# Employment protection, workforce mix and firm performance

**Chiara Ardito**[ab]

[a] *University of Torino, Department of Economics and Statistics, Lungo Dora Siena, 100/A – 10153 Torino – Italy (chiara.ardito@unito.it).* [b] *LABORatorio R. Revelli, c/o Collegio Carlo Alberto, Piazza Vincenzo Arbarello, 8 – 10122 Torino - Italy*

**Fabio Berton**[abc]

[a] *University of Torino, Department of Economics and Statistics, Lungo Dora Siena, 100/A – 10153 Torino – Italy (corresponding author: fabio.berton@unito.it).* [b] *LABORatorio R. Revelli, c/o Collegio Carlo Alberto, Piazza Vincenzo Arbarello, 8 – 10122 Torino – Italy.* [c] *IZA – Institute for the Study of Labor, Schaumburg-Lippe-Straße 5-9 – 53113 Bonn - Germany*

**Lia Pacelli**[ab]

[a] *University of Torino, Department of Economics and Statistics, Lungo Dora Siena, 100/A – 10153 Torino – Italy (lia.pacelli@unito.it).* [b] *LABORatorio R. Revelli, c/o Collegio Carlo Alberto, Piazza Vincenzo Arbarello, 8 – 10122 Torino - Italy*

**Filippo Passerini**[d]

[d] *Catholic University of Milan, Department of Economics and Finance, Via Necchi, 5 – 20123 Milan – Italy*

*(filippo.passerini@unicatt.it)*

- We study the effect of EPL on firm's performance and human capital endowment
- Firms raise stable workforce mainly retaining low-tenure and low-skill workers
- Firms seem to apply a cost-saving strategy that benefits profits
- The impact on productivity is anyway detrimental
- Effects are stronger for non-exporting and non-innovative firms

# Employment protection, workforce mix and firm performance.

**Chiara Ardito**[ab]

*[a] University of Torino, Department of Economics and Statistics, Lungo Dora Siena, 100/A – 10153 Torino – Italy (chiara.ardito@unito.it). [b] LABORatorio R. Revelli, c/o Collegio Carlo Alberto, Piazza Vincenzo Arbarello, 8 – 10122 Torino - Italy*

**Fabio Berton**[abc]

*[a] University of Torino, Department of Economics and Statistics, Lungo Dora Siena, 100/A – 10153 Torino – Italy (corresponding author: fabio.berton@unito.it). [b] LABORatorio R. Revelli, c/o Collegio Carlo Alberto, Piazza Vincenzo Arbarello, 8 – 10122 Torino – Italy. [c] IZA – Institute for the Study of Labor, Schaumburg-Lippe-Straße 5-9 – 53113 Bonn - Germany*

**Lia Pacelli**[ab]

*[a] University of Torino, Department of Economics and Statistics, Lungo Dora Siena, 100/A – 10153 Torino – Italy (lia.pacelli@unito.it). [b] LABORatorio R. Revelli, c/o Collegio Carlo Alberto, Piazza Vincenzo Arbarello, 8 – 10122 Torino - Italy*

**Filippo Passerini**[d]

*[d] Catholic University of Milan, Department of Economics and Finance, Via Necchi, 5 – 20123 Milan – Italy (filippo.passerini@unicatt.it)*

**Abstract**. We measure the impact of employment protection reduction in an uncertain framework on firms' hires and performance, exploiting the Italian 2015 Jobs Act. Results indicate that firms (1) stabilize workforce mainly through contract transformations of low-tenure and low-human-capital incumbent workers performing high-physical and low-intellectual tasks; (2) apply a cost-saving strategy that increases profits and decreases value added per-head. Effects are stronger among non-exporting and non-innovative firms. Our evidence casts doubts on the effectiveness of employment protection reductions in enhancing productivity in the long run.

**Keywords**: Employment Protection, Human Capital, Productivity, Tenure, Tasks

**JEL:** J08; J21; J24

Funding: University of Torino and Compagnia di San Paolo Bank Foundation. The funders had no involvement in the conduct of research, preparation of the article or the decision to submit it. Declaration of interest: none.

# Employment protection, workforce mix and firm performance

## 1. Introduction

Since it became a widely applied policy in the early nineties, labour market deregulation was implemented by relaxing the conditions to hire under temporary contracts (Berton et al., 2012), thus exacerbating the issue of dual labour markets (Hijzen et al., 2017). To re-equilibrate the gap and foster permanent employment, several reforms were approved after the 2009 crisis (Eichhorst et al., 2017). Italy epitomizes this narrative. In the present study we perform a mid-term diff-in-diffs evaluation of its *Jobs Act*, which reduced employment protection (EPL) for open-ended contracts signed in firms with more than 15 employees since March 2015.

Our work adds to the long-lasting debate on the impact of EPL changes in a context of economic uncertainty (Bentolila and Bertola, 1990). We question whether decreasing EPL helps firm performance and through which channel, i.e. enhanced productivity versus cost competition. In particular, we focus on small/medium firms (employing about 20% of workers) and evaluate the impact of an EPL reduction on their gross and net worker flows (Sestito and Viviano, 2018), investigating changes in their workforce human capital (HC) mix as measured by education (Charlot and Malherbet, 2013), skill/task (Kahn, 2018) and previous tenure (an original addition to the existing literature); we then evaluate the impact on firm performance as measured by productivity (Autor et al., 2007) and profits (Bjuggren, 2018) and single out innovative (Griffith and Macartney, 2014) and exporting firms (Selwaness and Zaki, 2019).

We exploit a linked employer-employee dataset of labour market histories merged with firm-level balance-sheets to study the above-mentioned outcomes at the plant/firm level. We study those outcomes jointly – as suggested in Boeri (2011) – instead of analysing them in isolation. On the one hand, this allows us to cast a comprehensive view on the implications of a major reform, often considered a case-study (Picot and Tassinari, 2017). On the other, it allows us to contribute also to the literature linking productivity to

worker turnover (Cappellari et al., 2012), workforce education (Kampelmann and Rycx, 2012), training and HC (Bratti et al., 2021).

Our analysis suggests that workforce HC mix downgraded and firms improved their resilience through a cost-saving rather than a productivity-enhancing strategy. This is consistent with surviving in the aftermath of an economic crisis. However, it casts serious doubts upon sustainability in the longer run, in a stagnant-productivity country.

## 2. Data

We rely upon the administrative dataset called *Comunicazioni Obbligatorie* (COB), covering the entire population of workers' transitions (accessions, separations, contract transformations) at the plant level in 2013-2017. Plants can then be linked to their parent firm. We focus on medium-size firms around the reform threshold (9-30 employees), fully located in Piedmont.[1] The final dataset includes about 16,500 firms (17,000 plants) and it is a de-facto balanced panel, reflecting the low probability of shutting-down for plants/firms employing at least 9 workers.

We complement COB with ASIA, an administrative archive of all active enterprises, to recover firm-size stock measurement, and with AIDA, an archive of incorporated companies' balance-sheets to retrieve information on firm performance.

## 3. Models and identification strategy

Our identification relies on a difference-in-differences strategy which exploits the setting of the Jobs Act, that reduced EPL only for firms with more than 15 employees. Following Bjuggren (2018), we assign plants to the treated/control groups according to the modal firm's monthly size in 2013. The treated group is made of firms employing 17-30 workers, while controls employ 9-13 workers. We exclude firms around the 15-employee threshold to avoid endogenous moves of firms reluctant to grow (Garibaldi et al., 2004).

To prompt the adoption of open-ended contracts, the reform was accompanied by temporary but generous hiring incentives. These were available to all firms and covered

[1] A North-western Italian region accounting for 7% of the national economy

100% social security contributions for contracts starting in 2015, decreased to 40% in 2016 and cancelled afterwards (Sestito & Viviano 2018). This potentially confounding factor is not present in our sample where full-time-equivalent wages (to which the rebate is proportional) in treated and control firms are equal (daily medians are 67.7 and 66.7 Euros, respectively).

We assess the effects of the reform by estimating the following equation

$$y_{it} = \alpha_i + \gamma_t^I ATECO_i I(t) + \gamma_t^P Province_i I(t) + \sum_{t=2014}^{2017} \delta_t \, I(Size \geq 17) + \varepsilon_{it} \quad (1)$$

which controls for units *i* fixed effects; one-digit sectors and eight provinces fixed effects interacted with year *t*. $\delta_t$ are the DiD coefficients of interest. $\delta_{2014}$ assesses the common trend, when not significantly different from the benchmark $\delta_{2013}$. Errors are clustered within units *i.* Specifications are estimated also by non/innovative (16% of the sample) and non/exporting (28%) units (defined in Appendix B).

***In Model 1*** we compute plant-level quarterly worker flows (hiring, transformation, separation, net change), disaggregated by several measures of HC. Pre period goes from q1.2013 to q4.2014, while post period from q2.2015 to q4.2017; Q1.2015 is deleted due to the transitory presence of HI but not of FC reduction. Hence, $y_{it}$, is a flow, *i* plant and *t* year.[2] ***In Model 2*** $y_{it}$ measures the performance of firm *i* during year *t*.

## 4. Results

### *4.1. Model 1. Workers' flows and HC mix*

Figure 1 provides results on total workforce net change (quarterly net flows), to investigate the effect of EPL reduction on workers mix. The null effects in 2014 support the parallel trend assumption. Effects take time to show up (2015 is not significant) and mostly decrease in 2017. On average, in 2016 and 2017, each treated plant grows by one

[2] To be clearer, we pool quarterly flows and estimate eq.(1) with yearly controls. Hence δ estimates quarterly flows, averaged over their year.

worker (0.25 each quarter) more than controls. The effect is statistically and economically significant. It is heterogenous along several dimensions of HC endowment: additional workers are mostly low-educated and unskilled, performing high-physical and low-intellectual tasks (see Appendix B for the exact definition). The effect is similar among exporting/non-exporting firms (Tables C1-C2) and stronger among non-innovative firms (Tables C3-C4).

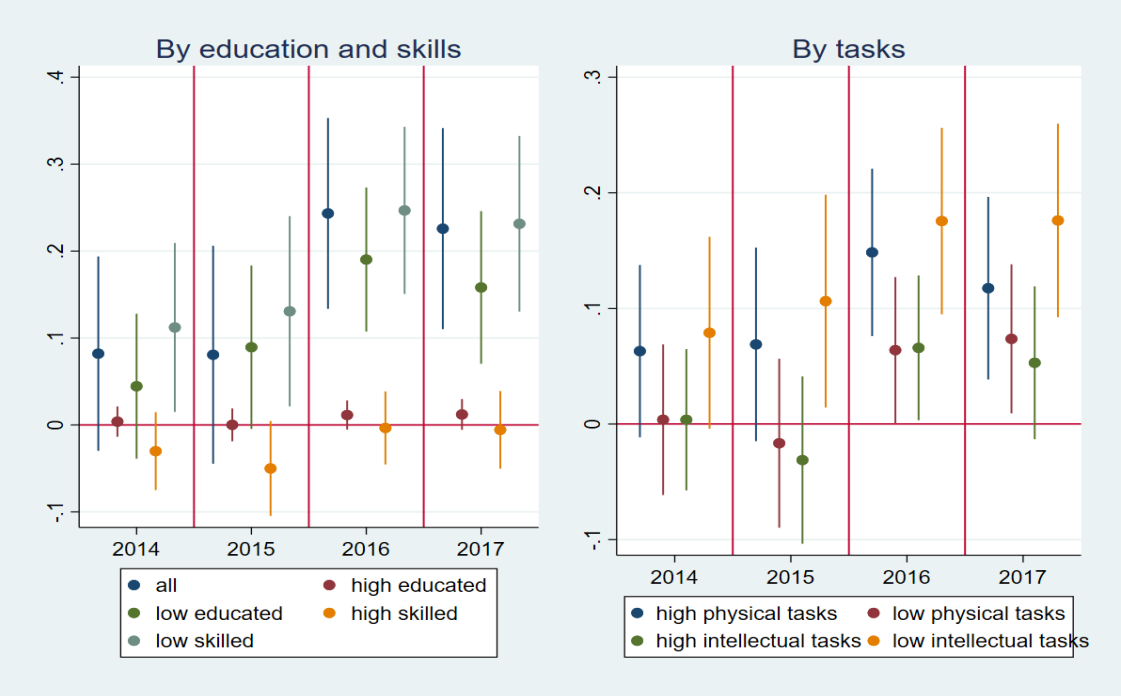


**Fig. 1: Total workforce: net flows by HC and job-tasks.**
*Source:* own computations on COB-ASIA-AIDA data. *Note*: estimated $\delta$ from eq. (1) and 95% c.i..

Figure 2 focuses on the impact of the reform on the creation of new open-ended contracts and highlights that most of them are due to transformations of temporary low tenure (<6 months) incumbents, indicating again a preference toward low-HC workers. The effect is strong for all firms in 2015; in 2016 decreases and it is mainly due to non-innovative firms; it disappears in 2017 for all but exporting firms (Tables C5-C8).

Figures 1 and 2 together indicate that in 2015 almost only transformations took place, with no significant effect on total workforce, while in 2016 and 2017 treated plants increased employment with respect to controls, mostly by retaining 2015's open-ended workers.

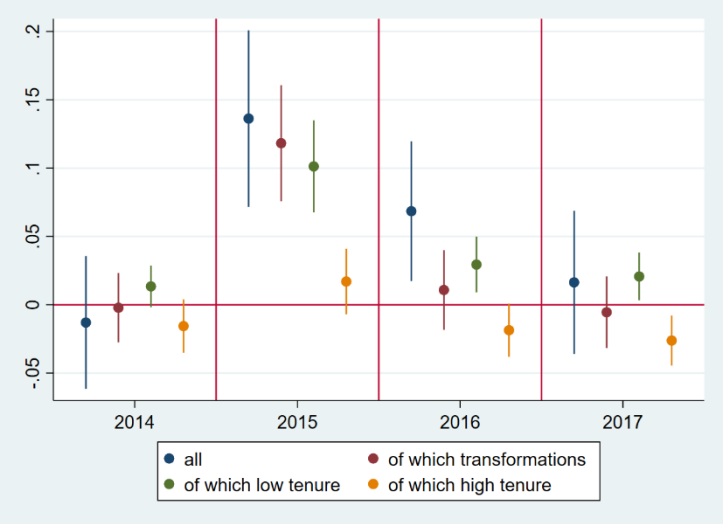


**Fig. 2**: N**ew open-ended contracts, by tenure**

*Source and Note*: see Figure 1

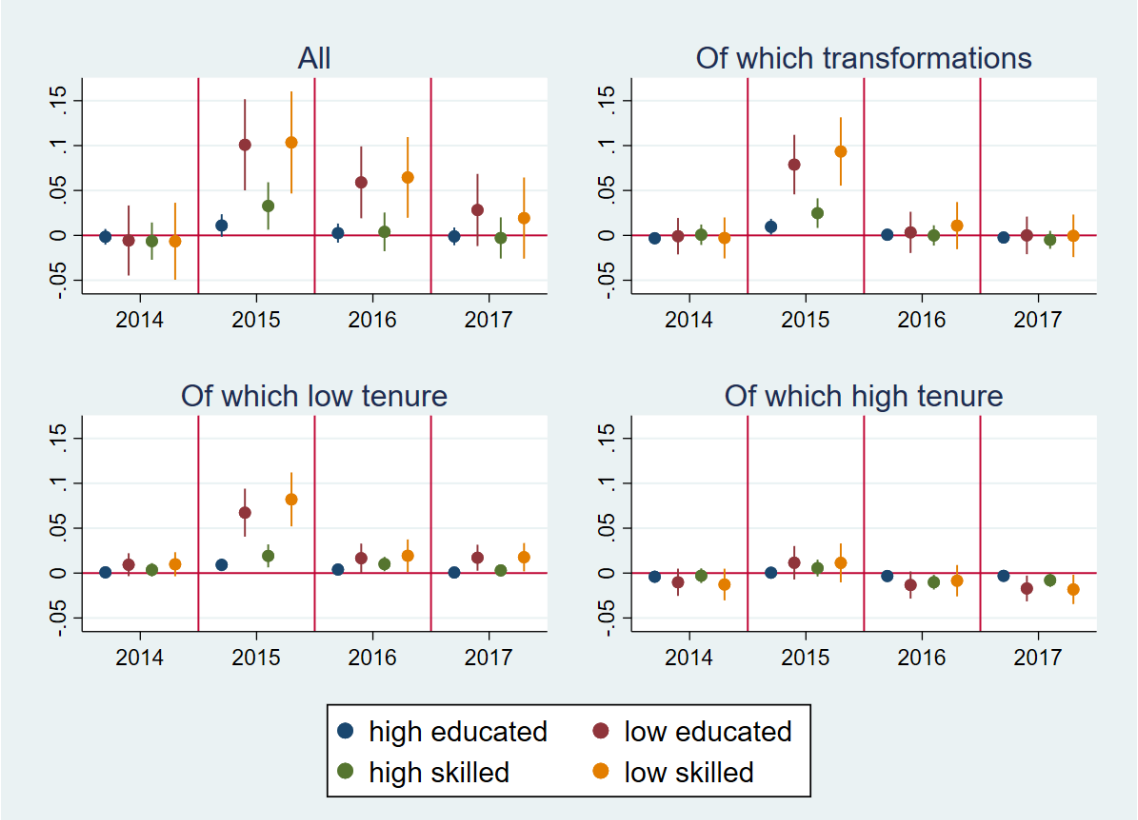


**Fig. 3: New open-ended contracts by tenure, education and skills**

*Source and Note*: see Figure 1

Figures 3 and 4 zoom into Figure 2 to show that new open-ended contracts are mostly transformations of temporary contracts of low-tenure, low-skilled and low-

educated incumbents, performing mostly high-physical and low-intellectual tasks. No effects are found for other profiles, but high-skilled low-tenure incumbents transformed in innovative firms (Table C11).

Concluding, in 2015 a strengthening strategy was in place, where workers shifted from temporary to open-ended contracts. Results highlight firms' determination to reduce HC adopting a surviving rather than a value-added enhancement strategy. We now move to firms' productivity and profits.

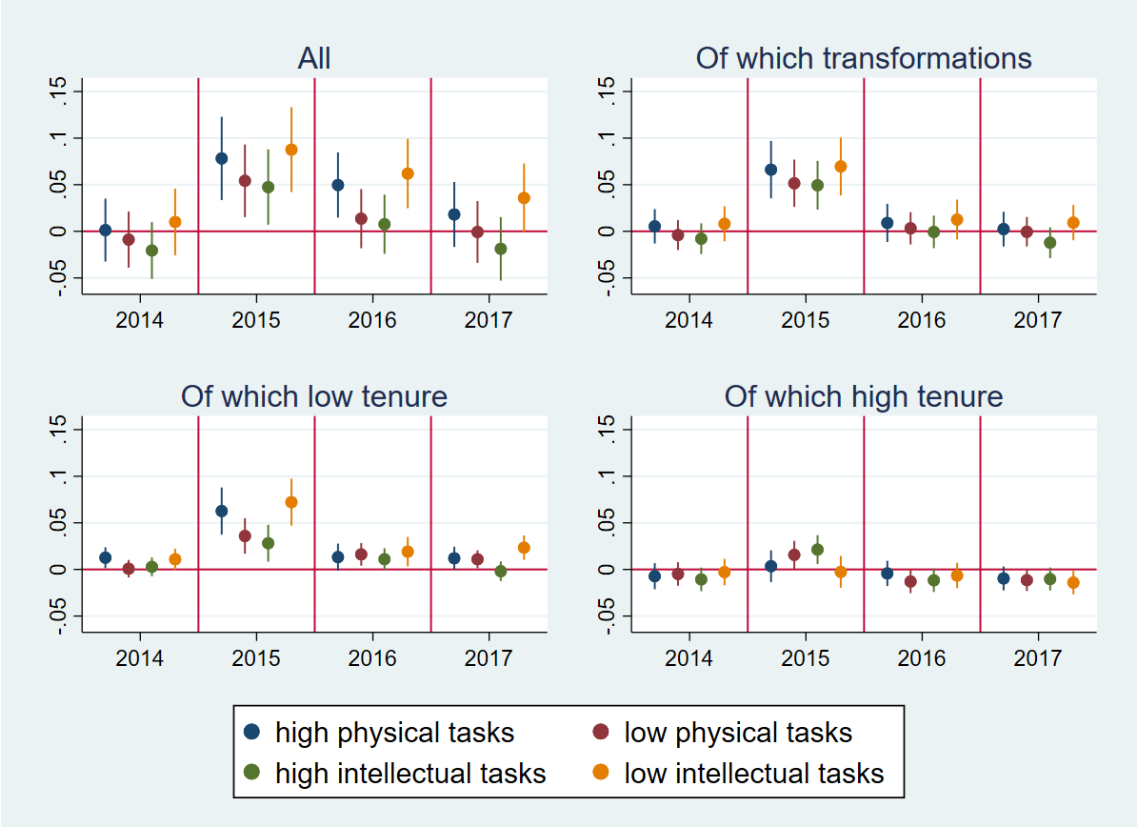


**Fig. 4:** N**ew open-ended contracts by tenure and tasks**
*Source and Note*: see Figure 1

### *4.2. Model 2. Firm performance*

Productivity, as measured by value added per worker, shows a decreasing trend in treated firms with respect to controls, that becomes significantly negative for "all firms" in 2017

(Figure 5). As employment was increasing (Figure 1), we deduce that value added did not catch up with employment.

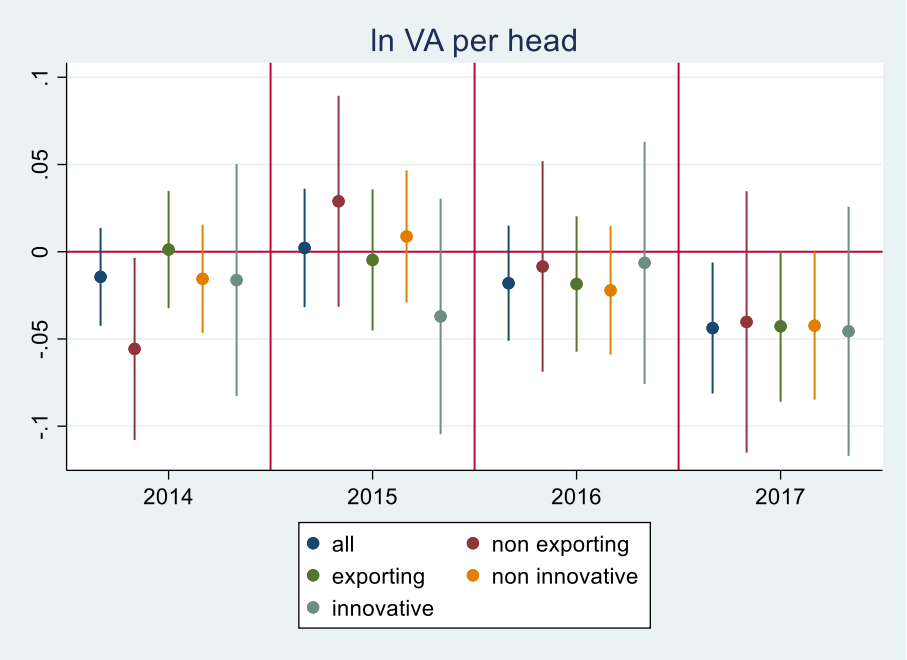


**Fig. 5: Firm-level productivity**
*Source and Note*: see Figure 1. No s.e. clustering for innovative firms due to small sample size.

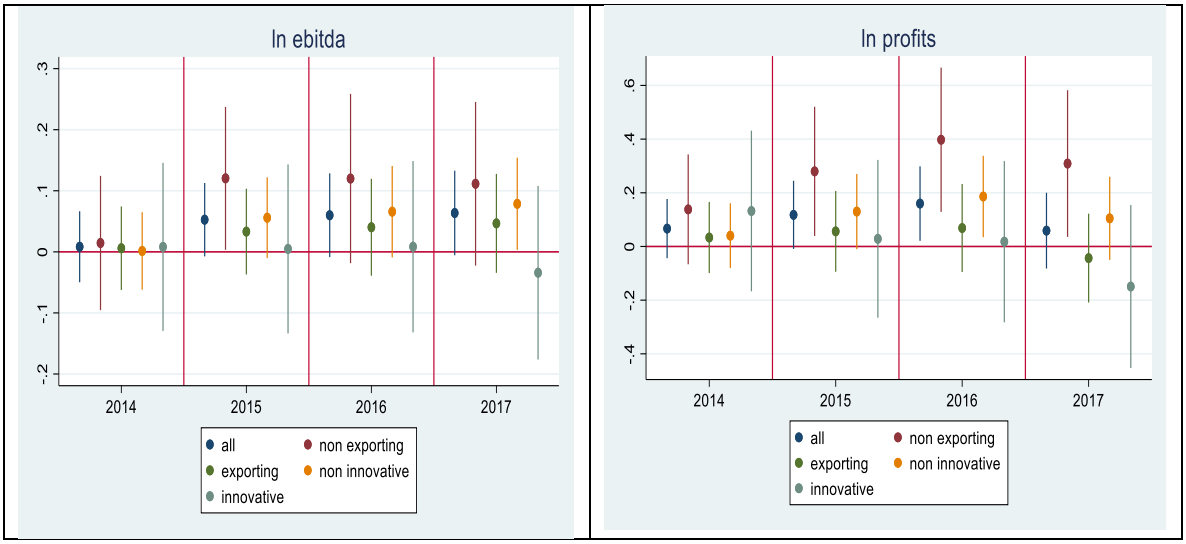


**Fig. 6: Effect on firm-level performance**
*Source and Note*: see Figure 5

Despite a stagnant/decreasing productivity trend (Figure 5), Figure 6 indicates that profits did not suffer, particularly in non-innovative and non-exporting firms. We deem

this coherent with results on HC: following a reduction in EPL, firms decreased HC penalizing productivity and following a cost-saving strategy. The effect was stronger among non-exporting/non-innovative firms.

## 5. Conclusions

The role of HC in explaining firms' performance has been widely debated; however, little has been said regarding their joint relationship with EPL. We assess that an EPL reduction may be unsuccessful in enhancing HC, as small/medium-size firms take advantage of the reform to become more resilient through a defensive strategy rather than by investing. This is mostly true for those not exposed to international competition or not innovative. External validity is limited, as no evaluation design is available for larger firms; however, 9-30 employee firms cover a significant share of employment in Italy. Such policies should therefore be more carefully designed to trigger the desired growth goals.

## Acknowledgements

We wish to thank Michelangelo Filippi for data assistance and the participants to the seminar held at the Department of Economics and Statistics of the University of Torino, to the Third Astril Conference, and to COMPIE 2021. The University of Torino and the *Compagnia di San Paolo* Bank Foundation are kindly acknowledged for financial support through the project *Young in, old out: demography and labor policies*.

## References


Autor, D., Kerr, W. and Kugler, A. (2007), "Does employment protection reduce productivity? Evidence from US states", The Economic Journal, 117: F189-F217

Bentolila, S. and Bertola, G. (1990), Firing Costs and Labour Demand: How Bad is Eurosclerosis?, Review of Economic Studies, 57(3); 381-402

Berton, F., Richiardi, M. and Sacchi, S. (2012) "The political economy of work, security and flexibility. Italy in comparative perspective", Bristol: The Policy Press

Bjuggren, C.M. (2018), "Employment protection and labor productivity", Journal of Public Economics, 157: 138-157

Boeri, T. (2011), "Institutional reforms and dualism in European labour markets", in O. Ashenfelter and D. Card (eds.) "Handbook of Labour Economics", Amsterdam: Elsevier

Boeri, T. and Garibaldi (2019) "A tale of comprehensive labour market reforms: evidence from the Italian Jobs Act", Labour Economics, 59: 33-48

Bratti, M., Conti, M., Sulis, G. (2021), "Employment protection and firm-provided training in dual labour markets", Labour Economics, 69

Cappellari, L., Dell'Aringa, C. and Leonardi, M. (2012), "Temporary employment, job flows and productivity: a tale of two reforms", The Economic Journal, 122(562): F188-F215

Charlot, O. and Malherbet, F. (2013) "Education and employment protection", Labour Economics, 20: 3-23

Eichhorst, W., Marx, P. and Wehner, C. (2017) "Labour market reforms in Europe: towards more flexicure labour markets?", Journal of Labour Market Research, 51(3): 1-17

Griffith, R. and Macartney, G. (2014), "Employment protection legislation, multinational firms and innovation", The Review of Economics and Statistics, 96(1): 135-150

Hijzen, A., Mondauto, L., and Scarpetta, S. (2017), "The impact of employment protection on temporary employment: Evidence from a regression discontinuity design", Labour Economics, 46: 64-76

Kahn, L. (2018), "Permanent jobs, employment protection and job content", Industrial Relations, 57(3): 469-538

Kampelmann, S. and Rycx, F. (2012), "The impact of educational mismatch on firm productivity: evidence from linked panel data", Economics of Education Review, 31(6): 918-931

Picot, G. and Tassinari, A. (2017), "All of one kind? Labour market reforms under austerity in Italy and Spain", Socio-Economic Review, 15(2): 461-482

Selwaness, I. and Zaki, C. (2019), "On the interaction between exports and labor market regulation: evidence from MENA countries", The Quarterly Review of Economics and Finance, 73: 24-33

Sestito, P. and Viviano, E. (2018) "Firing costs and firm hiring: evidence from an Italian reform", Economic Policy, 33(93): 101-130

# Employment protection, workforce mix and firm performance

## *Appendices*

## Appendix A: Average and median salaries in treated and control firms

**Table A1. Pre-reform median FTE daily wages in large vs small firms**

| Firms by size | Median FTE daily wage |
|---|---|
| Small (average no. employees in 2012: [9 – 13] | 67.69 |
| Large (average no. employees in 2012 [17 – 30] | 66.67 |

*Source*: Authors' calculations on Working Histories Italian Panel (WHIP) data. WHIP is built upon a 7% random sample of the Italian Social Security Institute (INPS) archives.

**Appendix B: Definitions**

The administrative dataset "Comunicazioni Obbligatorie" has been enriched of variables derived from external sources to describe more precisely job contents and tasks along the physical and intellectual dimensions and to identify which are the exporting/non-exporting and innovative/non-innovative firms in the sample. What follows briefly describes how these variables have been created and the source of information used.

*Physical and Intellectual Tasks*

The variables describing physical and intellectual tasks are derived from a set of indicators of task content developed by Eurofound (2016). These indicators are constructed at job cell level, defined by the combination of two-digit occupations (ISCO 08) and sectors (NACE Rev 2.0), with values ranging from 0 to 1. In our analysis, we define a job as characterized by *high* or *low* physical/intellectual task if its relevant index is above or below the median computed in the sample.

*Exporting / Non-exporting Firms*

The indicator variable identifying the Exporting firms is derived by our balance-sheet information. Although it does not include a flag explicitly accounting for firms active on international markets, we recover such piece of information by a word search strategy in the variable describing the core business of the company. Namely, we flag as "exporting" all firms whose business description includes the words "export", "exports", "exporting", "international" in either English or Italian. In addition, we further flag as exporting all firms with plant located outside Italy.

Doing so, we tag 1,862 firms as "Exporting" corresponding to 27.5% of the sample. The percentage obtained is in line with the average proportion of exporting Italian firms of similar size; in fact, according to the National Statistical Office, the proportion of exporting firms with 10-49 employees in Italy was 25.3% in 2014 (ISTAT-ICE 2020).

*Innovative / Non-innovative Firms*

We construct the indicator variable for "innovative firms" adopting the classification proposed by the OECD (2011). It ranks and identifies the twenty most innovative two-digit sectors according to a score of "innovation intensity" that combines information on four measures of innovation: product and process innovations, organization and market innovations, intellectual property rights and innovation-related expenditures. Doing so, we identify 16% of firms as "Innovative" in the sample.

*References*

Eurofound (2016) “What do Europeans do at work? A task-based analysis: European Jobs Monitor 2016”, Publications Office of the European Union, Luxembourg

ISTAT-ICE (2020) Commercio estero e attività internazionali delle imprese. Tavola 3.2.1. Available online at: http://www.annuarioistatice.it/attiv_intern/attivita.html# (last access: 05/06/2021)

OECD (2011), “Innovative sectors”, in OECD Science, Technology and Industry Scoreboard 2011, OECD Publishing, Paris. DOI: https://doi.org/10.1787/sti_scoreboard-2011-66-en

## Appendix C: Supplementary results on workers flow (Model 1)

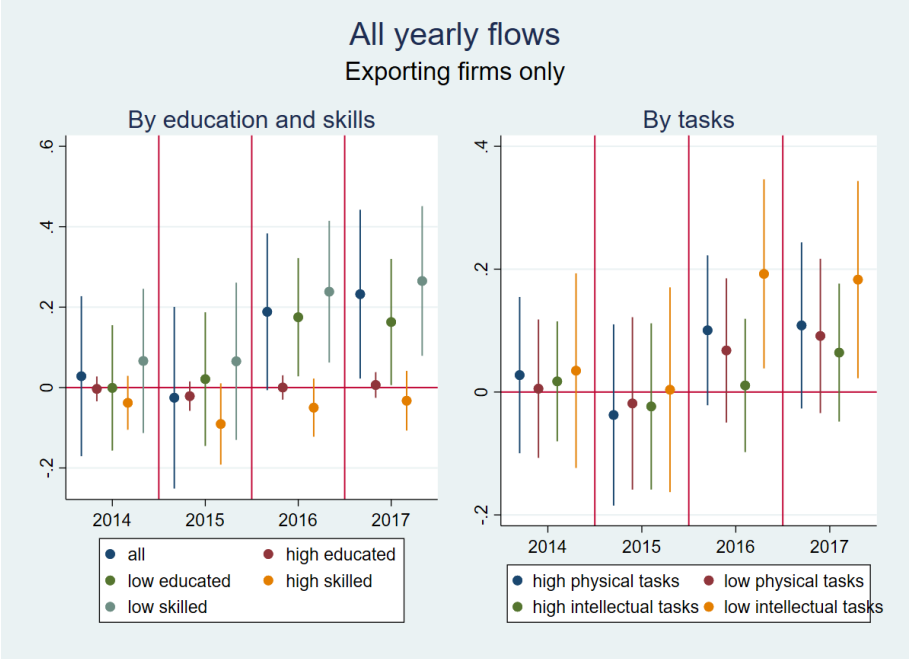


**Fig. C1: Total workforce: net flows by HC and job-tasks. Exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

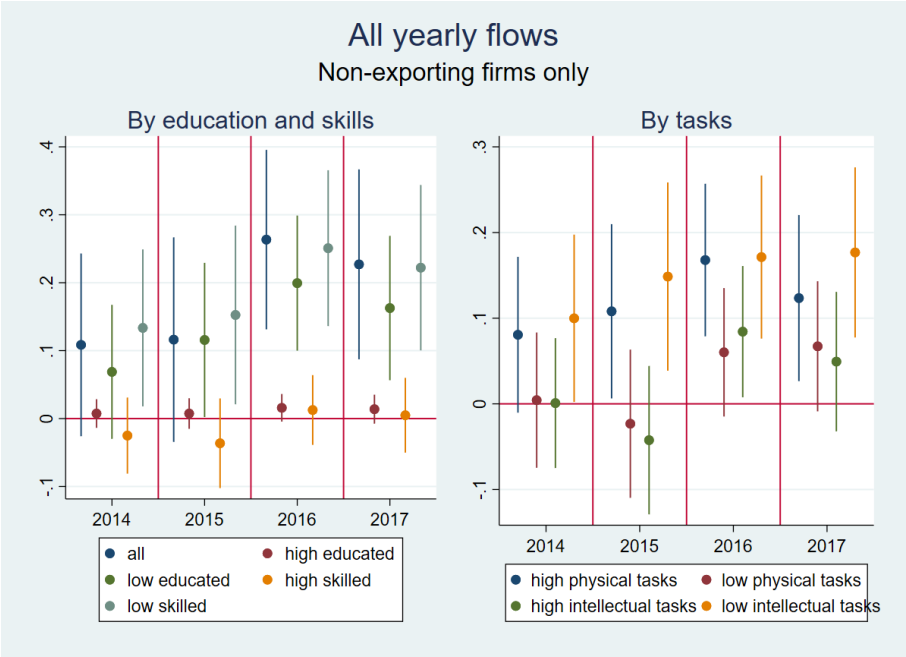


**Fig. C2: Total workforce: net flows by HC and job-tasks. Non-exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

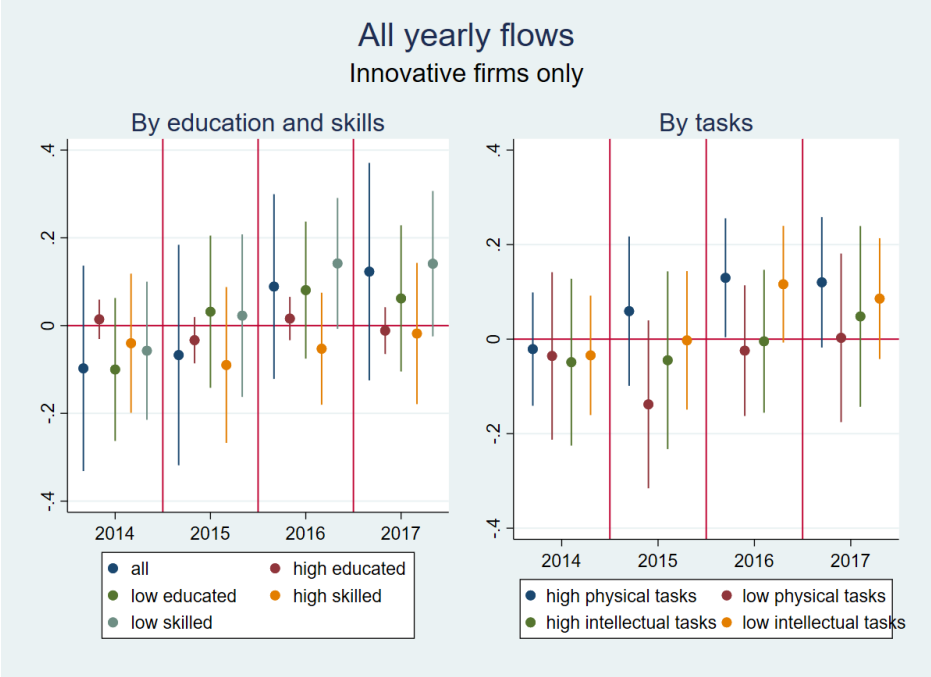


**Fig. C3: Total workforce: net flows by HC and job-tasks. Innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.

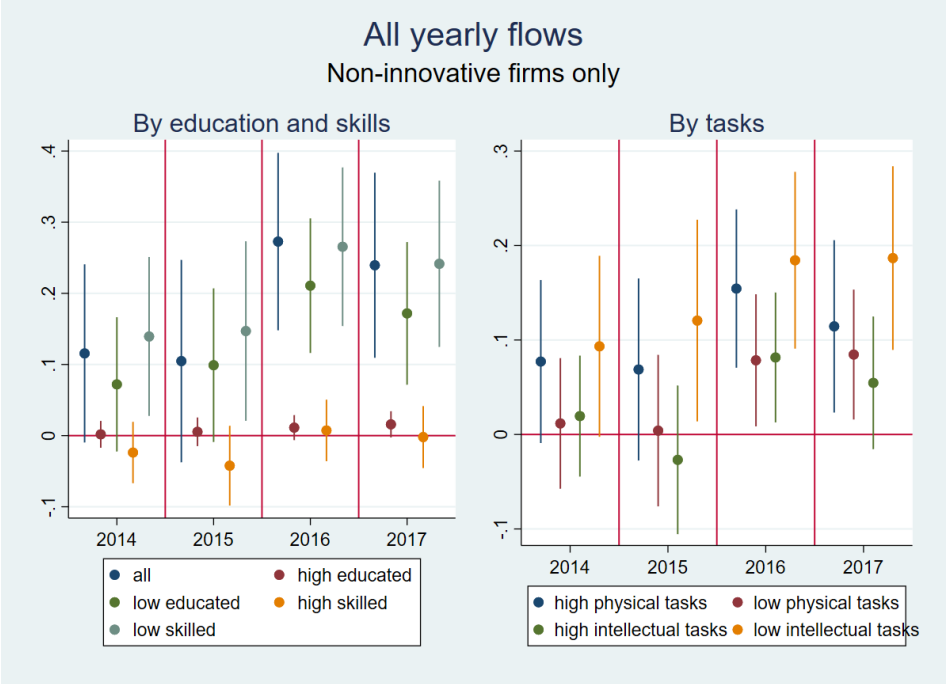


**Fig. C4: Total workforce: net flows by HC and job-tasks. Non-innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

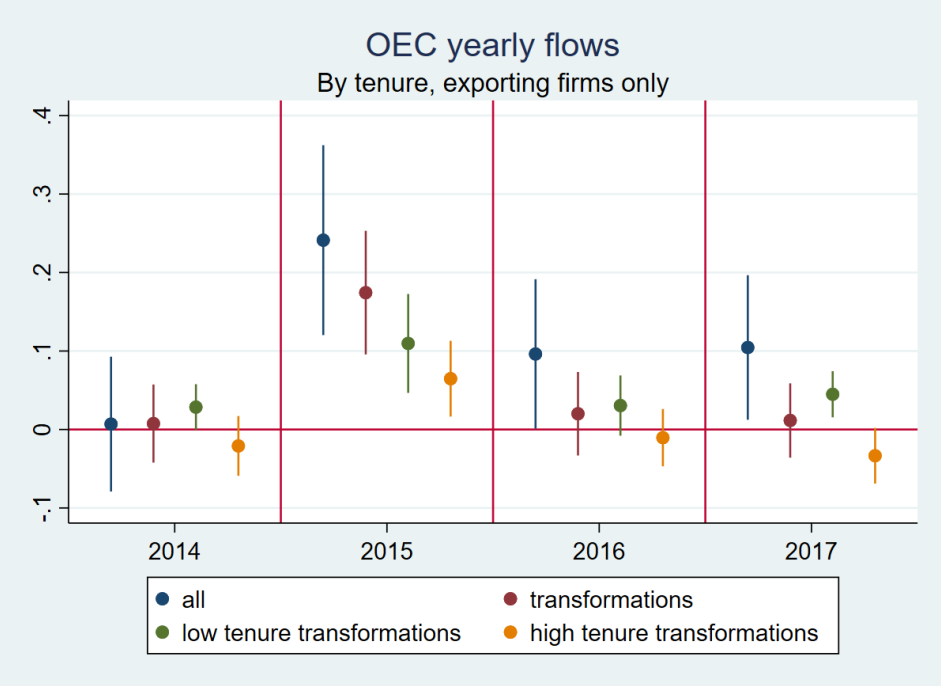


**Fig. C5: New open-ended contracts, by tenure. Exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

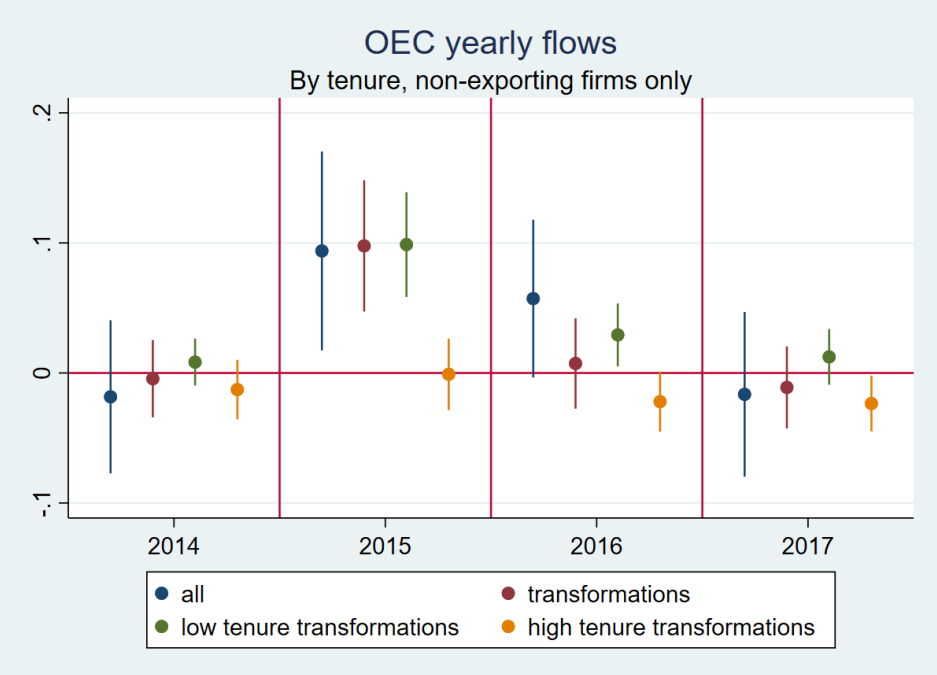


**Fig. C6: New open-ended contracts, by tenure. Non-exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

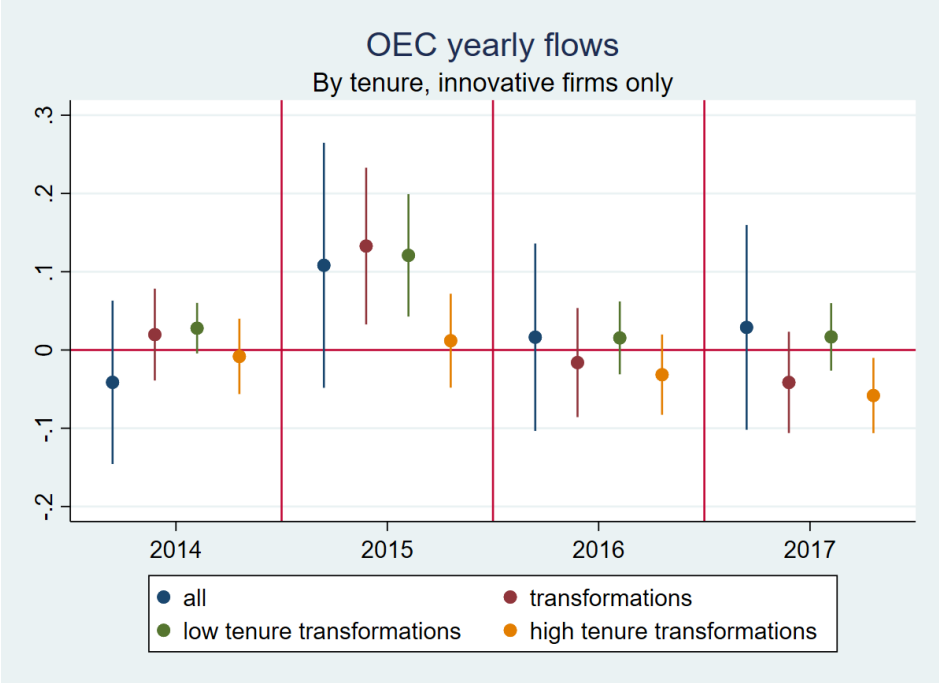


**Fig. C7: New open-ended contracts, by tenure. Innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

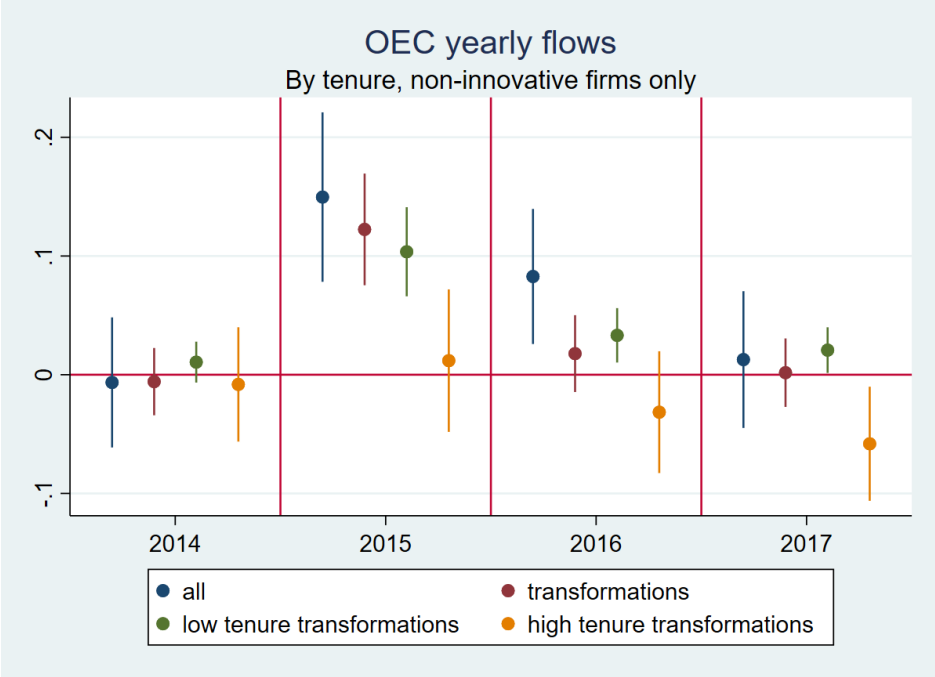


**Fig. C8: New open-ended contracts, by tenure. Non-innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

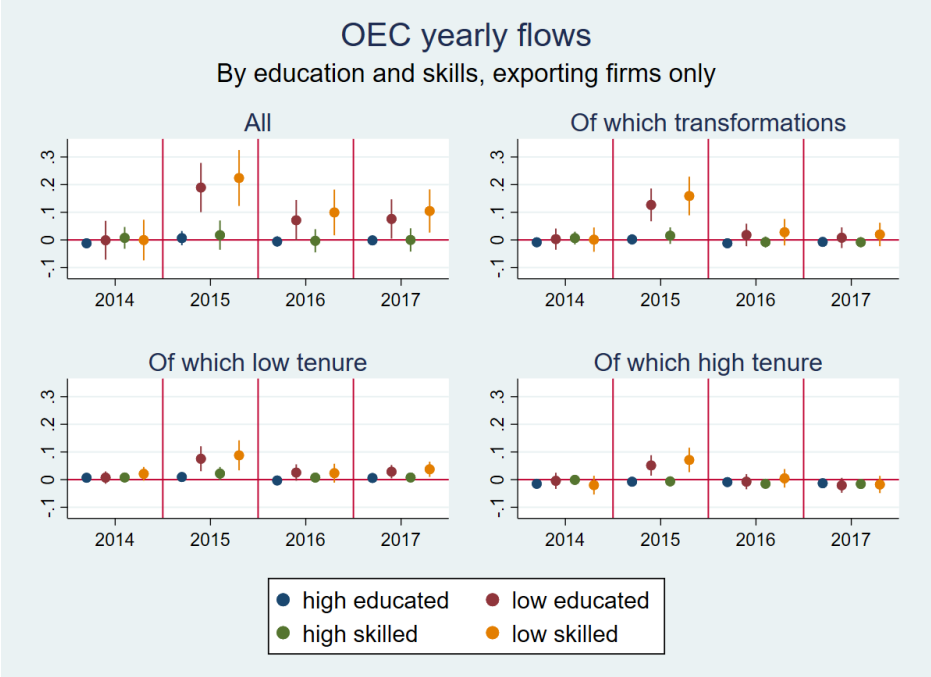


**Fig. C9: New open-ended contracts by tenure, education and skills. Exporting firms**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

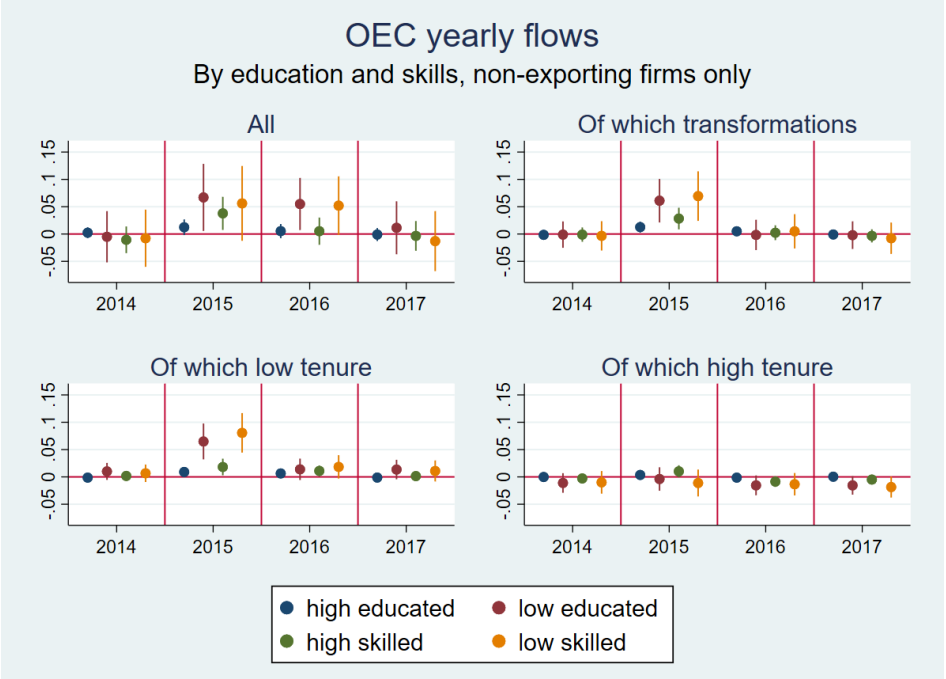


**Fig. C10: New open-ended contracts by tenure, education and skills. Non-exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i..

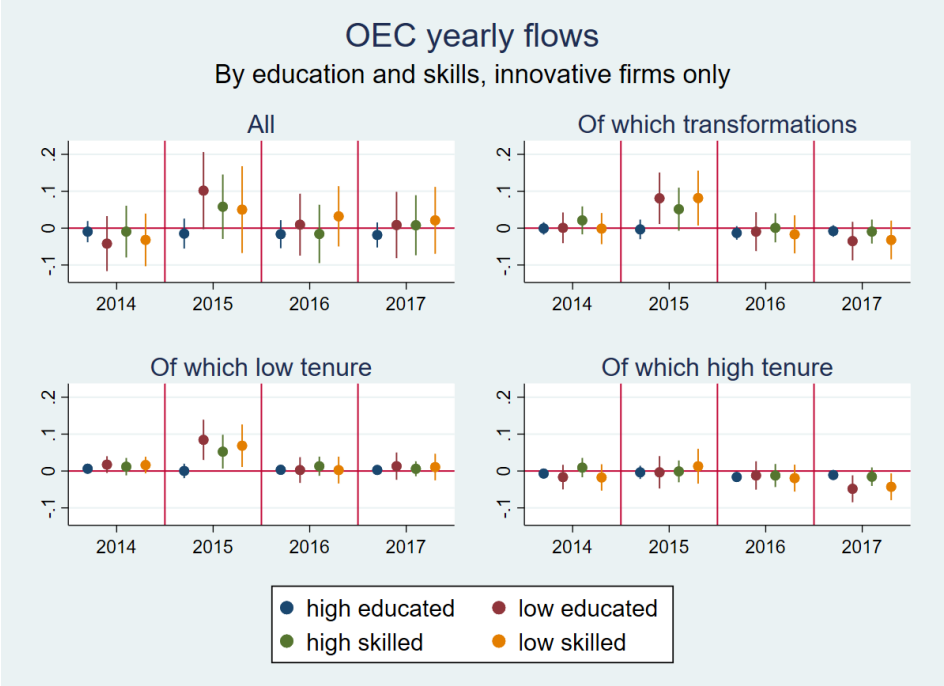


**Fig. C11: New open-ended contracts by tenure, education and skills. Innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.

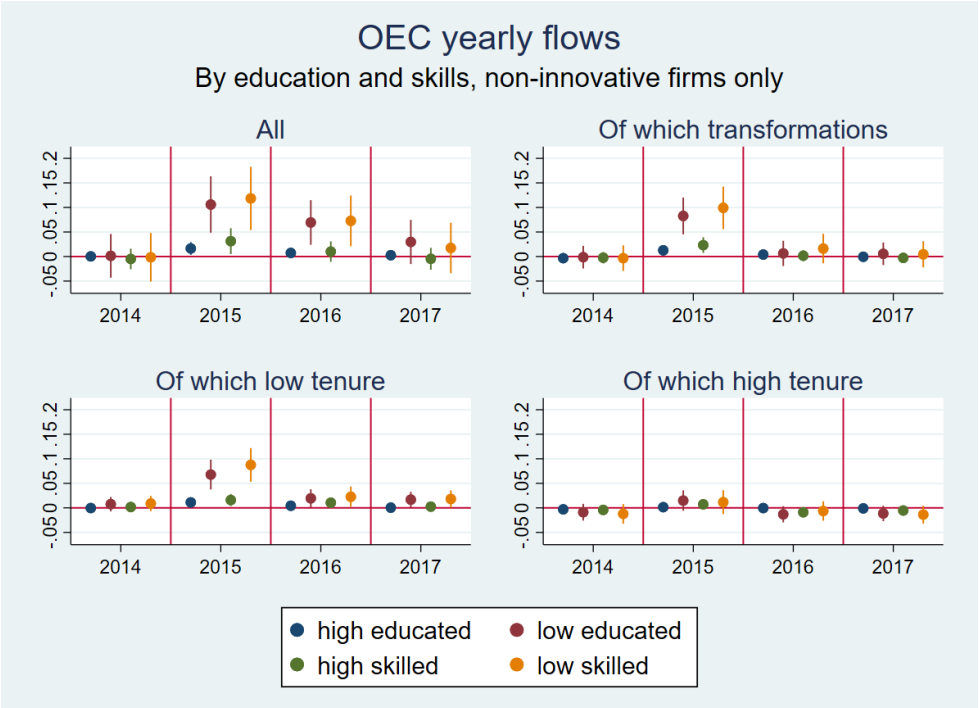


**Fig. C12: New open-ended contracts by tenure, education and skills. Non-innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.

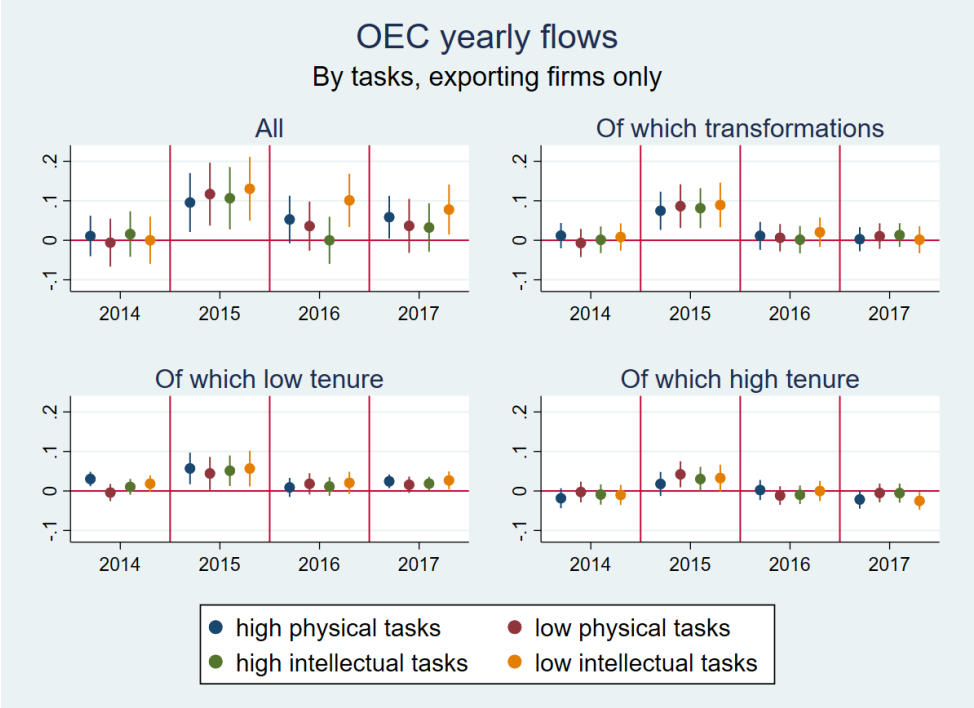


**Fig. C13: New open-ended contracts by tenure and tasks. Exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.

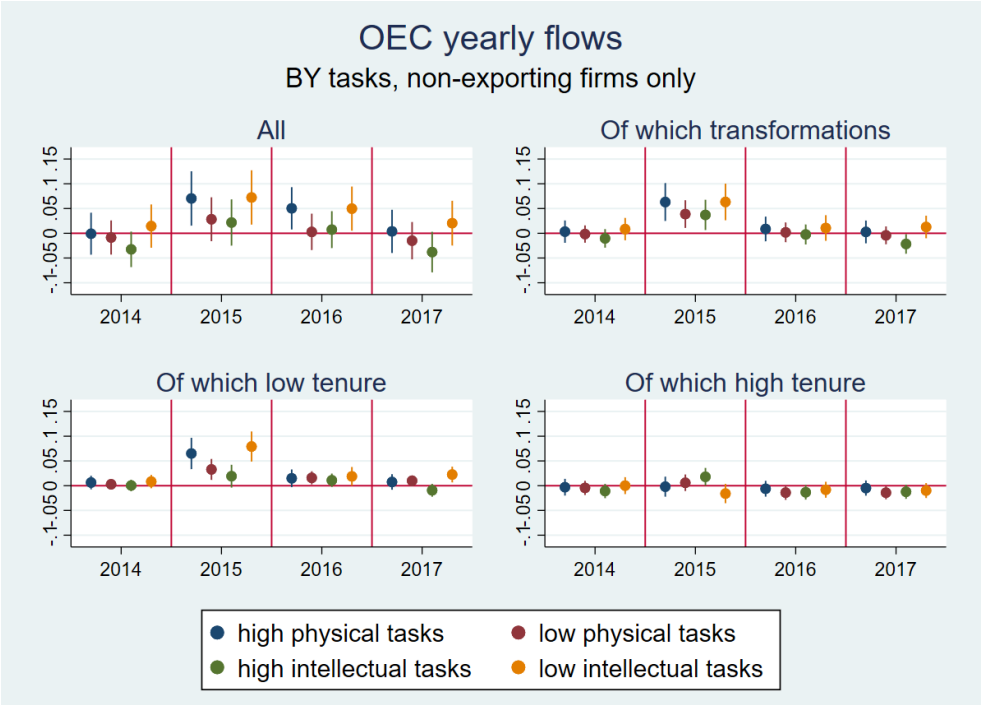


**Fig. C14: New open-ended contracts by tenure and tasks. Non-exporting firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.

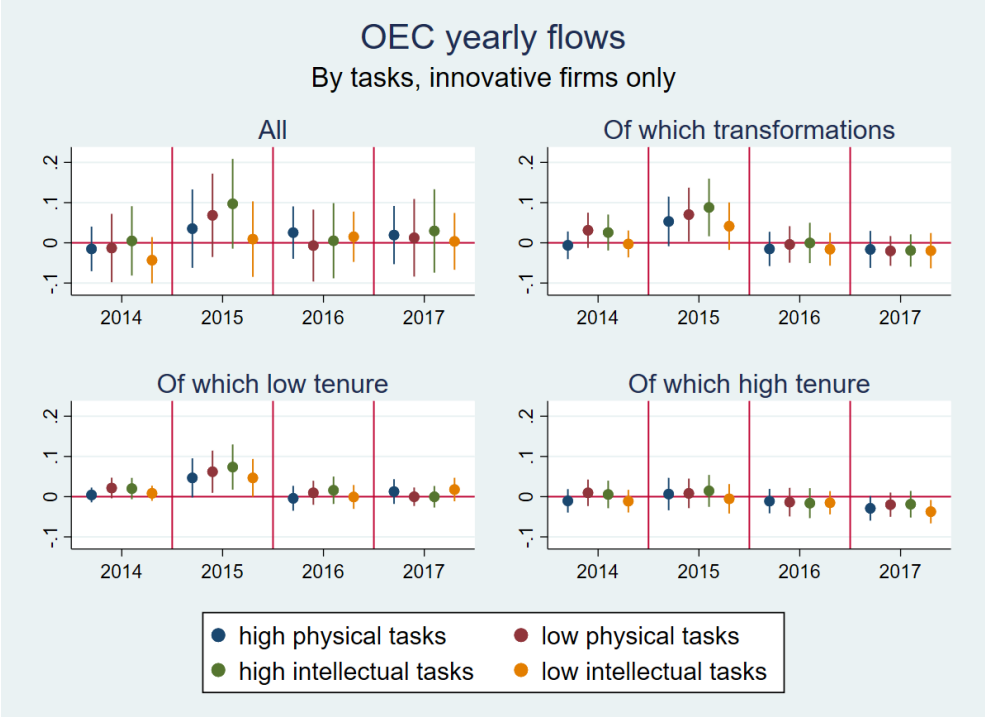


**Fig. C15: New open-ended contracts by tenure and tasks. Innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.

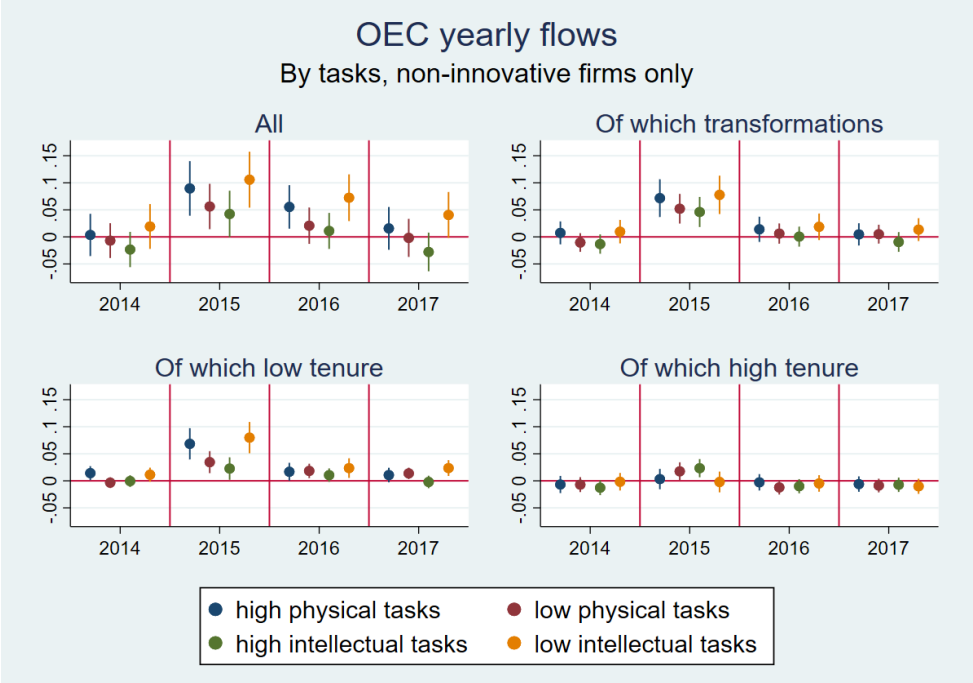


**Fig. C16: New open-ended contracts by tenure and tasks. Non-innovative firms.**
*Note*: estimated $\delta$ from eq. (1) and 95% c.i.