(Re)training at Scale: an Organizational Perspective

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Introduction

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- Through complementarities in production

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But an issue that is even more salient now to face new economic challenges and opportunities

- Digital transition (ICTs and Gen-AI), Green transition
- Industrial policy
- Tightening labor markets post-Covid

How should these skills problems be addressed?

Proposed interventions typically focus on two types of approaches

- Increase supply of skills (e.g. setting up coding schools)
- Reduce labor market frictions (e.g. improving information on skills needs for workers)

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Claim: These are necessary but insufficient interventions

Reason: Skills shortages and mismatches reflect **organizational** frictions, including inability to design and implement effective **(re)-training programs** at scale

This talk: present new evidence on frictions in training across and within firms

Today's roadmap

1. Introduction
2. Setting the Context
3. Training
4. Conclusions

Definitions

Three kind of skills problems

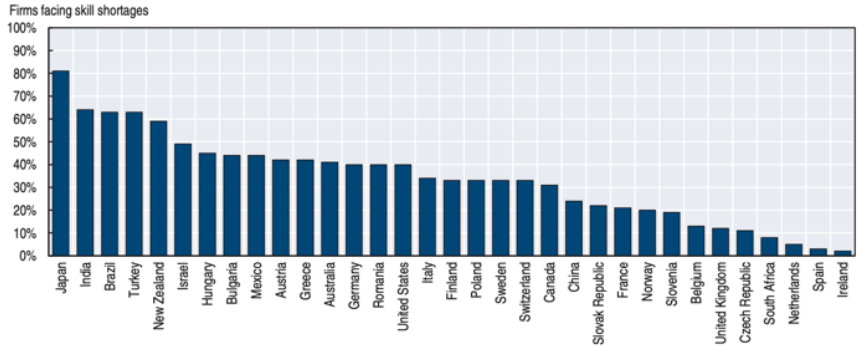
- **Skills gaps**: failure of the education system, especially K-12 public education, to provide students with these basic skills
- **Skills shortages**: undersupply of job-related skills of the kind associated with particular occupations (engineers or IT)
- **Skills mismatches**: the supply of skills and the demand for skills could be out of synch in either direction–oversupply or undersupply (misallocation)

Latter two directly related to firms, focus of this talk

Skills Shortages

Figure 1.4. **Skill shortage in selected countries**[a]

As a percentage of all firms with ten or more employees



Countries are sorted by the total skill shortage.

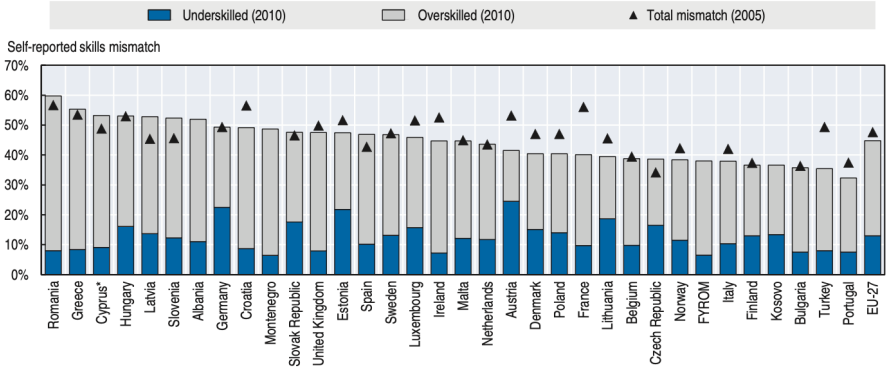
a) Firms are classified as facing a skill shortage if their manager reports having difficulties filling jobs.

Source: Manpower Talent Shortage Survey (2014).

Skills Mismatches

Figure 1.1. **Skill mismatch in Europe**[a,b]

As a percentage of all employment



The standard narrative

In the background: technological change affecting skills requirements, prompting firms to adapt

"Supply chain" view

- Bottlenecks in the supply of skills prevents adjustment, not enough candidates with the required skills
- Solution is to push education system to produce more of the desired skills

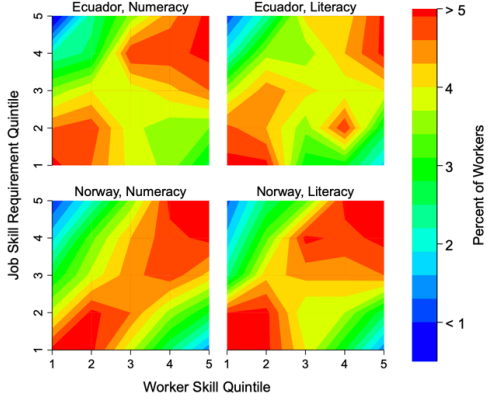
"Labor market frictions" view

- Frictions prevent markets from adjusting to new needs: e.g. incomplete information leads individuals to under or over estimate employment prospects, or firms to adjust wages to match workers' true productivity
- Solution is to eliminate labor market frictions, e.g. improve information on skills needs to workers

Is it enough to increase supply and reduce labor market frictions?

Bandiera et al. (2024): Meritocracy across Countries

Figure 1: Joint Distribution of Worker Skills and Job Skill Requirements by Skill Dimension



Notes: Each panel shows the joint distribution of worker skills and job skill requirements in a given country (i.e., Ecuador in the top panels and Norway in the bottom panels) for a given skill dimension (i.e., numeracy in the left panels and literacy in the right panels). Colors represent percentages of workers, ranging from low in blue to high in red. *Source:* PIAAC.

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Bandiera et al. (2024): Meritocracy across Countries

- Similar starting point: pervasive mismatches between job requirements and workers skills; heterogeneity across countries
- A different twist: mismatches are equilibrium outcomes

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Decompose sources of mismatches in three components

1. Supply: Differences in endowments of worker skills and job requirements=>match feasibility
2. Frictions: Differences in idiosyncratic matching frictions=>relative importance of workers' and job's unproductive traits in the matching process

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2. Frictions: Differences in idiosyncratic matching frictions=>relative importance of workers' and job's unproductive traits in the matching process
3. **Differences in "technology"** across countries shaping returns to worker-job matches (e.g. management practices)=>matching productivity. If there are strong complementarities, then greater incentives to sort along these dimensions

They specify and estimate the relative importance of these channels for macroeconomics growth using an equilibrium model of worker-job matching, then development accounting

Results

All three factors matter, but quantitatively endowments and technology (including management) play a much bigger role than frictions: 94% of cross-country differences in output per country

- **Just increasing technology would lead to a 35% reduction in variation in aggregate output across countries**
- Just increasing endowments would lead to 25% reduction
- Just reducing frictions by only 6%

Two key and novel points

- Mismatches are a consequence of unequal diffusion of endowments and technology: addressing mismatches alone not enough
- Closing differences in **firms' technology determining productivity of matches** key for development

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Why training?

Training is one of the most important technology that firms have at their disposal to improve the productivity of matches

Extensive literature explaining training-related tradeoffs for firms and workers (Becker, 1964)

However, existing literature largely silent on whether/how organizational frictions may affect these tradeoffs

Two organizational frictions may affect training intensity and effectiveness

1. Over-reliance on spot market for talent vs. internal labor markets (ILM)
2. Inability to design and manage training programs

Under-investment in training: The "Home Depot" Syndrome (Cappelli, 2023)

Firms increasingly in the market for "plug and play" talent to respond to financial accounting pressures (push to reduce employment-related costs)

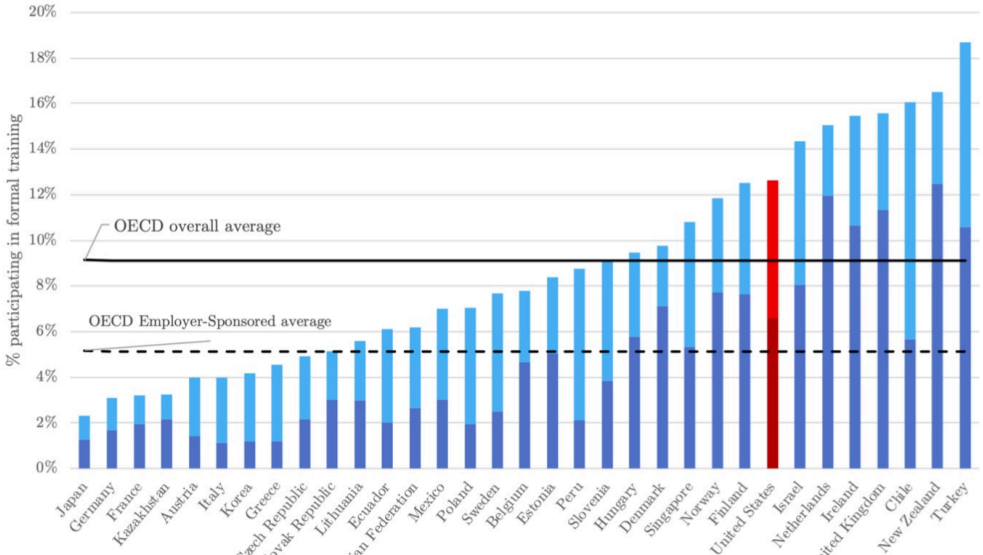
- Increasingly specific and idiosyncratic demand for skills, preference for experienced workers
- Lower investments in ILM, and externalization or HR activities
- Reluctance to increase wages

Implications

- Self-inflicted skills shortages: markets not thick enough to accommodate firms' requests
- A bad equilibrium: "Every employer wants a trained worker, and no one wants to pay for their training. And since everyone knows that all other firms are in the same situation, no-one is willing to train for fear of poaching"

Mixed evidence supporting this view

Training intensity across countries (PIAAC, Black et al, 2023)



Mixed evidence supporting this view

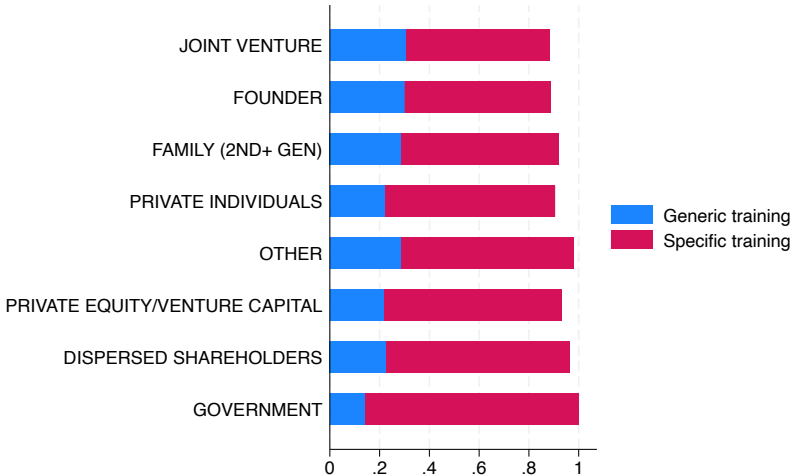
Unclear if investments in training have actually declined due to lack of data and very messy measurement problems (Osterman, 2022)

Large share of adult learning is employee sponsored (Desjardin, 2022)

- $100bn investments (Hoffman and Stanton, 2024), or 1.5% of total firms' annual budgets (BCG, 2023)

Training and financial accounting?

Training investments not significantly lower in organizations under stronger financial accounting pressures (WMS, 2022)



Training and management practices

Skill shortages may be a symptom of **organizational** frictions reducing training effectiveness

HR specific gaps

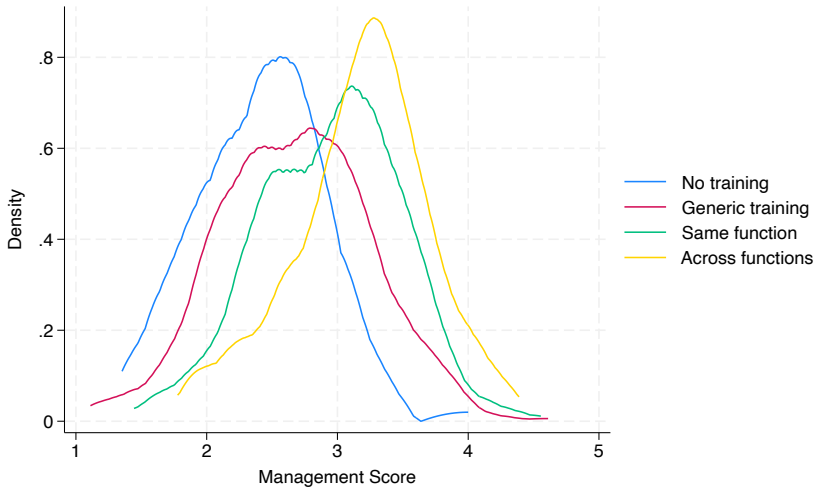
- Training part of a bundle, e.g. more responsibility in the hands of frontline employees, job rotations, quality programs, employee voice, etc. which are not widely adopted (Bloom, Sadun and Van Reenen, 2012)

More general organizational gaps

- Training investments require specific organizational practices to be effective
- *"One manager who wished to remain anonymous told me, "**My department is too disorganized and undisciplined to have a good program to quickly ramp up new employees for our needs**. Thus, we keep looking and looking, and three months go by and we may hire someone at that point, but by then a guy we saw three months ago that had the potential and a good work ethic would be starting to contribute."* Cappelli, 2010

Training and management practices

Training investments are significantly higher and more complex in better managed firms (WMS, 2022)



Deep dive: Reskilling

Reskilling: training to facilitate occupational change, e.g.

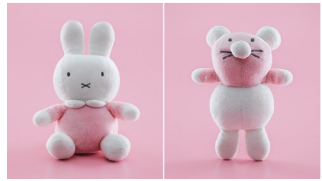
- Automotive: From mechanical to electric engineers
- Insurance: From actuaries to cyber security
- Banking: From bank tellers to greeters

Intense advocacy and policy attention (WEF, 2023), IMF (2024)

Very little evidence on take-up and effectiveness

Reskilling: some evidence

Old Training Paradigm	New Training Paradigm
Reskilling is a CSR initiative to support displaced workers	Reskilling Is a strategic imperative
Reskilling is an HR responsibility	Reskilling is the responsibility of every leader and manager
Reskilling is a training initiative	Reskilling goes beyond training – it is a holistic change management initiative
Employees need to be convinced to reskill	Employees want to reskill - when it makes sense
Reskilling is an individual firm problem	Reskilling takes a village



Reskilling in the Age of AI

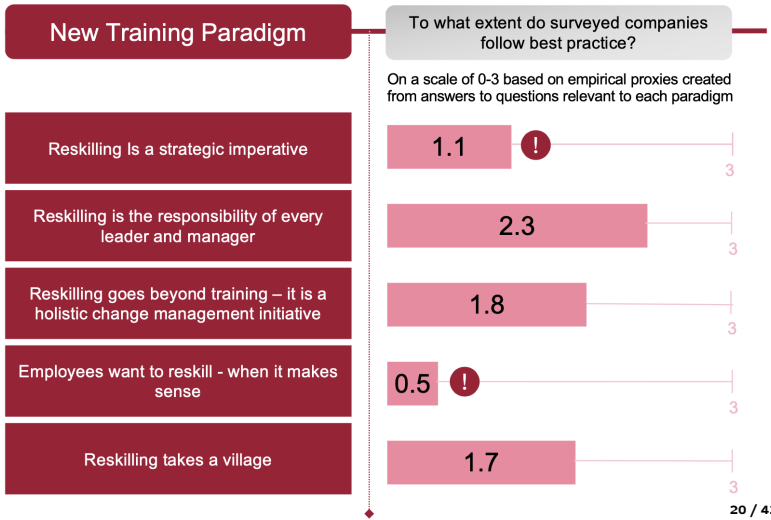
Five new paradigms for leaders—and employees by Jorge Tamayo, Leila Doumi, Sagar Goel, Orsolya Kovács-Ondrejkovic, and Raffaella Sadun

From the Magazine (September–October 2023)

In-depth interviews with Chief Human Resource Officers of global firms publicly committed to reskilling a large fraction of their workforce (35 firms, 11 industries, 4 continents)

Diffusion of these practices is still very limited

Survey of 1200 Chief Human Resource Officers of US firms with 100+ employees



Frictions **within** firms may also undermine effectiveness of training investments

Workers' selection into training

- Sandvik et al (2021), Training Industry Report (2021), OECD (2019)

Middle managers' resistance to (or inability to support) employees' advancement

- Haegele (2023), Friebel and Raith (2022)

Training Within Firms (Diaz, Nazarett, Ramirez, Sadun and Tamayo, 2024)

Study firm-specific training within **three** organizations using comprehensive and granular personnel data

- Car manufacturer (Argentina), fast food chain (Colombia), and retailer (Colombia)

Operational training

- Short training programs designed to foster acquisition of specific skills among both new and existing employees
- Training typically non mandatory and paid by the firm, but no direct bonus for training for managers or employees
- Skills acquisition advertised as key to lateral moves and promotions

Address two main questions

- What drives training take up among employees? Focus on role of **middle managers**
- How does the presence of a "high-training" middle manager affect performance?

Incentives to take up firm-specific training

Firm-specific training typically presents a dual moral hazard problem (Kahn and Huberman, 1988)

- The firm cannot directly compensate workers for the acquisition of firm-specific skills (incomplete contracts)
- Workers train only if there is a promise for higher wage if they do so
- But the firm has an incentive to claim that workers have not acquired skill even if they did to save on wages
- Workers anticipate that firms will renege on promise, and don't train

Firms in our sample try to overcome this problem committing to a promotion-based compensation that implicitly rewards skills' acquisition (Prendergast, 1993)

- Retaining and acquiring new skills necessary for lateral moves and promotions

The (possible) role of middle managers for training take-up

Middle managers are not directly involved in training

- Training imparted by dedicated staff
- Not directly compensated if workers get trained or for any other training-related activity

In practice, however, middle managers' incur some training-related costs:

- Advise employees on training opportunities
- Certify skills acquisition after training
- Lose workers to other opportunities if training is followed by a promotion

Middle managers may affect workers' perceived value of training through their behavior and traits, including

- People skills (Hoffman and Tadelis, 2021)
- Talent hoarding (Heagele, 2022)

▸ Managers' characteristics ▸ Stylized model

Estimating the role of middle managers for training take-up

In all three firms, middle managers are routinely rotated across stores/working groups for reasons exogenous to performance and/or training take up

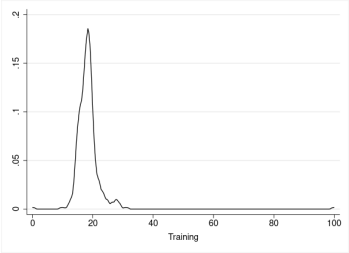
This allows us to estimate differences in training take up across teams that can be attributed to managers, controlling for time and store fixed effects (standard application of AKM model)

- Car Manufacturer: 1 Connected Set (CS)
- Fast Food: 7 CS
- Retailer: 14 CS

We estimate different types of fixed effects (FE) depending on the setting

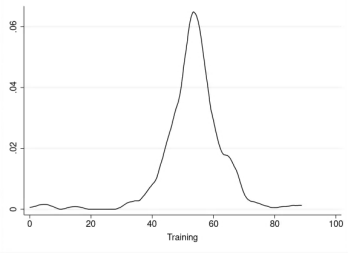
- Car manufacturer: Manager FEs and worker FEs
- Retailer and Fast Food Chain: Manager FEs and store FEs

Middle Manager fixed effects in training



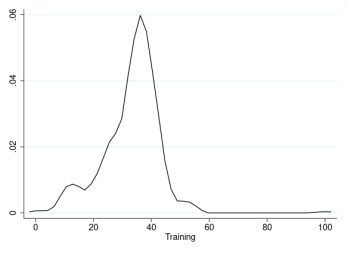
(a) Car Manufacturer

- 10th: 1 training program per working group - 90th: 6 training programs per working group (bi-week data)



(b) Fast Food Chain

- 10th: 2.10 training programs per store - 90th: 21.55 training programs per store (bi-week data)



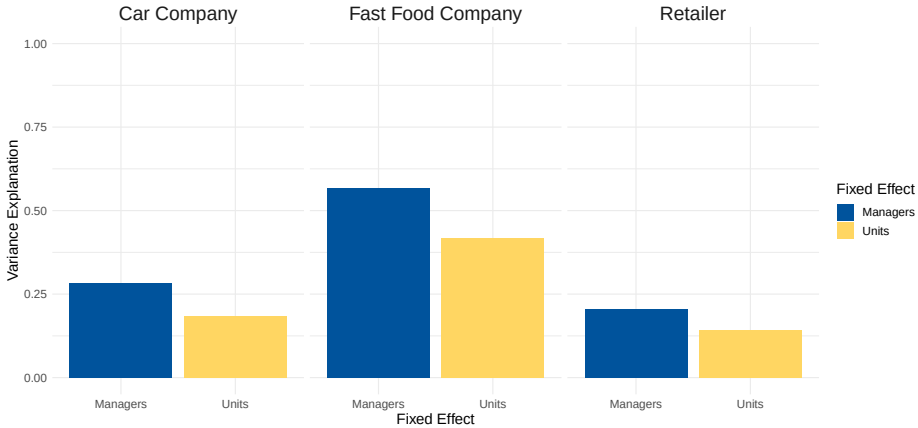
(c) Retailer

- 10th: 2.18 training programs per store - 90th: 3.78 training programs per store (bi-week data)

Note: Fixed Effects standardized by the mean of the fixed effect of the connected set to convert to values between 0-100.

▸ Go to Store FE ▸ Go to Productivity FE

Variance decomposition Manager vs Unit Fixed Effects



Portability

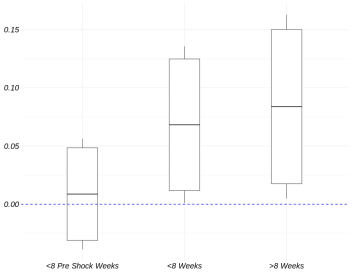
Define High-Training (HT) manager if FE is above median (rest of the managers=LT): what happens to training take up when a HT manager arrives in a unit j previously under a LT manager?

$$TR_{jt} = \sum_{-2 \leq k \leq 2, k \neq -1} D_{jt}^{k} \beta_k + \phi_j + \theta_t + \varepsilon_{jt},$$

where

- TR_{jt}: Total Training modules taken up by unit j in period t (pooled across 8 weeks)
- ϕ_j, θ_t unit and time FEs
- τ_j is the first period when unit j is assigned to HT manager
- $D_{jt}^{k} = 1[t = \tau_j + k]$ for $k \in (-2, 2)$ is the relative time-to-treatment dummy
- SEs clustered at the unit level

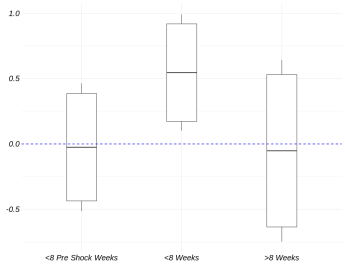
The arrival of a HT manager boosts training take-up



(a) Car Manufacturer

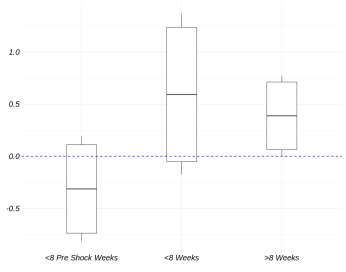
Percentage change in a working group in eight or more weeks before the shock, and the effect after the shock. Effect first eight weeks: 6.82%; after eight weeks 8.38%

▸ Portability estimated in split samples



(b) Fast Food Chain

Percentage change eight or more weeks before the shock, and the effect after the shock. Effect first eight weeks: 54.53%; after eight weeks -4.16 %



(c) Retailer

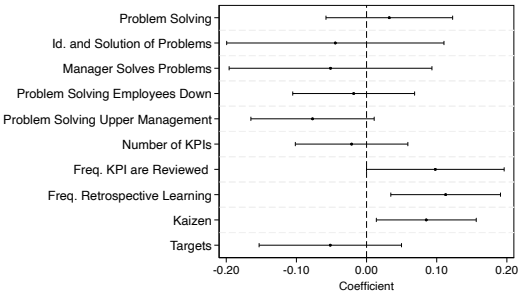
Percentage change eight or more weeks before the shock, and the effect after the shock. Effect first eight weeks 59.28 %; after eight weeks 38.78 %.

What do training FE capture?

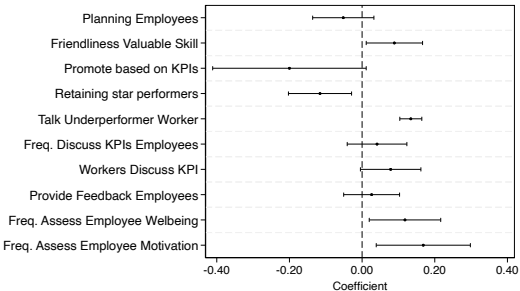
In the fast food restaurant, we could survey managers and match their answers with the estimated FEs (survey run in March 2023, 90% response rate, currently getting data on other 2 firms)

- Demographics
- Psychometric measures included in the Big-5 test (i.e., openness, conscientiousness, extraversion, agreeableness, and emotional stability)
- Leadership style (e.g. interpersonal conflicts, time management)
- Management and organizational practices, including HR

HT managers more likely to engage in problem solving, focus on left tail of talent distribution and care about employee wellbeing (Fast food, N=204)

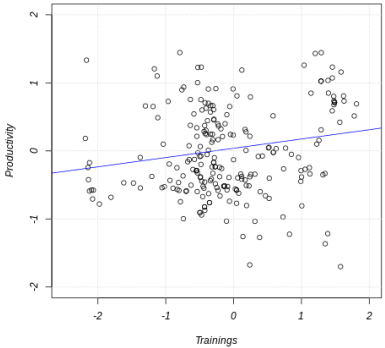


(a) Operations



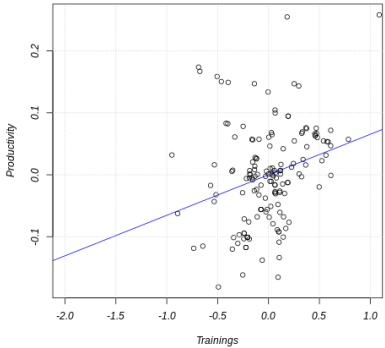
(b) HR

HT managers are not necessarily best performers on average: weak correlation betwee productivity and training FE



(a) Fast Food Company

The the correlation between training fixed effects and log productivity fixed effects: 0.121, with a significance level of 0.068



(b) Retail Company

Thethe correlation between training fixed effects and log productivity fixed effects: 0.27, with a significance level of 0.001.

But role of HT managers may be contingent on need for change and adaptation

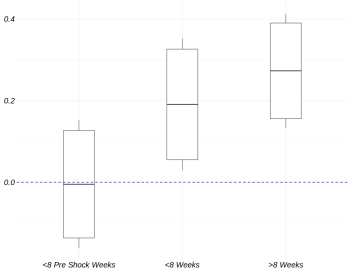
Value of HT managers may be contingent on importance of training for performance, e.g. when there is higher need for efficiency and/or mastering of new tasks

We analyze reaction to a sudden and exogenous demand shock forcing teams to adapt to a more high-pressure working environment

- Car manufacturer: CHQ requests a two production expansions (27% and 38%); one-off change implemented simultaneously across the plant
- Fast food chain & Retailer: CHQ rolls-out a partnership with last mile delivery service (delivery app), increasing transactions by 6% (FF) and 3% (Retailer); staggered roll-out across branches

In all three cases, no planned increase in hiring and hours and constant wages after the demand shock

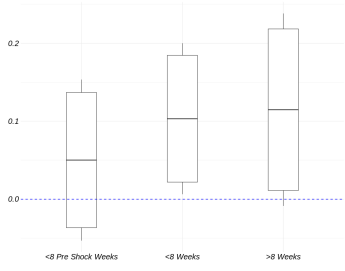
The demand shock is followed by another change: large increase in absenteeism across all firms



(a) Car Manufacturer

Percentage change in absent employees in a working group in eight or more weeks before the shock, and the effect after the shock. Effect first eight weeks 19.06%; after eight weeks 27.30%.

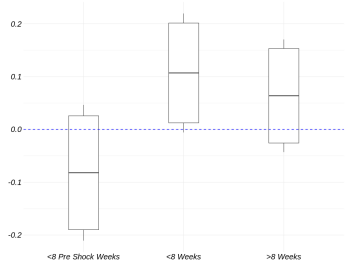
Go to Car Manufacturer



(b) Fast Food Chain

Percentage change in absent employees in a store eight or more weeks before the shock, and the effect after the shock. Effect first eight weeks 10.81%; after eight weeks 11.25%

Go to Fast Food Chain



(c) Retailer

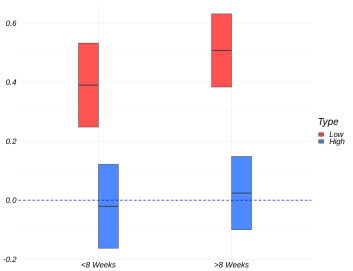
Percentage change in absent employees in a store eight or more weeks before the shock, and the effect after the shock. Effect first eight weeks 10.70%; after eight weeks 6.37%

Go to Retailer

Turnover

Reasons for Absenteeism

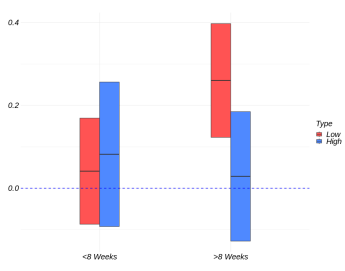
Increase in absenteeism largely driven by LT managers, HT managers see almost no change



(a) Car Manufacturer

Percentage change in absent employees in a working group in eight weeks after the shock, and the effect after more than eight weeks. Low-type manager: Effect first eight weeks 39.03%; after eight weeks 50.76%. High-type manager: Effect first eight weeks -2.05%; after eight weeks 2.43%

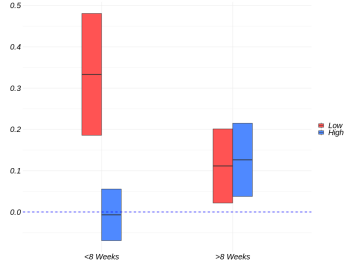
Go to Car Manufacturer



(b) Fast Food Chain*

Percentage change in absent employees in a store in eight weeks after the arrival, and the effect after more than eight weeks. Low-type manager: Effect first eight weeks 4.35%; after eight weeks 27.32%. High-type manager Effect first eight weeks 8.61%; after eight weeks 3.01%.

Go to Fast Food Chain



(c) Retailer

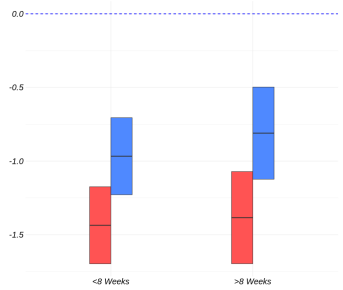
Percentage change in absent employees in a store in eight weeks after the shock, and the effect after more than eight weeks: Low-type manager: Effect first eight weeks 33.33%; after eight weeks, 11.14 %. High-type manager: Effect first eight weeks -0.6 % ; after eight weeks, 12.62%

Go to Retailer

Check Absenteeism Percentile 75 results

Other Absenteeism Definitions

This may be because HT managers behave differently even **during** the shock in terms of training...

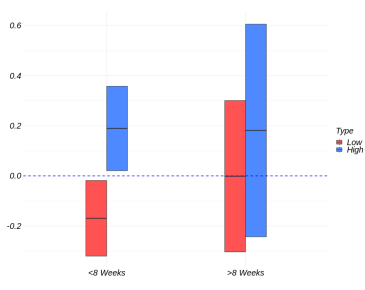


(a) Car Manufacturer

Percentage change in trained employees in a working group in eight weeks after the arrival and more than eight weeks after the shock. Low-type manager: Effect first eight weeks -132.27 %; after eight weeks, -131.67 %. High-type manager: Effect first eight weeks -84.95% ; after eight weeks, -84.57%

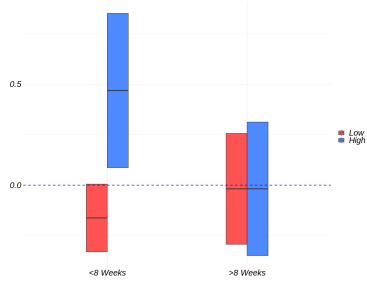
Note: graph excludes new hires

▸ Training all workers



(b) Fast Food Chain

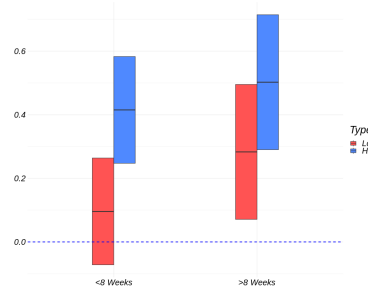
Percentage change in trained employees in a store eight weeks after the arrival and more than eight weeks after the shock. Low-type manager: Effect first eight weeks -18 %; after eight weeks, 0%. High-type manager: Effect first eight weeks 19% ; after eight weeks, 18%



(c) Retail Company

Percentage change in trained employees in a store eight weeks after the arrival and more than eight weeks after the shock. Low-type manager: Effect first eight weeks -16.22%; after eight weeks, -1.83%. High-type manager: Effect first eight weeks 46.86% ; after eight weeks, -1.81%

...and promotions

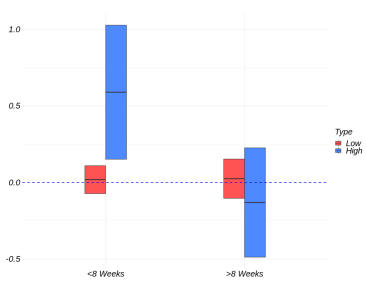


(a) Car Manufacturer

Percentage change in promotions in a working group in eight weeks after the arrival and more than eight weeks after the shock. Low-type manager: Effect first eight weeks 8.35 %; after eight weeks, 26.86 %. High-type manager: Effect first eight weeks 41.82% ; after eight weeks, 50.29%

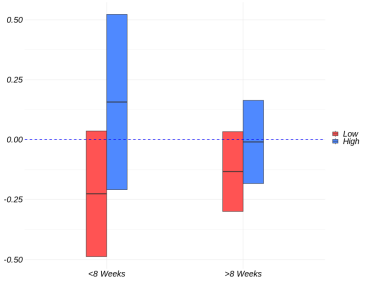
Note: graph excludes new hires

▸ Promotions all workers



(b) Fast Food Chain

Percentage change in promotions in a store eight weeks after the arrival and more than eight weeks after the shock. Low-type manager: Effect first eight weeks 5%; after eight weeks, 8%. High-type manager: Effect first eight weeks 55% ; after eight weeks, -15%



(c) Retail Company

Percentage change in promotions in a store eight weeks after the arrival and more than eight weeks after the shock. Low-type manager: Effect first eight weeks -22.59%; after eight weeks, -13.30%. High-type manager: Effect first eight weeks 15.70% ; after eight weeks, -0.96%

Heterogeneity within and across stores

1. Difference across stores: effects depends on HT manager being active in the unit/store (just pre-shock exposure to HT does not help)
2. Differences across layers in the organization: stronger impact of HT managers for lower ranked employees
3. Differences across occupations: stronger impact of HT managers for occupations more directly impacted by the shock
4. Differences across labor markets: stronger impact of HT managers when workers have more outside options

Finally, we study the response to a different "shock": extreme rainfall

Use rainfall as a proxy for increased cost of effort (Bandiera et al, 2020): how do workers with HT managers react to rainfall shocks?

Impute rainfall (in millimeters) using data from the nearest weather towers to each city using a radius of 50 km

- Rainfall Shock = 1 [Rainfall of biweekly period for each city > mean (Rainfall for each city)]

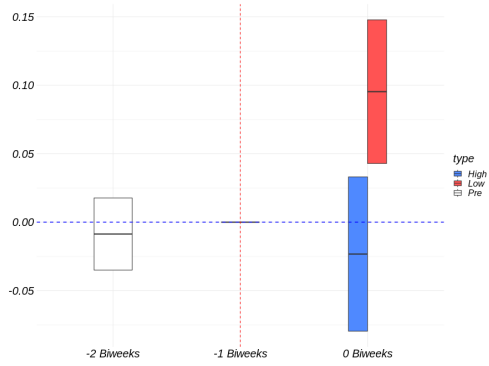
We analyze a panel of shocks at the store level: time window of two biweekly periods (before and after the shock)

$$Y_{jt}^{k} = \sum_{-2 \leq k \leq 2, k \neq -1} D_{jt}^{k} \beta_{k}^{1} + \sum_{-2 \leq k \leq 2, k \neq -1, -2} D_{jt}^{k} HT^{k(j,t)} \beta_{k}^{2} + \phi_{j} + \theta_{t} + \varepsilon_{jt},$$

where

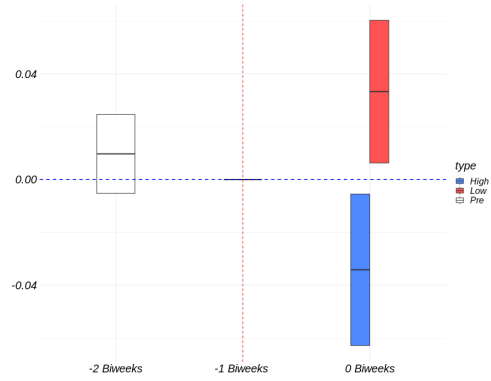
- D_{jt}^{k} dummy equal 1 if store j experience a weather shock in period k
- $HT^{k(j,t)}$ dummy equal 1 if store j had a HT manager in period k

Increase in absenteeism after a rainfall shock among LT, not HT managers



(a) Fast Food Chain

Percentage change in absent employees in a store after rainfall shock eight weeks after the shock and after more than eight weeks. Low-type manager: Effect first 2 weeks: 9.8% . High-type manager: Effect first 2 weeks: -2-5%



(b) Retailer

Percentage change in absent employees in a store two weeks after the shock, by unit/function of employee. Low-type manager: Effect first 2 weeks: 3.33% . High-type manager: Effect first 2 weeks: -3.41%

Today's roadmap

1. Introduction
2. Setting the Context
3. Training
4. Conclusions

Re-framing skills shortages and mismatches as organizational problems

Implications for Firms

- Aligning training with organization and strategy
- Attention to within-firm frictions, e.g. middle managers
- Flip side: training as a source of competitive advantage

Implications for Policy

- Training subsidies ineffective without active firm involvement
- Opportunity to improve current policies:
  - Supporting development of complementary management practices
  - Selecting the "right" firms: willing to commit to training plus broader HR policies (e.g. career advancements), champion new approaches etc.
  - Systematic evaluation of interventions (now largely missing)

Thank you

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