Task Specialization and the Native-Foreign Wage Gap: Evidence from Worker-level Data

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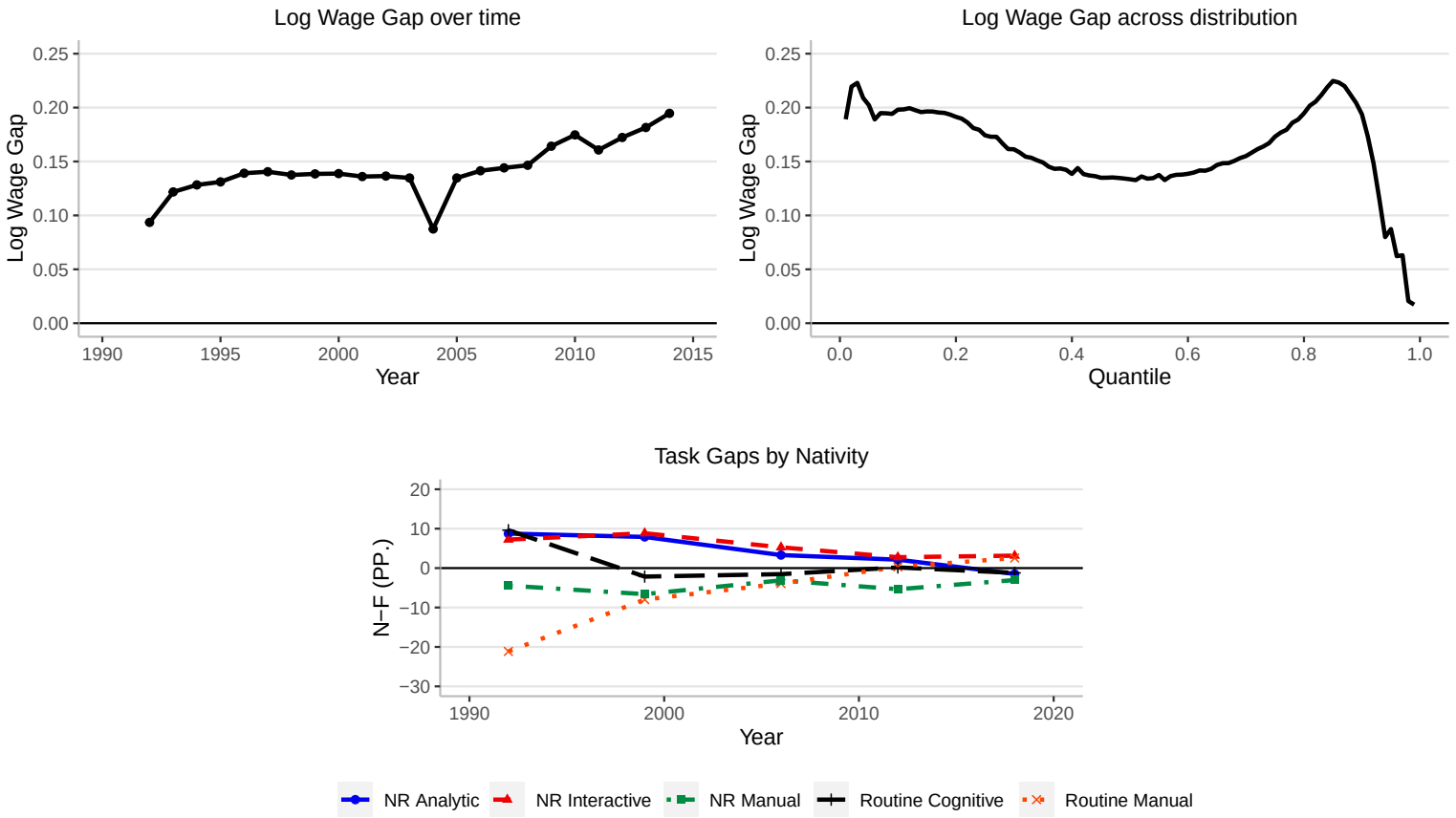
Motivation



NOTE. —"NR" stands for Non-Routine Activities. NR Analytic and NR Interactive can be subsumed under *Abstract* tasks, involving lots of problem-solving skills. Routine Cognitive and Routine Manual can be subsumed under *Routine* tasks, characterized by various repetitive steps. NR *Manual* involves activities requiring hand-eye coordination, which are difficult to automate.

Figure 1: Native-Foreign (NF) Wage & Task Gap in Germany, 1992-2018

Source: SIAB-R 7514, BIBB/IAB/BAuA

Motivation

- If F workers assimilate in terms of educational outcomes[1] and tasks, then why do we not observe a convergence in wages?

[1] Omitted in this presentation, see paper for details.

Contributions

1. **Variation in Tasks at worker-level predictive of the NF Wage Gap**
   - Robust to inclusion of Education and Experience measures

   $\Rightarrow$ Challenges identifying assumptions in structural models in which N & F with similar education-experience profile are assumed to be perfect substitutes (e.g., *D'Amuri, Ottaviano & Peri 2010*)

2. **RIF Decomposition applied to Migration Context**
   - Idiosyncratic differences pronounced among high-wage earners
   - Contribute up to 25% to explained wage gap

   $\Rightarrow$ Conventional decomposition methods such as Oaxaca-Blinder (OB) understate the impact of tasks on wage gaps

3. **Between-Occupation vs Within-Occupation Contributions**
   - Occupational segregation: $\geq 70\%$
   - Within-Occupation specialization: $\geq 10\%$

   $\Rightarrow$ Focus on occupational segregation alone understates degree of task specialization between N & F (e.g., *Peri & Sparber 2009, 2011*)

Data

- German employment surveys provided by BIBB/IAB/BAuA[2]
  - Key: Information on *self-reported* tasks by workers (1992 - 2018)

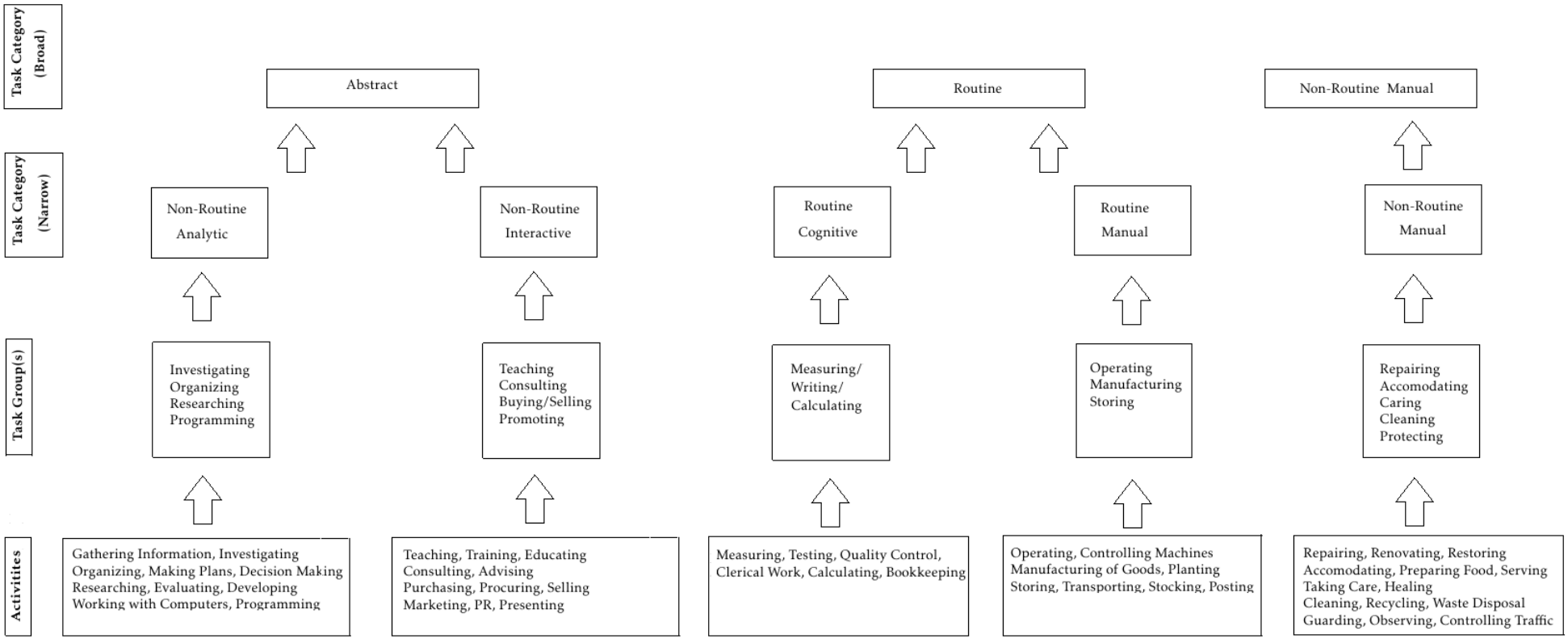


Figure 2: From Activities to Tasks: Construction of the Task Content

[2]BIBB = Federal Institute for Vocational Education, IAB = Institute of Employment Research, BAuA = Federal Institute of Occupational Safety and Health

Methodology

Main Analysis: Recentered Influence Function (RIF) Decomposition

- Conventional Oaxaca-Blinder (OB) Decomposition for groups $g = N, F$:

$$\implies \overline{w}_N - \overline{w}_F = \underbrace{(\overline{X}_F - \overline{X}_N)\hat{\beta}_N}_{\text{Explained Part}} + \underbrace{\overline{X}_F(\hat{\beta}_N - \hat{\beta}_F)}_{\text{Unexplained Part}} \tag{1}$$

- **What I do:** Generalize OB by applying it along the wage distribution and replace mean wages with corresponding RIF by $g = N, F$ at decile τ:

$$\implies RIF_\tau^N - RIF_\tau^F = \underbrace{(\overline{X}_\tau^F - \overline{X}_\tau^N)\hat{\beta}_\tau^N}_{\text{Explained Wage Gap}} + \underbrace{\overline{X}_\tau^F(\hat{\beta}_\tau^N - \hat{\beta}_\tau^F)}_{\text{Unexplained Wage Gap}} \tag{2}$$

Methodology: Recentered Influence Function (RIF) Decomposition

- Following *Firpo, Fortin & Lemieux (2009)*, construct an RIF based on:

$$RIF_g(w_g, p_\tau) = \underbrace{\frac{\tau - I(w_g \leq p_\tau)}{f_{w_g}(p_\tau)}}_{\text{Influence Function (IF)}} + \underbrace{p_\tau}_{\text{Recentered (R)}} \tag{3}$$

  - $g = N, F$
  - p_τ: Log Hourly Real Wage at decile $\tau = 0.1, ..., 0.9$
  - $I(w_g \leq p_\tau)$: Indicator suggesting if observed wage for $g = N, F$ falls below decile p_τ
  - $f_{w_g}(p_\tau)$: Marginal density of w_g associated with p_τ

Methodology

- Perform quantile regressions by replacing the original dependent variable ($ln\ w_{it}$) with its corresponding RIF:

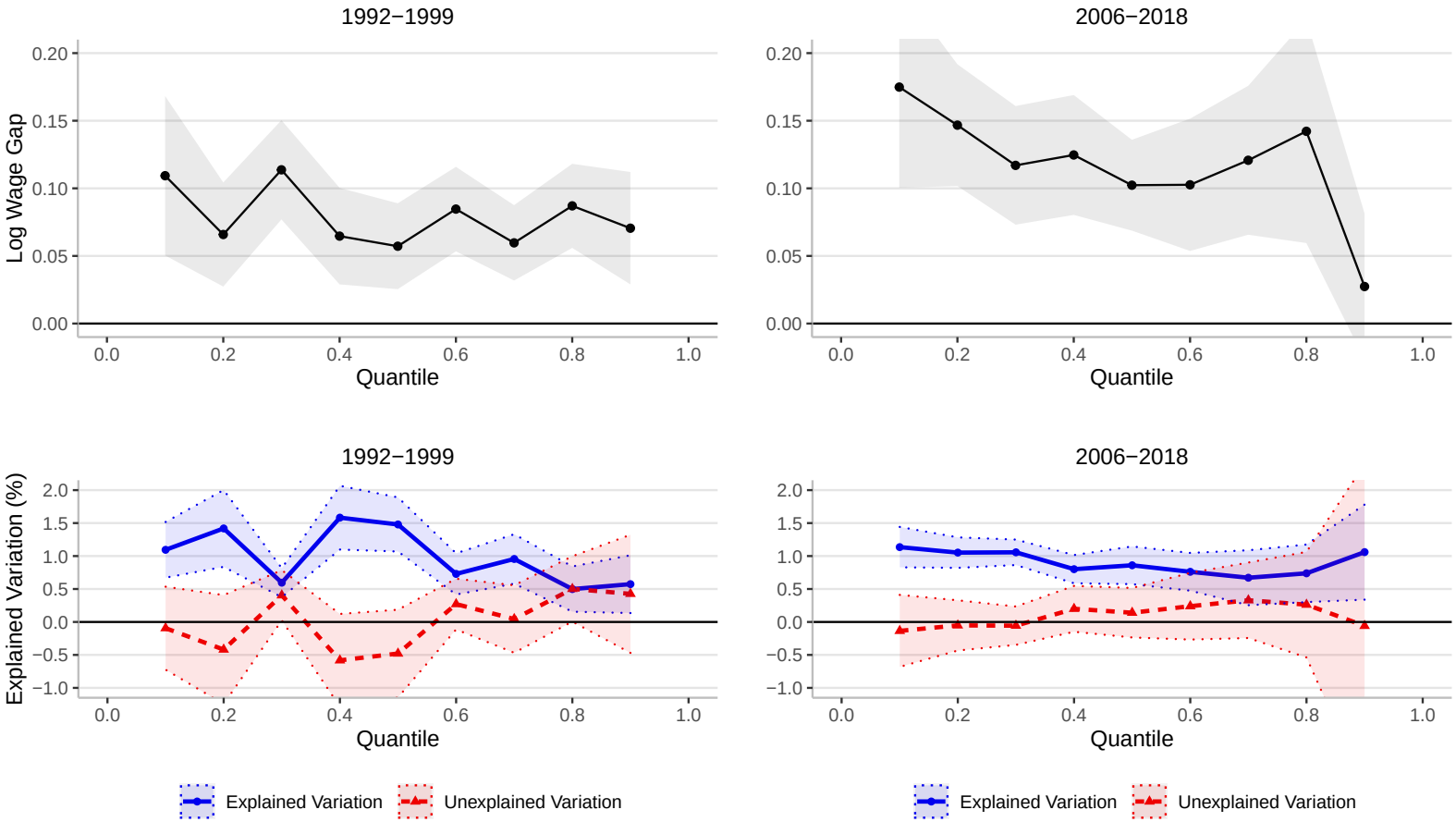
$$RIF_g(ln\ \widehat{w_{it}, p_\tau} | \boldsymbol{T}, \boldsymbol{X}) = \alpha + \beta_1 \boldsymbol{T_{it}} + \beta_2 \boldsymbol{T_{ot}} + \gamma \boldsymbol{X_{it}} + \delta_t + \lambda_r + \eta_s + \epsilon_{it} \quad (4)$$

- $\boldsymbol{T_{it}} = \left(T_{i1t}, T_{i2t}, ..., T_{iJt}\right)$: Task category j performed by i at time t
- $\boldsymbol{T_{ot}} = \left(T_{1o}, T_{2ot}, ..., T_{Jot}\right)$: Task category j performed in occupation o
- $\mathbf{X}_{it}$: Controls
- δ_t, λ_r, η_s: Time, Region, Sector dummies

▸ Occupational Segregation

▸ Within-Occupation Specialization

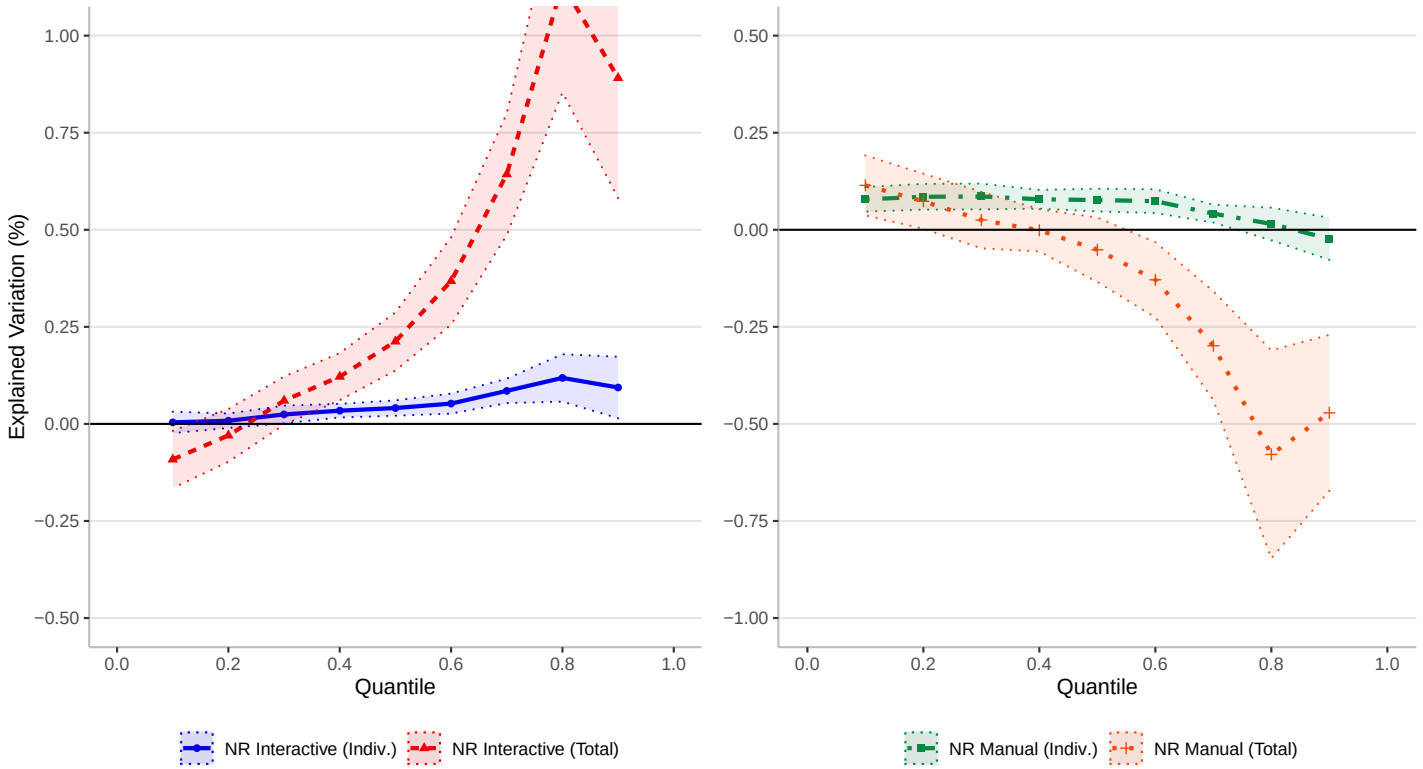
Key Results RIF Decomposition: Explained Wage Gap



NOTE. —Point estimates are displayed with a 95% Confidence Interval.

Figure 3: German Native-Foreign Wage Gap by sub-samples, 1992-2018

Key Results RIF Decomposition: Long-term Trends

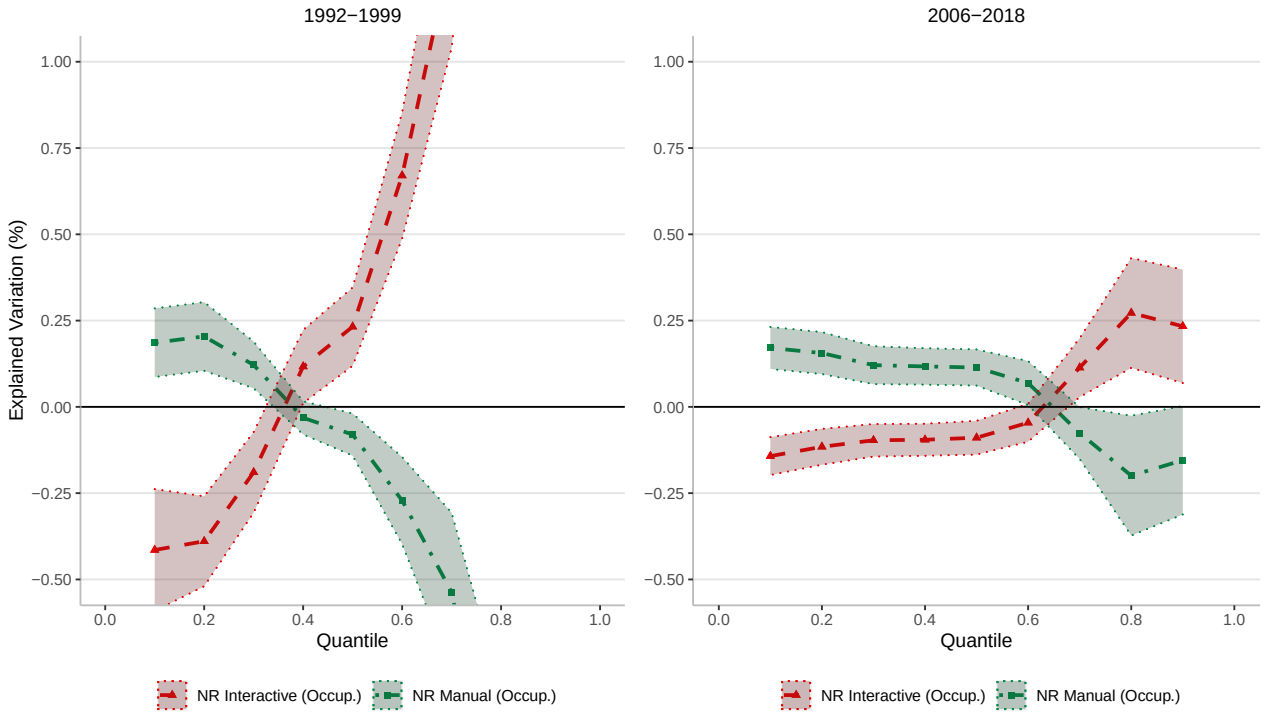


NOTE. —The decomposition results are top-censored for clarity, i.e. cut off at contributions of (+-) 100% to the explained wage gap. Point estimates are displayed with a 95% Confidence Interval.

Figure 4: Contributions of Individual-level variation in Tasks to the explained Native-Foreign Wage Gap, 1992-2018

▶ Regression

Key Results RIF Decomposition: Trends in Occupational Segregation

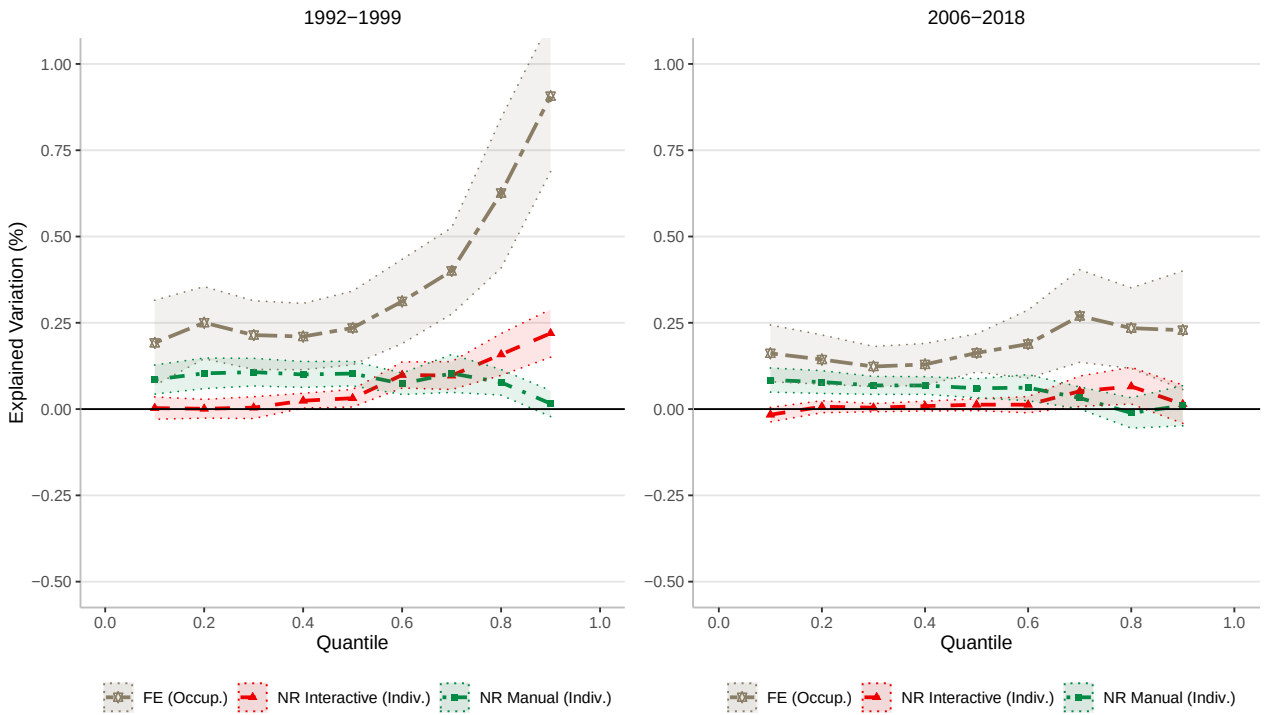


NOTE. —The decomposition results are top-censored for clarity, i.e. cut off at contributions of 100% & -50% to the explained wage gap. Point estimates are displayed with a 95% Confidence Interval.

Figure 5: Contributions of Occupation-level variation in Tasks to the explained Wage Gap, 1992-2018

▶ Regression

Key Results RIF Decomposition: Trends in Within-Occupation Task Specialization



NOTE. —Point estimates are displayed with a 95% Confidence Interval.

Figure 6: Contributions of Individual-level variation in Tasks to the explained Wage Gap conditional on Occupational FE, 1992-2018

Conclusions

1. **Task Specialization extends beyond occupational borders**
   - Reinforces comparative advantage in interactive tasks among skilled labor, thus contributing to rising wage gap between N and F workers
   - Structural models may understate LR wage *gains* from immigration

2. **Implications on Immigration Policy**
   - Federal Recognition Act (2012) & Skilled Immigration Act (2020) aim at improving recognition of foreign qualifications
   - Findings suggest Policy Challenges with respect to
     - (i) Attraction &
     - (ii) Retention of skilled immigrant workers