

Job-Worker Matches, Productivity and Management

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JAQ of All Trades: Job Mismatch, Firm Productivity and Managerial Quality*

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ABSTRACT

We present a novel measure of job-worker allocation quality (*JAQ*) by exploiting employer-employee data with machine learning techniques and validate it in various ways. Our measure correlates positively with earnings and negatively with separations over individual workers' careers. At firm level, it increases with competition, non-family firm status, workers' human capital and has a robust correlation with productivity. The quality of rank-and-file workers' job matches responds positively to improvements in management quality. *JAQ* can be constructed for any employer-employee data including workers' occupations, and used to explore research questions in organization and labor economics, as well as in corporate finance.

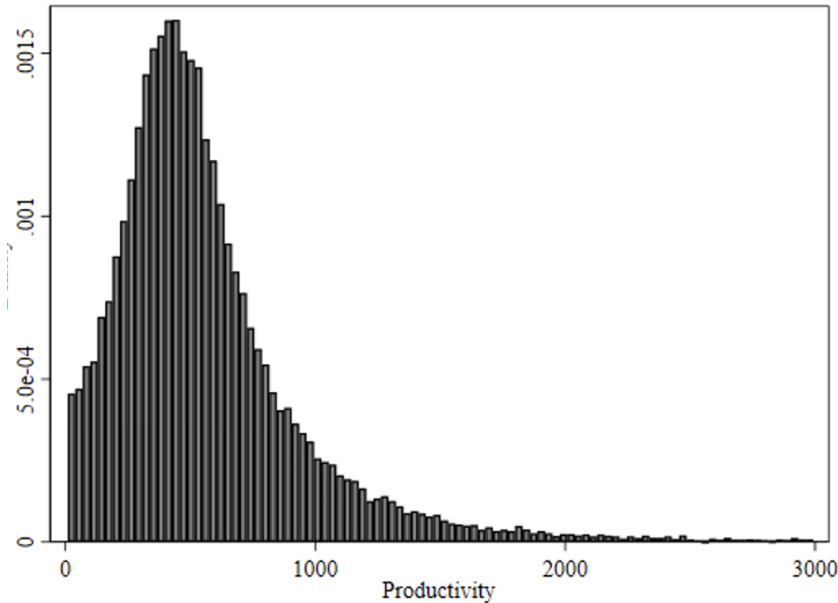
Keywords: jobs, workers, matching, mismatch, machine learning, productivity, management.
JEL Codes: D22, D23, D24, G34, J24, J31, J62, L22, L23, M12, M54.



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The Problem

Large dispersion in productivity between firms



What can explain this dispersion?

- Capital
- Materials
- Skills
- Worker quality (talent)
- **Management practices**

Understanding the **dispersion in productivity** helps **firms and governments** develop **better policies** to improve **productivity**

Our Project

Question: How important are job-worker matches for firm productivity?

Problem: How do we measure “job assignment quality” (JAQ) at scale?

Approach:

1. Develop a new measure (**JAQ**) that can be recovered from data on **firms** and **workers**
2. Use **Swedish registry data** for **firms** and **workers** to show that
 1. Matching matters for **workers**: careers, wages, and separations
 2. Matching matters for **firms**: productivity, competition, and ownership
 3. Matching matters for **managers**: productivity and R&F match quality
3. Make the measure **widely available** to **researchers**, **policymakers** and **practitioners**

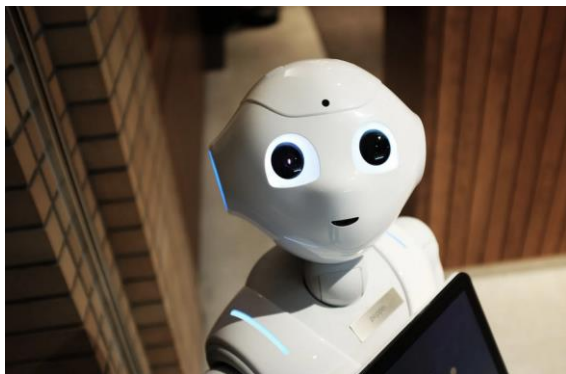


What is JAQ and how does it work?



Idea:

- Firms/managers assign workers to jobs based on their CVs
- **Better firms** have managers/HR departments that are **better at this job**
- We want to **learn how the best firms assign workers to jobs** from **observed data** and then **benchmark** all other firms against them



Approach:

- Use **machine learning** and **big data** to teach a machine learning algorithm how the best firms assign workers to jobs
- **Predict** the job-worker allocation quality for each worker in the economy
- Aggregate the predictions to a **firm level measure of job allocation quality**

What data do we use?

Sample from Statistics Sweden

- All firms and citizens in Sweden for 2001-2010
- Firms with **30-6000 employees** that report assets and sales
- Manufacturing, real estate, renting and b.a., wholesale and retail (62% firms/70% employment)
- 9k firms, 1.5M workers

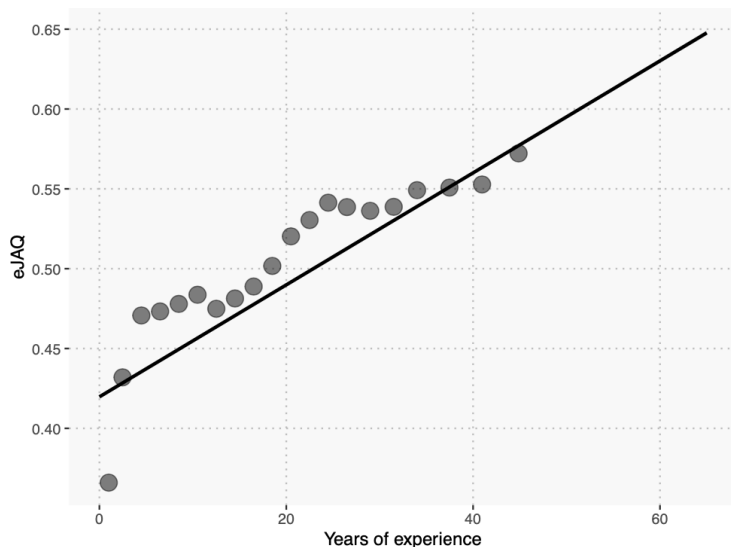
Worker CVs

- SSYK **3-digit** occupations
- Age, gender, location and immigrant status, education level, specialization, GPA and school
- Past work experience (LM experience, mobility, tenure, unemployment days, varied work experience, job experience) back to 1990

Firms

- Age, industry, size, assets, ownership etc.

1. Matching Matters For Workers



JAQ and workers

1. Match quality increases over a worker's career
2. Better matched workers earn more
3. Better matched workers are less likely to leave

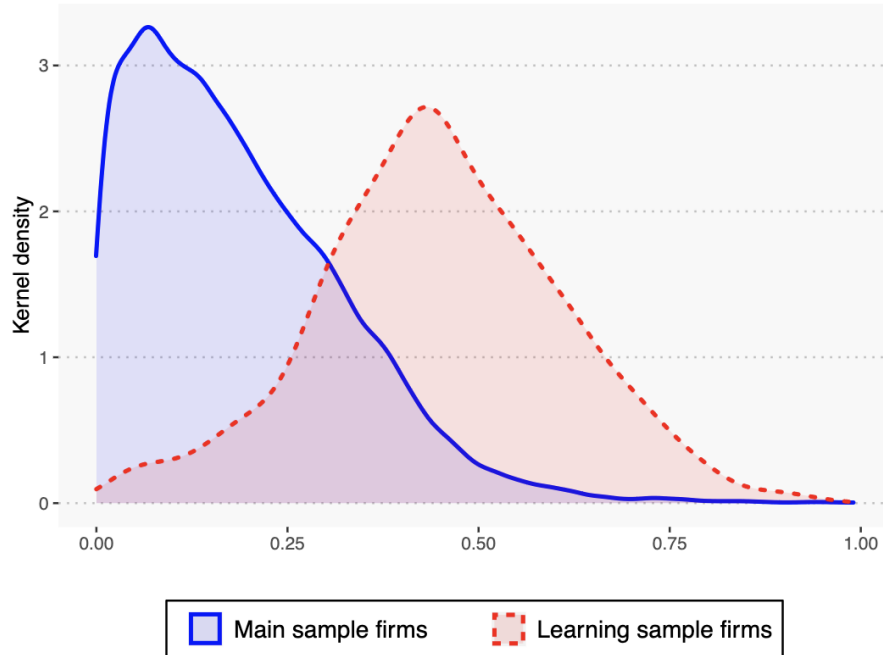
What matters for a good match?

1. Job experience
2. Industry experience
3. Location

Figure 3: Worker-level job allocation quality (*eJAQ*) by labor market experience

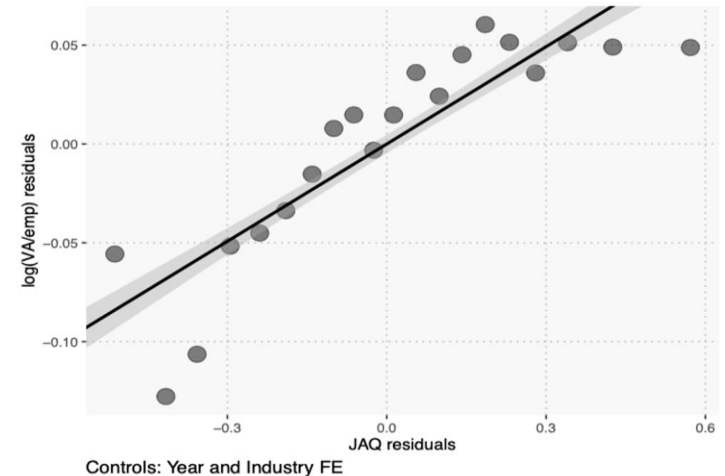
Goodness of fit goes from 35% to 57% over 50 years

2. Matching Matters For Firms



JAQ and Firms

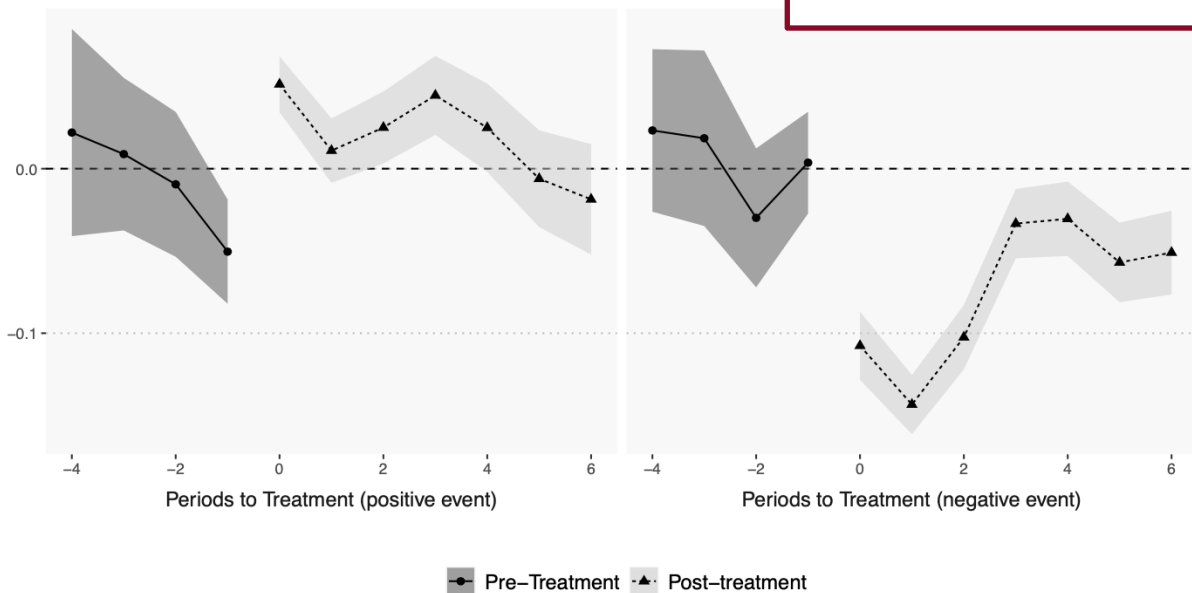
1. Higher JAQ, higher **productivity** (50% rel. MP)
2. Higher JAQ, stronger **competition in industry**
3. Lower JAQ in **family firms**



3. Matching Matters for Managers

JAQ and management

1. Better matched managers, higher **productivity**
2. Better matched managers, **better matched workers**
3. Replacing bad managers => **better matched workers**





Summary

1. Matching matters for **workers**: careers, wages, and separations
2. Matching matters for **firms**: productivity, competition, and ownership
3. Matching matters for **managers**: productivity and R&F match quality



What can we do to improve matching?

- Get manager matching right
- Listen to Nick: more competition, professional managers, more training and education
- Support more research and stay tuned:

3) Making the measure **widely available to researchers, policymakers and practitioners**

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