



# Training expenditure, agglomeration externalities and productivity: Firm level evidence from Local Labour Market

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# Motivations

- Does the agglomeration of training expenditure affect labour productivity?
- We investigate the interaction between turnover and the agglomeration of training expenditure on productivity:
  - Does Turnover act as a mechanism of **knowledge transfer** (Serafinelli, 2015) or of **loss of human capital** (Becker, 1964)?;
- To exploit a new data set providing an extensive list of firm's variables among which the **cost of training**.

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## Overview

- Related literature.
- The Framework.
- The Empirical analysis.
- Conclusions and Future research.

# Agglomeration of training expenditure and labour productivity (1)

- The amount of firm-provided training depends on the **comparison between its marginal benefits**, expressed in terms of higher labour productivity, and **costs** (Becker, 1964; Acemoglu and Pischke, 1999).
- A large number of contributions has explored the role of firm-provided training concluding that it is the **leverage** to obtain **productivity gains** and **better economic performance** (Blundell et al., 1999; Bartel, 2000; Collier et al., 2008; Angotti, 2011; Colombo and Stanca, 2014; Guerrazzi, 2016).

## Agglomeration of training expenditure and labour productivity (2)

- The amount of training expenditure varies across countries according to differences in the economic structures **BUT** other economic factors at lower territorial scale could influence firm's training investments (Croce and Ghignoni, 2012).
- Is productivity affected by local knowledge spillovers deriving from the agglomeration of training expenditure in Local Labour Markets (LLMs)?

## Agglomeration of training expenditure and labour productivity (3)

- Knowledge spillovers can be generated by human capital embodied in the labour supply located in an LLM, and have a positive influence on local productivity (Rosenthal and Strange, 2004; Henderson, 2007).
- Firms can, for instance, reach higher productivity if they have a skilled workforce able to adopt new knowledge and technologies (Acemoglu, 2002).
- This knowledge may circulate in the local economy through direct contacts between employers (Henderson, 2007) or through the local networks of service providers and business consultants (Acs and Varga, 2005).

## Agglomeration of training expenditure and labour productivity (4)

- In areas where a large share of firms train intensively, each worker has a good chance to gain from his/her neighbours thanks to human capital spillovers.
- This process of interactive learning necessarily occurs in the local context.
- Each firm, located in an area where the training expenditure is larger, will benefit from:
  - externalities (e.g. adoption of improved production methods); or
  - if in the LLM workers are more trained, firms can exploit other firm's training by hiring them

## Agglomeration of training expenditure and labour productivity (5)

- **Possible negative effects:** the agglomeration of training expenditure might favour a *poaching effect*.
- More qualified and skilled workers show a larger job-to-job mobility (Greenhalgh and Mavrotas, 1996; Trivellato et al., 2005) and trained are more likely to leave their employer after training due to better outside options (Brunello and De paola, 2004; Croce et al., 2016).
- In areas where there are more firms with higher propensity to train every firm can more easily engage in free-riding and hire workers trained by other employers.



# Turnover and productivity

The relationship between turnover and firm performance has been subject to **several contrasting views**:

- Higher turnover is likely to cause indirect negative effects: output forgone during the vacancy period, productivity decrease during the training process of new workers and could be a loss of human capital (Becker, 1975; Dess and Shaw, 2001; Shaw, 2011);
- Based on a cost-benefits perspective: inverted U-shape relationship. Some amount of turnover can allow firms to cut in high labor costs, correct its demography in terms of age or qualifications, acquire new and external knowledge (Abelson and Baysinger, 1984).

## Excess worker turnover and Training (1)

- **Standard effect of training:** firm's productivity increases by improving worker's ability.
- In local labour markets, characterized by a high level of training expenditure, worker's productivity should further increase enabling him/her to 'catch' the knowledge spillovers in the area.
- A similar externalities could arise inside the firm assuming that the presence of trained workers also increases the productivity of non-trained workers.

## Excess worker turnover and Training (2)

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High level of turnover means low average permanence into the firm.

- On one hand, a high level of turnover at firm level could discourage firms from offering training because of the risk of a loss of production knowledge  $\implies$  The positive effects derives from agglomeration externalities could be opposed.

## Excess worker turnover

Excess worker turnover (or churning) corresponds to worker flows in excess of those strictly necessary to achieve a given level of employment (Davis and Haltiwanger, 1990; Burgess et al., 2000):

$$ET = HR_{it} + SR_{it} - |NT_{it}| \quad (1)$$

where  $HR_{it}$ ,  $SR_{it}$  are, respectively, the hiring and separation rate in firm  $i$  at time  $t$ ,  $NT_{it}$  is the Net Turnover ( $HR_{it} - SR_{it}$ ).

- Churning can arise because workers quit their employers to look for a better job or better working conditions and are replaced, or/and
- because employers simultaneously hire and fire workers to improve their workforce quality, the skill mix available to the firm.

## The data

- **Source:** “*Rilevazione Imprese e Lavoro (RIL)*”, INAPP; “*Analisi Informatizzata delle Aziende Italiane (AIDA)*”, Bureau Van Dijk;
- **Year:** 2010, 2015;
- **Longitudinal Sample:** about 4,000 Italian corporations operating in non-agricultural private sectors for each year.
- **Variables of interest:**
  - value added at firm level (source: AIDA);
  - training costs (per employee) at firm level and at LLMs level (source: RIL);
  - excess worker turnover at firm level (source: RIL).

# The data

## Control variables:

- *Management controls*: employers' educational level, and dynastic governance
- *Firms controls*: sector of activity, size, Ln(physical capital per employee), etc.
- *Workforce controls*: gender, age, education, professions.
- *LLMs controls*: average of the managerial and firms characteristics measured at LLM

## N.B

- We select only **firms with more than five employees** to retain firms characterized by a minimum level of organizational structure.

## The econometric strategy

We estimate the following model:

$$\ln(\text{prod})_{it} = \alpha \text{TRC}_{it} + \beta \text{TRC}_{llm,t} + \delta \text{TRC}_{llm,t} * \text{EWT}_{it} + \chi \text{EWT}_{it} + \theta W_{it} + \gamma W_{llm,t} + \varepsilon_{it}$$

where:

- $\ln(\text{prod})_{it}$  denotes the (log) of value added per employees for firm  $i$  at time  $t$ ,
- $\text{TRC}_{it}$  is the (log of) training expenses per employee at firm level,
- $\text{TRC}_{llm,t}$  is the (log of) average of the training expenses measured at LLMs,
- $\text{EWT}_{it}$  the excess worker turnover at firm level.

## IV 2SLS approach

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Two instruments to deal with the potential endogeneity of the relationship between the amount of training investment and labor productivity

- The lagged (average) incidence of employers' association registered at local labor markets, and
- the lagged percent value of population with tertiary education (derived from Census data 2001 and 1991) (Croce et al. 2016).



## The results

**Three different specifications of Eq. (3):** Pooled OLS on Panel component, Fixed Effect (firm specific unobserved heterogeneity) and IV 2SLS approach.

Variables	Pooled OLS		Fixed Effect		IV 2SLS	
	[1]	[2]	[3]	[4]	[5]	[6]
$TRC_i$	0.013*** (0.003)	0.013*** (0.002)	0.005* (0.003)	0.005* (0.003)	0.009*** (0.004)	0.009** (0.004)
$TRC_{llm}$	0.012*** (0.006)	0.020*** (0.006)	-0.02 (0.007)	0.001 (0.007)	0.133* (0.008)	0.150* (0.083)
$TRC_{llm} * EWT$		-0.037*** (0.012)		-0.014** (0.006)		-0.073* (0.026)
$EWT_i$	0.014 (0.009)	0.197*** (0.061)	0.012*** (0.003)	0.082*** (0.031)	0.013 (0.009)	0.380*** (0.129)
Controls	yes	yes	yes	yes	yes	yes
N. Obs	7353	7353	7411	7411	7304	7327
R2	0.33	0.34	0.16	0.16	0.31	0.29

**Source:** RIL-AIDA 2010-2015. Standard errors are reported in parenthesis; they are computed via a bootstrap procedure with 1000 bootstraps (see Efron and Tibshirani 1993).

# Conclusions and Future research

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- A positive effect associated to the agglomeration of training expenses at local labor markets.
- The excess worker turnover plays a key role in reducing the positive externalities that a firm gain from being localized in areas when a high level of training expenses is invested.

## Future research

- RIL data set is not so representative at LLMs level  $\implies$  Province level.
- To increase the number of observations making a pooled-cross section analysis with fixed effect at firm level.

# Conclusions and Future research

## Future Research

- Investigate the identification problem: which are the channels through which training and turnover affect labour productivity.
- To find a better instrument for  $TRC_{llm}$  and an instrument also for EWT at firm level.
- The EWT is demand or supply induced? Possible instrument: the relative wage rank paid by a firm in the LLM conditional on firm observables.

THANK YOU FOR YOUR ATTENTION

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