

The effect of literacy and numeracy programmes on labour market outcomes

Lisa Meehan, Gail Pacheco, **Thomas Schober**

NZ Work Research Institute, Auckland University of Technology

Western Economic Association International
17th International Conference
Melbourne, 14 April 2023

Motivation

- 💡 literacy and numeracy skills are key to participate in modern societies
 - ▶ low skills are correlated with many adverse outcome: health, labour market, crime (e.g., Meehan, Pacheco, and Schober, 2022)
 - ▶ affect economic development of countries (OECD, 2010; Hanushek and Woessmann, 2008)
- 💡 many people lack these skills when they leave school
 - ▶ more than 25 % 15-year-old students in OECD countries have not attained a baseline level of proficiency in reading, mathematics, or science
- 💡 policies in many countries to improve adult's skills
- 💡 large literature on active labour market programmes for the unemployed and job training (e.g. Card, Kluve, and Weber, 2018)
- 💡 few studies on general literacy and numeracy interventions
 - ▶ Reder (2014) finds adult basic skills (ABS) programmes in the US increase earnings

Literacy and numeracy interventions in NZ

- 💡 NZ government provides funds to raise adult's skills **free of charge**
- 💡 learners typically self-select into participation
- 💡 large diversity in types of programmes and providers
 1. Workplace Literacy and Numeracy (Workplace LN)
 - ▶ 25-80 hours in total, intensity of 40 hours over a 10-40 week period
 - ▶ aimed to increase workplace productivity
 2. Intensive Literacy and Numeracy (Intensive LN)
 - ▶ 80-300 hours in total, 5-20 hours per week
 - ▶ targeted at learners with low skills
 3. Intensive Literacy and Numeracy - English for Speakers of Other Languages (ILN English)
 - ▶ 20-500 hours per year, 5-40 hours per week
 4. Intensive Literacy and Numeracy - Refugee English (ILN Refugee)
 - ▶ 20-500 hours per year, 5-40 hours per week

This paper

- 💡 characterize programme participants
- 💡 document changes in measured skills
- 💡 estimate effects on outcomes
- 💡 use data from the Integrated Data Infrastructure (IDI): large research database with micro-data from government agencies at Stats NZ
 - ▶ L+N participation from 2013 to 2021
 - ▶ characteristics of individuals from census and other data sources
 - ▶ income tax data to measure employment and earnings
 - ▶ literacy and numeracy assessment tool
 - ▶ workplace accidents from the Accident Compensation Corporation (ACC)

Disclaimer: Access to the data used in this study was provided by Stats NZ under conditions designed to give effect to the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers. These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI) which is carefully managed by Stats NZ. For more information about the IDI please visit <https://www.stats.govt.nz/integrated-data/>. The results are based in part on tax data supplied by Inland Revenue to Stats NZ under the Tax Administration Act 1994 for statistical purposes. Any discussion of data limitations or weaknesses is in the context of using the IDI for statistical purposes, and is not related to the data's ability to support Inland Revenue's core operational requirements.

Characteristics of programme participants

	(1) Workplace LN	(2) Intensive LN	(3) ILN English	(4) ILN Refugee	(5) Population
<i>Individual characteristics (%)</i>					
Age (years)	39.6	35.8	46.3	30.6	39.2
Female	48.9	57.4	65.5	57.6	50.5
Born in NZ	49.8	66.5	0.8		70.4
No secondary school qual.	33.2	58.2	50.4	31.2	20.6
<i>Employment and income</i>					
Any employment	85.5	36.1	22.1	40.0	73.2
Earnings (\$)	39800.3	5647.5	3246.3	4466.6	41057.6
Earnings (cond. on emp., \$)	46560.8	15631.7	14691.1	11186.0	56106.1
Any benefit payments	13.9	61.2	58.5	72.0	16.2
N	40029	35562	25113	3729	471756

Notes: This table compares average characteristics of different literacy and numeracy programme participants (columns 1 to 4) and the NZ population (column 5). Unless otherwise indicated, the numbers represent percentages. Missing numbers indicate that the number of individuals in the cell was too small to report (in accordance with Stats NZ confidentiality rules).

Changes in skills

- 💡 Literacy and Numeracy for Adults Assessment Tool (LNAAT)
 - ▶ aimed to inform effective teaching and monitor learners' progress
 - ▶ online or paper-based
 - ▶ continuous scale from 0 to 1000 for each assessment
- 💡 80-90 % of Workplace LN, Intensive LN, and ILN English participants have at least one assessment
- 💡 50 % of ILN Refugee participants
- 💡 analyse changes by comparing scores at the start and the end of programme
 - ▶ only 11-37 % have assessments at both start and end

Changes in skills

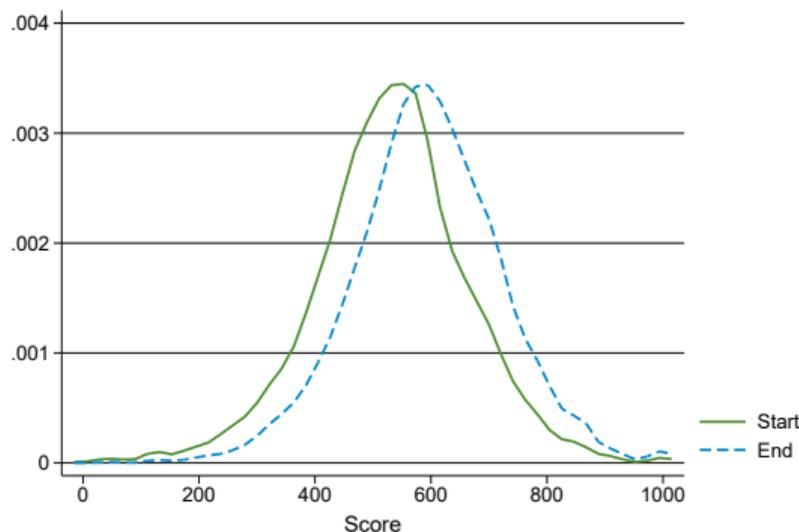


Figure: Kernel density estimates (Epanechnikov kernel) on the distribution of assessment scores at programme start and end

- 💡 average increase in scores for all assessed participants
 - ▶ largest gains for Workplace LN: 67.9 points (55% of the SD)
 - ▶ significant gains for Intensive LN and ILN English
- 💡 how representative are those who get tested?
- 💡 counterfactual of programme participation?

Labour market effects

- 💡 people self-select into programmes
- 💡 using individuals who participate in same programme as a counterfactual
 - ▶ treatment group participates 2014-2017
 - ▶ control group participates 2018-2021 ...*placebo participation* 4 years earlier
- 💡 estimate effects using a dynamic DiD model
- 💡 parallel trends assumption plausible?

$$y_{it} = \alpha \textit{treated}_i + \sum_{\substack{r=-3 \\ r \neq -1}}^3 \beta_r D_{it}^r + \sum_{\substack{r=-3 \\ r \neq -1}}^3 \gamma_r (D_{it}^r \times \textit{treated}_i) + \delta X_{it} + \epsilon_{it}$$

y_{it} outcome of individual i in year t

$\textit{treated}_i$ indicates being in the treatment group

D_{it}^r indicators for event time

X_{it} calendar year dummies, participant's sex and age

Labour market effects: Employment and earnings - descriptive trends

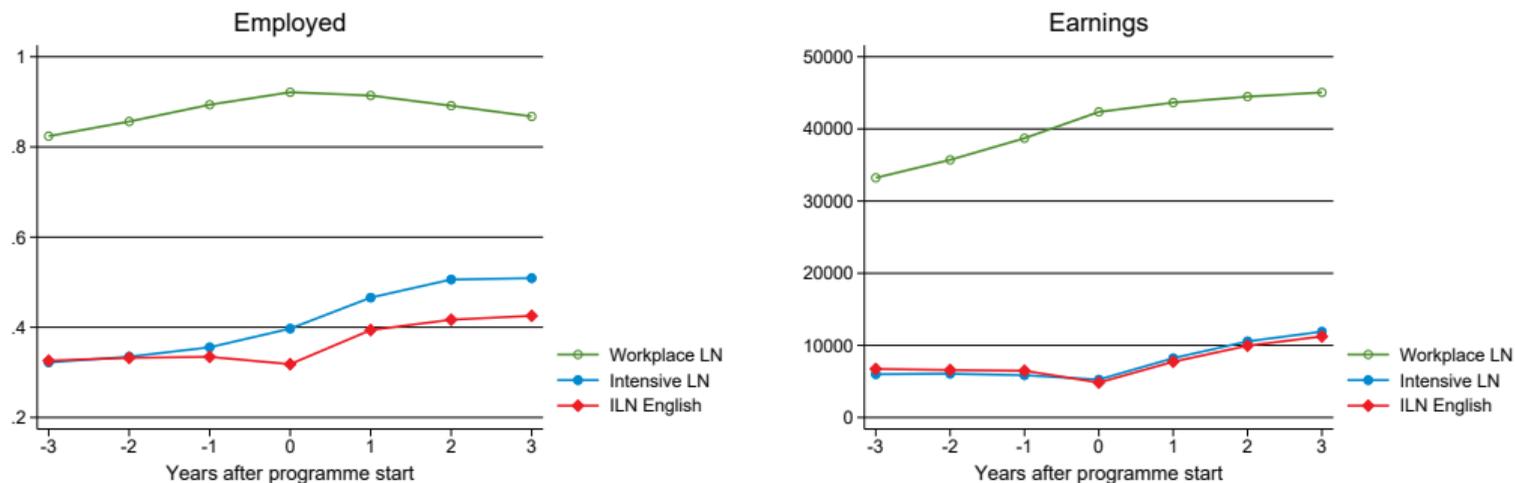


Figure: Employment rate (left) and average earnings (right) before and after programme participation

Labour market effects: Employment estimates

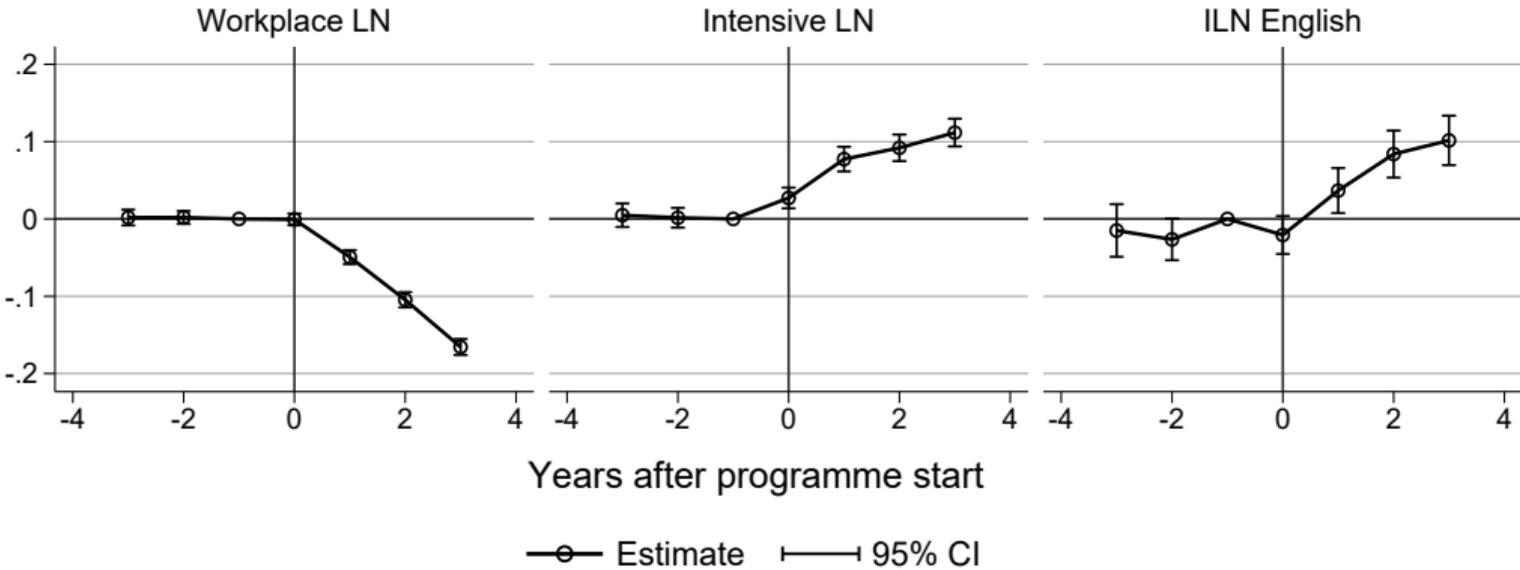


Figure: Effect of participation on any employment within a calendar year for different programmes

Labour market effects: Earnings estimates

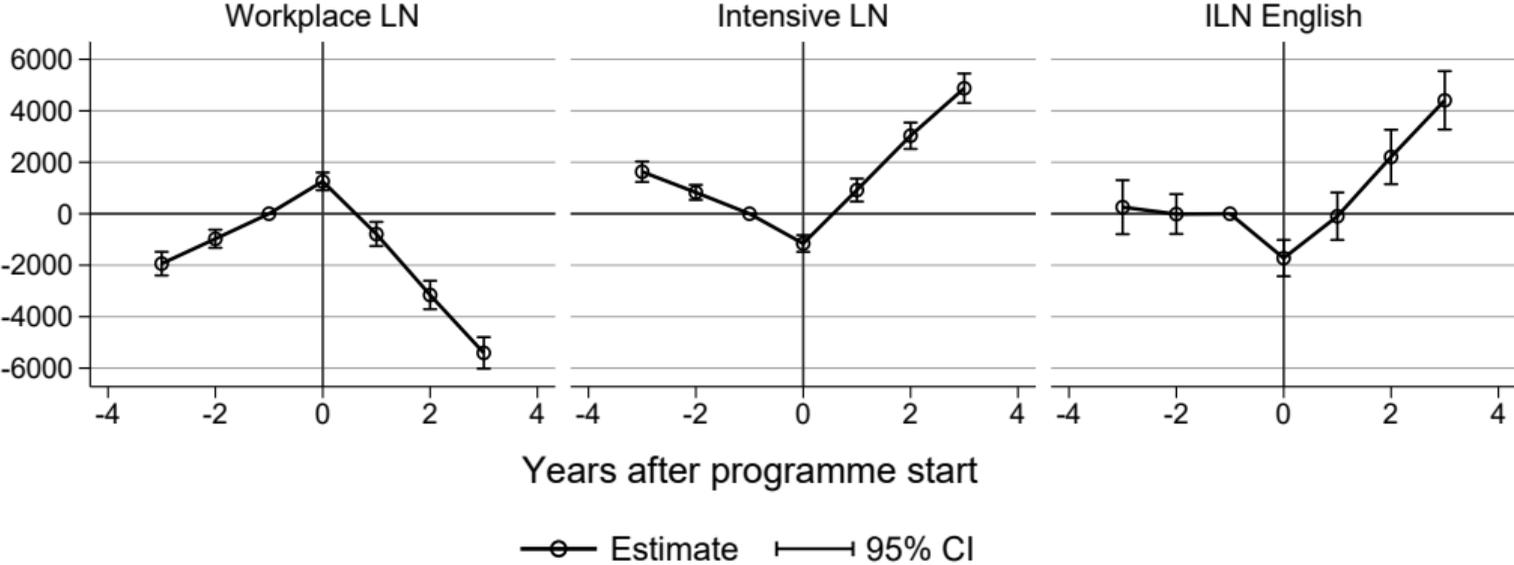


Figure: Effect of participation on annual earnings for different programmes

Conclusion

- 💡 increase in skills among those who got tested
- 💡 increase in employment and earnings for Intensive LN and ILN English participants
- 💡 problematic pre-trends for Workplace LN participants
- 💡 decrease in **accidents** for Workplace LN participants, increase for Intensive LN
- 💡 next steps
 - ▶ use matching as an alternative estimation strategy
 - ▶ study selection into skill assessments
 - ▶ explore additional well-being outcomes
 - ▶ heterogeneity analysis

Thank you!

thomas.schober@aut.ac.nz

References

-  Card, David, Jochen Kluge, and Andrea Weber (2018). "What works? A meta analysis of recent active labor market program evaluations". In: *Journal of the European Economic Association* 16.3, pp. 894–931.
-  Hanushek, Eric A. and Ludger Woessmann (2008). "The Role of Cognitive Skills in Economic Development". In: *Journal of Economic Literature* 46.3, pp. 607–668.
-  Meehan, Lisa, Gail Pacheco, and Thomas Schober (2022). *Literacy and numeracy skills and life-course outcomes: Evidence from PIAAC and linked administrative data*. NZ Work Research Institute. URL: https://workresearch.aut.ac.nz/_data/assets/pdf_file/0005/693788/PIAAC-trajectories_MBIE-working-paper-update.pdf.
-  OECD (2010). *The High Cost of Low Educational Performance: The Long-run Economic Impact of Improving PISA Outcomes*. Paris: OECD Publishing. URL: <https://doi.org/10.1787/9789264077485-en>.
-  Reder, Stephen (2014). *Research Brief: The impact on ABS program participation on long-term economic outcomes*. Washington DC: US Department of Education. URL: https://lincs.ed.gov/publications/pdf/ABS_EconomicOutcomes.pdf.

Labour market effects: Work-related accidents - descriptive trends

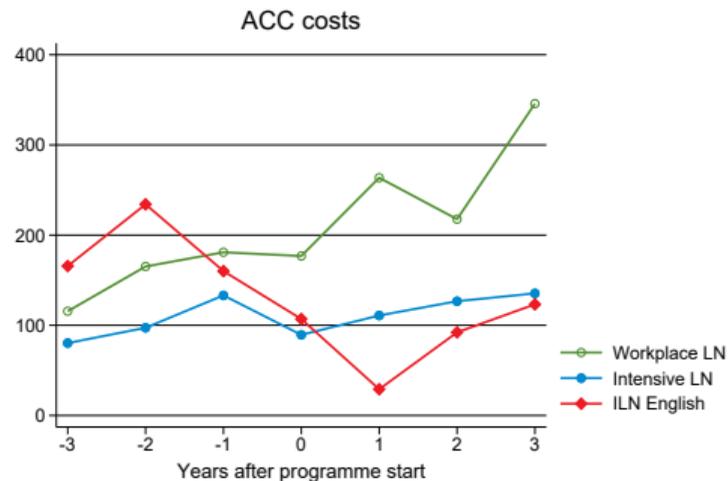
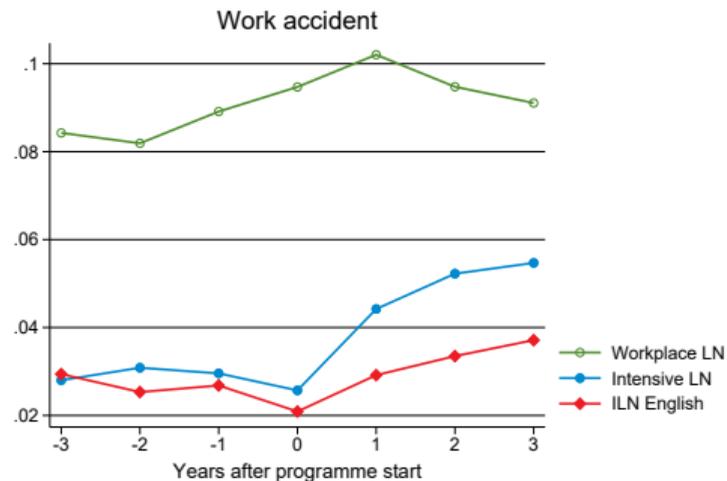
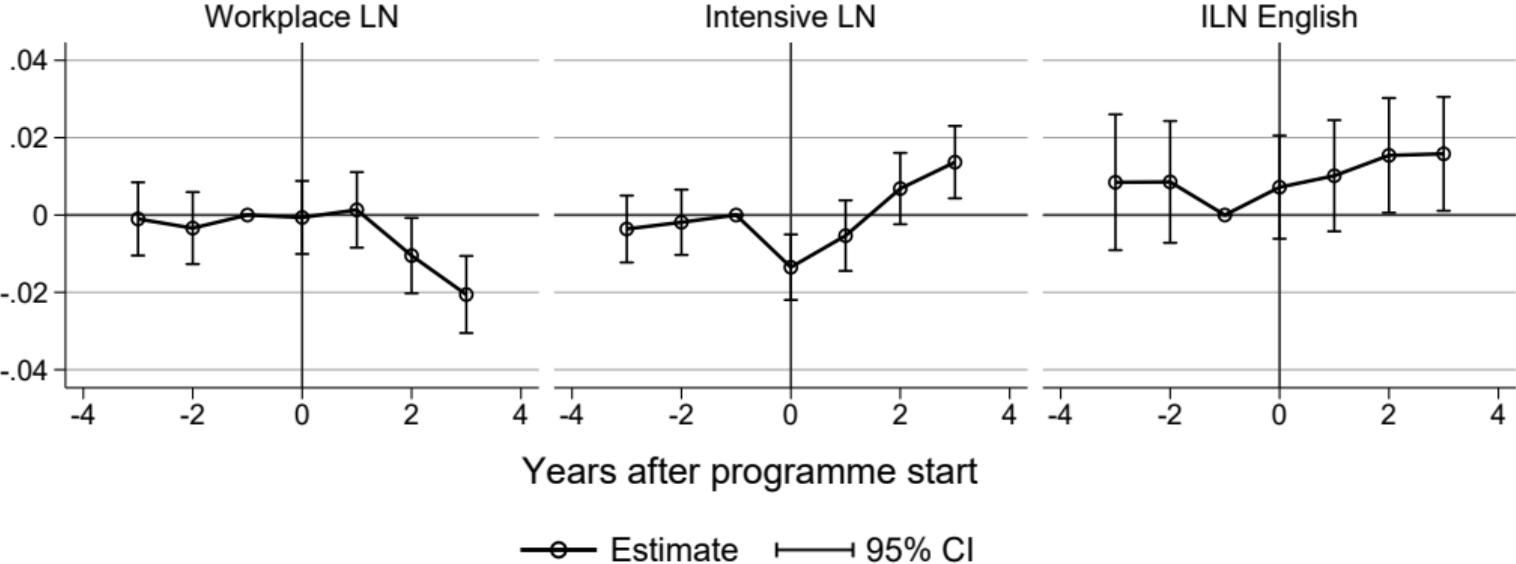


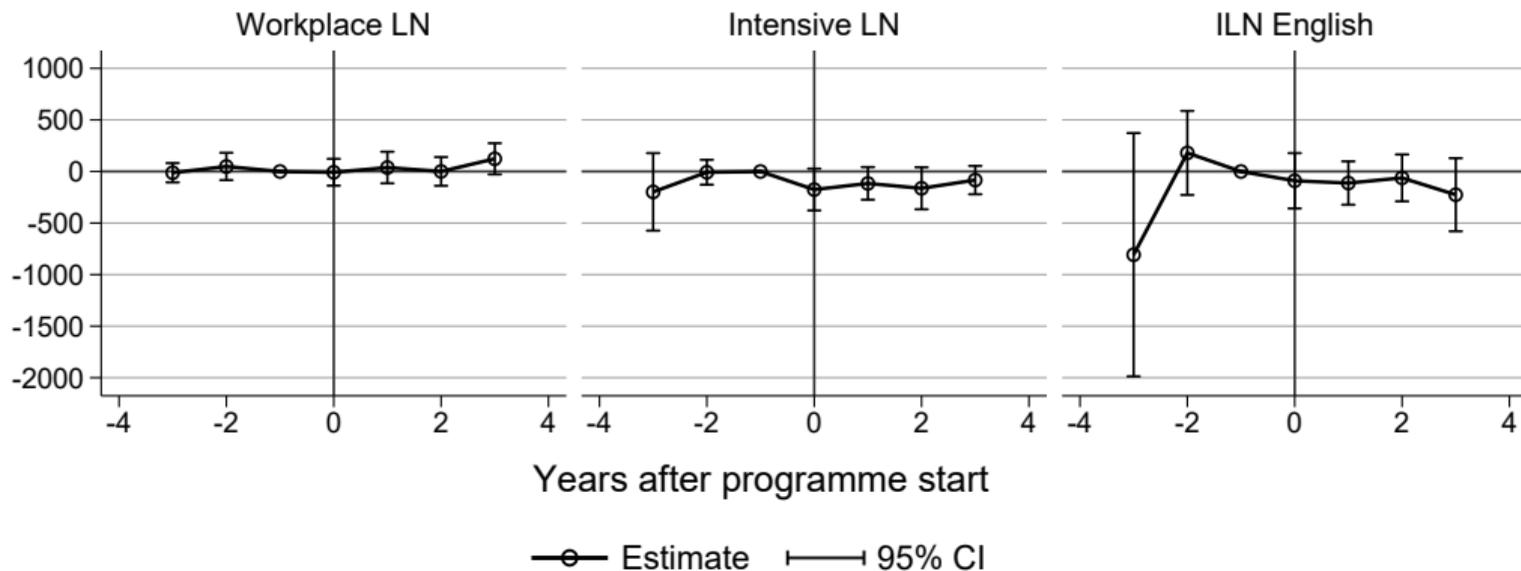
Figure: Share of people with workplace accidents (left) and average expenditure related to workplace accidents (right) before and after programme participation

Labour market effects: Workplace accidents



[▶ back](#)

Labour market effects: Expenditure related to work accidents



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