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HOW DO PRODUCT MARKET REGULATIONS AFFECT WORKERS? EVIDENCE FROM THE NETWORK INDUSTRIES

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This paper is part of an OECD project on the consequences of flexibility-enhancing reforms for workers. Other outputs from this project include:

Cournède, B., O. Denk, P. Garda and P. Hoeller (2016), "Enhancing Economic Flexibility: What Is in It for Workers?", *OECD Economic Policy Papers*, No. 19, OECD Publishing (for an overview of the research and policy implications).

Cournède, B., O. Denk and P. Garda (2016), "Effects of Flexibility-Enhancing Reforms on Employment Transitions", OECD Economics Department Working Papers, No. 1350, OECD Publishing.

Garda, P. (2016), "The Ins and Outs of Employment in 25 OECD Countries", *OECD Economics Department Working Papers*, No. 1350, OECD Publishing.

ABSTRACT/RÉSUMÉ

How do product market regulations affect workers? Evidence from the network industries

Knowing who gains and loses from regulatory reform is important for understanding the political economy of reform. Using micro-level data from 26 countries, this paper studies how regulatory reform of network industries, a policy priority in many advanced economies, influences the labour market situation of workers in network industries. Estimates are identified from changes in a worker's pay, industry-level employment flows and regulation over time. The main finding is that the regulation of network industries provides workers in this industry with a wage premium and higher employment stability relative to similar workers in other industries. Regulatory reform therefore tends to align labour income and employment stability in the reformed industry with those in other industries. Workers in the reformed industry lose out compared with others, because they no longer benefit from "excess" pay and employment stability.

JEL classification: J31; J63; L52; L98

Keywords: Regulation, reform, labour income, employment stability, network industries

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**Réglementation des marchés de produits :
quelles conséquences pour le marché du travail dans les industries de réseau ?**

Pour comprendre l'économie politique d'une réforme réglementaire, il est important de savoir qui seront les gagnants et qui seront les perdants. À partir de microdonnées recueillies dans 26 pays, cet article étudie les incidences que la déréglementation des industries de réseau – une priorité de l'action publique dans de nombreux pays avancés – peut avoir sur la situation des travailleurs employés dans ce secteur. Les effets sont estimés sur la base des variations observées au niveau des salaires, des flux de main-d'œuvre et de la réglementation. Les principaux résultats de l'analyse montrent que, dans les industries de réseau, la réglementation se traduit par une prime de salaire et une plus grande stabilité de l'emploi que dans les autres secteurs. La déréglementation tend donc à aligner vers le bas les revenus salariaux et le niveau de stabilité de l'emploi des travailleurs concernés, qui sont les perdants de la réforme puisqu'ils ne bénéficient plus du surcroît de salaire et de stabilité dont ils jouissaient auparavant dans leur emploi.

Classification JEL : J31 ; J63 ; L52 ; L98

Mots clés : réglementation, réforme, revenus du travail, stabilité de l'emploi, industries de réseau

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HOW DO PRODUCT MARKET REGULATIONS AFFECT WORKERS? EVIDENCE FROM THE NETWORK INDUSTRIES

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1. Introduction and main findings

1. Public policies affect different people in different ways. Knowing who are the winners and losers of policy reforms is essential for understanding the political economy of reform. One important source of heterogeneity arises because workers are employed in different industries and regulations affect industries differently. This is especially the case for the regulation, or deregulation, of particular industries, which is likely to have different consequences for workers in these industries than others.

2. This paper assembles individual-level data with industry information from 26 advanced countries and develops an empirical methodology to study the effects of reforms on workers in different industries. The data are suited to investigate the influence on workers' well-being along three dimensions: labour income, employment stability and subjective well-being. These are three important components of well-being, which are also included in the OECD Better Life Index (OECD, 2013) and the OECD Job Quality Framework (Cazes et al., 2015).

3. The data and methodology are used to study the effects of regulary reform in network industries, a policy priority in many advanced countries, on workers in this industry. Regulatory reforms of network industries have been shown to increase GDP (Égert and Gal, 2016). They may, however, not be beneficial for all workers, in particular not workers in the network industry. How such reforms affect the earnings, employment and satisfaction of individuals in the reformed industries is a particularly salient issue for a better understanding of the political economy of, and sometimes resistance to, reforms (Høj et al., 2006; OECD, 2009).

4. Cross-country individual-level data on labour income and employment transitions in and out of industries are not available in one harmonised database. The paper therefore draws on individual-level data with a total of 12½ million observations from nine different sources (household surveys, employer surveys, labour force surveys). For subjective well-being, data availability on job satisfaction constrains the analysis to five OECD countries: Australia, Germany, Korea, Switzerland and the United Kingdom. The datasets could be used to study the heterogeneous effects of other regulatory reforms, for example in finance, on workers in different industries.

5. Two companion papers analyse transitions out of and into employment along other dimensions (such as age, gender or education) and how flexibility-enhancing reforms influence them (Cournède et al., 2016a; Garda, 2016).[2] The present analysis is complementary to studies investigating the aggregate short-

1. Economics Department, OECD. Email: Oliver.Denk@oecd.org. I am grateful to many current and former OECD colleagues for useful comments and suggestions: Boris Cournède, Peter Gal, Paula Garda, Antoine Goujard, Peter Hoeller, Christian Kastrop, Catherine L. Mann, Alessandro Saia and Jean-Luc Schneider from the Economics Department; Andrea Bassanini, Federico Cingano and Mark Keese from the Directorate for Employment, Labour and Social Affairs and Fabrice Murtin from the Statistics Directorate. The paper also benefited from comments and suggestions of many OECD seminar and meeting participants. Special thanks go to Noémie Pinardon-Touati and Flora Vourch, former colleagues in the Economics Department, for stellar research assistance.

2. Cournède et al. (2016b) provide a non-technical summary of the findings in this and the papers mentioned.

and long-term effects of structural reforms on the labour market (Bassanini and Duval, 2006; Griffith et al., 2007; Bouis et al., 2012; Gal and Theising, 2015; Caldera Sánchez et al., 2016).

6. This is the first paper using individual-level data to estimate the consequences of the regulation of network industries on workers in these industries for many countries and along several dimensions. A number of recent papers with a cross-country focus have relied on industry- or firm-level data to look at, separately, the income and employment effects of regulation. Jean and Nicoletti (2015) document significant wage premia due to product market regulation in Europe and North America using industry-level data. Contrary to this paper, they analyse only the year 1996 and do not examine the employment effects of regulatory reforms. OECD (2016) and Bouis et al. (2016) study the short- and medium-term effect of network deregulation with industry-level data on the level of employment and productivity in these industries. The results differ: OECD (2016) finds that network deregulation temporarily reduces employment in network industries, while Bouis et al. (2016) detect no employment effects, neither negative nor positive. Gal and Hijzen (2016) obtain yet another result with firm-level data: They find that the effect of network deregulation on employment is first insignificant and then becomes positive after several years. However, none of the three papers focuses on the long-term effects on labour income, subjective well-being and the transition probabilities out of and into network industries for individual workers.

7. In another related study, Ng and Seabright (2001) argue that less public ownership in the airline industry, one form of deregulation in one of the network industries in this paper, lowered overly high pay of airline employees. Other authors have investigated the regulation of retail, a non-network industry that is often regulated, finding that retail regulation reduces employment (Bertrand and Kramarz, 2002; Skuterud, 2005; Schivardi and Viviano, 2011). A higher degree of product market competition can also translate into lower job security, measured by the probability of switching from a fixed-term to an open-ended contract (Aparicio-Fenoll, 2015).

8. Many papers have highlighted evidence from other contexts that product market reforms increase competition and lead to price falls (for a survey see Boeri et al., 2015). These price falls are arguably costly for incumbent firms by reducing rents and thus the scope to share them with their employees (Blanchard and Giavazzi, 2003; Blanchard, 2004). The analytical contrast of some of these papers with the present one is that they focus on the differential effects on prices, not the labour market, of incumbents versus new entrants within the same industry, not relative to other industries (Brown and Goolsbee, 2002; Goolsbee and Syverson, 2008).

8. The main findings of the paper are:

- The regulation of network industries provides workers in these industries with a wage premium relative to workers in other industries. This finding holds on average and for the large majority of OECD countries. The wage premium is estimated to have been 6½ per cent of a network industry worker's labour income in 2010. It is down from 16% in the mid-1980s as a result of lighter regulation.

- The regulation of network industries can also reduce worker flows, i. e. the likelihood of workers leaving the industry. In two-thirds of OECD countries, exit rates are lower for network than other industries. Regulation is estimated to have reduced the annual exit rate by ½ percentage point in 2010, from 10 to 9½ per cent. The more extensive regulation in the mid-1980s lowered the exit rate by 1½ percentage points.

- Regulations may reduce worker flows, because workers are less inclined to forego the wage premium they obtain in network industry jobs or because economic rents from regulation manifest

themselves in higher job security. Where regulatory reforms raise exit rates, the effects do not occur immediately; they take five years to unfold after reform.

- The empirical results suggest that regulatory reforms of network industries can create costs for people in these industries. Pay and job security of workers in network industries are likely to be less advantageous compared with other industries than before. The evidence on the presence and magnitude of such costs is weaker for job security than for labour income.

- For illustration, the cumulated loss (over 30 years) due to the reduced wage premium from the deregulation since the mid-1980s for a worker who has been continuously employed in a network industry is 1½ years of labour earnings. Indirect income benefits from the productivity advancements in the wider economy due to network reforms may, however, counterbalance these direct income losses for network industry workers.

- Deregulation of network industries also reduces workers' well-being by lowering their job satisfaction, mainly because their pay grows less.

7. The rest of the paper is organised as follows. The next section presents the data. Sections 3 and 4 describe the empirical approach and the results focusing on the long-term effects of regulatory reforms of the network industries. Section 5 analyses short- to medium-term dynamics. The final section offers a brief conclusion.

2. The data

10. Four main sources of data are used: individual-level data from household, employer and labour force surveys and policy data from the OECD Product Market Regulation database.

2.1. The individual-level data

11. The objective of this paper is to estimate heterogeneous effects of reforms on workers employed in different industries. One data source are panel data from household surveys which have three important advantages over cross-section data from household surveys. They allow the empirical analysis to control for unobserved individual traits, study transitions out of and into industries and match reported income and industry for the same year. However, only six OECD countries grant access to household survey panel data with industry information:[3]

- Australia (HILDA): 2001-12;
- Germany (SOEP): 1984-2012;
- Korea (KLIPS): 1998-2012;
- Switzerland (SHP): 1999-2013;
- United Kingdom (BHPS & UKHLS): 1991-2012;
- United States (PSID): 1969-2011.

12. Survey waves are available from 2001 for all countries, while the coverage for earlier years is different from country to country. The dataset excludes students, the disabled and retirees. In addition, it is

3. Canada's Survey of Labour and Income Dynamics (SLID) contains suitable information for the analysis in this paper. However, this analysis could not use it, because the SLID micro-data cannot be pooled with the other datasets, as would be needed for the regressions.

restricted to workers aged 25 to 59 to mitigate possible distortions on measured outcomes through students who take up work or workers who retire.

13. All variables have been harmonised across the seven surveys. Annual labour income is expressed in gross terms, i.e. measured before taxes and social security contributions, and has been deflated with the consumer price index. One important data construction issue concerns the dating of information. Respondents are asked about the industry they work in at the time of the interview, while the information on income refers to the preceding calendar year. This means that, for every observation in the empirical analysis matching income and industry, a person has to feature in two consecutive survey waves. Similarly, exit from an industry and entry into an industry require two consecutive observations for the same person. The industry breakdown is by two digits, resulting in 41 industries. About half of all observations have information on both income and industry (550 000). The job satisfaction data run on different scales across the five countries. All have been normalised to the 0-10 scale that HILDA, SOEP and SHP use. Linear functions map the 1-7 scale in BHPS/UKHLS and 1-5 scale in KLIPS into 0-10.[4] The PSID includes no job satisfaction data.

14. The analysis on the effects of regulation on labour income is complemented with 2010 data from the Eurostat Structure of Earnings Survey (SES). The SES has individual-level data on the characteristics of employees, including earnings, their employers and jobs in 15 additional OECD countries in Europe. Like with the six-country panel, the focus is on gross annual earnings, which include labour income taxes and social security contributions. The sample consists of full-time, full-year equivalent employees to exclude working time effects on earnings. To obtain full-year equivalents, employees working for less than 30 weeks are excluded from the analysis, and the earnings of employees working for less than one year but more than 30 weeks are scaled up proportionately. Similar to the six-country panel, the dataset is restricted to workers 20 to 59 years old. The total number of observations is 5½ million, and survey weights are used to make the sample better aligned with the actual population.

15. The analysis of how regulation influences transition rates out of and in network industries is supplemented with 1998-2008 data from the European Union Labour Force Survey (EU LFS). Although the EU LFS is not a panel, it has information on the industry a person works in at the time of the interview and 12 months earlier. Like with the six-country panel, the dataset is restricted to workers between 25 and 59 years old to mitigate possible distortions on measured outcomes through students who take up work or workers who retire. The EU LFS has 6½ million observations for 20 OECD countries in Europe in addition to those in the six-country sample. The education variable, which is used as a control, has many more categories than in the six-country sample. In 2009, the labour force survey changed its industry classification from one-digit NACE Rev. 1.1 to one-digit NACE Rev. 2. This makes it more difficult to identify network industries from 2009 onwards and so 2008 is used as the last year.

2.2. The policy variables

16. The policy indicator measures regulation in three network industries: energy (electricity and gas), transport (air, rail and road) and communication (telecom and post) regulation (ETCR). Data are available by country separately for each of these three industries annually and, with the exception of the early years of the PSID, cover the period of the different surveys. Regulatory aspects entering the ETCR are: entry regulation, public ownership, vertical integration, market structure and price controls (Koske et al., 2015). The EU LFS, however, does not separate between workers in the transport and communication industries, so that in this case the average of the two regulation indicators is used.

4. The interval between -0.5 and 10.5 is divided into 7 (for the 1-7 scale) and 5 (for the 1-5 scale) intervals of equal size. The midpoints of these intervals transform the values of the 1-7 and 1-5 scales to the 0-10 scale. Applying the same method to the 0-10 scale would leave its values unchanged.

17. The ETCR indicators are bounded for each industry between 0 (no regulation) and 6 (stringent regulation). They are nonetheless not designed to be comparable across the three network industries, hence the main variation used is the one between network industries and others. In addition, the OECD compiles regulatory indicators for retail distribution and professional services. However, these are collected only every five years, which limits their usefulness for this report, where individual-level data for most countries are available over a ten-year period.

18. The three network industries – energy, transport and communication – have been liberalised in all of the 26 OECD countries over the sample period (Figure 1). The ETCR indicator, which measures the stringency of regulation, has declined everywhere. It rose in only a few instances, and when so by a small amount. In the empirical part, variations in regulation of a particular industry therefore reflect flexibility-enhancing reforms, the subject of interest. Liberalisation episodes and regulatory stringency are highly correlated across the three network industries. The level of the indicator varied between 0.6 for energy and transport around 2010 for the United Kingdom and 6.0 for energy in the late 1990s for Estonia, France, Greece, Iceland, Italy, Luxembourg, the Netherlands and the Slovak Republic and communication in the mid-1980s for Germany.

3. The empirical approach

19. This part describes the empirical approaches used to estimate how reforms affect labour income and labour market flows. The identification of the effects on subjective well-being combines elements of both approaches and is discussed in the next section which presents the results. The focus is on long-term effects. Section 5 illustrates with two examples what happens along the adjustment path.

3.1. Estimating the effects of regulation on labour income

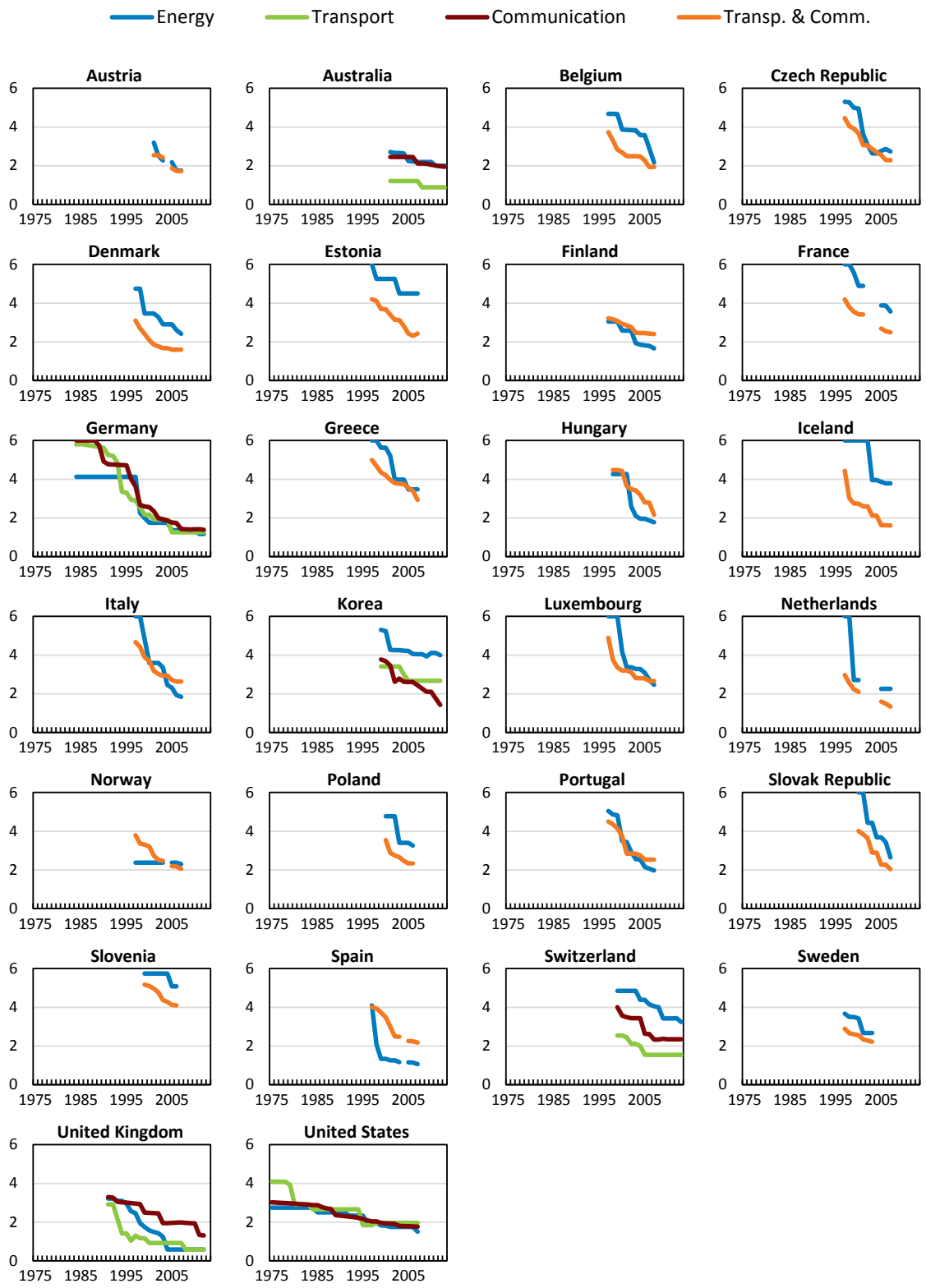
20. The baseline specification for estimating the effect of the ETCR indicator on labour income regresses the natural logarithm of the labour income of individual i who works in industry j in country c and year t, Inc_{ijct}, on $ETCR_{jct}$ for the industry she works in:

$$\ln(Inc_{ijct}) = \beta ETCR_{jct} + x_{ijct}\gamma \ [+\alpha_i] \ + \tau_{ct} \ [+\theta_{jc}] \ + \varepsilon_{ijct}. \qquad \text{(Equation 1)}$$

About 7% of observations of the six-country panel and 11% of the EU cross-section come from network industries. The subscript t could be dropped for the EU cross-section. The standard errors are clustered at the industry-country-year level in the six-country panel and industry-country level in the EU cross-section, to match the level of variation of the policy indicator. The idiosyncratic disturbances are denoted by ε_{ijct}.

21. The ETCR indicator is coded as zero for workers from non-ETCR industries. In the six-country panel, the control variables, x_{ijct}, are the age of the individual and age squared to capture the hump shape of labour earnings (Rios-Rull, 1996; Hyclak et al., 2013); other control variables varying over time at the individual level are not available for many observations. The EU cross-section dataset provides many more control variables, which are included in the empirical specification and detailed in the next section.

Figure 1. Regulation of network industries over the sample period



Note: Values for the regulation index are indicated in the years for which individual-level data are available.

Source: OECD Product Market Regulation database.

22. In contrast to most of the literature on wage premia, which usually relies on cross-section data, the six-country panel allows the baseline specification to include individual fixed effects, α_i, the first expression between square brackets. Hence, variation in the labour income of the same person over time is used for identification, which has the advantage of controlling for unobserved productivity differences between individuals. Krueger and Summers (1988) is one of the few papers using the same approach. Individual fixed effects cannot be used with the EU cross-section, while this dataset has the benefit of a much richer control set.

23. The labour income of network-industry workers may be different across countries, and in the six-country panel across time, for reasons that are unrelated with regulation. It could, for example, be higher in countries, or during periods, in which labour compensation is higher overall. Equation 1 includes country-year fixed effects, τ_{ct}, to control for overall differences in labour income across countries and time. These collapse to country fixed effects in the EU cross-section. The inclusion of the country(-year) fixed effects means that non-network industries are used as the control group for network industries. The identifying assumption is that, without regulation, labour income would be the same in network as in other industries, conditional on a person's characteristics. The country(-year) fixed effects control for any other factors of interest varying, over time, at the country level.

24. The baseline for the six-country panel does not contain the second expression in square brackets, i.e. country-specific industry fixed effects, θ_{jc}. For the EU cross-section, θ_{jc} can in any case not be estimated separately from the coefficient on $ETCR_{jct}$. Without these dummies, β in the six-country panel measures the average decline in income that a person experiences when: *i)* she moves from a network industry to a non-network industry; *ii)* she moves from a more highly regulated network industry to a more lightly regulated network industry; or *iii)* the industry she works in is being liberalised. It captures the wage, or more precisely labour income, premium associated with a one point rise of the ETCR indicator.

25. The baseline specification treats all non-network industries the same and as if they were a network industry with an ETCR indicator of zero. One concern is that non-network industries may be different for reasons unrelated with regulation. Another concern is that regulation is also present in non-network industries; this is well documented in the OECD regulation indicators for retail distribution and professional services, even if these data are not suited for this empirical analysis as they are available only every five years. To address these concerns, the panel structure of the six-country sample allows removing all cross-industry differences from the regression and using only year-to-year changes in a given industry's level of regulation for empirical identification. This is done by adding industry-country fixed effects, the second expression in square brackets. The coefficient of interest β then gives the decline in income associated with a reduction in an industry's ETCR indicator.

26. The advantage of including industry-country fixed effects is that identification does not rely on persistent cross-industry level differences in regulation. Put differently, the regression estimates whether differences in regulation over time are related with differences in wage premia, rather than whether the level of regulation influences the level of wage premia. The downside of this approach is that it uses less, potentially useful, variation in the data, which is likely to increase the standard errors. Identification relies on the assumption that in the absence of regulation labour incomes would have grown at similar rates in network and non-network industries. The next section also presents results when this assumption is lifted.

3.2. Estimating the effects of regulation on labour market flows

27. The baseline specification for estimating the effects of network regulation on the exit and entry rates for workers is similar to Equation 1:

$$Exit/EntryIndustry_{ijct} = \beta ETCR_{jct} + x_{ijct}\gamma + \tau_{ct} \ [+\theta_{jc}] \ + \varepsilon_{ijct} \qquad \text{(Equation 2)}$$

The standard errors are clustered at the industry-country-year level for both the six-country panel and the EU LFS.

28. The outcome variable is now an indicator variable which for industry outflows equals unity when individual i, who in year $t-1$ worked in industry j and country c, exits the industry in t, either into unemployment (or out of the labour force) or a different industry. A separate indicator variable is defined for inflows into the industry. It equals unity when individual i, who lives in country c and in year $t-1$ did not work in industry j, works in the industry in t. The six-country panel now does not include individual fixed effects. Changing of industry is a rare event for any individual in the data, so that with individual fixed effects little variation would remain. The regressions for both the six-country panel and the EU LFS nevertheless exploit information over time as exit and entry are defined over a 12-month period.

29. A similar concern arises with Equation 2 as with Equation 1. The coefficient of interest β is, to a large degree, identified by how exit rates vary across industries. It therefore captures mainly the extent to which network industries provide higher job security (measured through lower exit and entry) than other industries. But job turnover may be lower in network industries for reasons unrelated with regulation. If so, a negative coefficient on $ETCR_{jct}$ would falsely attribute a fall in job security to network liberalisation.

30. To address the concern of persistent industry heterogeneities driving the results, industry-country fixed effects, θ_{jc}, the expression between square brackets, are again introduced. They remove cross-industry variation from the regression. Therefore, only year-to-year variation in a given industry's level of regulation is used. β is then to be interpreted as estimating the effect of the decline in a network industry's ETCR relative to the "changes" in the other industries' ETCR, which for all non-network industries is no change.

31. The specification includes country-year fixed effects τ_{ct}. These capture all effects, such as macroeconomic developments, that can influence labour market flows across an economy in a given year. Their inclusion ensures that no country-wide developments can confound the relationship between network-industry liberalisation and changes in transition probabilities. The identifying assumption is that, in the absence of regulation, labour market flows would be the same, or in the specification with industry-country fixed effects would have evolved the same, for workers in network and other industries, similar to the estimation approach for labour income.

4. Empirical results

32. This section discusses the effects of changes in the ETCR on labour income, labour market flows and subjective well-being for individual workers in network industries.

4.1. The effects of regulation on labour income

Average effects

33. Equation 1 assesses the effects of network regulation on the labour income of persons working in network industries. The results for the six-country panel are shown in Table 1. For every point in the

ETCR indicator, the labour income of these individuals is 1.2% higher than that of workers in other industries (Column 1). The individual fixed effects have the benefit of accounting for unobserved differences across individuals (for example ability) that are correlated with income. They might, however, at the same time result in wage premia estimates that are too low as the fixed effects absorb a large part of the premium for people never moving out of network industries. Without individual fixed effects, the coefficient is larger: 2½ per cent (Column 2). The coefficients are statistically significant at the 1% level.[5]

34. The estimate in Column 1, even if it is identified by the variation of each worker's income over time, could be driven by network industries generally paying more for reasons unrelated with regulation. For example, firms in these industries may employ people in a way that makes them more productive than in potentially less efficiently organised industries. Industry-country fixed effects account for persistent pay differences across industries. When these are introduced in the regression, the coefficient on the ETCR remains almost exactly the same (Column 3). The standard error rises, but the estimate remains nevertheless statistically significant at the 10% level. The similarity of the results with and without industry-country fixed effects indicates that coding the ETCR as zero for workers in non-network industries is not an overly strong constraint. Hence, treating non-network industries the same as an unregulated network industry is a good approximation.

35. Another potential concern is that pay in network industries has grown less than in other industries not because of deregulation but other reasons. Column 4 interacts the country-year effects with a dummy variable for whether the person works in the network industries. This allows for different time trends for network and non-network industries. The coefficient doubles and is statistically significant at the 5% level.

36. Is the network industry wage premium identified by changes in the labour income of incumbent workers or changes in the labour income of workers who enter or exit these industries? Column 5 interacts the individual fixed effects with industry dummies, so that the remaining estimate is solely identified by workers who are continuously employed in the network industry. The coefficient of zero indicates that the wage premium changes little once a worker has entered a network industry.

37. A final robustness check drops all observations from non-network industries. This specification identifies wage premia solely through differences across sectors. This test is therefore very demanding, especially since the ETCR indicators for the three different network industries are not designed to be comparable. The coefficient rises to 5.0 and remains statistically significant at the 1% level. No individual fixed effects can be added in this regression as they would be practically identical to individual-industry fixed effects.

38. A similar analysis has been conducted with the 15 countries in the Eurostat Structure of Earnings Survey (SES). The regression in Column 2 of Table 1 is run with some modifications. As this survey is a cross-section, no individual fixed effects can be used. The SES has, however, the advantage that it allows for a much richer control set, which besides age, gender and education also includes years of experience in the firm and their square, the number of employees in the firm, geographical location of the firm, type of financial control, level of wage bargaining, type of employment contract and occupation.[6] The dummies for the geographical location of the firm render country fixed effects unnecessary.

5. Clustering at the industry-country, not industry-country-year, level to account better for serial correlation raises the standard errors. It leaves the estimates nevertheless statistically significant at conventional levels.

6. Age brackets: 14-19; 20-29; 30-39; 40-49; 50-59; 60+. Education categories: primary education; lower secondary education; upper secondary education; first stage of tertiary education (practical); first stage of tertiary education (theoretical); second stage of tertiary education. Employees in the firm: 1-49; 50-249; 250+. Types of financial control: public; private. Levels of wage bargaining: national; industry or industries in individual regions; firm or local unit; other; no collective agreement. Types of employment

Table 1. The effects of network regulation on labour income: 6-country panel

Dependent variable:	ln(Labour income)					
	(1)	(2)	(3)	(4)	(5)	(6)
ETCR	1.16*** (0.31)	2.51*** (0.39)	1.09* (0.58)	2.05** (1.01)	-0.005 (0.642)	5.02*** (1.23)
Age, age squared	✓	✓	✓	✓	✓	✓
Gender, education	No	✓	No	No	No	✓
Individual fixed effects	✓	No	✓	✓	No	No
Individual x Industry fixed effects	No	No	No	No	✓	No
Country x Year fixed effects	✓	✓	✓	✓	✓	✓
Network x Country x Year fixed effects	No	No	No	✓	No	No
Industry x Country fixed effects	No	No	✓	No	No	No
Sample	Full sample	Full sample	Full sample	Full sample	Full sample	Network industries
Observations	538 276	525 377	538 276	538 276	538 276	35 335

Note: All regressions are OLS. The coefficients are expressed in per cent. Standard errors, which are shown in brackets, are clustered at the industry-country-year level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The sample covers 6 OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID; OECD Economic Outlook database.

39. Employees in network industries receive a statistically significant wage premium also in the SES sample, as Table 2 shows (Column 1). The wage premium is 3.1% of an employee's labour earnings for each ETCR point. This is somewhat higher than the 1.2-2.5% in the six-country sample, which is particularly remarkable given the much larger number of control variables. For the United Kingdom, the sole country in the six-country panel that is also in the SES, the estimate for the wage premium (3.9%) is close to the one in the SES (4.4%). Using only observations from network industries, the wage premium is estimated to be 4.5%, statistically significant at the 10% level (Column 2).

contract: indefinite duration; fixed duration; apprentice. Occupations: legislators, senior officials and managers; professionals; technicians and associate professionals; clerks; service workers, shop and market sales workers; skilled agricultural and fishery workers; craft and related trades workers; plant and machine operators and assemblers; elementary occupations; armed forces. Employees in the firm for Estonia and level of wage bargaining for Luxembourg have country-specific categories. An indicator variable is created when a variable is missing for observations. Geographical location of the firm is reported at NUTS1 units for most countries, except for the Czech Republic, Estonia, Finland, Norway, Portugal and the Slovak Republic which have one each. The twelve units for the United Kingdom have been regrouped into six, based on geographical contiguity and economic similarity.

Table 2. The effects of network regulation on labour income: 15-country cross-section

Dependent variable:	ln(Labour income)	
	(1)	(2)
ETCR	3.13*** (0.69)	4.54* (2.57)
Employee controls	✓	✓
Employer controls	✓	✓
Job controls	✓	✓
Individual fixed effects	No	No
Region fixed effects	✓	✓
Sample	Full sample	Network industries
Observations	5 434 323	610 251

Note: All regressions are OLS. The coefficients are expressed in per cent. Standard errors, which are shown in brackets, are clustered at the industry-country level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The employee controls are: age, gender, highest level of education, and years of experience in the firm and their square. The employer controls are: number of employees in the firm, type of financial control and level of wage bargaining. The job controls are: type of employment contract and occupation. The sample covers 15 OECD European countries: Belgium, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain and Sweden. The year is 2010.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; Eurostat Structure of Earnings Survey.

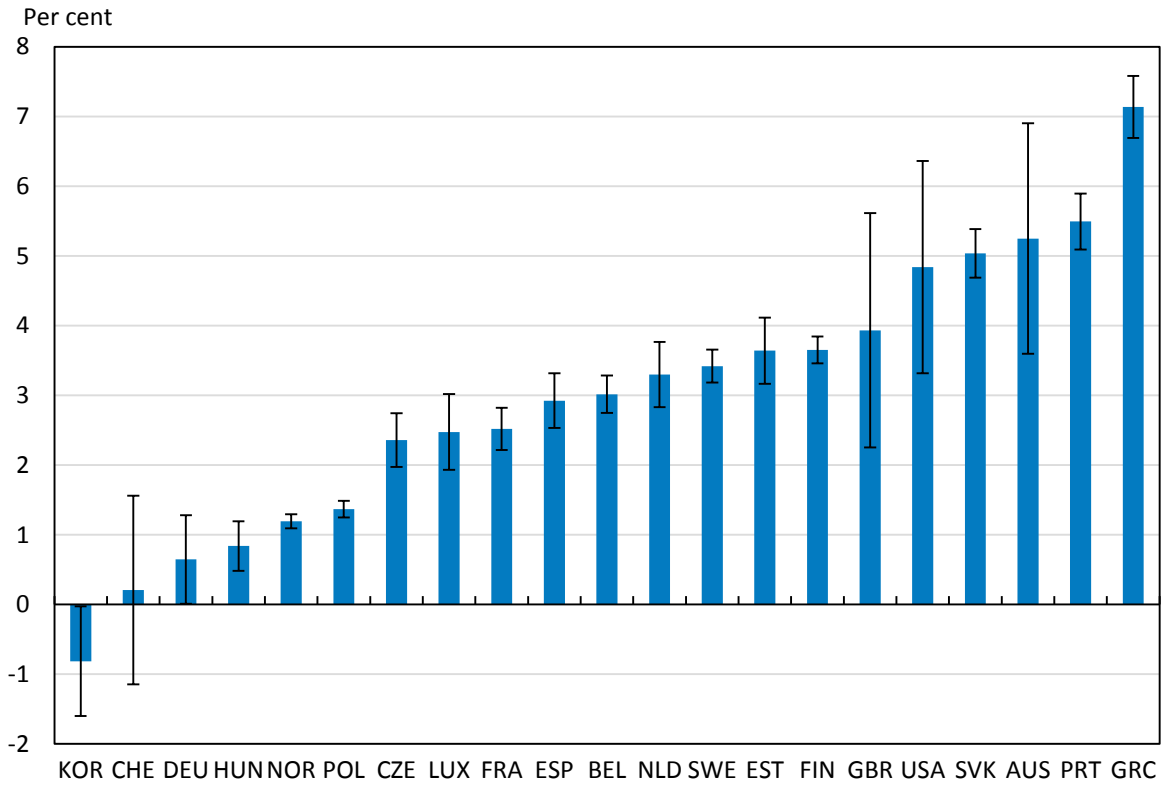
Decomposing the average effect

Decomposition by country

40. Figure 2 shows country-specific estimates for the six-country panel and the EU cross-section. Estimates for countries from the six-country panel average the coefficients from the specifications in Columns 1 and 2 of Table 1, and for countries from the EU cross-section the specification correspond to Column 1 of Table 2. Workers in network industries receive a wage premium, relative to individuals in other industries, that is statistically significant, at least at the 10% level, in 19 of the 21 OECD countries in the sample.

41. Calculating the average of the country-specific estimates and applying it to the average ETCR indicator in OECD economies in 2010 suggests that the wage premium for workers in network industries was 6½ per cent of their labour income. The wage premium for individuals in these industries has receded over past decades, as network industries have been liberalised. In 1985, the wage premium is estimated to have been 16%. For illustration, the cumulated loss (over 30 years) due to the reduced wage premium from the liberalisation since 1985 for an individual continuously employed in a network industry is worth about 1½ years of labour income.

Figure 2. The wage premium for workers in network industries per ETCR point



Note: For Australia, Germany, Korea, Switzerland, the United Kingdom and the United States, the bars indicate the average of the coefficients, in per cent, from the country-specific regressions in Columns 1 and 2 of Table 1. Data for these countries are available over different time periods between 1984 and 2012. For the other countries, the bars indicate the coefficient, in percent, from the country-specific regression in Column 1 of Table 2. Data for these countries are from 2010. The point estimates are surrounded by 90% confidence intervals.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID; OECD Economic Outlook database; Eurostat Structure of Earnings Survey.

Decomposition of the effects on annual labour income

42. Labour income is the product of hourly labour income and annual hours worked. Annual hours are the product of hours worked per month and number of months worked. Thus, regressing the natural logarithms of hourly income, monthly hours and months worked on the ETCR decomposes the effect for annual income additively into three components. Hours worked is not available for approximately 20% of the observations. Table 3 re-runs the baseline regression from Column 1 of Table 1 with the smaller sample. The estimate rises somewhat (Column 1).

43. Columns 2-4 decompose the aggregate effect in its three components. Approximately half of the aggregate effect stems from fewer monthly hours, three-eighths from reduced hourly income and one eighth from fewer months worked. Monthly hours could be lower due to the less frequent use of overtime hours or the more frequent use of non-full-time work arrangements. Lower hourly income means a reduced hourly wage premium. The estimate for the number of months worked is very small and possibly related with a somewhat higher probability of changing job after an unemployment spell.[7] The next subsection

7. Respondents are asked about the industry they work in at the time of the survey. It is therefore possible that by the end of the year they no longer work in the industry.

studies the consequences of network deregulation for job transitions out of and into network industries in detail.

Table 3. Breaking down the effects on labour income by its components: 6-country panel

Dependent variable:	Labour income (1)	Hourly income (2)	Monthly hours (3)	Months worked (4)
ETCR	1.59*** (0.28)	0.62** (0.25)	0.76*** (0.16)	0.22* (0.13)
Age, age squared	✓	✓	✓	✓
Gender, education	No	No	No	No
Individual fixed effects	✓	✓	✓	✓
Country x Year fixed effects	✓	✓	✓	✓
Sample	Full sample	Full sample	Full sample	Full sample
Observations	430 212	430 212	430 212	430 212

Note: All regressions are OLS. The coefficients are expressed in natural logarithms and the coefficients in per cent. Standard errors, which are shown in brackets, are clustered at the industry-country-year level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The sample covers 6 OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID; OECD Economic Outlook database.

Decomposition by industry

44. Is the wage premium different across the three different network industries: energy, transport and communication? Table 4 interacts the ETCR with a dummy variable for each industry in the regressions of Columns 1 and 2 of Table 1 with the six-country panel and Column 1 of Table 2 with the EU cross-section. The aggregate wage premium seems to come primarily from workers in the energy and communication industries. In the six-country panel, the coefficient on energy regulation is between 2% and 9%, the one on communication regulation between 3% and 5%, and the one on transport regulation is effectively zero with and without individual fixed effects (Columns 1 and 2). In the EU cross-section, energy regulation attracts the largest estimate, while the ones for transport and communication regulation are of similar size and both statistically significant at conventional levels.

Table 4. Breaking down the effects on labour income by industry

Dependent variable:	ln(Labour income)		
Dataset:	6-country panel		15-country cross-section
	(1)	(2)	(3)
Energy regulation	2.33***	9.30***	6.39***
	(0.59)	(0.67)	(1.03)
Transport regulation	0.28	-0.09	2.33***
	(0.39)	(0.33)	(0.68)
Communication regulation	2.67***	4.97***	2.69**
	(0.50)	(0.65)	(1.34)
Age, age squared	✓	✓	✓
Gender, education	No	✓	No
Employee controls	No	No	✓
Employer controls	No	No	✓
Job controls	No	No	✓
Individual fixed effects	✓	No	No
Country x Year fixed effects	✓	✓	No
Region fixed effects	No	No	✓
Observations	538 276	525 377	5 434 323

Note: All regressions are OLS. The coefficients are expressed in per cent. Standard errors, which are shown in brackets, are clustered at the industry-country-year level for the 6-country panel and the industry-country level for the 15-country cross-section. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The 6-country panel covers the following OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States. The 15-country cross-section covers the following OECD countries in Europe: Belgium, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Luxembourg, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain and Sweden. The year is 2010 for these countries.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID; OECD Economic Outlook database.

Decomposition by type of regulation

44. The ETCR indicators are constructed differently for each of the three industries and in particular comprise different aspects of regulation. This makes an exact decomposition by type of regulation difficult. Nevertheless, the ETCR for energy and the ETCR for communication have three components in common: entry regulation, public ownership and market structure. The ETCR for energy includes in addition a fourth component: vertical integration. It can, however, be re-defined to include the same three components as the ETCR for communication. The baseline estimates are not sensitive to re-running the regressions with this new ETCR that measures energy and communication regulation and does not take into account aspects of vertical integration. Breaking down the aggregate effect in the three types of regulation yields coefficients that are all statistically insignificant, probably related to the high correlation among the three components.

4.2. The effects of regulation on labour market flows

Average effects on industry outflows

46. The focus of this section is first on people leaving their industry using Equation 2. The average probability of a worker leaving a network industry is 9½ per cent across the six-country panel and the EU Labour Force Survey (EU LFS). The results for both samples are shown in Table 5. For every ETCR point, the probability of a worker exiting the industry from one year to the next is 1.1 percentage points lower in the six-country panel, statistically significant at the 1% level (Column 1). Removing persistent cross-industry variation from each country sample reduces the coefficient only by a small amount to -1.0 percentage point and leaves it statistically significant (Column 2). In the sample that has only workers in network industries, the coefficient becomes -1.6 percentage points (Column 3). The comparable estimates are much smaller in the 20-country EU LFS (Columns 4-6), but they remain negative. They are statistically significant only without industry-country fixed effects, in the samples with all workers and with only network industry workers.

Table 5. The effects of network regulation on industry outflows

Dependent variable:	**Exit from the industry**					
Dataset:	**6-country panel**			**20-country EU LFS**		
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
ETCR	-1.13*** (0.12)	-0.97*** (0.32)	-1.57*** (0.40)	-0.09** (0.04)	-0.15 (0.14)	-0.43** (0.18)
Age, age squared	✓	✓	✓	✓	✓	✓
Gender, education	✓	✓	✓	✓	✓	✓
Individual fixed effects	No	No	No	No	No	No
Country x Year fixed effects	✓	✓	✓	✓	✓	✓
Country x Industry fixed effects	No	✓	No	No	✓	No
Sample	Full sample	Full sample	Network industries	Full sample	Full sample	Network industries
Observations	577 778	577 778	38 121	6 567 528	6 567 528	491 376

Note: All regressions are OLS. Coefficients are expressed in percentage points. Standard errors, which are shown in brackets, are clustered at the industry-country-year level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The dependent variables are all indicator variables. Exit into unemployment also includes exit from the labour force. The 6-country panel covers the following OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States. The 20-country EU LFS covers the following European OECD countries: Austria, Belgium, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Hungary, Iceland, Italy, Luxembourg, the Netherlands, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain and Sweden. Data for these countries are available over different time periods between 1998 and 2008.

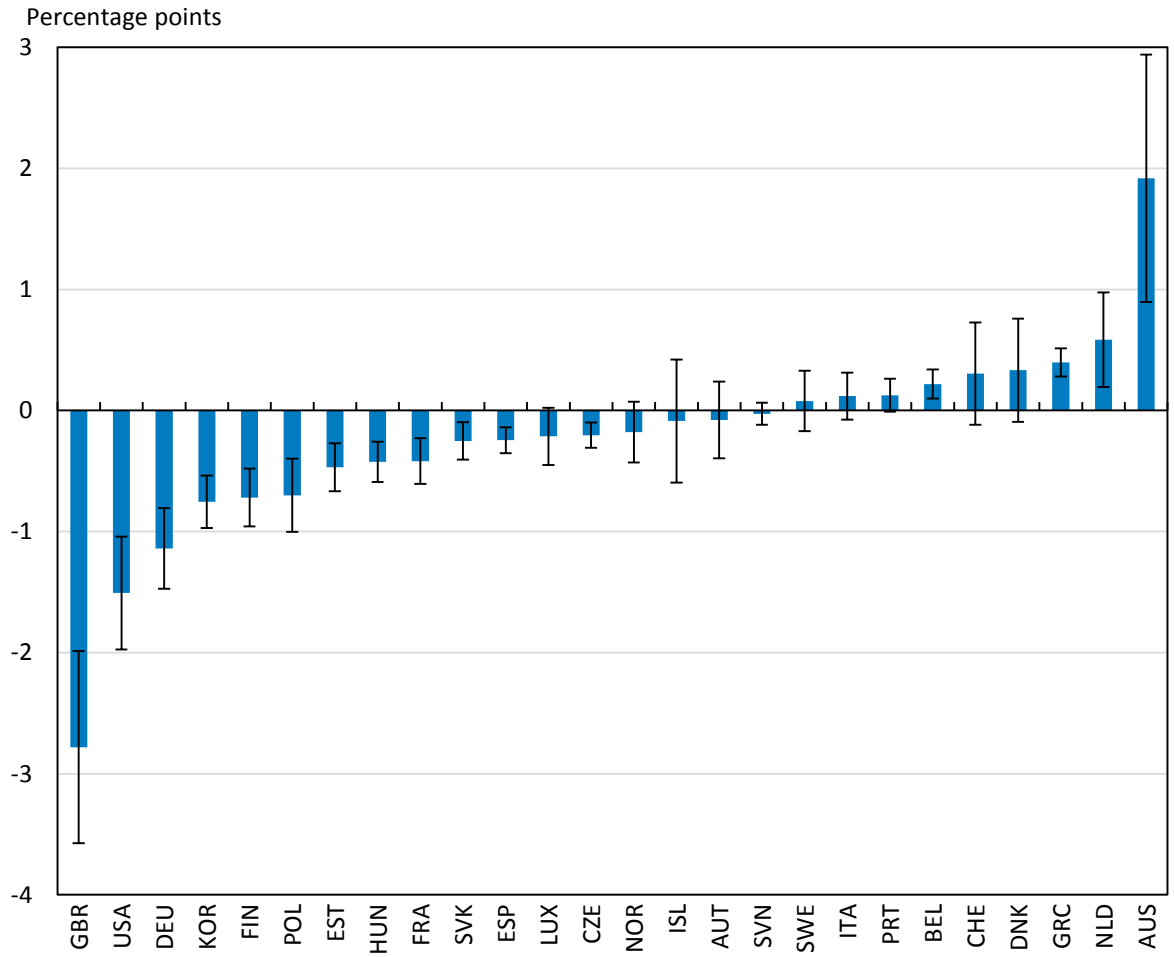
Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID; EU Labour Force Survey.

Decomposing the average effect on industry outflows

Decomposition by country

47. The same analysis has been conducted individually with each of the 26 countries included in the six-country panel and the EU LFS. The baseline specification in Column 1 of Table 2 is run with simple year dummies replacing the country-year fixed effects. Estimates vary widely across countries (Figure 3). Exit probabilities are, in a statistically significant fashion, lower in network industries than elsewhere for twelve countries and larger in four countries. The average of the country-specific coefficients is ½ percentage point, implying that in 2010 network regulation lowered the exit rate from a sample average of 10 to 9½ per cent. This effect of regulation is down from 1½ percentage points in 1985 as a result of regulatory reforms.

Figure 3. The effect of network regulation on workers' exit rate per ETCR point



Note: For Australia, Germany, Korea, Switzerland, the United Kingdom and the United States, the bars indicate the coefficient, in percentage points, from the country-specific regression in Columns 1 of Table 5. Data for these countries are available over different time periods between 1975 and 2012. For the other countries, the bars indicate the coefficient, in percentage points, from the country-specific regression in Column 4 of Table 5. Data for these countries are available over different time periods between 1998 and 2008. The point estimates are surrounded by 90% confidence intervals.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID; OECD Economic Outlook database; EU Labour Force Survey.

Decomposition by type of outflow

48. Exit from an industry is the sum of exit into unemployment or economic inactivity, and exit to another industry. Table 6 breaks the estimate in Column 1 of Table 5 for the six-country panel down into these two components. Three-quarters of the overall effect are due to industry reallocation and one-quarter to increased exit rates into unemployment or economic inactivity.

Table 6. Breaking down the effects on industry outflows by type of outflow: 6-country panel

Dependent variable:	**Exit into unemployment**	**Exit into another industry**
	(1)	**(2)**
ETCR	-0.30*** (0.05)	-0.83*** (0.11)
Age, age squared	✓	✓
Gender, education	✓	✓
Individual fixed effects	No	No
Country x Year fixed effects	✓	✓
Country x Industry fixed effects	No	No
Sample	Full sample	Full sample
Observations	577 778	577 778

Note: All regressions are OLS. Coefficients are expressed in percentage points. Standard errors, which are shown in brackets, are clustered at the industry-country-year level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The dependent variables are all indicator variables. Exit into unemployment also includes exit from the labour force. The sample covers 6 OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID.

Effects on industry inflows

49. Do people also become more likely to join network industries after liberalisation? The focus here is on results from the six-country panel. Table 7 shows results of re-running Equation 2, replacing the indicator variable for exit with one for entry. Deregulation increases entry without and with industry-country interactions in a statistically significant fashion (Columns 1 and 2). The estimate of one percentage point is to be put against an average proportion of 19% of workers in the network industries who newly enter one of these industries in any given year, either from another network industry, from a non-network industry or from non-employment. The overall effect of one percentage point is explained in equal proportions by people entering from unemployment and from other industries (Columns 3 and 4).

Table 7. The effects of network regulation on industry inflows

Dependent variable:	Entry into the industry (1)	Entry into the industry (2)	Entry from unemployment (3)	Entry from another industry (4)
ETCR	-1.01*** (0.13)	-1.29*** (0.37)	-0.49*** (0.05)	-0.52*** (0.12)
Age, age squared	✓	✓	✓	✓
Gender, education	✓	✓	✓	✓
Individual fixed effects	No	No	No	No
Country x Year fixed effects	✓	✓	✓	✓
Country x Industry fixed effects	No	✓	No	No
Observations	575 753	575 753	575 753	575 753

Note: All regressions are OLS. Coefficients are expressed in percentage points. Standard errors, which are shown in brackets, are clustered at the industry-country-year level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The dependent variables are all indicator variables. Entry from unemployment also includes entry from outside the labour force. The sample covers six OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID.

50. The size of the effect of regulation is quite similar for inflows and outflows, when comparing Columns 1 and 2 of Tables 5 and 7. This suggests that for the six countries in the panel dataset regulation does not significantly change the size of network industries but increases labour market churn, a result that is in line with Bouis et al. (2015). In other related work that uses industry-level data of 23 OECD countries, Bassanini (2015) and OECD (2016) show that network liberalisation can reduce employment in the short term. But since the effect they document is only temporary, it is consistent with the results in this section which provide estimates of long-term effects.

4.3. The effects of regulation on subjective well-being

51. A variant of Equation 1 can be used to study the effects of network industry regulation on subjective well-being in five of the six countries with panel data: Australia, Germany, Korea, Switzerland and the United Kingdom. In the estimations, labour income is replaced by self-reported job satisfaction (Table 8). People employed in network industries are not more satisfied with their job than others, as is apparent from the specification without industry-country fixed effects (Column 1). In fact, network-industry workers are less satisfied than others in the specification without individual fixed effects (Column 2). However, this does not necessarily mean that network-industry workers would be more satisfied if they worked in another industry: They may be less satisfied in whatever job for reasons that are not captured by the control variables.

Table 8. The effects of network regulation on subjective well-being

Dependent variable:	Job satisfaction					
	(1)	(2)	(3)	(4)	(5)	(6)
ETCR	0.009 (0.009)	-0.034*** (0.009)	0.038** (0.017)	0.062*** (0.015)	0.036** (0.017)	0.064*** (0.015)
ln(Labour income)	-	-	-	-	0.145*** (0.008)	0.188*** (0.009)
Age, Age squared	✓	✓	✓	✓	✓	✓
Gender, Education	No	✓	No	✓	No	✓
Individual fixed effects	✓	No	✓	No	✓	No
Country x Year fixed effects	✓	✓	✓	✓	✓	✓
Country x Industry fixed effects	No	No	✓	✓	✓	✓
Observations	429 757	404 387	429 757	404 387	398 339	388 446

Note: All regressions are OLS. Coefficients are expressed in points on a 0-10 scale. Standard errors, which are shown in brackets, are clustered at the industry-country-year level. *** indicates significance at the 1% level, ** at the 5% level and * at the 10% level. The sample covers five OECD countries: Australia, Germany, Korea, Switzerland and the United Kingdom. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland and 1991-2012 for the United Kingdom.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS.

52. An effect of network regulation on the level of subjective well-being is thus difficult to discern in the data. Nevertheless, even if network-industry workers are not more satisfied with their job, reforms could have reduced their job satisfaction. To investigate this, industry-country dummies are included. As a result, the coefficient rises nearly fourfold and becomes statistically significant at the 5% level (Column 3). The inclusion of industry-country fixed effects reverses the sign in the specification without individual fixed effects (Column 4), which is now the same as the one with individual fixed effects.

53. The empirical results therefore suggest that, while network-industry workers are not more satisfied with their job than others, their satisfaction diminishes when their industry is being deregulated. A one point reduction in the ETCR indicator reduces job satisfaction of workers in network industries by 0.04-0.06 points on the 0-10 scale. On average, job satisfaction in network industries is reported to be 6.9.[8] Additional well-being losses may come about through lower incomes, a hypothesis that is explored next.

54. Deregulation may make people in network industries less satisfied as it reduces their income. Re-running the regressions reported in Columns 3 and 4 with labour income as an additional control does not alter the estimate on the ETCR (Columns 5 and 6). A higher labour income is positively related with job satisfaction. How large is the effect of network liberalisation on subjective well-being? Averaging Columns 1 and 2 of Table 1, a one point reduction of the ETCR lowers the labour income of network-industry workers by 1.85%. Substituting this value into the regression results of Columns 5 and 6 of Table 8 indicates a decline in job satisfaction by 0.31 due to labour income. The drop in job satisfaction

8. The standard deviation of job satisfaction in the full sample is 2.0 after controlling for age and age squared, individual fixed effects, country-year fixed effects and industry-country fixed effects.

that is due to deregulation alone is, averaged across Columns 5 and 6 of Table 8, 0.05. Overall, these results suggest that deregulation reduces the job satisfaction of workers in network industries primarily because their labour incomes fall, but also for reasons (possibly increased job precariousness) that go beyond changing incomes.

5. The short- and medium-term dynamics

55. The paper thus far has examined the long-term effects of the deregulation of network industries. This section focuses on the short- to medium-term dynamics to determine how long it takes until the long-term effects unfold.

56. The empirical framework can easily be modified to study the adjustment path over the short and medium term. This is of particular interest in the context of the speed of job reallocation across industries. To this end, the term

$$\sum_{s=0}^{5} \delta_s \left[ETCR_{jc(t-s)} - ETCR_{jc(t-s-1)} \right]$$

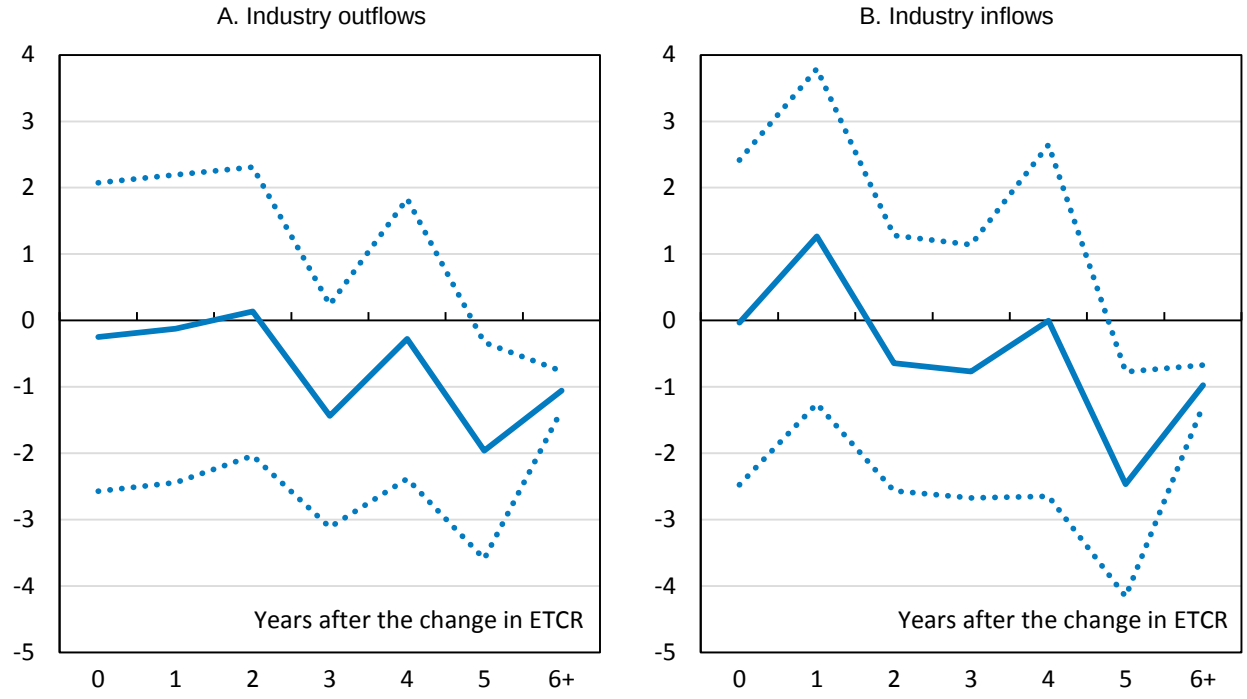
is added on the right-hand side of Equation 2. The focus is on the six-country panel for which the observed period is longer than for the EU LFS. The horizon is set at six years after the year of the reform. Not many observations are lost despite the lags, as the regulation indicators are available for a longer period than the individual-level data. In the future, a variant of the approach could be used to study the dynamics of the effects on labour income and job satisfaction.

57. Allowing for short- and medium-term effects does not materially alter the long-term effect, or the estimated β in Equation 2. A reduction of the ETCR indicator by one point in $t-6$ implies that in years t and beyond the exit rate from the network industry is on average 1.1 percentage points higher and the entry rate into the industry 1.0 percentage point higher. These coefficients are very similar to Column 1 of Tables 2 and 3, and they continue to be statistically significant at the 1% level.

58. Long-term outcomes are likely to matter more for welfare effects than short-term outcomes. The finding that effects do not materialise immediately or go temporarily in a different direction (Figure 4) is further justification to putting the analytical focus on the long term. The figure depicts the response to a one point increase in the ETCR indicator. No evidence is detected that a reform significantly influences labour market churn in the year of the reform and the following four years. It is only after five years and longer that reforms lead to statistically significantly higher exit and entry rates.

59. The year-to-year point estimates along the adjustment path tend to display large moves, likely related to the predominance of gradual reforms in the sample (Figure 1). Inflows and outflows evolve broadly similarly over time, so that aggregate employment in network industries does not appear to change after reforms. The result is in line with Bouis et al. (2015) but contrasts with OECD (2016) which finds, using industry-level data for 23 OECD countries, that removing entry barriers to network industries can temporarily reduce employment. Its much larger sample could be one reason behind the differences.

Figure 4. Estimates for the adjustment path of labour market flows to network regulation



Note: Coefficients are expressed in percentage points and depict the response to a one point increase in the ETCR indicator. The dotted lines represent the 90% confidence band. The sample covers six OECD countries: Australia, Germany, Korea, Switzerland, the United Kingdom and the United States. The time period is 2001-12 for Australia, 1984-2012 for Germany, 1998-2012 for Korea, 1999-2012 for Switzerland, 1991-2012 for the United Kingdom and 1975-2007 for the United States.

Source: OECD Secretariat calculations using OECD Product Market Regulation database; HILDA; SOEP; KLIPS; SHP; BHPS; UKHLS; PSID.

6. Conclusion

60. The empirical analyses have shown that regulatory reforms of network industries, such as energy or transport, can create costs for people in these industries. Network-industry workers, who get higher wages and in some countries have more secure jobs than their peers in other sectors, see these wage and job security premia decline post-reform. Reforms bring labour earnings in network industries more closely in line with those in other industries through less hourly pay and a decrease in the number of hours worked. In the majority of countries, reforms also increase the likelihood that a person employed in a network industry moves out of it. In addition, liberalisation makes network-industry workers less satisfied with their jobs.

61. These impacts may increase network industry workers' resistance to reforms. Income benefits for network industry workers from productivity advancements in the wider economy due to the same network reforms might, however, counterbalance these direct income losses. To give a sense of the magnitude of the effects: Section 4 found that for every point reduction of the ETCR indicator annual labour earnings of network industry workers fall by about 3% relative to workers in other industries. According to Égert and Gal (2016), the same reform increases GDP by about 3% after 10 years. Hence, the labour income of network industry workers may be unaffected by changes in the ETCR as the two effects offset each other (insofar as GDP and aggregate labour income move in line). Network industry workers would, however, be at a lower rank in the income distribution after the reform.

62. The paper has illustrated the main approaches and results. The methodology and data could be extended in several directions. One such avenue would be to use the recently updated *Regimpact* indicator to estimate the effects of network liberalisation on workers in other industries. The *Regimpact* indicator combines information about regulation in network industries with input-output tables to measure the extent to which other industries are affected by regulation in network industries. Another possibility would be to analyse flexibility-enhancing reforms in other industries where effects are likely to be strong. Retail and professional services are two sectors that seem particularly relevant. OECD policy indicators are available only infrequently in these areas, implying that the analysis would be more suited to assess level rather than dynamic effects.

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