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Deregulation Derailed: Evidence from Services Markets Liberalization in Croatia

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Deregulation Derailed: Evidence from Services Markets Liberalization in Croatia

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Abstract

Conventional wisdom suggests that when business regulation is excessive, deregulation should enhance efficiency. The liberalization of services markets in Croatia demonstrates that this is not necessarily the case, particularly when features of the reform process allow undue influence by those who stand to lose from the removal of regulatory barriers. To assess the effects of the Croatian reform, we determine the yearly volume of deregulation measures applicable to each affected sector and construct a sector-level panel dataset encompassing a wide range of outcomes. Exploiting within-sector, over-time variation in the volume of deregulation measures, we find that deregulation, on average, increased labor productivity but had no effect on entry, employment, or profit margins. While both new entrants and incumbents shared the labor-productivity gains, incumbents benefited more and also experienced an increase in profit margins. Heterogeneity analysis reveals that the reform was more effective in sectors with initial conditions indicative of weaker incumbent power. Our findings underscore the relevance of public-choice perspectives not only in understanding regulation, as emphasized by prior literature, but also in the context of deregulation.

Keywords: deregulation, liberalization, services markets, heterogeneity, special interests

JEL codes: L51, L80, D02, K20, P16

1. Introduction

Government regulation of industries and business activities is supposed to address market failures and protect the public interest. In practice, however, regulations often impose excessive compliance, administrative, and other costs, with adverse consequences for economic activity (see, e.g., Cordes et al., 2022; Parker & Kirkpatrick, 2012; De Soto, 1990). Accordingly, in recent years, policymakers worldwide have generally embraced deregulation over regulation as a guiding principle (see, e.g., Conboye et al., 2024; Stott & Nugent, 2024; Wighton, 2024; Council of Economic Advisers, 2019: Ch. 2). Empirical evidence indicates that carefully designed deregulation indeed tends to promote broadly desirable outcomes (see, e.g., Winston, 1993; Jayaratne & Strahan, 1996; Cubillos-Rocha et al., 2024).¹

Existing research, however, has predominantly examined instances of deregulation where the nature of the reform nearly guarantees the discovery of favorable effects. Examples include pinpointed interventions that unambiguously lower the costs of firm entry (e.g., Cheng et al., 2024; Bruhn, 2011; Kaplan et al., 2011; Branstetter et al., 2013; Buri et al., 2024) or eliminate the scope for undue government interference (e.g., Zhang & Jiang, 2024; Monteiro & Assunção, 2012; Alfaro & Chari, 2014; Aghion et al., 2008). They also encompass broader, economic-system-wide transformations where deregulation was accompanied by other structural changes such as privatization, foreign acquisition, and divesting (e.g., Arnold et al., 2011; Shepotylo & Vakhitov, 2015; Davis & Wolfram, 2012). In such settings—where deregulation targets a narrow, readily-identifiable provision or reflects the broader social momentum—reforms are arguably less likely to be obstructed or derailed by those who stand to lose from the removal of regulatory barriers.

In the present study, we provide a rare empirical insight into the repercussions of a very different instance of deregulation—the liberalization of services markets in Croatia. Between 2010 and 2022, Croatia promulgated more than 250 distinct deregulation measures affecting nearly 50 professions and activities. Unlike the typical instances of deregulation investigated in the literature, Croatia’s reform, first, necessitated the selection of a variety of sector-specific micro-measures and, second, involved a distinctly gradual approach. Across the different sectors, the relevant measures were being considered and implemented at different times and in varying volumes over a span of many years, often with direct industry involvement. As the reform unfolded, private interests—in particular incumbent businesses—were thus well-positioned to counter public-interest motives, thereby influencing and potentially shaping reform outcomes.

The ambitious policy initiative sought to boost entry, productivity, and employment in the targeted sectors. Yet, as our analysis demonstrates, the reform failed to fully achieve its objectives. In particular, several aspects of our evidence are indicative of (partial) government capture during the reform process.

¹ A further—much more voluminous—literature points the adverse effects of excessive regulation, thereby providing indirect insights about the anticipated benefits from deregulation. See, e.g., Bailey and Thomas (2017), Djankov et al. (2006), Klapper et al. (2006), and Besley and Burgess (2004).

To investigate the reform’s impact, we draw on detailed information on the substance of the reform as reflected in the implemented measures. We thereby assemble yearly data on the stock of deregulation measures applicable to each of the 145 affected sectors to which the implemented deregulation measures can be readily linked. Our approach to quantifying the extent of deregulation in a given sector thus closely aligns with a subset of the literature that approximates the de facto regulatory burden using the volume of regulatory or legislative measures (see, e.g., Mora-Sanguinetti et al., 2024; Di Vita & Ferrante, 2021; Di Vita, 2017; Djankov et al. 2002).²

We merge the data on the volume of sectoral deregulations with data on a broad range of sectoral outcomes derived from the Croatian firm census. We thereby assemble a sector-level panel covering both the years prior to and after the start of deregulation. To identify the effect of deregulation, as our primary approach, we estimate fixed-effects regressions and leverage within-sector, over-time variation in the number of deregulation measures. We subject our analysis to a number of robustness checks, including the application of an alternative estimation approach.

Our main estimates indicate that the reform, on average, boosted labor productivity in the impacted sectors, but exhibited few other favorable effects. In particular, we find no evidence that the deregulation measures affected aggregate sectoral entry rates, employment, or profit margins. On the contrary, the deregulation appears to have primarily benefited large incumbent firms. As a consequence of the reform, incumbent firms as a group experienced a disproportionately large increase in labor productivity and, unlike new firms, experienced a rise in profit margins. These findings indicate that public-interest considerations alone cannot fully explain the Croatian deregulation reform; government capture by industry insiders likely played a significant role.

To further evaluate the reform’s effectiveness, we also examine sectoral heterogeneity in its impact. We first identify the sectors where deregulation achieved its intended effect, defined as involving at least two out of four outcomes conventionally associated with advancing public interest (see Section 7.1). Upon addressing concerns about false positives inherent in multiple-hypothesis testing, we find that the reform produced the intended effect in approximately a quarter of the affected sectors.

We then examine whether sectors where deregulation failed to achieve its intended effect differ systematically from other sectors in their observable pre-reform characteristics. We find that they do—specifically, in ways suggesting the presence of powerful incumbents and close ties to the government. This provides additional evidence that the implementation of the deregulation reform in Croatia was significantly influenced by government capture. Beyond Croatia’s experience, our analysis highlights the sectoral conditions under which an analogous deregulation reform would be most likely to achieve its intended effects.

² For a nuanced variant of this approach applied in the U.S. context, see, e.g., Al-Ubaydli and McLaughlin (2017), Bailey and Thomas (2017), and Goldschlag and Tabarrok (2018). Shapiro (2024) provides a critical assessment of the literature on counting regulations.

The rest of the paper is organized as follows. Sections 2 and 3 provide the key institutional and conceptual background. Section 4 introduces our data. Sections 5 through 7 develop the different empirical approaches and present the results. The final section concludes.

2. The Croatian deregulation of domestic services markets

2.1. The reform's intent and features

The deregulation reform that we study represents Croatia's comprehensive effort to liberalize the domestic services markets.³ As emphasized by the Ministry of Economy and Sustainable Development (MESD), the reform's aims have been to facilitate market entry, as well as boost productivity and overall competitiveness in the applicable sectors. More generally, the deregulation efforts have been a critical component of the national strategy to improve the domestic regulatory framework.

The reform was distinctly gradual, a point we further elaborate on in Section 4. Elements of the deregulation reform were conceived already before 2010, but large-scale implementation of deregulation measures began in 2011—two years prior to Croatia's joining of the European Union (EU). The pace of reform implementation slowed down somewhat with the onset of the Covid-19 pandemic, but a large number of reform measures were passed even during and post the pandemic as part of the 2021-2026 National Recovery and Resilience Plan. By May 2023, the deregulation of the services market entailed the implementation of about 270 measures encompassing approximately 50 activities and professions. (We offer examples of implemented measures in Section 4.1.)

According to the official government summary, the reform resulted in many interventions aimed at fostering commerce. For example, the reform is described as having opened Croatia's market to EU/EEA competition, allowing cross-border services without cumbersome registrations or professional exams for EU/EEA nationals. The deregulation is depicted as having introduced digitalized procedures for starting a business and instituted automatic recognition of professional qualifications obtained in the EU/EEA states. The summary notes that the implemented measures abolished fixed professional fees (tariffs), enabling free price negotiation, while easing licensing and professional chamber requirements. It is stated that the reform removed territorial restrictions pertaining to the number of licenses (e.g., for taxi operators). In the context of the market for legal services, the introduced measures are said to have enhanced mobility for Croatian and EU lawyers, promoting flexibility and integration into the EU/EEA market. For most professions, the reform is described as having eliminated restrictions on permissible legal form of business.

2.2. The reform process

The reform did not involve broader public discourse. Consequently, there is very limited information about the exact process of design and selection of specific reform measures. Based on our research, it is clear that the impetus for most of the implemented measures came from the

³ See <https://psc.hr/en/services-market-liberalization/>

MESD. Since 2019, the MESD's reform design process has been further guided by action plans informed by the World Bank, based on its regulatory analysis of professional services.

The MESD, however, did not operate in isolation. Professional associations, chambers, and industry representatives also participated in the process—a point emphasized by the MESD. Industry incumbents, expected to be directly impacted by the reform, were consulted and actively contributed to the formulation and selection of specific measures. While direct industry participation in the crafting of policy measures offers the necessary expertise, it also raises the risk of reforms devolving into a form of government capture (see, e.g., McCarty, 2017; Ma, 2020; Baniak & Grajzl, 2009). In the investigated setting, for example, it is very likely that the incumbents were able to deliberate on the MESD's proposal and, upon exercising their influence, filter out the most damaging among the proposed measures.⁴ That is, as we elaborate below, both public interest motives and industry considerations likely influenced the reform process.

3. Conceptual considerations

The impact of deregulation on affected sectors depends on both the original rationale for the regulations and the motives driving deregulation. Specifically, if regulations in a given sector were implemented to address market failures, then deregulation would have been unwarranted from a social perspective and likely to worsen outcomes. However, there is substantial evidence that this is not the case in Croatia. Both domestic and external policymakers have convincingly argued that many activities and professions in Croatia have long been subject to overly stringent regulations and barriers to commerce.⁵

Thus, our central premise is that, in the Croatian context, the pre-reform levels of regulation in the pertinent sectors have on average been excessive from the social welfare standpoint. Then, the anticipated outcome of deregulation critically depends on the motives encompassing the deregulation process.

On the one hand, if the deregulation reform reflects public interest, the reform should improve sectoral outcomes such as competition and productivity, precisely as envisaged by the Croatian policymakers. In other words, much like regulation acts as 'helping hand' in the presence of market

⁴ Focusing on an earlier period than that covered by our data, Šimić Banović (2015) describes a never-materialized Croatian deregulation initiative aimed at reducing the overall regulatory burden across the Croatian economy (i.e., beyond the services markets). During the conception of that initiative, the pertinent government unit received input from many stakeholders, including the Business Advisory Council, which consisted of representatives from business associations such as the Chamber of the Economy, the Chamber of Crafts, and Croatian Exporters (Šimić Banović, 2015: 111). Indeed, "[t]he Business Advisory Council had an important two-fold function: promoting and reporting and reviewing and proposing solutions" (Šimić Banović, 2015: 111). However, "[i]nstead of a serious procedure, the entire process usually looked like bargaining, and the decisions were made with no accountability" (Šimić Banović, 2015: 117). Moreover, in describing the Croatian politico-economic landscape, Šimić Banović (2015: 122) notes that "[i]t is a fact that for big companies to succeed, it is necessary to keep good relations with politicians, and that often includes questionable moves from both sides."

⁵ For example, Croatia ranks toward the lower end of the upper tercile of countries based on the latest World Bank Ease of Doing Business ranking, behind many other Central and East European EU countries, such as Slovak Republic, Czech Republic, Poland, and Slovenia, as well as many non-EU member states, such as Montenegro, Moldova, Serbia, and North Macedonia.

failures (e.g., Pigou, 1938), deregulation in the presence of a preexisting government failure should aid in unleashing the previously stymied business potential (see, e.g., De Soto, 1990). Indeed, this motive has been a major impetus for deregulation initiatives in many industries across the globe, as noted in Section 1.

On the other hand, public choice theory highlights that policy design can be captured by dominant incumbents, influential politicians, and bureaucrats (Tullock, 1967; Stigler, 1971; Peltzman, 1976). When excessive regulation is a consequence of rent-seeking (see, e.g., Djankov et al., 2002), those benefiting from the corresponding rents will naturally resist reforms that threaten their interests.⁶ In such cases, deregulation may merely prolong the reach of the original ‘grabbing hand’ (Shleifer & Vishny, 2002), perpetuating to outcomes that favor industry incumbents at the expense of broader social welfare.

In sum, even when deregulation appears socially desirable in principle, its sectoral impact is theoretically ambiguous and ultimately depends on the relative importance of public interest (helping hand) versus public choice (grabbing hand) considerations. If the former prevails, deregulation should improve sectoral outcomes. Conversely, if the latter dominates, deregulation will yield limited social benefits and instead primarily benefit the industry incumbents.

In what follows, we subject these predictions to empirical scrutiny. To this end, we first introduce our data.

4. Data

4.1. The deregulation measures

To construct the dataset for purposes of assessing the effects of deregulation, we use two key sources of data. Our first key source of data is the information on the implemented deregulation measures. (We discuss the second key source of data in Section 4.3.) The original information, compiled by the MESD, comes in the form of a short description of 270 deregulation measures implemented across 48 activities and professions.⁷ The MESD further responded to our request and provided us with the date of the implementation of each measure. Table A1 in the Online Appendix A lists the names of all activities/professions in which the deregulation measures were implemented, the number of measures implemented per year, and the total number of measures implemented between 2007 and 2023 for each activity/profession. We discuss the dynamics of the implementation of deregulation measures below, after explaining the mapping of these measures from activities/professions to sectors.

Substance-wise, the implemented deregulation measures exhibit much variety. The measures range from broad ones that apply to most activities and professions (e.g., “Documents may be sent

⁶ In discussing an earlier attempted Croatian deregulation reform referred to as Hitrorez, Šimić Banović (2015: 116) provides a textbook example of rent-seeking-based opposition to reform: “[t]he protest by the public notaries” who feared that “after the completion of Hitrorez they would experience a vast decrease in the demand for their services”.

⁷ See <https://psc.hr/en/services-market-liberalization/> and follow the link “Detailed overview of the measures implemented”.

by email or by using e-service”; “Service providers from the European Economic Area are entitled to freedom of establishment and freedom to provide cross-border services”) to measures specific to particular activities/professions (e.g., “Removal of limitation on the number of law firms to be established by the same lawyer”). The measures also differ in their potential reach, ranging from relatively small simplifications of administrative requirements (e.g., “Taxi drivers may have a copy of the driving license in the vehicle instead of the original”) to measures enhancing the reliance on the market (e.g., “Prices of taxi services may be established on a market basis”). In Section 7.2, we use an expert-based assessment of the underlying measures to explore the role of the nature of the deregulation measures applicable to different professions/activities for the effectiveness of deregulation reform.

4.2. Mapping the deregulation measures to sectors

While the deregulation measures were conceived at the level of activities and professions, in Croatia no systematic data exist on the outcomes at the level of activities and professions. To assess the effects of reform, we therefore map the deregulation measures to NACE 4-digit sectors—the level at which we are able to define and observe our outcomes of interest (see below).

In some cases, an activity/profession subject to deregulation maps snugly to a NACE 4-digit sector (e.g., Travel agency activities). On other occasions, a given activity/profession may encompass multiple NACE 4-digit sectors (e.g., Human health activities). In that case, all NACE 4-digit sectors are viewed as subject to the implemented deregulation measures. In a yet further set of scenarios, the mapping from activities/professions to NACE 4-digit sectors is not possible at all because NACE 4-digit sectors are broader than or simply do not correspond to the classification of activities/professions used by Croatian policymakers.⁸ We altogether exclude such activities/professions, sectors, and deregulation measures from the analysis.⁹ The full set of NACE 4-digit sectors included in our analysis thus involves 145 sectors.

Figure 1 shows the flow (part (a)) and the stock (part (b)) of the number of deregulation measures implemented across years at the sectoral level for the 145 sectors that we focus on in our analysis. Many deregulation measures were implemented upon or soon after Croatia’s EU accession. An especially large number of measures affecting many sectors was implemented in 2015, when many of the deregulation measures targeting the construction industry were put in place.

Table A2 in Appendix A shows granular data on the pace of implementation of deregulation measures and the total number of deregulation measures implemented for each of the 145 sectors.

⁸ For example, the implemented deregulation measures for activities/professions, nannies, physiotherapists, private educational institutions, and scientific institutes affect only one part of the firms in the pertinent NACE 4-digit sectors, child day-care activities, specialists’ medical practice activities, and education. Another example for exclusion is when NACE 4-digit classification does not have a coherent sector or sectors corresponding to activities/professions targeted by the Croatian policymakers’ deregulation measures. An example are related crafts

⁹ We were not able to match 21 out of 48 professions. Exemplary professions we were not able to merge include: social welfare; nannies; physiotherapists; and psychologists or psychotherapists.

The sectors differ both with respect to the number of implemented measures and the dynamics of implementation. In the majority of sectors impacted by deregulation (69 percent), the total number of implemented deregulation measures implemented during the observed time period is less than three, the median value. A two-digit number of implemented measures is observed in six sectors.

Notably, the deregulation measures are typically implemented gradually, over several years. The implementation of all measures in a single year is observed in only a few sectors, in which the total number of implemented measures is small (one to three). The clear exception is the sector Taxi operation. In this sector, 13 deregulation measures were implemented in 2018.

4.3. Ascertaining sectoral outcomes

Our second key source of data includes information on the employment, balance sheets, and profit and loss statements for the universe of firms operating in the Croatian economy between years 2004 and 2022.¹⁰ We use the resulting firm-level data to ascertain the pertinent outcomes at the level of NACE 4-digit sectors—the same level to which we map the deregulation measures formally defined at the level of activities/profession (see Section 3.1). Specifically, we use the available firm-level data to calculate a number of different sectoral-level outcomes, both aggregates (totals) and percentiles reflecting within-sector firm distribution. In constructing the sector-level panel, we drop sector-years featuring inactive firms, defined as firms with zero employment or revenue.

Given the reform's aims, our primary focus is on four sectoral aggregate outcomes: total employment, labor productivity, profit margin, and entry rate. Employment and (labor) productivity constitute fundamental policy targets of most reforms, including the Croatian deregulation reform. Entry of new firms is a central indicator of business dynamism, which deregulation was expected to stimulate. Finally, sectoral profit margin provides insight into the level of competition in a sector (increased competition lowers profit margins) as well as, indirectly, the firms' burden of regulatory compliance (lesser regulatory burden increases profit margins). To provide additional insight into aggregate sectoral impacts, we also investigate seven further sectoral aggregate outcomes (totals): revenue, wage bill, material costs, exports, imports, exit rate, and churn rate. Table 1 provides the descriptive statistics for each of these variables. Table B1 in Appendix B provides complete variable definitions.

We further define additional sectoral outcomes that provide insight into the distributional effects of the deregulation reform. Specifically, for each outcome variable measurable at the firm level (employment, labor productivity, profit margin, revenue, wage bill, material costs, exports, imports), we for each sector in each year ascertain the value of the corresponding outcome at the 90th, 75th, 50th, 25th, and 10th percentile of the distribution of firms in the sector.

¹⁰ The data were procured by the Croatian Financial Agency (FINA).

Finally, in subpart of the analysis, we distinguish between the effect of the reform on incumbents versus new firms. Accordingly, for each sector and every year we define pertinent outcomes, measurable at the firm level, separately for incumbents and new firms.

4.4. Sectoral characteristics and the extensiveness of deregulation

The total number of reform measures implemented during the observed time period (2004-2022) varies considerably across sectors affected by deregulation. Figure 2 provides the distribution of sectors affected by the reform by the total number of implemented measures, a proxy for the extensiveness of the reform. The median (mean, respectively) number of total deregulation measures implemented in a given sector by the end of year 2022 equals 3 (3.69, respectively), with standard deviation of 4.47.

What types of sectors saw an especially extensive deregulation reform, as captured by the number of applicable deregulation measures? An answer to this question provides insight into the circumstances and motives behind the reform.

Table 2 provides the relevant information. We group the available sectoral variables into three broad groups: pre-reform outcomes (all expressed as totals), other observable pre-reform characteristics, and pre-reform regulation level, where pre-reform denotes the last year prior to the start of deregulation reform in a particular sector. (Tables B1 and B2 in Appendix B provide full variable definitions.) The unit of observation in a sector. For each sectoral characteristic (variable), we compare the mean value for the 45 sectors that experienced more than three reform measures (column (1)) with the mean value for the 100 sectors that experienced between one and three reform measures (column (2)). Column (3), reports the p -value based on the t -test of the null hypothesis of equality of the two means.

The analysis suggests two main insights. First, aside from reflecting political salience (see, e.g., Law & McLaughlin, 2022), genuine public-interest considerations—especially those pertaining to employment, productivity, and competition—must have been an important motive behind the Croatian deregulation reform. As evidenced by Table 2, the sectors experiencing a large number of deregulation measures are those with especially large potential gains for labor, as captured by high pre-reform employment, wage bill, and labor intensity. They further include sectors with a laggard performance record and limited dynamism, as reflected in low labor productivity and revenue growth, high profit margins—for the sector as a whole and for the largest incumbents—and capital intensity, and low exit and churn rates. And, they encompass sectors that were plausibly over-regulated in the first place, as characterized by our expert-based indicator of high pre-reform level of regulation.

Second, self-serving industry motives likely also played a role. As shown by Table 2, sectors subject to few deregulation measures are those that prior to the reform exhibited high levels of concentration. This finding resonates with the public-choice theory explanation for the reform: all else equal, incumbents' collective action is easier, and government more prone to industry capture, when the sector is dominated by a small number of powerful businesses (see, e.g., Olson, 1965).

It is also congruent with the fact that industry representatives often played an active role in reflections on appropriate deregulation measures (see Section 2).

In the ensuing sections, we turn to examining the effects of the reform. If the public interest motives prevailed over self-serving industry motives, we would expect the reform to exhibit broadly beneficial effects. In contrast, if public-interest motives were muted by self-serving industry voices, we would expect to observe fewer broadly-distributed beneficial effects at the expense of outcomes that benefit especially the incumbents.

5. Assessing the average effect of deregulation on sectoral aggregates

5.1. Main empirical approach

To estimate the average effects of deregulation, we leverage the within-sector, over-time variation in the number of applicable deregulation measures. Our starting point is the following empirical model:

$$y_{st} = \alpha + \beta \times D_{s,t-1} + \mu_s + \gamma_t + \mu_s t + \varepsilon_{st}, \quad (1)$$

where s indexes sector and t year. y_{st} is the applicable sectoral outcome measured in year t . Our focal explanatory variable, $D_{s,t-1}$, is the number (stock) of deregulation measures applicable to sector s at the end of year $t - 1$ (equivalently, at the start of year t). β is the focal coefficient of interest, capturing the effect of the level of deregulation on the examined sectoral outcome. α is the regression constant.

As we clarify in Appendix C, model (1) is directly implied by a specification where sectoral outcome y_{st} is related to the (lagged) number of regulation measures applicable to sector s .¹¹ Indeed, the focal coefficient β in model (1) equals the negative of the effect of the cumulative level of regulation, as measured by the number of regulation measures applicable to sector s at the end of year $t - 1$.

μ_s is the sector fixed effect that captures a plethora of sector-specific, time-invariant, unobserved factors that may exert an effect on sectoral outcomes and, at the same time, play a role in the timing and number of implemented deregulation measures applicable to sector s . Examples of such factors might include the pre-reform extent of regulation, the degree of within-sector competition, and the political clout of the pertinent industry. In contrast, γ_t is the year fixed effect, included to control for any factors that affect all sectors uniformly but vary across years, such as national policies, Croatia's EU accession, and economic circumstances, all of which could affect the sectoral dynamics of deregulation.

$\mu_s t$ is sector-specific linear time trend that controls for any unobserved sector-specific trends in outcomes. Specification (1) thus facilitates the identification of β while accounting for possibly heterogeneous trends. It may be, for instance, that a subset of sectors exhibits an increasing trend in specific outcomes and, at the same time, these sectors happen to be subject to most active

¹¹ For a variant of such a specification in a cross-country context, see Djankov et al. (2002).

deregulation. Then, we would observe an association between the sectoral outcomes and lagged deregulation level, but the association would not reflect the effect of deregulation. The inclusion of the sector-specific time trend is intended to mitigate such concerns. Finally, ε_{st} is the error term.

To estimate the focal parameter β in (1), we first-difference expression (1) with respect to time, yielding:

$$\Delta y_{st} = \beta \times \Delta D_{s,t-1} + \mu_s + \Delta \gamma_t + \Delta \varepsilon_{st}. \quad (2)$$

Model (2) is then estimable using the standard fixed-effects within-estimator (see, e.g. Wooldridge, 2002: Ch. 10; Cameron & Trivedi, 2005: Ch. 21). Throughout the analysis, we based inference on robust standard errors clustered at the sectoral level in order to address the likely within-sector correlation of unobservables over time.

5.2. Main results

Table 3 summarizes our main results for the estimate of average effects of deregulation. Each row in the table pertains to a different estimated model based on the outcome variable.

Part A shows the results for primary aggregate outcomes. On average, deregulation exhibits a positive effect on sectoral labor productivity. All else equal, the implementation of an additional deregulation measure increases sectoral labor productivity by 1.4 percent, or 0.3 percent of the variable's standard deviation based on its mean value (see Table 1). We do not find evidence that deregulation, on average, affects sectoral total employment, entry rate, and profit margin. None of the pertinent coefficient estimates are statistically significantly different from zero.

Part B of Table 3 displays the results for further sectoral aggregate outcomes. We find a positive effect of deregulation on sectoral aggregate revenue. All else equal, the implementation of an additional deregulation measure increases sectoral aggregate revenue by 1.3 percent, or 0.5 percent of the variable's standard deviation based on the variable's mean value (see Table 1). Thus, given that deregulation does not exert an effect of employment, the deregulation's effect on sectoral aggregate labor productivity (see above) is driven primarily by increases in sectoral aggregate revenue. In other words, on average, deregulation enables firms to increase their sales without requiring an increase in employment.

We also find no effect of deregulation, on average, on sectoral aggregate wage bill, material costs, international activity (imports or exports), profit margin, as well as exit and churn rate.

5.3. Gauging sensitivity to omitted variable bias

To assess the sensitivity of our results reported in Table 3 to omitted variables, we apply Oster's (2019) method. We focus on the two outcomes for which the average effect of deregulation is statistically significant (see Table 3): total labor productivity and total revenue. For each estimated model (outcome variable), we consider three scenarios based on the magnitude of R_{max} , the value of R^2 obtained on the basis of a hypothetical fixed effects within regression, but containing all relevant (observed and unobserved) controls. The first scenario is based on Oster-suggested value of R_{max} equal to $\min\{1.3R^2, 1\}$. We then explore two additional scenarios, in turn

setting R_{max} to equal $\min\{1.5R^2, 1\}$ and $\min\{2R^2, 1\}$. Under each scenario, we evaluate the value of δ , the ratio of the importance of selection on unobservables versus observables for which the effect of interest would be equal to zero.

Table 4 summarizes our results. Even in the most conservative scenario (column (3)), for each outcome, selection on unobservables would need to be many times more important than selection on observables to explain away the documented effect of deregulation. Overall, this suggests that our analysis does not suffer from omitted variables bias.

5.4. *Performing other robustness checks*

Focusing on primary outcomes, we performed several other robustness checks.¹² First, we estimated a variant of model (1) without the sector-specific linear time trend in order to check if the lack of the statistically significant effect of deregulation on most primary outcomes is perhaps due to our overly restrictive model specification. Second, we estimated models with additional lags of the deregulation variable, thereby allowing for the effect of deregulation to manifest with a delay. Third, we extended our sample by including sectors that did not experience any deregulation during the investigated period. None of the robustness checks altered any of our main findings (Table 3, part A): deregulation, on average, increases total sectoral labor productivity but does not exert a statistically significant effect on entry, employment, or profit margins.

5.5. *Applying an alternative estimator*

Our main empirical approach relies on a two-way fixed effects (TWFE) model, extended by the inclusion of a sector-specific time trend (see (1)). TWFE regressions, however, are not robust to treatment effects that vary across groups or over time (see, e.g., de Chaisemartin and D’Haultfœuille 2020). As part of sensitivity analysis, in estimating the effect of deregulation, we thus also apply a heterogeneity-robust event-study estimator proposed by de Chaisemartin and D’Haultfœuille (2024). The estimator is applicable to settings with non-binary, non-absorbing, and possibly lagged treatments such as ours. We focus on the four primary outcomes.

Table 5 summarizes the results in the form of the average cumulative (total) effect of deregulation per treatment unit (a deregulation measure). Importantly, this estimate reflects the sum of the effects of a treatment increment, at the time when it takes place and at later periods (see de Chaisemartin and D’Haultfœuille (2024)). It is therefore not directly comparable to the estimate of β from models (1) and (2).

The results using this alternative estimator closely resonate with those obtained using our main approach (Table 3, part A). Deregulation induces an increase in total sectoral labor productivity, but exerts no discernible effect on entry rate and profit margin. Congruent with our main estimates (Table 3, part A), the point estimate for employment in Table 5 is negative. However, in contrast to the estimates based on our main approach, the effect on employment is now statistically significant. Overall, we interpret these results as suggesting that the use of an alternative estimation

¹² For brevity, we only summarize our findings. Full results are available upon request.

approach does not change our key conclusions. We therefore proceed with the analysis using our main approach.

6. Probing further effects of deregulation

We next move beyond investigating the effects of deregulation on sectoral aggregates. We examine the distributional effects of deregulation and the effects for incumbents versus new firms. The resulting analysis provides further insight into the reform's impact and the relevance of competing explanations for the reform.

6.1. Distributional effects

We estimate variants of model (1), or rather its first-differenced version (2), where, in each instance, we use as the outcome variable the relevant sectoral percentile (90th, 75th, 50th, 25th, and 10th) based on the underlying distribution of firms in the sector. Table 6 summarizes the results. For brevity, we only report the estimates of the focal coefficient, indicative of the effect of deregulation.

Deregulation exerts a positive effect on labor productivity of both more and less productive firms. (The positive effect at the median is marginally statistically insignificant, with p -value equal to 0.140.) However, while deregulation leads to labor productivity gains for both most and least productive firms (at 90th and 10th percentile, respectively), in absolute terms, the estimated gain for the former (€4,197) is considerably larger than the estimated gain for the latter (€448).

Deregulation further increases revenue, employment, and wage bill at the upper end of the applicable within-sector distribution (90th percentile), indicating that the deregulation allowed for the expansion of activity especially for the largest firms. Moreover, given the lack of the effect of deregulation on either export or imports, the primary expansion of these firms' activity occurred domestically.

Interestingly, we do not see analogous effects of deregulation in the left tail of the applicable within-sector distribution (10th and 25th percentile). The exception is the effect on the profit margin, which increased following deregulation. Overall, therefore, when beneficial, the deregulation appears to have aided especially the larger firms.

6.2. Effects for incumbents versus new firms

If deregulation entails government capture, deregulation measures should either not hurt or possibly even benefit the incumbents while involving relatively few beneficial effects for new firms (see, e.g., Bailey & Thomas, 2017; Gutierrez & Philippon, 2019). To explore the validity of this conjecture, we use the Croatian firm census to distinguish between incumbents and new firms in each sector in each year covered by our data. We define the sectoral outcomes—aggregates and percentiles—separately for incumbents and new firms. We then estimate variants of model (2) for each firm subset. We investigate the effect on both total (aggregate) and distributional outcomes.

Table 7 summarizes the results, providing the estimates of the focal coefficient. Part A presents the results incumbents and part B for new firms. The estimates reveal both differences and

similarities among incumbents and new firms with respect the effect of deregulation on primary outcomes.

Deregulation enhances total labor productivity for incumbent firms. Incumbents in addition experience positive labor productivity effects at all percentiles of the pertinent distribution. In contrast, new firms do not see a rise in aggregate labor productivity and experience statistically significant positive labor productivity effects only at the left side of the pertinent distribution (50th, 25th, and 10th percentile). The absolute magnitudes of the corresponding effects for new firms are non-trivial, but limited; for example, at the 10th percentile of the applicable distribution, deregulation increases sales per employee by €1,929. In contrast, at the 90th percentile of the relevant distribution for incumbents, the estimated increase in labor productivity is several-fold larger, amounting to €4,430.

Similarly, deregulation increases aggregate profit margin for incumbents, but not for new firms. Only some new firms (at the 90th and 25th percentile) experience an increase in profit margin. But we find no statistically significant effects of deregulation on employment—total or at specific percentiles—for either incumbents or new firms, although the positive effect on total employment for new firms (0.0337) is just marginally statistically insignificant (p -value equals 0.103).

With regard to further outcomes (revenue, wage bill, material costs, exports, and imports), for incumbents, we find no effects of deregulation on the aggregates and hardly any effects even for specific percentiles. In contrast, for new firms, we find that deregulation increases the total wage bill and stimulates aggregate exports. In addition, deregulation increases the material costs for new firms at the lower percentiles of the relevant distribution (50th, 25th, and 10th).

Overall, the findings underscore an important contrast in deregulation's effect on incumbents and new firms. Deregulation benefitted incumbents along two margins: by enhancing their aggregate labor productivity and profit margins. In contrast, deregulation impacted new firms primarily by stimulating expansion, as indicated by the deregulation measures-induced increase in wage bill and exports, as well as material costs, particularly at lower percentiles. Importantly, while less productive new firms did benefit from deregulation, especially the most productive incumbents benefitted considerably more.

7. Investigating sectoral heterogeneity in the reform's effects

7.1. Empirical approach and findings

On average, the deregulation reform appears to have had few discernible effects on the key sectoral aggregates (see Section 5). But to what extent does the effect of deregulation vary across sectors? Are there sectors where the deregulation exhibited the intended effect? To address these question, we specify the following expanded version of model (1):

$$y_{st} = \sum_{s \in S} \beta_s \times D_{s,t-1} \times \mathbb{I}_s + \mu_s + \gamma_t + \mu_s t + \varepsilon_{st}, \quad (4)$$

where S denotes the set of the 145 sectors included in our analysis and \mathbb{I}_s is a time-invariant indicator equal to 1 if the sector-year observation applies to sector s and 0 otherwise. Then, β_s

captures the effect of deregulation level on the focal outcome for sector s . In this part of analysis, we focus only on the four primary outcomes of interest (see Section 4.3), all expressed as sectoral totals: log employment, log labor productivity, profit margin, and entry rate.

To estimate the complete set of β_s for $s \in S$ for a given outcome, we first-difference model (4) with respect to time, t :

$$\Delta y_{st} = \sum_{s \in S} \beta_s \times \Delta D_{s,t-1} \times \mathbb{I}_s + \mu_s + \Delta \gamma_t + \Delta \varepsilon_{st}. \quad (5)$$

We then apply the fixed effects within estimator to (5).

With 145 estimated β_s , $s \in S$, for each considered outcome, at least some of the estimated β_s for any given outcome are bound to be statistically significantly different from zero. We must therefore address concerns about false positives that arise in multiple-hypothesis-testing settings.

We use the false discovery rate (FDR) approach, which allows us to control the expected proportion of falsely rejected null hypotheses. Relative to an alternative approach, the family-wise error rate, FDR entails greater power in detecting true effects. Accordingly, the use of FDR methods is especially suitable in settings such as ours, where the benefit of detecting true positives plausibly exceeds the cost of false positives. We use the Benjamini and Yekutieli (2001) FDR method that allows for arbitrary correlation between the uncorrected p -values (those relevant to conventional hypothesis testing). We set the FDR at the conventional value of five percent, implying that, in our analysis, the expected proportion of rejected null hypotheses that are incorrectly rejected will not exceed 0.05.

We then refer to the deregulation reform as exhibiting the ‘intended effect’ on a given sector if the deregulation reform exhibits at least two out of the following four statistically significant effects for that sector after applying the FDR correction: increase in (log) employment, increase in labor productivity, decrease in profit margin, and increase in entry rate. The direction of these four effects directly echoes the originally intended effects of the reform (see Section 2.1).

Upon estimating four different models (one per each of the four considered outcomes), testing 145 hypotheses per each model, and applying the FDR correction for each of the 145 tested hypotheses for each model, our analysis reveals that the deregulation reform exhibits the intended effect for 37 out of 145 sectors (25.5 percent). Table D1 in Appendix D provides information on which specific sectors exhibit the intended effect.¹³

7.2. Sectoral characteristics and the deregulation’s intended effect

Are the sectors for which the deregulation reform exhibits the intended effect, as defined above, systematically different from other sectors with respect to pre-reform characteristics? And if so, in

¹³ To gain further insight into sectoral heterogeneity of the reform’s effects, we also implemented a survey and conducted interviews with firms from different sectors. The findings based on the corresponding qualitative analysis underscore sector-specific variations in how deregulation impacted firms and reinforce the conclusion that, in most sectors, deregulation fell short of achieving its intended effects. The complete set of findings based on this additional analysis is available upon request.

what way? Answers to these questions have dual relevance. First, they provide further insight into the relative importance of public-interest versus capture accounts of the reform. Second, beyond Croatia's experience, they offer an indication of the type of sectors that would be most amenable to successful deregulation.

Table 8 provides the relevant insights. We group the available sectoral characteristics into three broad groups: pre-reform outcomes (all expressed as totals), other pre-reform characteristics, and pre-reform regulation level and reform features. (Tables B1 and B2 in Appendix B provide full variable definitions.) The unit of observation in a sector. For each sectoral characteristic (variable), we compare the mean value for the 37 sectors for which deregulation reform exhibits the intended effect (column (1)), as defined in Section 7.1, with the mean value for the 108 sectors for which we do not find evidence of deregulation having the intended effect (column (2)). Table 8, column (3), reports the p -value based on the t -test of the null hypothesis of equality of the two means.

The analysis implies that sectors where the deregulation reform did not exhibit the intended effect (NIE) and the sectors where the deregulation reform had the intended effect (IE) differ with respect to three key sets of features.

First, the NIE sectors tend to be larger with respect to pre-reform level of economic activity, as measured by total employment, revenue, wage bill, material costs, and imports. Moreover, in the NIE sectors, the largest incumbents generated more revenue and reaped greater profit margins. With profitability sometimes viewed as proxying firms' capacity to exert undue influence (see, e.g., Rand & Tarp, 2012; Clarke & Xu, 2004; Svensson, 2003), these findings resonate with the importance of public-choice considerations in understanding the Croatian deregulatory reform.

At the same time, these sectoral features overlap considerably with those that depict the sectors with an above-average number of implemented deregulation measures (Table 2). This suggests that many implemented reform measures were generally not especially far-reaching, consistent with the argument that the sectoral incumbents, who may have benefited from pre-existing regulations, succeeded in screening out their non-preferred measures.¹⁴

Second, the NIE sectors exhibit lesser pre-reform competitive dynamics, as captured by entry and churn rates, and involve lower pre-deregulation revenue growth. This finding echoes the public-choice-based interpretation—especially as articulated by Olson (1982)—that deregulation would have least likely been impactful in stagnant sectors where entrenched leaders have successfully consolidated their influence.

And third, there is some indication that the NIE sectors have greater presence of state-owned enterprises (SOE intensity). In addition to exhibiting limited responsiveness to market-oriented reform, SOEs often maintain close ties to government agencies, which can result in a higher likelihood of government capture (see, e.g., Hellman et al., 2003; Shleifer & Vishny, 1994).

¹⁴ During an earlier attempt of economy-wide deregulation in Croatia, Šimić Banović (2015: 119) reports that, "Without doubt, a relatively high number of recommendations was implemented, but those were the ones with low impact because ministries usually decided to implement the easy tasks first and these did not have a high impact".

Congruent with the public-choice perspective, the reform in SOE-intensive sectors could therefore result in deregulation that is more symbolic than substantive.

In contrast, we find no evidence of systematic differences between the NIE and IE sectors with regard to other observable features—including the level of pre-reform regulation, the number of implemented deregulation measures, and the expert-perceived strength of the enacted measures.¹⁵ All in all, these findings are further indications of the relevance of government-capture explanation for the Croatian deregulation reform.

8. Conclusion

Conventional wisdom holds that, in the presence of excessive regulation, deregulation should foster industry dynamism and promote socially favorable outcomes. The distinctly gradual liberalization of domestic services markets in Croatia offers a cautionary tale about the challenges of achieving effective deregulation. On average, the reform led to gains in labor productivity in the affected sectors. However, the reform's broader public-interest objectives—such as fostering entry, employment, and competitive dynamics—remained largely unmet. Instead, the benefits disproportionately accrued to large firms and incumbents, suggesting that deregulation reinforced, rather than dismantled, pre-existing imbalances and inefficiencies. Consistent with this interpretation, the sectors where deregulation failed to achieve its intended effects were, among others, those with a pronounced presence of powerful incumbents and government ties just prior to the reform.

More broadly, our findings highlight the relevance of public-choice perspectives not only in understanding regulation, as emphasized in the voluminous prior literature, but also in the context of deregulation. Deregulation is hardly a panacea if the style and substance of reform allows private interests—those that likely favored over-regulation in the first place—to influence and ultimately derail an otherwise sensible deregulation campaign.

¹⁵ The first and the third measure are expert-based assessments provided to us by the Ministry of Economy and Sustainable Development (MESD); see Table B2 in Appendix B.

References

- Aghion, P., Burgess, R., Redding, S.J., & Zilibotti, F. (2008). The unequal effects of liberalization: Evidence from dismantling the License Raj in India. *American Economic Review*, 98(4), 1397-1412.
- Alfaro, L., & Chari, A. (2014). Deregulation, misallocation, and size: Evidence from India. *Journal of Law and Economics*, 57(4), 897-936.
- Al-Ubaydli, O., & McLaughlin, P.A. (2017). RegData: A numerical database on industry-specific regulations for all United States industries and federal regulations, 1997-2012. *Regulation & Governance*, 11(1), 109-123.
- Arnold, J.M., Javorcik, B.S., & Mattoo, A. (2011). Does services liberalization benefit manufacturing firms? Evidence from the Czech Republic. *Journal of International Economics*, 85(1), 136-146.
- Bailey, J.B., & Thomas, D.W. (2017). Regulating away competition: The effect of regulation on entrepreneurship and employment. *Journal of Regulatory Economics*, 52(3), 237-254.
- Benjamini, Y., & Yekutieli, D. (2001). The control of the false discovery rate in multiple testing under dependency. *Annals of Statistics*, 29(4), 1165-1188.
- Besley, T., & Burgess, R. (2004). Can labor regulation hinder economic performance? Evidence from India. *Quarterly Journal of Economics*, 119(1), 91-134.
- Branstetter, L., Lima, F., Taylor, L.J., & Venâncio, A. (2014). Do entry regulations deter entrepreneurship and job creation? Evidence from recent reforms in Portugal. *Economic Journal*, 124(577), 805-832.
- Bruhn, M. (2011). License to sell: The effect of business registration reform on entrepreneurial activity in Mexico. *Review of Economics and Statistics*, 93(1), 382-386.
- Buri, R., Heinonen, M., Kanervo, J., & Karjalainen, J. (2024). The effects of entry deregulation: Evidence from interurban passenger transport. *Journal of Regulatory Economics*, 66(2), 181-204.
- Cameron, A.C., & Trivedi, P.K. (2005). *Microeconometrics: Methods and Applications*. New York, NY: Cambridge University Press.
- Cheng, H., Ding, S., & Liu, Y. (2024). The effectiveness of entry deregulation: Novel evidence from removing minimum capital requirements. *Journal of Development Economics*, 170(C), 103304.
- Clarke, G. R. G., & Xu, L. C. (2004). Privatization, competition, and corruption: How characteristics of bribe takers and payers affect bribes to utilities. *Journal of Public Economics*, 88(9-10), 2067-2097.
- Conboye, J., Hancock, A., & Tamma, P. (2024). Europe wrapped itself in a web of new rules. Can it reverse course? *The Financial Times*, December 20, 2024.
- Cordes, J.J., Dudley, S.E., & Washington, L.Q. (2022). *Regulatory Compliance Burdens: Literature Review and Synthesis*. Regulatory Studies Center. The George Washington University.
- Council of Economic Advisers. (2019). *Economic Report of the President Together with the Annual Report of the Council of Economic Advisers*. Washington, DC: The White House.

- Cubillos-Rocha, J.S., Gamboa-Arbelaez, J., Melo-Velandia, L.F., Restrepo-Tamayo, S., Roa-Garcia, M.J., & Villamizar-Villegas, M. (2021). Effects of interest rate caps on credit access. *Journal of Regulatory Economics*, 60(2), 117-139.
- Davis, L.W., & Wolfram, C. (2012). Deregulation, consolidation, and efficiency: Evidence from US nuclear power. *American Economic Journal: Applied Economics*, 4(4), 194-225.
- de Chaisemartin, C., & D'Haultfœuille, X. (2024). Difference-in-differences estimators of intertemporal treatment effects. *Review of Economics and Statistics*, forthcoming.
- de Chaisemartin, C., & D'Haultfœuille, X. (2020). Two-way fixed effects estimators with heterogeneous treatment effects. *American Economic Review*, 110(9), 2964-2996.
- De Soto, H. (1990). *The Other Path*. New York, NY: Harper and Row.
- Di Vita, G. (2018). Institutional quality and the growth rates of the Italian regions: The costs of regulatory complexity. *Papers in Regional Science*, 97(4), 1057-1081.
- Di Vita, G., & Ferrante, L. (2021). Is legislation grease or sand to economic growth? An econometric analysis using data from Italian regions before and after the 2008 crisis. *European Journal of Law and Economics*, 51(3), 541-561.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2002). The regulation of entry. *Quarterly Journal of Economics*, 117(1), 1-37.
- Djankov, S., McLiesh, C., & Ramalho, R.M. (2006). Regulation and growth. *Economics Letters*, 92(3), 395-401.
- Goldschlag, N., & Tabarrok, A. (2018). Is regulation to blame for the decline in American entrepreneurship? *Economic Policy*, 33(93), 5-44.
- Grajzl, P., & Baniak, A. (2009). Industry self-regulation, subversion of public institutions, and social control of torts. *International Review of Law and Economics*, 29(4), 360-374.
- Gutierrez, G., & Philippon, T. (2019). The failure of free entry. NBER Working Paper 26001.
- Hellman, J. S., Jones, G., & Kaufmann, D. (2000). Seize the state, seize the day: State capture and influence in transition economies. *Journal of Comparative Economics*, 31(4), 751-773.
- Jayaratne, J., Strahan, P.E. (1996). The finance-growth nexus: Evidence from bank branch deregulation. *Quarterly Journal of Economics*, 111(3), 639-670.
- Kaplan, D.S., Piedra, E., & Seira, E. (2011). Entry regulation and business start-ups: Evidence from Mexico. *Journal of Public Economics*, 95(11), 1501-1515.
- Klapper, L., Laeven, L., & Rajan, R. (2006). Entry regulation as a barrier to entrepreneurship. *Journal of Financial Economics*, 82(3), 591-629.
- Law, M.T., & McLaughlin, P.A. (2022). Industry size and regulation: Evidence from US states. *Public Choice*, 192(1), 1-27
- Ma, C. (2020). Self-regulation versus government regulation: An externality view. *Journal of Regulatory Economics*, 58(2), 166-183.
- McCarty, N. (2017). The regulation and self-regulation of a complex industry. *Journal of Politics*, 79(4), 1220-1236.
- Monteiro, J.C.M., & Assunção, J.J. (2012). Coming out of the shadows? Estimating the impact of bureaucracy simplification and tax cut on formality in Brazilian microenterprises. *Journal of Development Economics*, 99(1), 105-115.

- Mora-Sanguinetti, J.S., Quintana, J., Soler, I., & Spruk, R. (2024). The heterogenous effects of a higher volume of regulation: Evidence from more than 200k Spanish norms. *Journal of Regulatory Economics*, 65(1), 137-153.
- Olson, M. (1965). *The Logic of Collective Action: Public Goods and the Theory of Groups*. Cambridge, MA: Harvard University Press.
- Olson, M. (1982). *The Rise and Decline of Nations: Economic Growth, Stagflation, and Social Rigidities*. New Haven, CT: Yale University Press.
- Oster, E. (2019). Unobservable selection and coefficient stability: Theory and evidence. *Journal of Business and Economic Statistics*, 37(2), 187-204.
- Parker, D., & Kirkpatrick, C. (2012). *Measuring Regulatory Performance. The Economic Impact of Regulatory Policy: A Literature Review of Quantitative Evidence*. Paris: OECD.
- Peltzman, S. (1976). Toward a more general theory of regulation. *Journal of Law and Economics*, 19(2), 211-240.
- Pigou, A.C. (1938). *The Economics of Welfare*, 4th ed. London, UK: Macmillan and Co.
- Rand, J., & Tarp, F. (2012). Firm-level corruption in Vietnam. *Economic Development and Cultural Change*, 60(3), 571-595.
- Shapiro, S. (2024). Counting regulatory burden: A call for nuance. *Humanities and Social Sciences Communications*, 11, 1463, 1-10.
- Shepotylo, O., & Vakhitov, V. (2015). Services liberalization and productivity of manufacturing firms. *Economics of Transition*, 23(1), 1-44.
- Shleifer, A., & Vishny, R.W. (1994). Politicians and firms. *Quarterly Journal of Economics*, 109(4), 995-1025.
- Shleifer, A., & Vishny, R.W. (2002). *The Grabbing Hand: Government Pathologies and Their Cures*. Cambridge, MA: Harvard University Press.
- Stigler, G.J. (1971). The theory of economic regulation. *Bell Journal of Economics and Management Science*, 2(1), 3-21.
- Stott, M., & Nugent, C. (2024). The minister taking a chainsaw to Argentina's statute book. *The Financial Times*, November 4, 2024.
- Svensson, J. (2003). Who must pay bribes and how much? Evidence from a cross section of firms. *Quarterly Journal of Economics*, 118(1), 207-230.
- Šimić Banović, R. (2015). Cutting the red ribbon but not the red tape: The failure of business environment reform in Croatia. *Post-Communist Economies*, 27(1), 106-128.
- Tullock, G. (1967). The welfare cost of tariffs, monopoly, and theft. *Western Economic Journal*, 5(3), 224-232.
- Wighton, D. (2024). Starmer will reap rewards if he succeeds with planning deregulation. *The Times*, July 31, 2024.
- Winston, C. (1993). Economic deregulation: Days of reckoning for microeconomists. *Journal of Economic Literature*, 31(3), 1263-1289.
- Wooldridge, J.M. (2002). *Econometric Analysis of Cross Section and Panel Data*. Cambridge, MA: MIT Press.
- Zhang, J., & Jiang, J. (2024). Investment deregulation and innovation performance of Chinese private firms. *Journal of Financial Stability*, 70(C), 101207.

Table 1: Key descriptive statistics

| Variable | Mean | S.D. | Min. | Max. | Obs. |
|--------------------|---------------|---------------|---------|-----------------|-------|
| Primary outcomes | | | | | |
| Employment | 2,716.1 | 6,261.5 | 2 | 52,870 | 2,455 |
| Labor productivity | 177,662.0 | 816,841.9 | 1,046.7 | 28,350,596.0 | 2,455 |
| Entry rate | 0.133 | 0.153 | 0 | 2 | 2,455 |
| Profit margin | 0.1393 | 0.0942 | -0.2523 | 0.6604 | 2,455 |
| Further outcomes | | | | | |
| Revenue | 294,708,181.9 | 761,477,431.9 | 0 | 8,456,035,840.0 | 2,455 |
| Wage bill | 31,198,806.6 | 69,975,761.7 | 3,344.7 | 651,134,528.0 | 2,455 |
| Material costs | 226,640,157.7 | 616,512,684.1 | 411.0 | 6,785,839,104.0 | 2,455 |
| Exports | 21,838,654.7 | 88,521,317.8 | 0 | 2,910,114,048.0 | 2,455 |
| Imports | 52,548,044.8 | 172,694,857.0 | 0 | 2,365,178,880.0 | 2,455 |
| Exit rate | 0.082 | 0.068 | 0 | 1 | 2,455 |
| Churn rate | 0.214 | 0.176 | 0 | 2 | 2,455 |
| Reform treatment | | | | | |
| Deregulation level | 1.65 | 2.71 | 0 | 36 | 2,455 |

Note: The table presents descriptive statistics for sectoral totals. The unit of observation is a sector in a given year. The panel is not balanced because some sectors in some years involve inactive firms, defined as firms with zero employment or revenue.

Table 2: Pre-reform sectoral characteristics and the extensiveness of deregulation reform

| Sectoral characteristics | Mean | | (3) $p > t $ |
|----------------------------------|--|--|---------------|
| | (1) Sectors with >3 dereg. measures | (2) Sectors with ≤ 3 dereg. measures | |
| Pre-reform outcomes (totals) | | | |
| Log employment | 7.58 | 5.94 | <0.000 |
| Log labor productivity | 10.76 | 11.57 | <0.000 |
| Entry rate | 0.130 | 0.151 | 0.591 |
| Profit margin | 0.1800 | 0.1119 | <0.000 |
| Log revenue | 18.34 | 17.48 | 0.020 |
| Log wage bill | 16.77 | 15.16 | <0.000 |
| Log material costs | 17.75 | 17.19 | 0.146 |
| Log exports | 13.45 | 13.14 | 0.720 |
| Log imports | 14.20 | 14.06 | 0.869 |
| Exit rate | 0.038 | 0.101 | <0.000 |
| Churn rate | 0.169 | 0.251 | 0.071 |
| Other pre-reform characteristics | | | |
| Revenue growth (percent) | 0.98 | 1.21 | 0.073 |
| Services (dummy) | 0.511 | 0.980 | <0.000 |
| Capital intensity | 0.826 | 0.372 | 0.002 |
| R&D intensity | 0.00017 | 0.00011 | 0.401 |
| Intangible assets intensity | 0.041 | 0.033 | 0.749 |
| SOE intensity | 0.102 | 0.078 | 0.531 |
| Herfindahl-Hirschman index | 0.096 | 0.175 | 0.002 |
| Log revenue top 3 firms | 17.16 | 16.85 | 0.359 |
| Profit margin top 3 firms | 0.727 | 0.540 | <0.000 |
| Pre-reform regulation level | | | |
| High regulation level (dummy) | 0.867 | 0.051 | <0.000 |

Notes: The table compares with respect to pre-reform and other characteristics the 45 sectors that experienced an above-average number of deregulation measures (more than 3) and 100 sectors that experienced average number or fewer deregulation measures (between 1 and 3). The unit of observation is a sector. Column (1) shows mean values of variables for sectors with above-average number of deregulation measures. Column (2) shows mean values of the same variables for sectors with average or fewer number of deregulation measures. For any given variable (row), column (3) reports the p -value based on the t -test of equality of means in columns (1) and (2).

Table 3: The average effect of deregulation level, sectoral totals

| Part A: Primary outcomes | | | | | |
|--------------------------|---|----------|----------|-------------------------|-------|
| Model (outcome) | Estimates for Deregulation level ($t - 1$) | | FE & STT | R ² (within) | Obs. |
| | Coeff. | S.E. | | | |
| Log employment | -0.0020 | (0.0039) | Yes | 0.0524 | 2,455 |
| Log labor productivity | 0.0136** | (0.0066) | Yes | 0.0448 | 2,455 |
| Entry rate | -0.0051 | (0.0051) | Yes | 0.1049 | 2,455 |
| Profit margin | 0.0025 | (0.0021) | Yes | 0.0156 | 2,455 |
| Part B: Further outcomes | | | | | |
| Model (outcome) | Estimates for Deregulation level ($t - 1$) | | FE & STT | R ² (within) | Obs. |
| | Coeff. | S.E. | | | |
| Log revenue | 0.0131** | (0.0061) | Yes | 0.0534 | 2,455 |
| Log wage bill | 0.0047 | (0.0033) | Yes | 0.0686 | 2,455 |
| Log material costs | 0.0086 | (0.0057) | Yes | 0.0690 | 2,455 |
| Log exports | 0.0098 | (0.0446) | Yes | 0.0226 | 2,455 |
| Log imports | 0.0040 | (0.0702) | Yes | 0.0111 | 2,455 |
| Exit rate | 0.00002 | (0.0018) | Yes | 0.1928 | 2,455 |
| Churn rate | -0.0051 | (0.0055) | Yes | 0.1600 | 2,455 |

Notes: The table reports OLS estimates of the first-differenced model (2). Unit of observation is sector in a given year. Each row pertains to a different model based on the outcome variable. Each model controls for the full set of sector and year fixed effects (FE) and sector-specific time trend (STT). The reported R² is based on within-sector estimation. The reported standard errors (S.E.) are robust and clustered at the sector level. ***, **, and * respectively denote p -value smaller than 0.01, 0.05, and 0.1.

Table 4: The sensitivity of the estimates in Table 3 to omitted variable bias

| Outcome (model from Table 3): | $ \delta $ for $\beta = 0$ | | |
|-------------------------------|--------------------------------|--------------------------------|------------------------------|
| | (1) $R_{max}=\min\{1.3R^2,1\}$ | (2) $R_{max}=\min\{1.5R^2,1\}$ | (3) $R_{max}=\min\{2R^2,1\}$ |
| Log labor productivity | 27.2 | 16.8 | 8.6 |
| Log revenue | 12.7 | 7.7 | 3.9 |

Notes: The table summarizes the results of Oster (2019) tests of the sensitivity to omitted variable bias of the estimates of the coefficient on Deregulation level at $t - 1$ for those models reported in Table 3 for which the pertinent coefficient estimate is statistically significant. The table shows the value of $|\delta|$, the absolute value of the ratio of the importance of selection on unobservables versus observables for which the effect of interest would be equal to zero. Column (1) shows results based on Oster-recommended value of R_{max} , the value of R^2 from a hypothetical regression containing all relevant (observed and unobserved) controls. Columns (2) and (3) show results based on even more conservative scenarios.

Table 5: Robustness check, an alternative estimator

| Model (outcome) | Avg. cumulative (total) effect of a deregulation measure | | Placebos, <i>p</i> -value |
|------------------------|---|----------|------------------------------|
| | Estimate | S.E. | |
| Log employment | -0.0760** | (0.0358) | 0.814 |
| Log labor productivity | 0.0462* | (0.0242) | 0.393 |
| Entry rate | -0.0064 | (0.0151) | 0.112 |
| Profit margin | 0.0031 | (0.0063) | 0.544 |

Notes: The table presents results for primary outcomes based on the application of the de Chaisemartin and D'Haultfœuille (2024) event-study estimator for non-binary, non-absorbing treatments. The first two columns show the estimate and the corresponding standard error (S.E.) for the average cumulative (total) effect of deregulation per treatment unit (a deregulation measure), reflecting the sum of the effects of a treatment increment, at the time when it takes place and at later periods. The third column shows the *p*-value for the joint test of the null hypothesis of the placebos. All models include a specification with two placebos (not reported). Lack of rejection of the corresponding null provides support in favor of the parallel trends assumption. The estimation was implemented using the `did_multiplgt_dyn` command in Stata.

Table 6: Summary of the effects of deregulation level, sectoral percentiles

| Part A: Primary outcomes | | | | | |
|--------------------------|-------------------------------|------------------------|------------------------|------------------------|------------------------|
| Model (outcome) | Effect on sectoral percentile | | | | |
| | 90 th pctl. | 75 th pctl. | 50 th pctl. | 25 th pctl. | 10 th pctl. |
| Log employment | 0.0087** | -0.0035 | -0.0066 | -0.0005 | 0.0033 |
| Log labor productivity | 0.0149** | 0.0110** | 0.0088 | 0.0132* | 0.0193* |
| Profit margin | 0.0020 | 0.0027 | 0.0026* | 0.0060** | 0.0131* |
| Part B: Further outcomes | | | | | |
| Model (outcome) | Effect on sectoral percentile | | | | |
| | 90 th pctl. | 75 th pctl. | 50 th pctl. | 25 th pctl. | 10 th pctl. |
| Log revenue | 0.0181** | 0.0109* | 0.0152** | 0.0135 | 0.0389 |
| Log wage bill | 0.0087* | 0.0112** | 0.0048 | 0.0038 | 0.0221* |
| Log material costs | 0.0115 | 0.0012 | 0.0088 | 0.0075 | 0.0223 |
| Log exports | -0.0297 | -0.0345 | -0.0070 | -0.0051 | 0.0002 |
| Log imports | -0.0396 | 0.0533 | 0.0217 | -0.0080* | -0.0045 |

Notes: The table reports OLS estimates of the coefficient on the focal explanatory variable Deregulation level at $t - 1$ from the first-differenced model (2). Unit of observation is sector in a given year. Each cell pertains to a different model based on the outcome variable. Each model controls for the full set of sector and year fixed effects and sector-specific time trend. ***, **, and * respectively denote p -value smaller than 0.01, 0.05, and 0.1 based on standard errors (not reported) clustered at the sector level.

Table 7: Summary of the effects of deregulation level,
sectoral outcomes for incumbent versus new firms

| Part A: Incumbent firms | | | | | | |
|-------------------------|---------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Model (outcome) | Effect on sectoral: | | | | | |
| | Total | 90 th pctl. | 75 th pctl. | 50 th pctl. | 25 th pctl. | 10 th pctl. |
| Log employment | -0.0040 | -0.0044 | -0.0056 | -0.0082 | -0.0138 | -0.0115 |
| Log labor productivity | 0.0114* | 0.0139* | 0.0147* | 0.0169** | 0.0159** | 0.0196** |
| Profit margin | 0.0044* | 0.0041 | 0.0053** | 0.0042* | 0.0062*** | 0.0150** |
| Log revenue | 0.0078 | 0.0105 | 0.0104 | 0.0159* | 0.0113 | 0.0226 |
| Log wage bill | 0.0007 | -0.0001 | 0.0028 | 0.0017 | -0.0075 | -0.0144 |
| Log material costs | 0.0036 | 0.0040 | 0.0002 | 0.0102 | 0.0046 | 0.0127 |
| Log exports | 0.0376 | 0.0779 | -0.0027 | -0.0079 | -0.0162 | -0.0123 |
| Log imports | 0.0071 | -0.0171 | 0.0121 | 0.0457 | -0.0030 | -0.0106 |
| Part B: New firms | | | | | | |
| Model (outcome) | Effect on sectoral: | | | | | |
| | Total | 90 th pctl. | 75 th pctl. | 50 th pctl. | 25 th pctl. | 10 th pctl. |
| Log employment | 0.0337 | 0.0100 | 0.0123 | 0.0128 | 0.0074 | 0.0026 |
| Log labor productivity | 0.0537 | 0.0476 | 0.0470 | 0.0617** | 0.0611** | 0.0729** |
| Profit margin | 0.0251 | 0.0189* | 0.0145 | 0.0163 | 0.0205* | 0.0225 |
| Log revenue | 0.0648 | 0.0375 | 0.0463 | 0.0497 | 0.0761 | 0.0836 |
| Log wage bill | 0.0573* | 0.0209 | 0.0195 | 0.0302 | 0.0302 | 0.0353 |
| Log material costs | 0.0695 | 0.0520 | 0.0523 | 0.0656* | 0.0655* | 0.1232** |
| Log exports | 0.2988** | 0.0521 | 0.1231* | 0.0283 | -0.0005 | -0.0039 |
| Log imports | 0.0812 | 0.0109 | 0.0143 | -0.0141 | -0.0226 | -0.0056 |

Notes: The table reports OLS estimates of the coefficient on the focal explanatory variable Deregulation level at $t - 1$ from the first-differenced model (2). Unit of observation is sector in a given year. Each cell pertains to a different model based on the outcome variable. Each model controls for the full set of sector and year fixed effects and sector-specific time trend. ***, **, and * respectively denote p -value smaller than 0.01, 0.05, and 0.1 based on standard errors (not reported) clustered at the sector level.

Table 8: Sectoral characteristics and the intended effect of the deregulation reform

| Sectoral characteristics | Mean | | (3) $p > t $ |
|----------------------------------|----------------------------------|-------------------------------------|---------------|
| | (1) Sectors with intended effect | (2) Sectors without intended effect | |
| Pre-reform outcomes (totals) | | | |
| Log employment | 5.66 | 6.72 | 0.002 |
| Log labor productivity | 11.12 | 11.38 | 0.135 |
| Entry rate | 0.224 | 0.117 | 0.007 |
| Profit margin | 0.1346 | 0.1325 | 0.913 |
| Log revenue | 16.74 | 18.09 | <0.001 |
| Log wage bill | 14.73 | 15.98 | <0.001 |
| Log material costs | 16.35 | 17.71 | <0.001 |
| Log exports | 12.30 | 13.56 | 0.167 |
| Log imports | 12.29 | 14.73 | 0.004 |
| Exit rate | 0.093 | 0.078 | 0.429 |
| Churn rate | 0.317 | 0.195 | 0.012 |
| Other pre-reform characteristics | | | |
| Revenue growth (percent) | 1.35 | 1.07 | 0.045 |
| Services (dummy) | 0.784 | 0.852 | 0.340 |
| Capital intensity | 0.571 | 0.493 | 0.619 |
| R&D intensity | 0.00012 | 0.00013 | 0.888 |
| Intangible assets intensity | 0.016 | 0.042 | 0.338 |
| SOE intensity | 0.036 | 0.103 | 0.088 |
| Herfindahl-Hirschman index | 0.163 | 0.147 | 0.558 |
| Log revenue top 3 firms | 16.07 | 17.25 | <0.001 |
| Profit margin top 3 firms | 0.521 | 0.625 | 0.041 |
| Pre-reform regulation level | | | |
| High regulation level (dummy) | 0.351 | 0.290 | 0.486 |
| Reform features | | | |
| Many measures (dummy) | 0.324 | 0.306 | 0.833 |
| Strong measures (dummy) | 0.243 | 0.213 | 0.704 |

Notes: The table compares with respect to pre-reform and other characteristics the 37 sectors that exhibit the intended effect of the deregulation reform and the 108 sectors that do not exhibit the intended effect. The deregulation reform is said to exhibit a intended effect on a sector if, based on the estimates of model (1), the reform gives rise to at least two out of the following four statistically significant effects after the five-percent false discovery rate (FDR) correction using the Benjamini and Yekutieli (2001) method (see text): increase in (log) employment, increase in (log) labor productivity, increase in entry rate, and decrease in profit margin. The unit of observation is a sector. Column (1) shows mean values of variables for sectors exhibiting the intended effect. Column (2) shows mean values of the same variables for sectors that do not exhibit the intended effect. For any given variable (row), column (3) reports the p -value based on the t -test of equality of means in columns (1) and (2).

Figure 1: Deregulation measures at the sectoral level over time, flow and stock

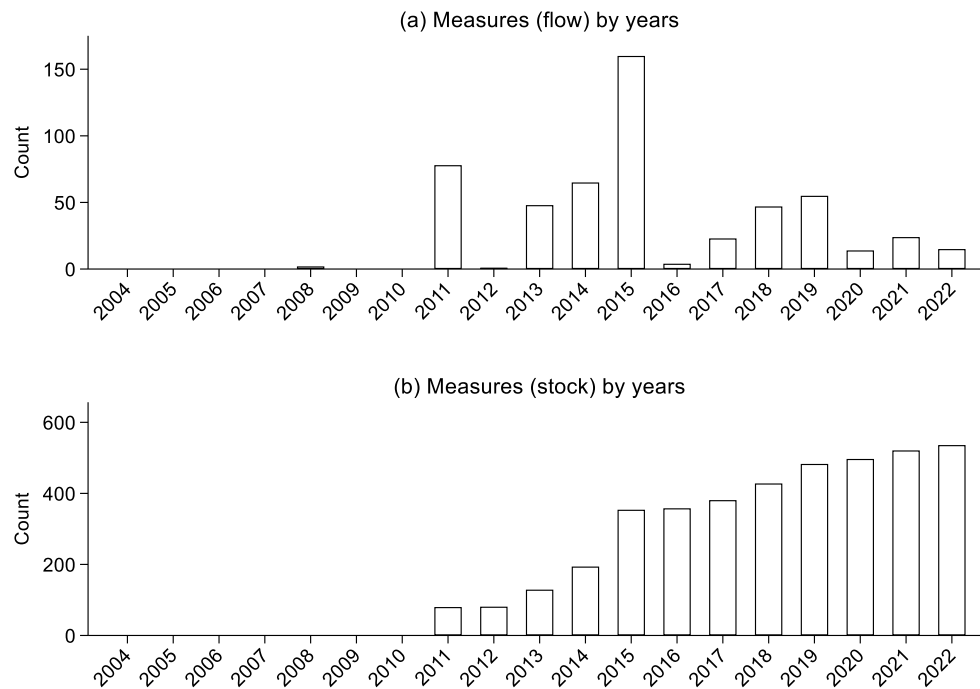
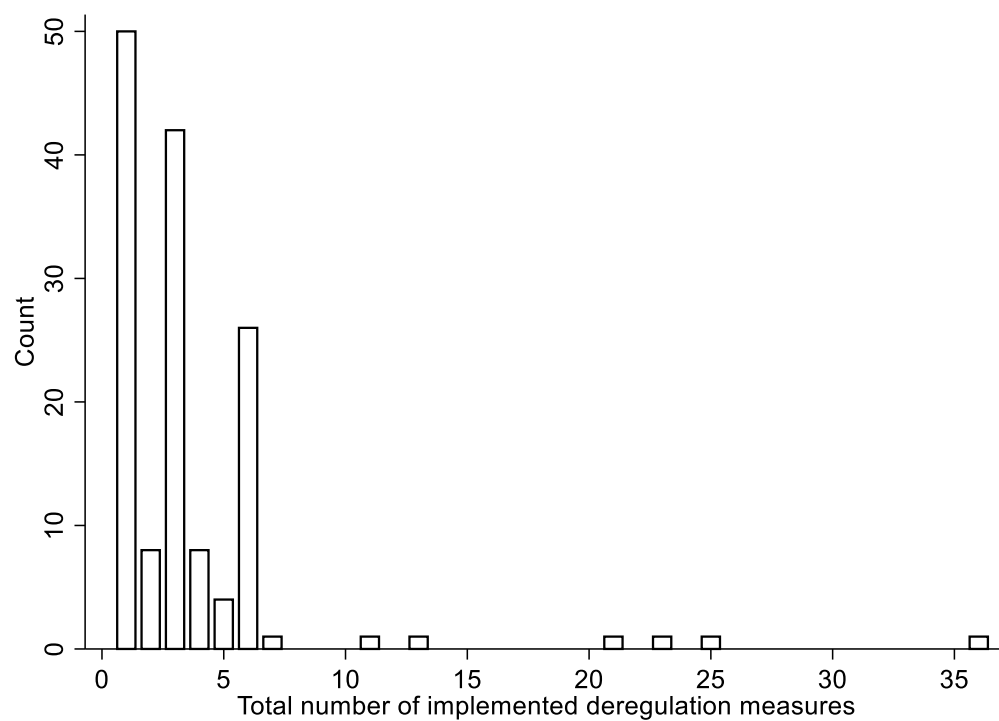


Figure 2: The distribution of sectors, affected by the deregulation reform, by total number of implemented deregulation measures between 2008 and 2022



Online appendices for

**Deregulation Derailed:
Evidence from Services Markets Liberalization in Croatia**

Appendix A

Table A1: The number (flow) of implemented deregulation measures across activities/professions and years

| Profession and service activity | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | Total |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|-------|
| Accountants | | | | | | | 2 | | | | | | 1 | | | | 3 |
| Air-conditioner maintenance | | | | | | | | | 3 | | | | | | | | 3 |
| Architects | | | | | | | 3 | | 9 | | | 1 | | 2 | | | 15 |
| Auditors | | 2 | | | | | 2 | | | | | 8 | | | | 2 | 14 |
| Catering industry | | | | | | | 1 | 1 | 3 | | | 1 | | | | | 6 |
| Chemicals | | | | | | | | | | | | | | 1 | | | 1 |
| Civil construction, mechanical and electrical engineers | | | | | | | 2 | | 9 | | | | 1 | 2 | | 1 | 15 |
| Construction works managers/site engineers | | | | | | | 1 | | | | | | 2 | | | | 3 |
| Construction | | | | | | | 1 | | 4 | | | | 1 | | | | 6 |
| Dentists | | | | | | | 1 | | | | | | | | | | 1 |
| Driving schools | | | | | | | 1 | | | | 5 | | | | 1 | | 7 |
| Education and rehabilitation services | | | | | | | | | | | | | | | | 3 | 3 |
| Employment agency | | | | | | | 1 | | | | 1 | | | | | | 2 |
| Energy | | | | | | | | | | | | 2 | | 1 | | | 3 |
| Energy certification | | | | | | | 1 | 1 | | | 2 | | 4 | 1 | | | 9 |
| Environment protection | | | | | | | | | | | | 3 | 2 | | | | 5 |
| Foundations | | | | | | | | | | | | 5 | | | | | 5 |
| Geodetic engineers | | | | | | | 1 | | | | | 8 | 1 | | | | 10 |
| Healthcare | | | | | | | | | | | | | 5 | | | | 5 |
| Intellectual property | | | | | | | | | | | | | | 1 | | | 1 |
| Lawyers | | | | | | | 1 | | | | | 1 | | | 15 | 2 | 19 |
| Media and paper press | | | | | | | 1 | | | | | | | | | | 1 |
| Mining engineers | | | | | | | | | | | | | | | | 3 | 3 |
| Nannies | | | | | | | 1 | | | | | | 1 | | | | 2 |
| Pharmacists | | | | | | | | | | | | | 2 | | | | 2 |
| Physiotherapists | | | | | | | | | | | | | | 2 | | | 2 |
| Port navigators and nautical tourism | | | | | | | | | | | | | | 1 | 1 | | 2 |
| Postal services | | | | | | | 2 | | | | | | 2 | | | | 4 |
| Private archives | | | | | | | | | | | | | 1 | | | | 1 |

| | | | | | | | | | | | | | | | | | |
|--|---|---|--|--|---|---|---|---|---|---|---|----|---|---|---|---|----|
| Private detectives | | | | | | | | | | | | 1 | | | | | 1 |
| Private educational institutions and scientific institutes | | | | | | | | 1 | | | | 1 | | | 1 | 1 | 4 |
| Private museums, libraries and theatres | | | | | | | | | 1 | | | | | | | | 1 |
| Private security guards | | | | | | | | | | | | | | 3 | | 1 | 4 |
| Private undertakers | | | | | | | | | 2 | | | | | | | 1 | 3 |
| Psychologists | | | | | | | | | | | | 1 | | | 1 | 3 | 5 |
| Psychotherapists | | | | | | | | | | | | 7 | | | | 2 | 9 |
| Public notaries | | | | | | | | | | | | | | | | 2 | 2 |
| Real estate agents | | | | | | 1 | 1 | | | | 2 | | | | | | 4 |
| Regulated professions | | | | | | | | | | 4 | | | | | | | 4 |
| Related crafts | 1 | 1 | | | | | 1 | | | | | | | 1 | | | 4 |
| Retail distribution | | | | | 2 | | 1 | 4 | 1 | | 1 | | | | | | 9 |
| Social welfare | | | | | | | 1 | | | | | | 1 | | | | 2 |
| Sports | | | | | | | | | | | | | | | 2 | | 2 |
| Tax advisors | | | | | | | 1 | | | | 6 | | | | 1 | 3 | 11 |
| Taxi | | | | | | | | | | | | 13 | | | | | 13 |
| Tourism and tourist guides | | | | | | | 1 | | | | | 16 | | 2 | 2 | | 21 |
| Veterinarians | | | | | | | 2 | | | | | 2 | | | | | 4 |

Notes: Construction refers to construction works, project management, inspection of building components and testing the construction material.

Table A2: The number (stock) of implemented deregulation measures across NACE Rev. 2 sectors (4-digit) and years

| Sector name | NACE | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Trade of electricity | 3514 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 2 | 2 |
| Trade of gas through mains | 3523 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 3 | 3 | 3 |
| Development of building projects | 4110 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of residential and non-residential buildings | 4120 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of roads and motorways | 4211 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of railways and underground railways | 4212 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of bridges and tunnels | 4213 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of utility projects for fluids | 4221 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of utility projects for electricity and telecommunications | 4222 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of water projects | 4291 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Construction of other civil engineering projects n.e.c. | 4299 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Demolition | 4311 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Site preparation | 4312 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Test drilling and boring | 4313 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Electrical installation | 4321 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Plumbing, heat and air conditioning installation | 4322 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Other construction installation | 4329 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Plastering | 4331 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |

| | | | | | | | | | | | | | | | | | |
|--|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Joinery installation | 4332 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Floor and wall covering | 4333 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Painting and glazing | 4334 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Other building completion and finishing | 4339 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Roofing activities | 4391 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Other specialised construction activities n.e.c. | 4399 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 5 | 5 | 5 | 5 | 6 | 6 | 6 | 6 |
| Sale of cars and light motor vehicles | 4511 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 |
| Sale of other motor vehicles | 4519 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 4 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 |
| Wholesale trade of motor vehicle parts and accessories | 4531 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Retail trade of motor vehicle parts and accessories | 4532 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 3 | 3 | 3 | 4 | 4 | 4 | 4 | 4 | 4 |
| Sale, maintenance and repair of motorcycles and related parts and accessories | 4540 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 |
| Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods | 4611 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents involved in the sale of fuels, ores, metals and industrial chemicals | 4612 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents involved in the sale of timber and building materials | 4613 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents involved in the sale of machinery, | 4614 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

| | | | | | | | | | | | | | | | | | |
|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| industrial equipment, ships and aircraft | | | | | | | | | | | | | | | | | |
| Agents involved in the sale of furniture, household goods, hardware and ironmongery | 4615 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents involved in the sale of textiles, clothing, fur, footwear and leather goods | 4616 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents involved in the sale of food, beverages and tobacco | 4617 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents specialised in the sale of other particular products | 4618 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Agents involved in the sale of a variety of goods | 4619 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of grain, unmanufactured tobacco, seeds and animal feeds | 4621 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of flowers and plants | 4622 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of live animals | 4623 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of hides, skins and leather | 4624 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of fruit and vegetables | 4631 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of meat and meat products | 4632 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of dairy products, eggs and edible oils and fats | 4633 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of beverages | 4634 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

| | | | | | | | | | | | | | | | | | |
|--|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wholesale of tobacco products | 4635 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of sugar and chocolate and sugar confectionery | 4636 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of coffee, tea, cocoa and spices | 4637 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of other food, including fish, crustaceans and molluscs | 4638 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Non-specialised wholesale of food, beverages and tobacco | 4639 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of textiles | 4641 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of clothing and footwear | 4642 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of electrical household appliances | 4643 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of china and glassware and cleaning materials | 4644 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of perfume and cosmetics | 4645 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of pharmaceutical goods | 4646 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of furniture, carpets and lighting equipment | 4647 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of watches and jewellery | 4648 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of other household goods | 4649 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of computers, computer peripheral equipment and software | 4651 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

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|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wholesale of electronic and telecommunications equipment and parts | 4652 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of agricultural machinery, equipment and supplies | 4661 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of machine tools | 4662 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of mining, construction and civil engineering machinery | 4663 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of machinery for the textile industry and of sewing and knitting machines | 4664 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of office furniture | 4665 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of other office machinery and equipment | 4666 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of other machinery and equipment | 4669 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of solid, liquid and gaseous fuels and related products | 4671 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Wholesale of metals and metal ores | 4672 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of wood, construction materials and sanitary equipment | 4673 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of hardware, plumbing and heating equipment and supplies | 4674 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of chemical products | 4675 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Wholesale of other intermediate products | 4676 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |

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|--|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Wholesale of waste and scrap | 4677 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Non-specialised wholesale trade | 4690 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Retail sale in non-specialised stores with food, beverages or tobacco predominating | 4711 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Other retail sale in non-specialised stores | 4719 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of fruit and vegetables in specialised stores | 4721 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of meat and meat products in specialised stores | 4722 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of fish, crustaceans and molluscs in specialised stores | 4723 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores | 4724 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of beverages in specialised stores | 4725 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of tobacco products in specialised stores | 4726 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Other retail sale of food in specialised stores | 4729 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of automotive fuel in specialised stores | 4730 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of computers, peripheral units and software in specialised stores | 4741 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

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|---|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail sale of telecommunications equipment in specialised stores | 4742 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of audio and video equipment in specialised stores | 4743 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of textiles in specialised stores | 4751 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of hardware, paints and glass in specialised stores | 4752 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of carpets, rugs, wall and floor coverings in specialised stores | 4753 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of electrical household appliances in specialised stores | 4754 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of furniture, lighting equipment and other household articles in specialised stores | 4759 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of books in specialised stores | 4761 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of newspapers and stationery in specialised stores | 4762 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of music and video recordings in specialised stores | 4763 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of sporting equipment in specialised stores | 4764 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of games and toys in specialised stores | 4765 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

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|--|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Retail sale of clothing in specialised stores | 4771 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of footwear and leather goods in specialised stores | 4772 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Dispensing chemist in specialised stores | 4773 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 5 | 5 | 5 | 5 |
| Retail sale of medical and orthopaedic goods in specialised stores | 4774 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of cosmetic and toilet articles in specialised stores | 4775 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores | 4776 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of watches and jewellery in specialised stores | 4777 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Other retail sale of new goods in specialised stores | 4778 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale of second-hand goods in stores | 4779 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale via stalls and markets of food, beverages and tobacco products | 4781 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale via stalls and markets of textiles, clothing and footwear | 4782 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale via stalls and markets of other goods | 4789 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Retail sale via mail order houses or via Internet | 4791 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

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|--|------|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|
| Other retail sale not in stores, stalls or markets | 4799 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Taxi operation | 4932 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 13 | 13 | 13 | 13 |
| Postal activities under universal service obligation | 5310 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 |
| Other postal and courier activities | 5320 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 |
| Restaurants and mobile food service activities | 5610 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 |
| Event catering activities | 5621 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 |
| Other food service activities | 5629 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 |
| Beverage serving activities | 5630 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 5 | 5 | 5 | 6 | 6 | 6 | 6 | 6 |
| Real estate agencies | 6831 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 | 4 |
| Legal activities | 6910 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 17 | 21 |
| Accounting, bookkeeping and auditing activities; tax consultancy | 6920 | 0 | 2 | 2 | 2 | 2 | 2 | 5 | 5 | 5 | 5 | 11 | 19 | 20 | 20 | 21 | 25 |
| Architectural activities | 7111 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 | 13 | 13 | 15 | 16 | 20 | 23 | 23 | 23 |
| Engineering activities and related technical consultancy | 7112 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 | 12 | 12 | 14 | 22 | 29 | 32 | 32 | 36 |
| Veterinary activities | 7500 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 4 | 4 | 4 | 4 | 4 |
| Activities of employment placement agencies | 7810 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 2 |
| Travel agency activities | 7911 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 9 | 11 | 11 | 11 |
| Private security activities | 8010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 | 4 |
| Investigation activities | 8030 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 |
| Driving school activities | 8553 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 6 | 6 | 6 | 6 | 7 | 7 |
| Hospital activities | 8610 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 |
| General medical practice activities | 8621 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 5 | 5 | 5 | 5 |

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|--|------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Specialist medical practice activities | 8622 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 5 | 5 | 5 | 5 |
| Dental practice activities | 8623 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 2 | 2 | 2 | 4 | 4 | 4 | 4 |
| Other human health activities | 8690 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 3 | 3 | 3 | 3 |
| Operation of arts facilities | 9004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Library and archives activities | 9101 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| Museums activities | 9102 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Operation of sports facilities | 9311 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Activities of sport clubs | 9312 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Fitness facilities | 9313 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Other sports activities | 9319 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| Funeral and related activities | 9603 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 |

Notes: NACE refers to NACE Rev. 2.

Appendix B

Table B1: Variable definitions, key outcomes

| Variable | Definition |
|--|---|
| Sectoral totals (aggregates) | |
| Primary outcomes | |
| Employment | Total number of firm employees in the sector. |
| Labor productivity | Total sector revenue, in €, divided by total sector employment. |
| Entry rate | The number of new firms in the sector in a given year, divided by total number of firms in the sector in the previous year. |
| Profit margin | The ratio of the difference between total sector revenue and material costs and wage bill to total sector revenue. |
| Further outcomes | |
| Revenue | Total sector revenue (sales), in €. |
| Wage bill | Total sector wage bill, in €. |
| Material costs | Total sector material costs, in €. |
| Exports | Total sector exports, in €. |
| Imports | Total sector imports, in €. |
| Exit rate | The number of firm exits in the sector in a given year, divided by total number of firms in the sector in the previous year. |
| Churn rate | Sum of entry rate and exit rate. |
| Sectoral percentiles | |
| Primary outcomes | |
| Employees p^{th} pctl. | Number of firm employees for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Labor productivity p^{th} pctl. | The ratio of revenue (in €) to employment for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Profit margin p^{th} pctl. | The ratio of the difference between revenue and material costs and wage bill to revenue for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Further outcomes | |
| Revenue p^{th} pctl. | Revenue (sales, in €) for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Wage bill p^{th} pctl. | Wage bill (in €) for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Material costs p^{th} pctl. | Material costs (in €) for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Exports p^{th} pctl. | Exports (in €) for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Imports p^{th} pctl. | Imports (in €) for the firm that is, based on this variable, in the p^{th} percentile of firms in the sector. |
| Deregulation treatment | |
| Deregulation level | The stock of deregulation measures applicable to a given sector in a given year. |

Note: All variables are defined for a sector in a given year.

Table B2: Variable definitions, other sectoral characteristics as listed in Tables 2 and 8

| Variable | Definition |
|----------------------------------|---|
| Other pre-reform characteristics | |
| Revenue growth | Growth in total sector revenue in the last pre-reform year relative to the prior year. |
| Services | Dummy equal to 1 if sector is classified by NACE as a services sector. |
| Capital intensity | Ratio of net fixed assets for all firms in the sector to total assets of all firms in the sector. |
| R&D intensity | Ratio of total sector expenditures on research and development to total sector revenue. |
| Intangible assets intensity | Ratio of total sector intangible assets to total sectoral revenue. |
| SOE intensity | Ratio of total revenue of all state-owned enterprises in the sector to total sector revenue. |
| Herfindahl-Hirschman index | Sum of the squares of the market shares of firms in the sector. |
| Revenue top 3 firms | Joint revenue of the top 3 firms in the sector based on revenue. |
| Profit margin top 3 firms | The ratio of the difference between joint revenue and joint material costs and wage bill to joint revenue of top 3 firms based on profit margin. |
| Pre-reform regulation level | |
| High regulation level | Dummy equal to 1 if sector entails high level of regulation prior to the deregulation reform. An expert-based measure provided by the Ministry of Economy and Sustainable Development. |
| Reform features | |
| Many measures | Dummy equal to 1 if the sector was during the observed period subject to an above-median number of deregulation measures. |
| Strong measures | Dummy equal to 1 if at least one deregulation measure applicable to the sector is deemed strong, as defined by an expert opinion provided by the Ministry of Economy and Sustainable Development. |

Notes: All pre-reform characteristics are defined for the last year before the start of the deregulation reform.

Appendix C

This appendix demonstrates that specification (1) is directly implied by a specification where sectoral outcome y_{st} is related to the (lagged) number of regulation measures applicable to sector s . A cross-sectional, cross-country variant of specification of this kind is estimated, for example, in Djankov et al. (2002).

To elucidate this point, consider the following model:

$$y_{st} = \alpha + \tilde{\beta} \times R_{s,t-1} + \tilde{\mu}_s + \mu_s t + \gamma_t + \varepsilon_{st}, \quad (C1)$$

where $R_{s,t-1}$ is the level of regulation, as measured by the number of regulation measures, applicable to sector s at $t - 1$. Then, if no additional regulation measures are promulgated after $t = 0$, as is the case in our setting,

$$R_{s,t-1} = R_{s,0} - D_{s,t-1}, \quad (C2)$$

where $R_{s,0}$ is the level of regulation, as measured by the number of regulation measures, applicable to sector s at the end of $t = 0$ and $D_{s,t-1}$ is the level of deregulation as captured by the cumulative number of deregulation measures applicable to sector s at the end of year $t - 1$ (see expression (1)).

Substituting (C2) into (C1) and collecting terms yields expression (1), where

$$\beta = -\tilde{\beta} \quad (C3)$$

$$\mu_s = \tilde{\mu}_s + \tilde{\beta} \times R_{s,0}. \quad (C4)$$

Thus, as noted in Section 5.1, from (C3), the focal coefficient β in model (1) equals the negative of the effect of the (lagged) level of regulation, $R_{s,t-1}$.

Appendix D

Table D1: Sectors and intended effect (IE) of deregulation

| NACE | Sector name | DE |
|------|--|-----|
| 3514 | Trade of electricity | No |
| 3523 | Trade of gas through mains | Yes |
| 4110 | Development of building projects | Yes |
| 4120 | Construction of residential and non-residential buildings | No |
| 4211 | Construction of roads and motorways | No |
| 4212 | Construction of railways and underground railways | No |
| 4213 | Construction of bridges and tunnels | No |
| 4221 | Construction of utility projects for fluids | No |
| 4222 | Construction of utility projects for electricity and telecommunications | No |
| 4291 | Construction of water projects | No |
| 4299 | Construction of other civil engineering projects n.e.c. | No |
| 4311 | Demolition | No |
| 4312 | Site preparation | Yes |
| 4313 | Test drilling and boring | Yes |
| 4321 | Electrical installation | No |
| 4322 | Plumbing, heat and air conditioning installation | No |
| 4329 | Other construction installation | Yes |
| 4331 | Plastering | Yes |
| 4332 | Joinery installation | No |
| 4333 | Floor and wall covering | Yes |
| 4334 | Painting and glazing | Yes |
| 4339 | Other building completion and finishing | No |
| 4391 | Roofing activities | No |
| 4399 | Other specialised construction activities n.e.c. | No |
| 4511 | Sale of cars and light motor vehicles | No |
| 4519 | Sale of other motor vehicles | Yes |
| 4531 | Wholesale trade of motor vehicle parts and accessories | No |
| 4532 | Retail trade of motor vehicle parts and accessories | No |
| 4540 | Sale, maintenance and repair of motorcycles and related parts and accessories | No |
| 4611 | Agents involved in the sale of agricultural raw materials, live animals, textile raw materials and semi-finished goods | Yes |
| 4612 | Agents involved in the sale of fuels, ores, metals and industrial chemicals | No |
| 4613 | Agents involved in the sale of timber and building materials | No |
| 4614 | Agents involved in the sale of machinery, industrial equipment, ships and aircraft | No |
| 4615 | Agents involved in the sale of furniture, household goods, hardware and ironmongery | No |
| 4616 | Agents involved in the sale of textiles, clothing, fur, footwear and leather goods | No |
| 4617 | Agents involved in the sale of food, beverages and tobacco | Yes |
| 4618 | Agents specialised in the sale of other particular products | No |
| 4619 | Agents involved in the sale of a variety of goods | No |
| 4621 | Wholesale of grain, unmanufactured tobacco, seeds and animal feeds | No |

| | | |
|------|---|-----|
| 4622 | Wholesale of flowers and plants | No |
| 4623 | Wholesale of live animals | Yes |
| 4624 | Wholesale of hides, skins and leather | Yes |
| 4631 | Wholesale of fruit and vegetables | No |
| 4632 | Wholesale of meat and meat products | No |
| 4633 | Wholesale of dairy products, eggs and edible oils and fats | Yes |
| 4634 | Wholesale of beverages | No |
| 4635 | Wholesale of tobacco products | No |
| 4636 | Wholesale of sugar and chocolate and sugar confectionery | No |
| 4637 | Wholesale of coffee, tea, cocoa and spices | No |
| 4638 | Wholesale of other food, including fish, crustaceans and molluscs | No |
| 4639 | Non-specialised wholesale of food, beverages and tobacco | No |
| 4641 | Wholesale of textiles | No |
| 4642 | Wholesale of clothing and footwear | No |
| 4643 | Wholesale of electrical household appliances | No |
| 4644 | Wholesale of china and glassware and cleaning materials | No |
| 4645 | Wholesale of perfume and cosmetics | No |
| 4646 | Wholesale of pharmaceutical goods | No |
| 4647 | Wholesale of furniture, carpets and lighting equipment | No |
| 4648 | Wholesale of watches and jewellery | No |
| 4649 | Wholesale of other household goods | No |
| 4651 | Wholesale of computers, computer peripheral equipment and software | No |
| 4652 | Wholesale of electronic and telecommunications equipment and parts | No |
| 4661 | Wholesale of agricultural machinery, equipment and supplies | Yes |
| 4662 | Wholesale of machine tools | No |
| 4663 | Wholesale of mining, construction and civil engineering machinery | No |
| 4664 | Wholesale of machinery for the textile industry and of sewing and knitting machines | Yes |
| 4665 | Wholesale of office furniture | No |
| 4666 | Wholesale of other office machinery and equipment | No |
| 4669 | Wholesale of other machinery and equipment | No |
| 4671 | Wholesale of solid, liquid and gaseous fuels and related products | No |
| 4672 | Wholesale of metals and metal ores | No |
| 4673 | Wholesale of wood, construction materials and sanitary equipment | No |
| 4674 | Wholesale of hardware, plumbing and heating equipment and supplies | No |
| 4675 | Wholesale of chemical products | No |
| 4676 | Wholesale of other intermediate products | No |
| 4677 | Wholesale of waste and scrap | No |
| 4690 | Non-specialised wholesale trade | No |
| 4711 | Retail sale in non-specialised stores with food, beverages or tobacco predominating | No |
| 4719 | Other retail sale in non-specialised stores | No |
| 4721 | Retail sale of fruit and vegetables in specialised stores | No |
| 4722 | Retail sale of meat and meat products in specialised stores | No |
| 4723 | Retail sale of fish, crustaceans and molluscs in specialised stores | No |

| | | |
|------|--|-----|
| 4724 | Retail sale of bread, cakes, flour confectionery and sugar confectionery in specialised stores | No |
| 4725 | Retail sale of beverages in specialised stores | No |
| 4726 | Retail sale of tobacco products in specialised stores | No |
| 4729 | Other retail sale of food in specialised stores | Yes |
| 4730 | Retail sale of automotive fuel in specialised stores | Yes |
| 4741 | Retail sale of computers, peripheral units and software in specialised stores | No |
| 4742 | Retail sale of telecommunications equipment in specialised stores | No |
| 4743 | Retail sale of audio and video equipment in specialised stores | No |
| 4751 | Retail sale of textiles in specialised stores | Yes |
| 4752 | Retail sale of hardware, paints and glass in specialised stores | No |
| 4753 | Retail sale of carpets, rugs, wall and floor coverings in specialised stores | Yes |
| 4754 | Retail sale of electrical household appliances in specialised stores | Yes |
| 4759 | Retail sale of furniture, lighting equipment and other household articles in specialised stores | No |
| 4761 | Retail sale of books in specialised stores | No |
| 4762 | Retail sale of newspapers and stationery in specialised stores | No |
| 4763 | Retail sale of music and video recordings in specialised stores | Yes |
| 4764 | Retail sale of sporting equipment in specialised stores | No |
| 4765 | Retail sale of games and toys in specialised stores | Yes |
| 4771 | Retail sale of clothing in specialised stores | Yes |
| 4772 | Retail sale of footwear and leather goods in specialised stores | Yes |
| 4773 | Dispensing chemist in specialised stores | No |
| 4774 | Retail sale of medical and orthopaedic goods in specialised stores | No |
| 4775 | Retail sale of cosmetic and toilet articles in specialised stores | No |
| 4776 | Retail sale of flowers, plants, seeds, fertilisers, pet animals and pet food in specialised stores | No |
| 4777 | Retail sale of watches and jewellery in specialised stores | No |
| 4778 | Other retail sale of new goods in specialised stores | No |
| 4779 | Retail sale of second-hand goods in stores | No |
| 4781 | Retail sale via stalls and markets of food, beverages and tobacco products | Yes |
| 4782 | Retail sale via stalls and markets of textiles, clothing and footwear | Yes |
| 4789 | Retail sale via stalls and markets of other goods | No |
| 4791 | Retail sale via mail order houses or via Internet | Yes |
| 4799 | Other retail sale not in stores, stalls or markets | No |
| 4932 | Taxi operation | Yes |
| 5310 | Postal activities under universal service obligation | No |
| 5320 | Other postal and courier activities | Yes |
| 5610 | Restaurants and mobile food service activities | No |
| 5621 | Event catering activities | No |
| 5629 | Other food service activities | No |
| 5630 | Beverage serving activities | Yes |
| 6831 | Real estate agencies | No |
| 6910 | Legal activities | No |
| 6920 | Accounting, bookkeeping and auditing activities; tax consultancy | No |
| 7111 | Architectural activities | No |

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|------|--|-----|
| 7112 | Engineering activities and related technical consultancy | No |
| 7500 | Veterinary activities | No |
| 7810 | Activities of employment placement agencies | No |
| 7911 | Travel agency activities | No |
| 8010 | Private security activities | No |
| 8030 | Investigation activities | Yes |
| 8553 | Driving school activities | No |
| 8610 | Hospital activities | Yes |
| 8621 | General medical practice activities | No |
| 8622 | Specialist medical practice activities | Yes |
| 8623 | Dental practice activities | No |
| 8690 | Other human health activities | No |
| 9004 | Operation of arts facilities | No |
| 9101 | Library and archives activities | No |
| 9102 | Museums activities | Yes |
| 9311 | Operation of sports facilities | No |
| 9312 | Activities of sport clubs | No |
| 9313 | Fitness facilities | Yes |
| 9319 | Other sports activities | Yes |
| 9603 | Funeral and related activities | No |

Notes: For each sector (row), the column DE indicates whether the deregulation measures exhibit the intended effect (Yes) or not (No) on that sector. The deregulation measures are said to exhibit the ‘intended effect’ on a given sector if they exert at least two out of the following four statistically significant effects on that sector after applying the FDR correction (see Section 7.1): increase in (log) employment, increase in labor productivity, decreases in profit margin, and increase in entry rate. NACE refers to NACE Rev. 2.