In so doing, we develop a deeper understanding of the relation between EPLs and commercialization—a later stage of the innovation process—while controlling for R&D investments.

2.2. Hypotheses

2.2.1. EPLs and new product launch

New product commercialization starts with the *decision* on whether and which inventions to launch and take to the market (Zahra and Nielsen, 2002). These decisions are made by managers (Schmidt and Calantone, 2002; Simester and Zhang, 2010), who decide to launch products when the anticipated benefits surpass the projected costs (Nerkar and Shane, 2007). Launching a novel product could be beneficial and could enhance the firm's competitive position by generating new sales. However, attaining such benefits often requires costly adjustments of human resources, related to changing the skill mix and hiring new employees to upscale production and sales. These costs, however, differ among countries with EPLs of varying stringency (Botero et al., 2004).

Specifically, launching new products usually requires new skills (Zahra and Nielsen, 2002). Managers can adjust their firm's skill mix by hiring new employees and, if necessary, laying off employees with obsolete skills. However, stricter EPLs distort labor mobility, which increases the cost of attracting new employees and firing redundant ones (Barbosa and Faria, 2011), making skill adjustments more difficult.

Further, innovation targets growth and increasing demand (e.g., García-Vega et al., 2021). When firms launch new products to penetrate the market, they must often expand the workforce to scale up operations. Under stricter EPLs, employees can only be asked to work a certain number of extra hours, while lower labor mobility makes it more challenging, and thus costly, to attract new recruits. In addition, product launch is uncertain, and many launches fail (e.g., Castellion and Markham, 2013; Kim et al., 2022), obliging managers to quickly release employees—but under strict EPLs, the costs of dismissal are high.

When making new product launch decisions, managers anticipate higher costs in countries with stricter EPLs for several reasons. First, hiring and firing employees with new skills is more costly. Managers could mitigate the high cost of skills adjustments in stringent-EPL countries by (re-)training their workers and reusing their existing firm-specific knowledge (e.g., Hoxha and Kleinknecht, 2020). However, such training is also costly in itself, and benefits from training take time to materialize. Second, the higher cost of up- and downsizing the workforce is difficult for managers to mitigate in countries with stringent EPLs.

The above observations suggest that managers operating under stricter EPLs face greater barriers and higher related costs when launching new products. These obstacles can even threaten the survival of small firms, which typically have limited financial slack (Vanacker et al., 2017). Accordingly, managers strive to avoid such risk, making small-firm managers in countries with stricter EPLs less likely to launch new products. Therefore, we hypothesize:

Hypothesis 1. In countries with stricter EPLs, small firms are less likely to launch new products to the market.

2.2.2. EPLs and the sales performance of new product launches

Several factors suggest a positive relation between the strength of EPLs and the sales performance of new product launches. The first relates to the threshold for selecting projects previously described. Stricter EPLs can encourage managers to be more selective in choosing which new products to launch, focusing on those with a higher likelihood of success. Such selectivity leads to a higher-quality product portfolio and higher sales, as managers in strong-EPL countries may be more cautious and thorough in their product development and market research processes because the costs they must take into account (e.g., for layoffs and severance packages) are higher. Before pursuing a new product launch, managers can be expected to try to mitigate the potential drawbacks and pitfalls linked to stricter EPLs or deselect those projects where this turns out to be impossible, while retaining some of the advantages (such as those described below) linked to stricter EPLs. Thus, managers' selectivity can explain a positive relationship between EPLs and new product sales.

A second factor is the fact that, once the launch decision has been made, the *implementation* of a launch plan becomes key. Product launches are usually inter-functional endeavors (Cuijpers et al., 2011; Ernst et al., 2010) with engagement from and collaboration across multiple departments of a firm, including R&D, human resources, production, marketing, and sales. In small firms, the entire workforce is likely to be involved. New product launches are demanding for employees, as they require extra effort compared to regular operations: new suppliers must be secured, problems related to production ramp-up solved, marketing campaigns coordinated, and seamless distribution logistics arranged (Cooper, 2019).

Indeed, stricter EPLs can also foster the engagement of employees towards successful commercialization.[1] As Streeck (1997, p. 201) argues: "workers whose employment security is not just dependent on their employers' good will […] are likely to identify more with the firm as a community of fate and find it in their interest to contribute to its

[1] We acknowledge that stricter EPLs can also demotivate employees and foster shirking (e.g., Francis et al., 2018). However, the extreme case in which *all* a firm's employees are motivated or demotivated for all new projects likely only exists in theory. In practice, firms employ people with different levels of motivation (e.g., Mahmoud et al., 2021). Thus, both effects likely co-occur, in that EPLs can motivate some employees but demotivate others for specific projects. In line with our Hypothesis 1, in situations where employee demotivation linked to stricter EPLs would be a key concern (i.e., there are too few "strong shoulders" to support the product launch), managers would already have discontinued the projects.

prosperity." In more employee-friendly contexts, more engaged employees are more likely "to internalize the firm's innovation objectives, which strengthens their motivation to overcome difficulties and failure during the innovation process" (Chen et al., 2016, p. 62). Based on norms of reciprocity, employee engagement will raise effort, motivation, and eventually performance (e.g., Kahn, 1990; Soane et al., 2012), which is more likely in countries with stricter EPLs.

Moreover, stricter EPLs could promote a stable work environment. Prior research suggests that hiring new employees may disrupt established work routines (Grillitsch and Schubert, 2021). Stricter EPLs may increase the cost of hiring new employees, which could potentially foster a more stable working environment as firms may choose to rely more on their current workforce because of the higher costs associated with hiring (and firing) employees. This results in a lower likelihood of disrupting existing organizational routines. Similarly, regulations governing changes in employees' work schedules contribute to a greater sense of stability in the workplace.

Finally, the successful launch and commercialization of new products also requires that both current and new employees engage in training and develop new knowledge (Zahra and Nielsen, 2002). New hires need to engage in learning about the firm's organizational structures and processes; current employees need to engage in developing new skills needed for the successful launch of new products. As employees will not be able to transfer firm-specific knowledge to another firm without eroding its value, their willingness to engage in learning and training depends on the prospective duration of their future tenure at the firm (Lazear, 2009). Stricter EPLs can incentivize employees to invest in firm-specific knowledge (Belot et al., 2007; Tang, 2012; Wasmer, 2006) due to current employees' decreased probability of being replaced by a new recruit and/or lower probability of dismissal. Empirical evidence, in turn, shows that firm-specific human capital makes workers more productive (Lee et al., 2015). A meta-analysis on the effects of human capital on firm performance indicates that firm-specific human capital contributes to operational indicators of firm performance across a range of industries (Crook et al., 2011).

Taken together, in countries with stricter EPLs, the threshold that a project needs to overcome to be selected for commercialization by the management may be higher. Moreover, employees will be more engaged and/or invest more in firm-specific human capital, all of which are related to successful commercialization. Therefore, we hypothesize:

Hypothesis 2. Conditional upon small firms launching new products to the market, in countries with stricter EPLs, these firms' new product launches exhibit higher sales.

3. Method

3.1. Data sources and sample

Our main data source is the Community Innovation Survey (CIS), which is carried out by multiple EU member states since 1993 and administered by Eurostat, the statistical office of the EU. We combine multiple survey waves (i.e., CIS 2012, 2014, and 2016). The countries included in our analyses vary by survey year because not all countries allow data access or report on all the variables we need in each year.

Table 1 shows that the innovativeness of countries in our sample varies from strong to modest.[2] Thus, besides the variation in innovation across firms within a particular country, there is also substantial variation across the countries represented in our sample. We supplement firm-level CIS data from these countries with country-level data from the World Bank's *Doing Business* report and its website, along with data from the World Economic Forum. Table 1 further shows that the sample displays considerable variation in the strength of countries' EPLs.

Table 1
Sample composition.

	Country	2012 CIS	2014 CIS	2016 CIS	EPLs
Strong innovator countries	Estonia	Yes	Yes	Yes	51
	Germany	Yes	No	Yes	42
	Norway	No	Yes	No	44
Moderate innovator countries	Czech Republic	Yes	Yes	Yes	11
	Greece	No	Yes	Yes	50
	Lithuania	Yes	Yes	Yes	38
	Portugal	Yes	Yes	Yes	43
	Slovenia	Yes	No	No	54
	Spain	Yes	Yes	Yes	49
Emerging innovator countries	Bulgaria	Yes	Yes	Yes	19
	Croatia	Yes	Yes	Yes	50
	Hungary	Yes	Yes	Yes	22
	Latvia	No	Yes	No	43
	Romania	Yes	Yes	Yes	46
	Slovakia	Yes	No	Yes	22

EPLs = Employment protection laws (0 = least rigid, 100 = most rigid). Country classifications for the sampled countries in the 2012, 2014, and 2016 CIS come from the Eurostat 2021 European Innovation Scoreboard (EIS). For more details, see: https://research-and-innovation.ec.europa.eu/statistics/performance-indicators/european-innovation-scoreboard_en. The EIS provides a comparative assessment of the research and innovation performance of the EU Member States and the relative strengths and weaknesses of their research and innovation systems. Strong innovator countries have an average country performance between 100% and 125% of the EU average, moderate innovator countries have an average country performance between 70% and 100% of the EU average, and emerging innovator countries have an average country performance below 70% of the EU average.

Our sample covers both the manufacturing and service sectors.[3] We selected firms that were not part of a corporate group; firms that belong to such groups have limited discretion over their innovation activities. Moreover, following the EU's definition of smaller firms (European Commission, 2003), we only include firms with 11–49 employees. These firms are particularly subject to the institutional pressures of their home country because they lack the flexibility of bigger firms (and group subsidiaries) to shift resources and activities across countries (Belenzon and Tsolmon, 2016). These steps resulted in a final sample of 12 countries and 10,578 firm observations for the 2012 CIS survey, 12 countries and 10,517 firm observations for the 2014 CIS survey, and 12 countries and 12,594 firm observations for the 2016 CIS survey. We present results on the pooled sample in the main analyses.[4]

3.2. Measures

3.2.1. Dependent variables

Our first dependent variable, *New product launch*, is a dummy variable, set to 1 if the firm launched a new product (defined as a good or service) to the market during the period t_{-2}–t_0 and 0 otherwise (e.g., Leiponen and Helfat, 2010, 2011). T_0 is defined as the CIS year, i.e., 2012, 2014, or 2016, and t_{-2} is defined as two years before the CIS year. For those firms that introduced new products during the period t_{-2}–t_0, we also include a second dependent variable: *New product sales,* defined

[2] For more details, see: https://ec.europa.eu/research-and-innovation/en/statistics/performance-indicators/european-innovation-scoreboard/eis

[3] Separate OLS regression results for the manufacturing and service sectors are provided in Internet Appendix A.6. We also split the manufacturing sector into high-tech and low-tech in Internet Appendix A.6. Results remain qualitatively similar in the subsamples.

[4] Separate OLS regression results for each CIS Year subsample are provided in Internet Appendix A.7. The results remain qualitatively similar in each subsample.

as the sales in the year t_0 related to new products that were launched to the market during the period t_{-2}–t_0, scaled by total sales in the year t_0 (e.g., Laursen and Salter, 2006).

3.2.2. Independent variable

We measure *Employment protection laws (EPLs)* using the World Bank's rigidity of employment index (*Doing Business* 2010 report)[5] (World Bank, 2010), which is based on Botero et al.' (2004) work. Botero et al. (2004, p. 1353) stress that this index is "an economic measure of protection of (employed) workers, and not just a reflection of legal formalism." The index exhibits large variation across countries, theoretically ranging between 0 and 100, with higher values indicating stricter EPLs. The index is the average of three subindices: "difficulty of hiring," or laws that regulate the difficulty of hiring new employees; "rigidity of hours," or laws that regulate the flexibility of extending working hours; and "difficulty of redundancy," or laws related to the difficulty of firing employees.

3.2.3. Institutions and other country-level control variables

Considering that other institutions besides EPLs can affect firms' innovation, we control for other country-level institutions (Acharya et al., 2013; Acharya and Subramanian, 2009; Brown et al., 2013). We control for *Creditor protection* (*Doing Business* 2010 report) because, in countries with stricter creditor rights, managers are more risk-averse. We measure creditor rights using the strength of legal rights index, which draws on a country's collateral and bankruptcy laws (World Bank, 2010). Scores on this index range between 0 (low creditor protection) and 10 (high creditor protection); we multiplied these scores by 10 to ensure a similar scale as our independent variable.

We also control for *Minority shareholder protection* (*Doing Business* 2010 report) because minority shareholders (e.g., venture capital investors) offer financing and knowledge that provide support for product launches and their sales. Minority shareholder protection is measured by the strength of investor protection index (World Bank, 2010), which draws on the work of Djankov et al. (2008). Scores on the original index range between 0 and 10, with higher values indicating stronger minority shareholder protection in a country. We multiplied scores on this index by 10 to ensure a similar scale as our independent variable.

To rule out the possibility that EPLs capture economic development, which correlates with the development of regulatory institutions, we control for the natural logarithm of *GDP* per capita (measured at t_{-2}). We also include intellectual property protection (*IP protection*), which captures the ownership and appropriation rights related to discoveries and the resulting IP. We use the IP protection measure from the World Economic Forum's Global Competitiveness Report 2009–2010 (resp. 2011–2012, 2013–2014). The measure is based on expert opinions on how well IP is protected in a country on a scale ranging from 1 (not at all) to 7 (to a great extent).

3.2.4. Firm-level control variables

Our choice of firm-level control variables follows prior research (e.g., Laursen and Salter, 2006; Leiponen and Helfat, 2010, 2011). We control for *R&D intensity*, as firms usually commit to R&D spending in the pursuit of developing new products. The measure captures a firm's total expenditures on internal and external R&D as a percentage of total sales (in the year t_0). As our measure of R&D intensity was found to be prone to outliers, we winsorize it at the 97.5th percentile. As larger firms with greater resources are more likely to commercialize new products, we also control for firm *Size* as the natural logarithm of the firm's total sales in the year t_0.[6] We also control for a firm's collaborative efforts, which may help it to access and integrate knowledge and technologies that can result in product launches and/or sales. *Collaboration* is a dummy indicating whether the firm cooperated with others on any of its innovation activities during the period t_{-2}–t_0. Further, access to public R&D support may improve the ability to commercialize new products. Therefore, we include *Public financial support*, measured as a dummy indicating whether the firm received any financial support from the government during the period t_{-2}–t_0.

Training stimulates internal knowledge flows that can benefit commercialization. Hence, we include the dummy *Training for innovative activities*, indicating whether the firm engaged in in-house or contracted employee training during the period t_{-2}–t_0. We expect the development and commercialization of new products to increase with the introduction of new organizational practices. *Organizational innovation* is measured as a dummy that indicates whether the firm changed business practices for organizing procedures, methods of organizing work responsibilities and decision-making, or methods of organizing external relations during the period t_{-2}–t_0. Finally, we include *Marketing innovation* as a control, as we expect that it can affect new product launch (sales). This variable is a dummy equal to 1 if the firm changed its products' packaging, promotion, product placement, or pricing methods during the period t_{-2}–t_0 and 0 otherwise.

3.2.5. Industry and CIS year dummies

Industries differ in their innovation attractiveness. Moreover, firms' sales of new products depend on the length of product life cycles within an industry. We control for these factors by including *Industry dummies*, operationalized as dummies for two-digit NACE industries. Last, we include *CIS Year dummies* (as we have three different survey waves) to control for any systematic time-variant shocks in firms' new product commercialization, such as general economic upturns and downturns. For more information on the variables, as well as the data source used, see Internet Appendix A.1.

3.3. Econometric approach

To test the relationship between EPLs and new product commercialization, we estimate the following model:

$$NPC_{i,t} = \beta_0 + \beta_1 EPLs_{country,2009} + \beta_2 SIS_{country,2009} + \beta_3 C_{country,t} + \beta_4 C_{i,t} + \lambda_{ind} + \lambda_{year} + \varepsilon_{i,t}$$

Each data point corresponds to a given firm-year observation *i,t*. The dependent variable $NPC_{i,t}$ refers to the new product commercialization outcome for a given firm-year observation. This is either (1) *New product launch* or (2) *New product sales,* as previously defined. The variable $EPLs_{country,2009}$ is our main independent variable. The model also includes the intercept (β_0), measures for the stringency of other stakeholder institutions in 2009 ($SIS_{country,2009}$), time-varying country control variables ($C_{country,t}$), and firm-year control variables ($C_{i,t}$). We also include NACE two-digit industry dummies (λ_{ind}) and CIS Year dummies (λ_{year}).

Our first dependent variable in the regressions to test Hypothesis 1, *New product launch,* is binary. We use Linear Probability Models to

[5] Given the unavailability of World Bank EPLs measures in the most recent *Doing Business* reports (the 2010 index is the latest available), we decided to use the 2010 measure across our three samples. The 2010 measure is tailored to measure the protection of employees in a hypothetical firm with 60 FTE, whereas earlier reports measure employment regulation for larger firms only (with 201 FTE). In line with this approach, we also use *Doing Business* 2010 data on other stakeholder institutions (creditor protection and minority shareholder protection). EPLs have been shown to remain stable over time. Capron and Guillén (2009), for example, report a 0.95 correlation between their labor rights index of the early 1990s and the index of the early 2000s.

[6] Using an alternative proxy for firm size, at the beginning of each survey wave, the results remain consistent and statistically significant. In particular, we use a turnover growth rate between the first and last years of the CIS period reported by Eurostat to calculate turnover at the beginning of the CIS period based on turnover at the end of the CIS period.

estimate the association between *New product launch* and *EPLs*.[7] To test Hypothesis 2, we employ OLS regressions.[8] All models are estimated with heteroscedasticity-robust standard errors.[9]

4. Results

4.1. Main results

Table 2 presents the descriptive statistics and correlations for the study's variables, except for the industry and year dummies. Correlations between countries' EPLs and the controls are only modest. The Variance Inflation Factors (VIFs) of the independent and control variables across the analyses range between 1.12 and 1.66—well below the critical threshold of 10 that would suggest multicollinearity problems (e.g., Kutner et al., 2005). Only *GDP* per capita and *IP protection*, both control variables in our regressions, fall outside this range (VIFs between 4 and 5), since both are highly correlated (see Table 2). Given their theoretical relevance, we decided to keep both variables in the model, since "omitting a relevant but collinear variable is problematic in a regression because it deflates standard errors and may lead to spurious findings" (Lindner et al., 2020, p. 288).

Table 3 presents our main findings on the pooled sample. Models 1, 2, and 3 are Linear Probability Models on the relationship between EPLs and new product launch. Models 4, 5, and 6 are OLS regressions on the association between EPLs and new product sales. We build our models gradually by first inserting EPLs with the industry and year dummies only (Models 1 and 4) before adding a full set of control variables (Models 2 and 5). We compare *EPLs*' coefficient stability between the simplest models (Models 1 and 4) and full models (Models 2 and 5) using Oster's δ (Oster, 2019). The test computes a parameter δ reflecting the amount of variation that unobservables would have to explain relative to the observables in order to nullify the results (i.e., reduce the coefficient of *EPLs* to zero). $|\delta| = 1$ implies the unobservables would need an explanatory power as strong as all the observables to invalidate the results, whereas $|\delta| > 1$ suggests a stronger power than all the observables. Finally, in Models 3 and 6, we further add the interaction term between *EPLs* and *R&D intensity*, as a proxy for invention. This allows us to test whether EPLs change the conversion efficiency of translating R&D (i.e., invention) into new product launches and sales.

Turning to the model on new product launch (Model 1) that includes industry and year dummies only, we find strong support for Hypothesis 1. The coefficient of *EPLs* is negative and significant ($\beta = -0.004$, *p*-value = 0.000). When we add firm- and country-level control variables, the relationship remains negative and significant ($\beta = -0.005$, p-value = 0.000). These results indicate that firms launch fewer new products in countries with stricter EPLs. Oster's δ equals 4.07, which is >1 (in absolute value)—a commonly used threshold in earlier work (e.g., Dixon et al., 2021; Mawdsley and Somaya, 2021). A value of 4.07 indicates that selection on unobservables would need to be at least 407 % stronger than selection on unobservables to nullify the results, which is highly unlikely. The relationships are also economically meaningful. Based on the results in Model 2, in the country with the highest value for *EPLs* (Slovenia, 54), the probability of launching a new product is about 21 % lower than in the country with the lowest observed value for *EPLs* (Czech Republic, 11).

Next, we turn to the OLS models on new product sales to test Hypothesis 2. The coefficient for *EPLs* in Model 4 ($\beta = 0.044$, *p*-value =

Table 2
Descriptive statistics and correlation matrix pooled dataset (2012, 2014, 2016 CIS).

(N = 33,689)	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) New product launch^{D}	0.60	0.49	1.00																
(2) New product sales (N = 20,179)	35.73	34.07	–	1.00															
(3) EPLs	40.37	12.85	−0.10	0.01	1.00														
(4) Creditor protection	59.17	17.22	−0.02	0.16	−0.45	1.00													
(5) Minority shareholder protection	53.68	6.88	**0.00**	−0.04	−0.17	0.12	1.00												
(6) GDP per capita^{L}	10.36	0.25	−0.05	−0.05	0.53	−0.38	−0.23	1.00											
(7) IP protection	4.06	0.63	−0.01	−0.14	0.47	−0.48	−0.12	0.85	1.00										
(8) R&D intensity^{W}	5.84	15.72	0.06	0.19	0.11	0.04	−0.01	0.12	0.05	1.00									
(9) Size^{L}	14.12	1.34	−0.05	−0.08	0.23	−0.11	−0.09	0.28	0.22	−0.22	1.00								
(10) Collaboration^{D}	0.27	0.44	0.12	0.05	0.09	−0.01	−0.14	0.10	0.06	0.23	0.03	1.00							
(11) Public financial support^{D}	0.32	0.47	0.05	0.07	0.03	0.03	−0.03	0.06	0.04	0.29	0.01	0.29	1.00						
(12) Training for innovative activities^{D}	0.32	0.47	0.13	−0.04	−0.10	−0.10	0.01	−0.04	0.07	−0.01	−0.02	0.08	0.02	1.00					
(13) Organizational innovation^{D}	0.43	0.50	0.10	0.06	0.11	−0.08	−0.04	0.09	0.09	0.06	0.05	0.13	0.05	0.22	1.00				
(14) Marketing innovation^{D}	0.43	0.50	0.22	**0.01**	0.02	−0.13	−0.05	0.03	0.06	0.03	0.01	0.09	0.02	0.19	0.40	1.00			
(15) National market orientation^{D}	0.85	0.36	0.06	−0.02	0.11	−0.10	−0.09	0.14	0.11	0.05	0.18	0.07	0.08	−0.01	0.06	0.07	1.00		
(16) EU market orientation^{D}	0.61	0.49	0.08	**0.00**	0.03	−0.07	−0.04	0.02	0.02	−0.01	0.24	0.07	0.10	0.00	0.03	0.07	0.31	1.00	
(17) Worldwide market orientation^{D}	0.39	0.49	0.09	0.02	0.16	−0.11	0.02	0.10	0.08	0.02	0.24	0.08	0.08	−0.02	0.05	0.08	0.23	0.49	1.00

EPLs = Employment protection laws. ^{L} natural logarithm (+1). ^{D} dummy variable. ^{W} winsorized at the 97.5th percentile. New product sales is only available for firms with New product launch dummy = 1, hence the correlation between (1) and (2) is omitted. Correlations in bold are not significant at the 5% level. See Internet Appendix A.1 for variable definitions.

[7] As a check, we also use a Probit regression, which gives qualitatively similar results. Results are provided in Internet Appendix A.8.

[8] We also cross-check our analyses with Heckman regressions (e.g., Certo et al., 2016) and the results remain unchanged. Results are provided in Internet Appendix A.5.

[9] Results using clustered or wild-cluster bootstrapped standard errors are provided in Internet Appendix A.9. Results remain qualitatively similar.

Table 3
Main results: EPLs and new product commercialization (OLS models).

Dependent variable	New product launch (0/1)			New product sales (%)		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EPLs	−0.004*** (0.000)	−0.005*** (0.000)	−0.005*** (0.000)	0.044* (0.019)	0.299*** (0.023)	0.307*** (0.024)
EPLs × R&D intensity	–	–	−0.000 (0.000)	–	–	−0.002 (0.001)
Creditor protection	–	−0.001*** (0.000)	−0.001*** (0.000)	–	0.248*** (0.013)	0.248*** (0.013)
Minority shareholder protection	–	0.000 (0.000)	0.000 (0.000)	–	−0.209*** (0.034)	−0.207*** (0.034)
GDP per capita	–	−0.233*** (0.022)	−0.233*** (0.022)	–	21.689*** (1.979)	21.850*** (1.989)
IP protection	–	0.090*** (0.008)	0.089*** (0.009)	–	−14.737*** (0.726)	−14.799*** (0.729)
R&D intensity	–	0.001*** (0.000)	0.001 (0.001)	–	0.298*** (0.020)	0.365*** (0.062)
Size	–	−0.009*** (0.002)	−0.009*** (0.002)	–	−0.835*** (0.232)	−0.843*** (0.232)
Collaboration	–	0.101*** (0.006)	0.101*** (0.006)	–	−0.900 (0.543)	−0.896 (0.543)
Public financial support	–	−0.014* (0.006)	−0.014* (0.006)	–	1.076* (0.535)	1.093* (0.535)
Training for innovative activities	–	0.060*** (0.006)	0.060*** (0.006)	–	0.202 (0.483)	0.187 (0.483)
Organizational innovation	–	0.012* (0.006)	0.012* (0.006)	–	3.691*** (0.514)	3.689*** (0.514)
Marketing innovation	–	0.175*** (0.006)	0.175*** (0.006)	–	0.743 (0.508)	0.755 (0.508)
National market orientation	–	0.027** (0.008)	0.027** (0.008)	–	−3.404*** (0.732)	−3.395*** (0.732)
EU market orientation	–	0.024*** (0.006)	0.024*** (0.006)	–	0.267 (0.575)	0.258 (0.575)
Worldwide market orientation	–	0.053*** (0.006)	0.053*** (0.006)	–	1.477** (0.550)	1.462** (0.550)
Oster's δ	–	4.072	–	–	−2.343	–
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
CIS Year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,689	33,689	33,689	20,179	20,179	20,179

This table reports OLS regression results from the relationship between EPLs (Employment protection laws) and New product launch (Hypothesis 1) or New product sales (Hypothesis 2). Heteroscedasticity-robust standard errors in parentheses. The constant term is not reported. Oster's δ assesses changes in the EPLs parameter and regression R^2 between short (Model 1 and 4) and full regressions (Models 2 and 5) to bound potential bias from selection on unobservables. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

0.019) provides evidence that more stringent EPLs are positively associated with new product sales. The relationship remains qualitatively similar (in sign and significance) after adding firm- and country-level control variables in Model 5 (β = 0.299, p-value = 0.000).[10] Oster's δ equals −2.34, which is again >1 (in absolute value). This suggests that in order to reduce the estimated relation between *EPLs* and *New product sales* to zero, the selection on unobservable variables would need to be at least 234 % stronger than the selection on observables. Again, this is highly unlikely. The relationship is again economically significant. Based on the results in Model 5, in the country with the lowest value for *EPLs*, new product sales are about 13 % lower (for firms that introduced at least one new product) than in the country with the highest observed value for *EPLs*. This equates to a difference of approximately 344 K EUR.[11]

Further, while the previous models already control for investments in invention (i.e., R&D intensity), we further examine whether the direct EPLs associations we find depend on a firm's level of R&D intensity. This is important, as supplementary tests (see Internet Appendix A.11) indicate a positive relationship between EPLs and R&D intensity. The tests presented here provide evidence on whether EPLs relate to firms' new product commercialization by changing the efficiency with which ideas are converted into new products. Moderating analyses (Models 3 and 6) that include *EPLs × R&D intensity* as an additional control variable provide further insights. Turning to the new product launch regression in Model 3, we find no evidence of a significant interaction effect between *EPLs* and *R&D intensity* (β = −0.000, p-value = 0.756). Also, in the new product sales regression (Model 6), the interaction effect between *EPLs* and *R&D intensity* remains insignificant (β = −0.002, p-value = 0.263). Overall, our findings suggest that EPLs' association with commercialization is independent from invention. Now that we have established the main findings, we will delve deeper into more specific mechanisms and other important findings.

4.1.1. Managers' selectivity

In Hypothesis 1, we argued that managers anticipate higher costs in countries with stricter EPLs, making them more likely to abandon innovation projects and, thus, not select them for market launch. In Table 4, we examine the relation between *Innovation project abandoning*—measured as a dummy variable that captures whether managers decide to abandon or suspend innovation projects that required previous investments in invention—and *EPLs*. In Model 1, we examine the relation between *Innovation project abandoning* and *EPLs*. Consistent with our

[10] One might wonder whether EPLs increase average success while reducing extraordinary success. To check this, we run the new product sales regressions using multiple dependent variables that are dummies equal to 1 when a firm had sales from new products that were above the 50th, 55th, 60th, 65th, 70th, and 75th percentile of new product sales across the sample. The results show that EPLs increase both average and extraordinary success. Results are provided in Internet Appendix A.10.

[11] Across the pooled sample, firms with at least one new product launch have an average total turnover equal to about 2,644 K EUR.

Table 4
Main results: EPLs and innovation project abandoning (OLS models).

Dependent variable	Innovation project abandoning (0/1) Model 1	New product launch (0/1) Model 2	New product sales (%) Model 3
EPLs	0.002***	−0.005***	0.305***
	(0.000)	(0.000)	(0.024)
EPLs × Innovation project abandoning	–	0.002***	−0.054
		(0.001)	(0.051)
Innovation project abandoning	–	−0.125***	3.407
		(0.024)	(2.189)
Country controls	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
CIS Year dummies	Yes	Yes	Yes
Observations	33,689	33,689	20,179

This table reports OLS regression results from the relationship between EPLs (Employment protection laws), Innovation project abandoning, New product launch (Hypothesis 1), or New product sales (Hypothesis 2). Heteroscedasticity-robust standard errors in parentheses. Innovation project abandoning is a dummy variable which takes the value of 1 if an enterprise had any investments in invention activities (such as the acquisition of machinery, equipment, buildings, software, and licenses; engineering and development work, feasibility studies, design, training, R&D and marketing) that did not result in a new product or process innovation because the project was abandoned or suspended before completion. *** $p < 0.001$; ** $p < 0.01$.; * $p < 0.05$.

proposed mechanism, we find that EPLs are positively associated with managers' decision to abandon innovation projects (M1: $\beta = 0.002$, p-value $= 0.000$).

In Models 2 and 3, we explore whether the relations between EPLs and new product launch (Model 2) or new product sales (Model 3) can be explained by EPLs' association with innovation abandonment. We interact *EPLs* with the *Innovation project abandoning* variable. Since the interaction effect in Model 2 is positive and significant (M2: $\beta = 0.002$, p-value $= 0.000$), the results indicate that part of the relation between *EPLs* and *New product launch* is indeed explained by managers' being more likely to abandon innovation projects in countries with stricter EPLs. We visualize the results in Fig. 1. Interestingly, we fail to find a significant interaction between *EPLs* and *Innovation project abandoning* in the new product sales regression (M3: $\beta = -0.054$, p-value $= 0.294$). Accordingly, this finding makes it less likely that Hypothesis 2 is explained by managers' selectivity effects because we fail to find evidence that project abandonment, and thus selection by management, in countries with stricter EPLs, relates to "better" project quality in terms of sales.

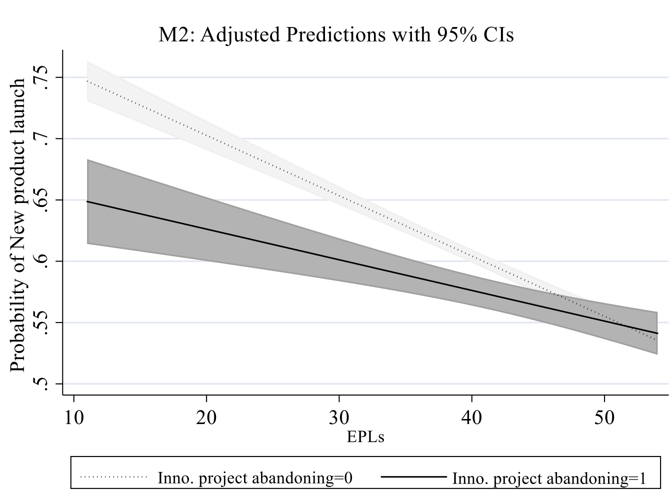

Fig. 1. EPLs and new product launch moderated by innovation project abandoning.

4.1.2. EPLs subindices

We rerun our regressions using the subindices of countries' overall *EPLs* measure, namely: "difficulty of hiring," "rigidity of hours," and "difficulty of redundancy." The results are reported in Table 5. We first include these indices individually before adding them jointly to the model. Including them one by one in the regressions on *New product launch* and *New product sales* provides significant coefficients with signs consistent with the main findings. Further, the results on new product launch support research by Arvanitis (2005), who found a positive relationship between firms' use of temporary workers and flexible working hours, and the probability of launching new products. Flexible working conditions can help to alleviate capacity constraints (and thus reduce the costs related to product launch), leading to a higher likelihood of new product launches. The results on *New product sales* also align with our hypothesis, as regulations relating to the difficulty of hiring and rigidity of working hours can create a stable work environment, which makes it less likely that existing workers' norms, habits, and routines and, thus, operations are being affected.

The inclusion of the redundancy subindex next to the other subindices ("horse race" regression) in the analysis shows a negative and significant coefficient in the *New product sales* regression, which suggests that more stringent protection against firing is likely to lead to lower productivity among workers. These results align with Bradley et al. (2017) and Francis et al. (2018), who argue that stringent EPLs may induce employee shirking. In the *New product launch* regression, this specification makes the coefficient of the redundancy subindex insignificant, providing evidence that hiring regulation and constraints on extending working hours are driving the results there. Also, in the "horse race" regression, the latter two components (i.e., regulation pertaining to hiring and extending working hours) retain a negative sign and significance consistent with the main analyses. Please note that in the "horse race" regressions, we jointly include all three subindices separately; however, all three subindices are conceptually interconnected (i.e., part of the same "bundle") and hence are better represented in an overall EPLs index (Botero et al., 2004). Still, taken together, we find that the subcomponents "difficulty of hiring" and "rigidity of hours" are significant, with signs consistent with our main analyses. Thus, in line with our theory, these components are driving EPLs' relationships with new product commercialization.

4.2. Robustness tests

In this subsection, we present a selection of additional robustness tests, full details of which can be found in the Internet Appendix.

4.2.1. Radical versus incremental innovations

We conducted separate analyses for radical and incremental innovations, inspired by earlier work that shows that labor flexibility may have different implications depending on innovation radicalness (Zhou et al., 2011). Radical innovations refer to products that are new to the firm's market, while incremental innovations are new to the firm only (Giannopoulou et al., 2019; Laursen and Salter, 2006). Internet Appendix A.2 reports the results. In Models 1 and 2 we examine EPLs' relation to the new product launch and sales of radical innovations, while in Models 3 and 4 we examine EPLs' relation to the new product launch and sales of incremental innovations. Overall, regardless of the radicalness of new products, we find similar results. Radical innovations depend more heavily on new skills or new human capital than incremental innovations (e.g., Griffith and Macartney, 2014). The similar relations we find for radical and incremental innovations suggest that such human capital-based arguments are unlikely to drive our results.

4.2.2. Endogeneity

In our primary analyses, we have already discussed the results of the diagnostic test developed by Oster (2019), indicating that our findings are resilient against potential biases stemming from omitted variables.

Table 5
Main results: EPLs and new product commercialization (OLS models). EPLs subindices.

Dependent variable	New product launch (0/1)				New product sales (%)			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Difficulty of hiring	−0.003*** (0.000)	–	–	−0.003*** (0.000)	0.172*** (0.015)	–	–	0.159*** (0.022)
Rigidity of hours	–	−0.002*** (0.000)	–	−0.001*** (0.000)	–	0.257*** (0.019)	–	0.203*** (0.020)
Difficulty of redundancy	–	–	−0.003*** (0.000)	0.000 (0.000)	–	–	0.145*** (0.021)	−0.080** (0.029)
Country controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
CIS Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	33,689	33,689	33,689	33,689	20,179	20,179	20,179	20,179

This table reports OLS regression results from the relationship between EPLs (Employment protection laws) subindices Difficulty of hiring, Rigidity of hours, Difficulty of redundancy and New product launch (Hypothesis 1) or New product sales (Hypothesis 2). Heteroscedasticity-robust standard errors in parentheses. *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Additionally, we follow recent innovation studies and report the results from the robustness of inference to replacement (RIR) approach to further assess the likelihood that bias resulting from endogeneity in the estimate for *EPLs* is driving our results (Thatchenkery and Katila, 2023; for a detailed description, see Busenbark et al., 2022). The RIR approach makes counterfactual changes to the data and indicates "how much of a given effect size must be biased in order to overturn an otherwise statistically significant parameter estimate" (Busenbark et al., 2022, p. 44). The resulting interpretation can account for all sources of bias, not just omitted variables (Busenbark et al., 2022). Depending on the regression (*New product launch* or *New product sales*), we find that between 85.16 % and 89.01 % of the estimate would have to be due to bias to make our results insignificant. These percentages are much higher than previously accepted thresholds in prior innovation studies (Thatchenkery and Katila, 2023) and suggest that bias is very unlikely to be driving our results. Even though these tests do not rule out endogeneity as a concern, they do provide an indication that potential endogeneity concerns (alone) are unlikely to drive our findings.

4.2.3. *Weighted regressions*

To reduce the possibility that countries with many observations are driving our results, we estimate weighted regressions (Internet Appendix A.3). The weight applied is the inverse number of observations per country within each CIS wave; eventually, this ensures that each country in our sample is assigned an equal weight within each CIS wave. We also rerun our regressions using the raw survey weights provided by Eurostat (not available for all country-years in our sample). We find similar results for both analyses.

4.2.4. *Curvilinear relationships*

We also check for possible U- or inverse U-shaped relations between EPLs and both new product launch and sales (Internet Appendix A.4). We include the squared term of *EPLs* in the regressions on *New product launch* and *New product sales*. Formal "*U* tests" are available for the identification of significant (inverse) U-shaped relationships (Haans et al., 2016). The *p*-values associated with these U tests for both the launch and sales regressions do not indicate any (inverse) U-shaped relationships.

4.2.5. *Heckman selection regressions*

To cross-check whether sample selection could be driving the results in our regressions on *New product sales*, we estimate Heckman regressions (Internet Appendix A.5). In doing so, we align with earlier literature using Community Innovation Survey data and focusing on the same set of dependent variables that we do (Fonseca et al., 2019; Frenz and Ietto-Gillies, 2009). In our regressions on *New product sales* (which can only be observed for firms that launch a new product), sample selection might bias our results in the case that launching firms are not a random subset of our full sample. We use the two-step estimator (Certo et al., 2016).

While it is always challenging to find appropriate exclusion criteria, we rely on prior work by Hashi and Stojčić (2013) and define three market-orientation dummies as exclusion restrictions in the first Heckman step. Additionally, we include another exclusion restriction, training for innovative activities, which is defined in the CIS questionnaire as "In-house or contracted out training for your personnel specifically for the *development and/or introduction* of new or significantly improved products and processes" (emphasis added). Such training is explicitly oriented towards introducing new products; conversely, it does not focus on increasing sales performance. Indeed, our main results (Table 3) indicate that although there is a strong relationship between training for innovative activities (and one of the market orientation dummies) and the launch of new products, there is no significant relationship with new product sales. These results suggest that the exclusion restrictions are valid and reliable (Lennox et al., 2012). In Internet Appendix A.5, while the lambda factor in the Heckman model is marginally significant (p-value = 0.097), the coefficient of *EPLs* remains significant and closely aligns in magnitude with our primary analyses.

5. Discussion

We have focused on the relationship between countries' EPLs and small firms' new product commercialization—a stage of the innovation process that is frequently overlooked in earlier work on EPLs. We examined two distinct outcomes related to the commercialization of small firms' new products, namely their launch and subsequent sales. Our empirical focus on small firms is important, as such firms rely on innovation for competitive differentiation, cash flow, productivity, and growth (Cefis and Marsili, 2006). Recognizing that EPLs serve as contextual factors that shape not only invention (e.g., R&D investments) but also later stages in the innovation process, such as commercialization, our analyses provide several insights.

Specifically, our results show a *negative* relationship between stricter EPLs and the likelihood of new product launches. Our empirical tests suggest that managers are less inclined to introduce new products in countries with stricter EPLs due to the potentially higher costs associated with reduced employment flexibility. However, we also find a *positive* relationship between stricter EPLs and the sales of new products. Our results indicate that this relationship is unlikely to be explained solely by selection effects and/or the fact that stricter EPLs can foster new skill development, as we find similar results for incremental and radical innovations. Accordingly, stricter EPLs are likely related to more employee-friendly work environments that foster employee commitment, which benefits sales generation.

Our study builds upon previous research that has explored the role of various contingencies in the relation between EPLs and innovation (broadly defined), such as the radicalness of innovations (e.g., Griffith and Macartney, 2014), firms' competitive position (e.g., Keum, 2020b), and process versus product innovation (e.g., Bena et al., 2022). We examine another contingency: different outcomes *within* a single stage of the innovation process, namely commercialization. Our approach aligns well with conceptualizations of EPLs in the context of beneficial constraints theory, which suggests that EPLs have diverse and sometimes opposing effects under different circumstances (Streeck, 1997, 2004). Indeed, our study illustrates that for innovation commercialization, a single firm can encounter both the negative and positive consequences of stricter EPLs for new product launch decisions versus new product sales, respectively. Interestingly, our study also demonstrates that EPLs have "additive effects," meaning that they are related to both new product launch decisions and new product sales, independently from their relation to invention.

More broadly, our study moves beyond research that has examined the antecedents of commercialization at the individual, firm, network, or industry level (e.g., Laursen and Salter, 2006; Smith et al., 2005). This shift in focus is crucial, as new product commercialization does not occur in an institutional vacuum. Therefore, we provide an institution-based perspective on firms' activities of launching new products and generating sales from them (e.g., Peng et al., 2009; Van Essen et al., 2012). While we acknowledge that recent research has highlighted the importance of considering EPLs when making decisions regarding new product launches (Barbosa and Faria, 2011; García-Vega et al., 2021; Hoxha and Kleinknecht, 2020), we advance this research by conceptualizing the new product commercialization stage as encompassing both the launch *and* sale of new products. After all, one key process through which firms can recoup their innovation investments is by generating new product sales that contribute to profits and developing a competitive advantage.

Our analysis has limitations that should be considered when interpreting our results. For instance, although the Community Innovation Surveys provide high-quality data on firms' innovative activities, they do not allow us to track individual firms over time, providing only snapshots within the biennial survey periods. Consequently, our analyses are inherently cross-sectional in nature. However, the additional analyses we presented earlier instill confidence that the issues typically associated with the use of cross-sectional data are unlikely to affect our results significantly. Moreover, we cannot draw definitive causal conclusions regarding EPLs' long-term effects, or about innovation-related consequences for firms that experience shocks in EPLs within their respective countries. Therefore, future research could explore how firms' new product commercialization reacts to EPL shocks, using panel datasets that cover more extended timeframes.

Further, our study focuses solely on a single national institution: EPLs. Numerous other institutions (e.g., regulations) relate to new product commercialization, and we control for some of the most important ones. For example, our results regarding countries' creditor protection largely support the main findings on EPLs. This is not surprising, as debt providers are often hesitant about significant and potentially risky organizational changes (e.g., Schneper and Guillén, 2004). Even though we cannot account for all possible institutional differences across countries, future research could employ longitudinal data encompassing a broader range of countries (both within and outside the EU), allowing for more variance in a wider array of institutional factors while controlling for stable country-level factors (e.g., through the inclusion of country dummies).

Finally, our results have relevance for policy debates concerning new product commercialization. Our study is particularly timely as policymakers and researchers have expressed conflicting views regarding the role of EPLs and employment flexibility in promoting innovation and productivity more broadly. Most labor reforms have aimed at relaxing EPLs and increasing labor market flexibility, in an "unconditional plea by mainstream economists for the deregulation of labor markets" (Zhou et al., 2011, p. 959), in the belief that this will lead to a more dynamic economy. However, despite decades of such supply-side economic policies, productivity growth in major OECD countries has stagnated (Kleinknecht, 2020). In this regard, scholars have convincingly advanced the positive view that EPLs should be strengthened instead (i.e., reducing flexibility) (Hoxha and Kleinknecht, 2020; Lucidi and Kleinknecht, 2010). This aligns with Schumpeter (1943)'s view counseling against complete flexibility in resource allocation. He argues that while perfect competition is necessary for the optimal allocation of resources, innovation (and hence economic progress) is not feasible under perfect competition; thus, competition is usually temporarily suspended whenever innovations are being introduced (Schumpeter, 1943, pp. 104–5). Implicitly, Schumpeter argues that innovation needs imperfect markets—and our evidence is consistent with this perspective, because stricter EPLs are related to higher new product sales.

Moreover, as EC President Ursula von der Leyen has noted, "Europe is a powerhouse in science. But while we're good at making science with money, we need to get better at making money out of science [...] and turn [researchers'] ideas into products on the market."[12] Understanding the role of EPLs as a factor that can either facilitate or hinder small firms' new product commercialization is therefore crucial. Much policymaking is focused on simply getting more inventions on to the market—but our results call for nuanced conclusions that depend on the specific commercialization outcome in focus. The results suggest that studying new product commercialization and relying solely on (the number of) new product launches as an overall indicator can be misleading, potentially leading to incomplete conclusions. While stricter EPLs are negatively related to new product launches, the flip side is that they are positively related to new product sales.

CRediT authorship contribution statement

Maarten Cerpentier: Writing – review & editing, Writing – original draft, Formal analysis, Data curation, Conceptualization. **Anja Schulze:** Writing – review & editing, Writing – original draft, Funding acquisition, Conceptualization. **Tom Vanacker:** Writing – review & editing, Writing – original draft, Supervision, Funding acquisition, Conceptualization. **Shaker A. Zahra:** Writing – review & editing, Writing – original draft, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The authors do not have permission to share data.

Acknowledgements

We thank the Editors, Alex Coad and Martin Kenney, and three anonymous *Research Policy* referees for their helpful and constructive comments. This paper has benefited from presentations at the 2021 Academy of Management Conference, Syracuse University, and the 3rd Workshop on Governance in Private Firms (Antwerp, 2021). We acknowledge financial support from the Research Foundation Flanders [G012619N] and the Swiss National Science Foundation [PP00P1_150490]. We are grateful to Eurostat (and in particular to Marta Zimolag) for providing us with access to the Community

[12] For more details, see: https://twitter.com/vonderleyen/status/1372485907752816640

Innovation Survey dataset.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.respol.2024.105039.

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