ADEMU
A Dynamic Economic and Monetary Union

ADEMU WORKING PAPER SERIES

Is deregulation of product and labour markets promoting employment and productivity? A difference-in-differences approach

Hugo Correia[†]

Ana Fontoura Gouveia[‡]

October 2017

WP 2017/073
www.ademu-project.eu/publications/working-papers

Abstract

This paper examines the impact of labour and product market reforms on sectoral employment and productivity, following a difference-in-differences approach. Using industry-level data for the period 1997-2013, we show that employment protection deregulation has a positive effect on sectoral employment for industries more exposed to labour market legislation, despite having a non-positive impact on productivity. Upstream product market deregulation also increases sectoral employment for the downstream sectors more dependent on upstream inputs. Nevertheless, it has mixed effects on sectoral productivity: while upstream sectors face productivity losses, the downstream sectors more exposed to the deregulated sectors grasp productivity gains.

JEL Classification: C23; E23; E24; J23; L16; O47

Keywords: Labour Market Reforms; Product Market Reforms; Employment; Productivity.

[†] Nova School of Business and Economics

[‡] Corresponding author, GPEARI/Ministry of Finance and Nova SBE. ana.gouveia@gpeari.minfinancas.pt

Horizon 2020
The Framework Programme for Research and Innovation

Acknowledgments

The author would like to acknowledge the support of the ADEMU project, "A Dynamic Economic and Monetary Union. This project is related to the research agenda of the ADEMU project, “A Dynamic Economic and Monetary Union". ADEMU is funded by the European Union's Horizon 2020 Program under grant agreement N° 649396 (ADEMU).

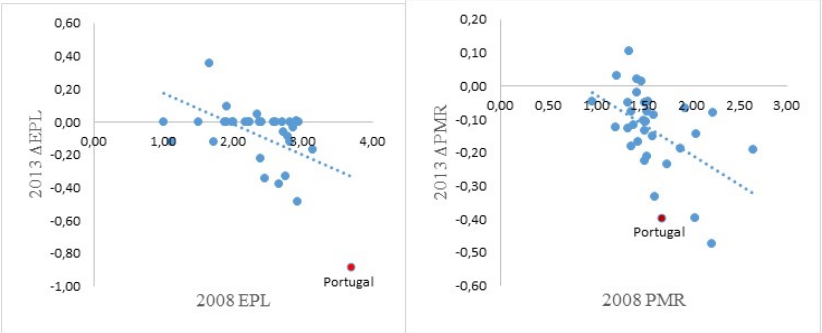
The opinions expressed are those of the authors and not necessarily of the institutions. The authors are indebted to Susana Peralta (Nova SBE) for the lengthy discussions and detailed comments on earlier versions of the draft. The comments of Alexander Coutts (Nova SBE), Ana Filipa Fernandes, Tiago Martins and José Azevedo Pereira (all GPEARI – Ministry of Finance), Pedro Portugal (Banco de Portugal/Nova SBE), Teresa Molina (Nova SBE) and the participants of the 2nd Lisbon Conference on Structural Reforms (6 July 2017) are also grateful acknowledged. Finally, the authors thank Statistics Portugal for providing the sectoral level data and for prompt methodological assistance; and Balazs Égert (OECD) for guidance with the product market regulatory impact indicators. Any errors or omissions are the authors’ responsibility.

The ADEMU Working Paper Series is being supported by the European Commission Horizon 2020 European Union funding for Research & Innovation, grant agreement No 649396.

1. Introduction

In recent years, there has been a surge in the calls for product and labour market reforms, as a growth-promoting tool. Such reforms have been prescribed for Portugal, particularly after the sovereign debt and economic crisis and the adjustment programme that ensued (European Commission, 2014; OECD, 2014), leading the country to one of the most ambitious plan of structural reforms amongst developed countries (OECD, 2014; Koske, I. et al., 2015; see Figure 1). In the labour market, employment protection legislation reforms included cuts in severance pay; inclusion of further reasons for dismissal based on inadaptability; and performance-based criteria for dismissals in the case of extinction of the work position (OECD, 2017). The product market has also seen significant developments with product and service markets liberalization (covering both networks and professional services), enhancement of the competition framework and improvements in the enforcement (European Commission, 2016; OECD, 2013a; 2014); in a context of further reforms, improving framework conditions (e.g. judicial system, business environment, etc.).

Figure 1 – Evolution of Employment Protection Legislation (EPL) and Upstream Product Market Regulation (PMR) in OECD countries



Source: Own calculations, based on OECD Indicators of Employment Protection Legislation and OECD Indicators of Product Market Regulation. These indicators range from 0 to 6, where a lower value reflects a more competition-friendly regulatory stance.

What are the expected impacts of these changes? To answer this question, we take advantage of sectoral level national accounts data to assess the effects of product and labour market deregulation on employment and productivity outcomes. This strategy allows us to obtain the marginal effect of regulation on the Portuguese economy, taking into account the idiosyncratic conditions of the country. This allows us to overcome the limitation of cross-country studies, where the estimated parameters are assumed to be the same throughout the panel of countries, in spite of these having different underlying economic structures.[1] Industry-level analysis also has advantages vis-à-vis (non-weighted) firm-level analysis, since the impact of a reform on the average firm does not necessarily carry over to its corresponding sector, as a whole.[2]

Following a difference-in-differences approach, we show that employment protection deregulation has a positive effect on employment for industries more exposed to labour market legislation, despite having a non-positive impact on productivity. In addition, product market deregulation in network sectors (energy, transport and communication) promotes employment growth downstream for the industries more exposed to the deregulated sectors. Concerning productivity, whilst the deregulated upstream sectors are found to suffer losses, the downstream sectors grasp productivity gains.

[1] It is worth noting the existence of a trade-off. Cross-country sectoral data necessarily increase the sample variation in opposition to exclusively considering national sectoral data.

[2] Indeed, there are a number of studies looking at the firm-level impact of structural reforms implemented in Portugal, which are particularly useful to understand heterogeneous effects across firms. See, for instance, Gouveia et al (2017a) and Monteiro et al (2017).

The paper is organized as follows: Section 2 reviews the relevant literature, Section 3 presents the methodology, and Section 4 describes the datasets and the variables used. The results are presented in Section 5 and, finally, Section 6 provides the conclusion and lays the foundations for future work.

2. Literature Review

This section reviews the quantitative evidence on the effects of product and labour market deregulation on productivity and employment.

While some studies argue that stringent labour market regulation curbs productivity (OECD, 2007; Bassanini et al., 2009; Cingano et al., 2010), others find productivity gains from employment regulation (Acharya et al., 2013; Gouveia et al., 2017a). Concerning the effect on employment, OECD (2016) provides industry-level evidence of short-run employment losses caused by easing Employment Protection Legislation (EPL), which are then reversed in the long-run. Indeed, most authors find evidence of EPL's negative sectoral effect on employment, namely in labour intensive industries (Ahsan and Pagés, 2009) and in industries that have high job reallocation rates, particularly due to a reduction in the net entry of firms (Pagés and Micco, 2007). There are also cross-country studies, with aggregate-level data, establishing a link between regulation and higher unemployment (Scarpetta, 1996; La Porta et al., 2004).

Turning to the product market, upstream product market deregulation has been found to foster aggregate and sectoral-level long-run employment for those downstream industries more dependent on the intermediate inputs provided by upstream sectors (OECD, 2016). This effect is explained by a competition channel which decreases downstream input prices, increases its quality, and eliminates the regulatory-induced competitive disadvantage of downstream sectors when negotiating contracts and prices with upstream ones (Bourlès et al., 2010). Product market deregulation has also been linked with positive aggregate employment effects that strengthen over time (Fiori et al., 2012). Bassanini (2015) finds evidence of reversible employment short-run losses in upstream sectors, mainly through downsizing.

On the impact of product market regulation on productivity, several papers establish a positive link between pro-competitive upstream product market reforms and downstream productivity, using both firm-level (Arnold et al., 2011; Forlani, 2012; Gal and Hijzen, 2016; Topalova and Lanau, 2016) and sectoral-level data (Bourlès et. al., 2010, 2013; Barone and Cingano, 2011). On the contrary, Amable et al. (2016) argue that deregulation curbs innovation in upstream sectors, which trickles down to downstream sectors, hindering productivity growth. Also, there is evidence of important heterogeneous effects across firms. Indeed, while some authors argue that reforms have greater returns the closer an economy is to the technological frontier (Arnold et al., 2008; Acemoglu et al., 2003, 2006; Vandenbussche et al., 2006), others show that gains increase with the distance to the frontier (Nicoletti and Scarpetta, 2003; Gouveia et al., 2017a; Gouveia et al, 2017b). Bourlès et al., (2013) also find evidence of heterogeneous effects, showing that deregulation boosts the returns to innovation for the most productive firms but reduces the innovation incentives for the least productive. This heterogeneity renders a sectoral assessment particularly relevant.

3. Methodology

Our baseline regression evaluates the effect of product and labour market regulatory indicators on two outcomes – employment and productivity – by comparing industries with different exposures to regulation. The fundamental reasoning behind this specification is that the intrinsic nature of an industry makes it more or less affected by regulation. In other words, the degree whereby a sector is exposed to regulation determines how binding regulation is for that sector, thus allowing us to perform a difference-in-differences analysis.

Following the literature, we consider that sectors with higher layoffs are more exposed to labour market regulation (e.g. Bassanini et al., 2009), while those that are more dependent on upstream-sector inputs are more exposed to product market regulation (e.g. Bourlès et. al., 2010).

We thus implement the difference-in-differences specification of Bassanini et al. (2009), who specify the expected pairwise-difference between any two sectors (k and h) as:

$$E\left(\Delta \log \text{Outcome}_{k,t} - \Delta \log \text{Outcome}_{h,t}\right) = (f(\text{Exp}_k) - f(\text{Exp}_h))g(\text{Reg}_{t-1}, \Delta\text{Reg}_t) \quad [1]$$

where f(.) is a non-negative and non-decreasing function.

Letting g(.) be linear, and f(.) the identity function, we can re-write [1] as:

$$E\left(\Delta \log \text{Outcome}_{k,t}\right) - E\left(\Delta \log \text{Outcome}_{h,t}\right) = \beta\text{Reg}_{t-1}(\text{Exp}_k - \text{Exp}_h) + \delta\Delta\text{Reg}_t(\text{Exp}_k - \text{Exp}_h) + (\gamma_k - \gamma_h) \quad [2]$$

Hence, for industry j, the expected growth of the outcome variable can be expressed as:

$$E(\Delta\text{Outcome}_{j,t}) = \beta\text{Exp}_j \text{Reg}_{t-1} + \delta\text{Exp}_j \Delta\text{Reg}_t + \gamma_j + \mu_t \quad [3]$$

, where μ_t captures sector-invariant effects. In this setting, our baseline regression can be written as:

$$\Delta\text{Outcome}_{j,t} = \beta\text{Exp}_j \text{Reg}_{t-1} + \delta\text{Exp}_j \Delta\text{Reg}_t + \theta_j + \theta_t + \varepsilon_{jt} \quad [4]$$

where $\text{Outcome}_{j,t}$ stands for productivity or employment variables of industry j in year t (depending on the specification), Exp_j denotes the exposure to the regulatory variable for industry j, and Reg_t stands for product or labour market regulation at time t (depending on the specification). Furthermore, θ_j and θ_t are industry and time fixed effects, respectively.

The intuition for the difference-in-differences approach can be easily seen by focusing on a particular case of equation [4], whereby the treatment is defined by an indicator variable which identifies industries as being entirely regulation-binding (treatment group), if their exposure is greater than a certain threshold.[3] In this binary setting (as opposed to our continuous one), the estimated coefficients provide us with the difference between treatment and control groups. In the continuous case we follow, β and δ give us the impact of "treatment" intensity. Indeed, as pointed out by Bassanini et al., (2009), it is more plausible that the extent to which an industry is affected by regulation depends on a continuous variable (such as our exposure variable).

In equation [4], β measures the growth-effect, i.e. the permanent impact of the regulatory variable on the growth rate of the outcome variable while δ captures the level-effect i.e. the permanent level-impact of deregulation. Nevertheless, some level-effects may not be captured by δ if they take too much time to materialize; additionally, a level effect which only materializes in the very long-term may be taken, in our model, by a permanent growth effect.

4 Data

We use annual sectoral-level data from the Portuguese National Accounts (ESA2010), compiled by INE – *Instituto Nacional de Estatística* (Statistics Portugal). The time frame considered is restricted by the available regulatory indicator variables of choice – sourced from OECD - which cover the 1997-2013 period. The sectors included in the analysis are those whereby, for the relevant timeframe, a suitable matching could be performed between the 2-digit ISIC Rev.3 aggregation (followed by OECD regulatory indexes) and the 2-digit CAE Rev.3 (followed by the Portuguese National Accounts).[4] These procedures decrease the sectoral dataset from 306 to 288 observations in the employment protection analysis, and from 612 to 576, for the product market regulation case.

The outcome variables, derived from national accounts, are worked hours (HoursWorked), as a baseline for employment, with the number of employees (Employees) being used for robustness checks. The measure of productivity is labour productivity, determined by the ratio of gross value added (GVA) to worked hours (HoursWorked). Output is used instead of gross value added, for assessing the robustness of the results.

[3] See Bassanini et al (2009), Appendix 2, p.16, for a derivation of the discrete case.

[4] See Box 1 in the Appendix for a breakdown of the different sectors considered for the EPL and PMR analysis, respectively.

Turning now to the regulatory variables, the regulatory stringency of the labour market is measured through the OECD indicator of Employment Protection Legislation, a measure of the incurred costs and procedures associated with the dismissal and hiring of employees. This measure is partitioned into three sub-indicators: EPR, an index of regulatory strictness concerning individual dismissal of workers on regular contracts; EPT, which measures the degree of regulation for temporary contracts; and EPRC, comprising a weighted sum of both individual and collective dismissal sub-indicators.[5] These regulatory indicators range from 0 (no regulation) to 6 (maximum stringency). We follow Bassanini et al. (2009) and Jain-Chandra and Zhang (2014), and use the layoff rate for the United States for the period 2001-03 as a measure of exposure to labour market regulation. These rates were computed by Bassanini et al. (2009) and are based on the 2004 Displaced Workers Supplement data. The rationale is that industries which are more prone to adjust to shocks in demand and supply through layoffs are more affected by regulation governing layoffs. The US is the OECD country with the lowest level of employment protection legislation, thus serving as a de facto proxy that captures any given industry's "natural" layoff rate in the absence of regulation. By using the US layoff rate, we avoid endogeneity issues related with using the Portuguese layoff rate, as this national value could be determined by the prevailing level of regulation in the labour market.

For the effects of upstream product market deregulation on downstream industries, we rely on the regulatory impact indicator (Regimpact), computed by the OECD.[6] This indicator, developed by Égert and Wanner (2016) building on Conway and Nicoletti (2006), follows the same methodological approach just described for the labour market: it incorporates the OECD regulatory indices for network sectors (ranging from 0 to 6, where 6 is maximum regulation), which are then weighted by an industry-specific exposure variable. The exposure variable is computed using the input-output matrices, ascertaining the relevance of upstream sector industries on the input usage of the different sectors (relying on the inverse of the Leontief matrix, kept constant for the entire period). The intuition is that a sector which uses a higher amount of inputs from the upstream industries is more vulnerable to regulation in those sectors. Similarly to the layoff rate, and following the identification strategy of Rajan and Zingales (1998), we rely on the input-output data from the correspondent US industry, to avoid endogeneity issues.

Table 1 presents the descriptive statistics for the variables used in the different specifications.

Table 1 – Descriptive Statistics

Variables - PMR (612 Observations)	Unit	Mean	Std Dev	Min.	Max.
Narrow Indicator (US)	unit	0.58	1.00	0.11	6.53
Wide Indicator (US)	unit	1.25	1.23	0.23	6.76
Gross Value Added	10^6 €	4,160.00	4,832.00	191.00	22,220.00
Total Output	10^6 €	9,008.00	8,513.00	311.00	43,830.00
Hours Worked	10^6	204.00	255.00	3.00	1,313.00
Employees	10^3	133.00	169.00	2.00	757.00
Variables - EPL (306 Observations)	**Unit**	**Mean**	**Std Dev**	**Min.**	**Max.**
US Layoff Rate	unit	5.18	1.35	2.83	8.12
EPR - Regular Contracts	unit	4.33	0.38	3.18	4.58
EPT - Temporary Contracts	unit	2.44	0.40	1.81	2.81
EPRC - Individual and Collective Dismissals	unit	3.79	0.39	2.81	4.10
Gross Value Added	10^6 €	3,946.0	5,019.0	191.0	22,220.0
Total Output	10^6 €	10,814.0	10,287.0	651.0	43,830.0
Hours Worked	10^6	242.00	313.00	3.00	1,313.00
Employees	10^3	140.00	184.00	2.00	757.00

Source: Own computations using Statistics Portugal (INE), OECD data (both ranging from 1997-2013) and Displaced Workers Supplement data (2004).

[5] EPRC attributes a weight of 2/7 for additional provisions for collective dismissals and 5/7 to individual dismissals (regular contracts). For additional details on these indicators please refer to chapter 2 of OECD (2013d).

[6] A wider version including also retail distribution and professional services is also used for robustness checks. However, given that only the networks regulatory indices have an annual frequency (the others are available every 4 years), the narrow version only covering networks is better suited for time series analysis. For additional details please refer to Égert and Wanner (2016).

5. Empirical Results

This section presents the estimation results for specification [4], adapting it in accordance with the outcomes and regulatory indicators of choice.

Labour Market Regulation

The results, presented in Table 2, provide evidence of a negative link between employment protection legislation and the number of hours worked, in industries that are "naturally" more affected by such legislation. A likely explanation is that industries more prone to adjust to market shocks through hirings and layoffs have a higher latent labour demand than the one displayed under tight regulation. Therefore, if regulation hinders their ability to adjust, they are cautious to hire due to uncertainty, implying less efficient production outcomes, as they are less responsive to market changes. With deregulatory reform, these sectors are able to increase net hirings, with net benefits arising from increased flexibility. The result is robust to the usage of the variation in the number of employees as a measure of employment growth and is visible for all three measures of employment regulation. Concerning the effects on productivity, the results presented in Table 3 suggest a non-positive response of productivity to a reduction of employment protection. Indeed, results are, in general, non-significant,; there are only two significant effects, for the indicators of temporary contracts (EPT) and of stringency ruling individual and collective dismissals (EPRC) – supporting the result of losses from deregulation, but that fail to be robust to changes in the outcome variable of labour productivity.

Table 2 – Impact of Employment Protection Legislation on Sector-Level Employment

Variables	ΔHoursWorked	ΔEmployees	ΔHoursWorked	ΔEmployees	ΔHoursWorked	ΔEmployees
EPR_{t-1}	-0.02**	-0.02**	-	-	-	-
ΔEPR	-0.01	0.00	-	-	-	-
EPT_{t-1}	-	-	-0.02**	-0.01**	-	-
ΔEPT	-	-	-0.01	-0.01	-	-
$EPRC_{t-1}$	-	-	-	-	-0.02**	-0.02**
ΔEPRC	-	-	-	-	-0.01	-0.01
Time Fixed Effects	YES	YES	YES	YES	YES	YES
N	288	288	288	288	270	270
Overall R^2	5%	5%	9%	10%	5%	6%

Notes: Variations in the number of observations are due to data availability. Results were estimated using robust standard errors. ***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Own computations, using INE and OECD data for the years 1997-2013

Table 3 – Impact of Employment Protection Legislation on Sector-Level Productivity

Variable	Δ LP = GVA/Employees	Δ LP = Output/Employees	Δ LP = GVA/Employees	Δ LP = Output/Employees	Δ LP = GVA/Employees	Δ LP = Output/Employees
EPR_{t-1}	0.06	0.02	-	-	-	-
ΔEPR	-0.04	0.01	-	-	-	-
EPT_{t-1}	-	-	0.02	0.02**	-	-
ΔEPT	-	-	-0.00	0.00	-	-
$EPRC_{t-1}$	-	-	-	-	0.05*	0.02
ΔEPRC	-	-	-	-	-0.06	0.00
Time Fixed Effects	YES	YES	YES	YES	YES	YES
N	288.00	288.00	288.00	288.00	270.00	270.00
Overall R^2	0.00	0.00	0.02	0.02	0.00	0.10

Notes: Variations in the number of observations are due to data availability. Results were estimated using robust standard errors. ***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Own computations, using INE and OECD data for the years 1997-2013.

Product Market Regulation

Competitive-enhancing reforms of network sectors are estimated to have a positive impact on employment growth for industries that depend relatively more on those upstream intermediate inputs, and are consequently more affected by upstream product market regulation (Table 4). One expects that lower upstream regulation pressures upstream sectors to reduce prices and to increase the quality of their services, via increased competition and reduced negotiation-edge vis-à-vis downstream clients, which fosters downstream growth (both at the extensive and intensive margin) and allows downstream sectors to channel resources towards further hirings. The results are robust to using the number of employees as employment variable and to the use of the wide version of the regulatory index.

The direct effect on upstream industries employment is unclear. Whilst competition may lead to a downsizing of incumbents, firm entry is promoted by deregulation. Since the regulatory impact indicator is also capturing the effect that upstream deregulation has on the upstream sectors (direct effect of deregulation), we exclude the upstream industries from our sample and re-estimate the regression, in order to exclusively capture the indirect effects of upstream deregulation (on downstream sectors). While for the case of the narrow indicator (i.e. excluding networks) there are no significant changes between the estimated coefficients, they turn out to be stronger when looking at the wide indicator (i.e. excluding networks, retail and professional services from the sample), showing that the effect on upstream sectors is necessarily lower or even negative (Table 5).[7]

Turning to the impact on productivity, we find that an upstream deregulatory process dampens labour productivity growth (Table 6). This result is robust to the usage of the wide indicator and to the usage of Output, instead of the baseline variables.

Table 7 clarifies this outcome. Indeed, we find that there are productivity gains for downstream industries, which means that productivity losses in Table 6 are driven by effects on upstream sectors, which are hampered by increased competition and lower incentives to innovation (due to reduced mark-ups). The downstream sectors are likely to see their input costs going down and to gain better access to upstream services, thus allowing them to increase the efficiency of their production process and to channel resources towards productivity-enhancing technology.

Table 4 - Impact of Upstream Product Market Regulation on Sector-Level Employment

Variable	ΔHoursWorked	ΔEmployees	ΔHoursWorked	ΔEmployees
Regimpact$_{t-1}$ (narrow)	-0.01***	-0.01***	-	-
ΔRegimpact(narrow)	-0.02	-0.01	-	-
Regimpact$_{t-1}$ (wide)	-	-	-0.01***	-0.01***
ΔRegimpact(wide)	-	-	-0.01	-0.01
Time Fixed Effects	YES	YES	YES	YES
N	576	576	576	576
Overall R^2	11%	10%	7%	6%

Notes: Results were estimated using robust standard errors. ***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Own computations, using INE and OECD data for the years 1997-2013.

[7] Please note that due to reduced number of upstream sectors, a regression cannot be performed solely for those sectors. Our analysis shows that the effects on upstream sectors are lower than in downstream but nothing can be said about the sign: the effect may still be positive (but lower than in downstream industries) or it can be negative.

Table 5 - Impact of Upstream Product Market Regulation on Downstream Sector-Level Employment

Variable	ΔHoursWorked	ΔEmployees	ΔHoursWorked	ΔEmployees
$Regimpact_{t-1}$ (narrow)	-0.01***	-0.01***	-	-
ΔRegimpact(narrow)	-0.01	-0.01	-	-
$Regimpact_{t-1}$ (wide)	-	-	-0.02	-0.05**
ΔRegimpact(wide)	-	-	-0.07**	-0.08**
Time Fixed Effects	YES	YES	YES	YES
N	560	560	496	496
Overall R^2	10%	9%	11%	6%

Notes: Variations in the number of observations are due to data availability. Results were estimated using robust standard errors. ***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Own computations, using INE and OECD data for the years 1997-2013.

Table 6 - Impact of Upstream Product Market Regulation on Sector-Level Productivity

Variable	Δ LP = GVA/HoursWorked	Δ LP = Output/HoursWorked	Δ LP = GVA/HoursWorked	Δ LP = Output/HoursWorked
$Regimpact_{t-1}$ (narrow)	0.02**	0.02*	-	-
ΔRegimpact(narrow)	0.03	-0.01	-	-
$Regimpact_{t-1}$ (wide)	-	-	0.02**	0.02***
ΔRegimpact(wide)	-	-	0.00	-0.01
Time Fixed Effects	YES	YES	YES	YES
N	576	576	576	576
Overall R^2	2%	15%	2%	11%

Notes: Results were estimated using robust standard errors. ***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Own computations, using INE and OECD data for the years 1997-2013.

Table 7 - Impact of Upstream Product Market Regulation on Downstream Sector-Level Productivity

Variable	Δ LP = GVA/HoursWorked	Δ LP = Output/HoursWorked	Δ LP = GVA/HoursWorked	Δ LP = Output/HoursWorked
$Regimpact_{t-1}$ (narrow)	0.02	-0.00	-	-
ΔRegimpact(narrow)	-0.07*	-0.10***	-	-
$Regimpact_{t-1}$ (wide)	-	-	-0.07***	-0.03*
ΔRegimpact(wide)	-	-	-0.03	-0.01
Time Fixed Effects	YES	YES	YES	YES
N	560	560	496	496
Overall R^2	3%	16%	1%	13%

Notes: Results were estimated using robust standard errors. ***: significant at 1% level; **: significant at 5% level; *: significant at 10% level.

Source: Own computations, using INE and OECD data for the years 1997-2013.

6. Conclusion

Recent years have seen a surge in the demand for product and labour market deregulation alike. Portugal has been in the forefront of this matter, having undertaken an ambitious reform programme, in the midst of sluggish economic growth and persistent economic imbalances. Empirical evidence on the aggregate sectoral impact of structural reforms, taking into account the specificities of the Portuguese economy, is therefore vital from a policy maker's standpoint, in order to sharpen the design and implementation of such reforms and to complement the existing firm-level and cross-country evidence. Furthermore, literature shows that information is crucial for the ownership of any reform process (Boeri and Tabellini, 2012; Gouveia et al., 2017b).

In this context, we use sectoral-level data for the periods 1997-2013 to evaluate the impact of labour and product market reforms on employment and productivity, following a difference-in-differences approach. Concerning labour market reforms,

and in line with the findings of OECD (2016) and Pagés and Micco (2007), our results suggest that decreasing the costs associated with hirings and dismissals fosters employment for industries more exposed to labour market regulations (proxied by the industry's layoff rate in the absence of regulation). However, as also pointed by Acharya et al. (2013), there is no evidence of a positive impact on productivity.[8]

In respect to product market reforms, upstream deregulation is found to promote employment for the sectors with relatively high degree of exposure to upstream inputs, matching the findings of OECD (2016). Additionally, our results show that downstream industries derive productivity gains from upstream product market deregulation, similarly to the findings of Barone and Cingano (2011) and Bourlès et. al., (2010; 2013). Conversely, and as argued by Amable et al. (2016), we find evidence that upstream sectors face productivity losses, possible due to reduced incentives to innovate (via reduced mark-ups).

The analysis in this paper could be enlarged in a number of ways. In particular, the analysis of employment outcomes focuses on quantity of overall employment. It would be interesting to consider the effects on full-time and part-time employment and on permanent and temporary contracts as changes in regulation may have heterogeneous effects. Also, we do not account for the impact on the quality of employment, which is also a key element for policy assessment as deregulation may induce less stable employment relations and an erosion of workers' rights, with important equity considerations. Furthermore, we do not account for interactions among reforms or for the initial regulatory stance. However, the impact of changes in regulation may be non-linear and may depend on the existing level of regulation, which is important for the sequencing and packaging of reforms. Furthermore, we consider that the effects are symmetric, i.e. that loosening and tightening regulation has a comparable effect, which is not necessarily the case.

References

Acemoglu, D.; Aghion, P. and Zilibotti, F. 2003. "Vertical integration and distance to frontier." Journal of the European Economic Association, 1(2-3): 630 -638.

Acemoglu, D.; Aghion, P. and Zilibotti, F. 2006. "Distance to frontier, selection, and economic growth." Journal of the European Economic Association, 4(1): 37-74.

Acharya, V. V; Baghai, R. P. and Subramanian, K. V. 2013. "Labor laws and innovation." The Journal of Law and Economics, 56(4): 997-1037

Ahsan, A. and Pagés, C. 2009. "Are all labour regulations equal? Evidence from Indian manufacturing." Journal of Comparative Economics, 37(1): 62-75.

Amable, B.; Ledezma, I. and Robin, S. 2016. "Product market regulation, innovation, and productivity." Research Policy, 45(10): 2087-2104.

Arnold, J.; Nicoletti, G. and Scarpetta, S. 2008. "Regulation, Allocative Efficiency and Productivity in OECD Countries: Industry and Firm-Level Evidence." OECD Economics Department Working Papers 616, OECD Publishing.

Arnold, J..; Javorcik, B. and Mattoo, A. 2011. "Does services liberalization benefit manufacturing firms? Evidence from the Czech Republic." Journal of International Economics, 85(1): 136-146.

Banerji A.; Ebeke C.; Furceri D.; Dabla-Norris E.; Duval R.; Komatsuzaki T.; Poghosyan T. and Crispolti V. 2017. "Labor and Product Market Reforms in Advanced Economies: Fiscal Costs, Gains, and Support." IMF Staff Discussion Note, March 2017.

Bassanini, A; Nunziata, L and Venn, D. 2009. "Job protection legislation and productivity growth in OECD countries." Economic Policy, 24(58): 349-402.

[8] Gouveia et al (2017a) using firm-level data for Portugal show that deregulation of labour markets decrease productivity for almost all firms (except for those in the bottom productivity decile).

Bassanini, A. 2015. “A bitter medicine? Short-term employment impact of deregulation in network industries.” IZA Discussion Papers, No. 9187

Barone, G. and F. Cingano. 2011.“Service Regulation and Growth: Evidence from OECD Countries.” The Economic Journal, 121(555)

Boeri, T. and Tabellini, G. 2012. “Does information increase political support for pension reform?” Public Choice, 150(1): 327-362.

Bourlès, R.; Cette, G.; Lopez, J.; Mairesse, J. and Nicoletti, G. 2010. “The impact on growth of easing regulations in upstream sectors.” Research Report. CESifo

Bourlès, R.; Cette, G.; Lopez, J.; Mairesse, J. and Nicoletti, G. 2013. “Do product market regulations in upstream sectors curb productivity growth? Panel data evidence for OECD countries.” Review of Economics and Statistics, 95(5): 1750-1768.

Cingano, F.; Leonardi, M.; Messina, J. and Pica, G. 2010. “The effects of employment protection legislation and financial market imperfections on investment: evidence from a firm-level panel of EU countries.” Economic Policy, 25(61): 117-163.

Conway, P. and G. Nicoletti. 2006. “Product market regulation in the non-manufacturing sectors of OECD countries”, OECD Economics Department Working Paper, No. 530.

Égert, B. and I. Wanner. 2016. “Regulations in services sectors and their impact on downstream industries: The OECD 2013 Regimpact Indicator.” OECD Economics Department Working Papers, No. 1303, OECD Publishing, Paris.

European Commission. 2014.” The Economic Adjustment Programme for Portugal - Eleventh Review.” Occasional Papers 191. April 2014. Brussels.

European Commission. 2016. “Ex-post evaluation of the economic adjustment programme in Portugal: 2011- 2014.” Institutional paper 040. November 2016.

Fiori, G.; Nicoletti, G.; Scarpetta, S. and Schiantarelli, F. 2012. “Employment effects of product and labour market reforms: are there synergies?” The Economic Journal, 122(558).

Forlani, E. 2012. “Competition in Services and Efficiency of Manufacturing Firms: Does 'Liberalization' Matter?” LICOS Discussion Paper No. 311/2012 (Katholieke Universiteit Leuven).

Gal, P. and Hijzen, A. 2016. “The short-term impact of product market reforms: A cross-country firm-level analysis.” IMF Working Paper 16/116.

Gouveia, A. F.; Santos, S. and Gonçalves, I. 2017a. "The impact of structural reforms on productivity: The role of the distance to the technological frontier." OECD Productivity Working Papers, No. 8, OECD Publishing, Paris.

Gouveia, A.F. 2017b. “Political support for reforms of the pension system – two experiments”, Journal of Pension Economics and Finance, January 2017

Jain-Chandra, S. and Zhang, L. 2014. “How can Korea Boost Potential Output to Ensure Continued Income Convergence?” IMF Working Paper 15/54

Koske, I.; Wanner, I.; Bitetti, R. and Barbiero, O. 2015. “The 2013 update of the OECD's database on product market regulation: Policy insights for OECD and non-OECD countries." OECD Economic Department Working Papers, No.1200, OECD Publishing.

La Porta, R.; Botero, J. C.; Djankov. S.; Lopez-de-Silanes. F. and Shleifer, A. 2004. The Regulation of Labor. Technology, 1339.

Monteiro, G., Gouveia, A.F. and Santos, S. 2017. “Short-run effects of product markets deregulation: a more productive, more efficient and more resilient economy?” OECD Productivity Working Papers, OECD Publishing, Paris, September 2017.

Nicoletti, G. and Scarpetta, S. 2003. “Regulation, productivity and growth. OECD Economics.” Department Working Paper 347. OECD publishing. Paris.

OECD. 2007. “More jobs but less productive? The impact of labour market policies on productivity.” OECD Employment Outlook 2007.

OECD, 2013a. “Portugal: Reforming the State to promote Growth. Better Policies Series.” OECD, Paris

OECD. 2013b. “Product Market Regulation Database.” www.oecd.org/economy/pmr.

OECD. 2013c. Employment Protection Database www.oecd.org/employment/protection

OECD. 2013d. “Protecting jobs, enhancing flexibility: A new look at employment protection legislation.” OECD Employment Outlook 2013, OECD Publishing.

OECD. 2014. “Portugal: Deepening Structural Reform to Support growth and Competitiveness.” OECD Better Policies Series.

OECD. 2016. “Short-term labour market effects of structural reforms: pain before the gain?” OECD employment outlook. Chapter 3.

OECD. 2017. "Labour market reforms in Portugal 2011-2015." OECD Publishing, Paris.
Pagés C. and Micco, A. 2007. “The Economic Effects of Employment Protection: Evidence from International Industry-Level Data.” (No. 4120). Inter-American Development Bank.

Rajan, R.G. and L. Zingales. 1998. “Financial dependence and growth”. American Economic Review, 88(3), 559-86.

Lanau, S. and Topalova, P. 2016. “The Impact of Product Market Reforms on Firm Productivity in Italy.” IMF Working Paper 16/119.

Nicoletti, G. and Scarpetta, S. 2003. “Regulation, productivity and growth.” OECD Economics Department Working Paper 347. OECD publishing. Paris.

Scarpetta, S. 1996. “Assessing the role of labour market policies and institutional settings on unemployment: A cross-country study.” OECD Economic Studies, 26(1): 43-98.

Topalova, P. 2016. “The Refugee Surge in Europe: Economic Challenges.” Staff Discussion Note 16/02. International Monetary Fund, Washington.

Vandenbussche, J.; Aghion, P. and Meghir, C. 2006. “Growth, distance to frontier and composition of human capital.” Journal of Economic Growth, 11(2): 97-127.

Appendix – Box 1

Sectors Considered for the Employment Protection Legislation analysis:
Manufacture of food products, beverages and tobacco products; Manufacture of textiles, wearing apparel and leather products; Manufacture of wood and paper products, and printing; Manufacture of coke, and refined petroleum products; Manufacture of chemicals and chemical products; Manufacture of basic pharmaceutical products and pharmaceutical preparations; Manufacture of rubber and plastics products, and other non-metallic mineral products; Manufacture of basic metals and fabricated metal products, except machinery and equipment; Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c.; Manufacture of transport equipment; Manufacture of furniture; other manufacturing; repair and installation of machinery and equipment; Water, sewerage, waste management and remediation activities; Construction; Wholesale and retail trade, repair of motor vehicles and motorcycles; Transportation and storage; Accommodation and food service activities; Telecommunications.

Sectors Considered for the Product Market Regulation analysis:
Agriculture, forestry and fishing; Mining and quarrying; Manufacture of food products, beverages and tobacco products; Manufacture of textiles, wearing apparel and leather products; Manufacture of wood and paper products, and printing; Manufacture of coke, and refined petroleum products; Manufacture of chemicals and chemical products; Manufacture of basic pharmaceutical products and pharmaceutical preparations; Manufacture of rubber and plastics products, and other non-metallic mineral products; Manufacture of basic metals and fabricated metal products, except machinery and equipment; Manufacture of computer, electronic and optical products; Manufacture of electrical equipment; Manufacture of machinery and equipment n.e.c.; Manufacture of transport equipment; Manufacture of furniture; other manufacturing; repair and installation of machinery and equipment; Electricity, gas, steam and air-conditioning supply; Water, sewerage, waste management and remediation activities; Construction; Wholesale and retail trade, repair of motor vehicles and motorcycles; Transportation and storage; Accommodation and food service activities; Publishing, audiovisual and broadcasting activities; Telecommunications; Computer programming, consultancy and related activities; information service activities; Financial and insurance activities; Real estate activities; Legal and accounting activities; activities of head offices; management consultancy activities; architecture and engineering activities; technical testing and analysis; Scientific research and development; Advertising and market research; other professional, scientific and technical activities; Veterinary activities; Administrative and support service activities; Public administration and defence; compulsory social security; Education; Human health services; Social work activities; Arts, entertainment and recreation; Other services activities.