#### HIRING AND THE DYNAMICS OF THE GENDER GAP

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### Motivation

The gender wage gap in Germany for full-time workers



 The gender wage gap is a pervasive feature of the labor market and increasingly difficult to explain from a pure human capital perspective (Goldin 2014)

 In a frictional labor market, men and women of equal productivity might still face disparate job opportunities and bargaining prospects (Manning 2011, Robinson 1933)

# Equal pay for equal work (opportunity)?

Prompted policies designed to tackle the gender pay gap that predominantly center around the role of firms

- Europe:
  - Job classification systems (the Netherlands)
  - Regular gender pay reporting, without audit (Denmark) or with audit (France and Sweden)
  - In Germany, companies employing more than 200 staff have to provide, upon request, the average wage of a group of colleagues of the opposite sex doing work of equal value to the member of staff in question (OECD report 2022)
- US: Title VII of the Civil Rights Act mandates that companies are barred from engaging in discriminatory practices against women and other protected groups concerning hiring, layoffs, and promotions

Equal pay for equal work (opportunity)?



- Firm-specific hiring and compensation practices? Challenging when men and women sort into different firms
- We ask how similar work opportunities that arise within firms may lead to differences in wage and career outcomes for male and female incoming new hires

- Main idea
  - Sudden departures of existing workers  $\rightarrow$  exogenous hiring shocks to firms
  - Sudden departures → identifying replacements through excess hiring

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  - Sudden departures of existing workers  $\rightarrow$  exogenous hiring shocks to firms
  - Sudden departures  $\rightarrow$  identifying replacements through excess hiring
- Main results
  - Same hiring opportunity: Using data between 1980 and 2016, comparing workers entering firms after similar unexpected departures and ex-ante probability of hiring a female or male worker, female workers earn on average 20 log points lower
  - + Same pre-hire wage: Half of the gap persists when comparing workers with the same pre-hire wage at their previous firm
  - We discuss the dynamics of this gap and its implication in a firm-worker fixed effects model. Does the gender hiring opportunity gap gets absorbed as differences in firm time-invariant effects or individual time-invariant effects?

#### Data with unexpected departure events

Empirical analysis of differential impact by replacement gender

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#### DATA WITH UNEXPECTED DEPARTURE EVENTS

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Universe of employer-employee matched German social security records in 1975-2021

- All entries and exits of workers
- Reason for exits (including departure due to death) and exact dates
- Spell-level data to clearly identify outcomes pre- and post-departure
- Rich set of individual and establishment characteristics:
  - Daily wages, full-time status, detailed occupation code
  - Firm composition

- Focus on unexpected death events between 1980 and 2016 of workers with high labor market attachment
- Following Jäger and Heining (2022) to restrict among departures due to death
  - At most 64 years old
  - Worked full-time at death event d and 4 years prior d 4
  - No sick leave of 6+ weeks in the 5 years preceding their death
- Small-medium establishments with at most 50 full-time workers and 150 total workers
- Starting point of 90,000 unexpected death events



Hiring and the Dynamics of the Gender Gap (Illing, Schwank, and Tô)





Hiring and the Dynamics of the Gender Gap (Illing, Schwank, and Tô)



## Construction of replacement workers

- Motivating factors:
  - Excess hiring is 78% (75%) concentrated in the same 3-digit (5-digit) occupation as the departing worker
  - Excess hiring occurs mostly in the first 6 months, and more concentrated in earlier months

## Construction of replacement workers

- Motivating factors:
  - Excess hiring is 78% (75%) concentrated in the same 3-digit (5-digit) occupation as the departing worker
  - Excess hiring occurs mostly in the first 6 months, and more concentrated in earlier months
- Replacement workers:
  - Excess hiring within the same 3-digit occupation of the outgoing worker within the first
    6 months is strictly positive (30% of events)
  - First full-time new hire in the same 3-digit occupation of the outgoing worker

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# Empirical analysis of differential impact by replacement gender

Hiring and the Dynamics of the Gender Gap (Illing, Schwank, and Tô)

# Comparing events by the gender of the replacement worker

- Firms that hire a male or a female replacement worker can be different
  - Unexpected departures create exogenous hiring shocks, not exogenous replacement
- We use observables through a machine learning exercise to largely account for the ex-ante predicted chance of a female replacement worker being hired
  - Contrast with Jäger and Heining (2022) who use matched control firms to study the impact of sudden departures on coworkers
  - We focus on new hires and *differential impact* on wages and careers of new hires by gender
- Conditional on having the same chance of hiring a female replacement, the actual realization can be considered random
  - Assess by comparing levels (not just parallel trends) leading to the hiring event

Use machine learning for two purposes:

- Confirm that the sample of events with and without excess hiring is observably similar: very hard to predict even with a rich set of predictors
  - 500 variables covering firm and labor market conditions in the previous 3 years
- Predict the probability that the replacement worker is female versus male

# Prediction accuracy for excess female hiring



- Sensitivity = true positive rate
- 1 Specificity = false positive rate
- The probability of being able to distinguish the two groups is 92.4% (area under the curve)
- Most predictive covariates relate to the share of females at the firm and in the same occupation as the departing worker

# Prediction accuracy for any excess hiring



- Sensitivity = true positive rate
- 1 Specificity = false positive rate
- The probability of being able to distinguish the two groups is 62% (area under the curve)
  - Firms with and without a replacement worker are relatively similar observably

# Summary statistics

	Male-Male	Male-Female	Female-Male	Female-Female
Panel A: Outgoing worker				
Daily wage in EUR	94.89 (44.20)	105.04 (70.09)	86.31 (60.71)	75.60 (32.49)
Age	46.00 (10.97)	47.35 (10.58)	44.10 (11.45)	43.81 (11.84)
Tenure (years)	7.65 (6.36)	8.54 (6.68)	7.63 (6.34)	7.58 (6.19)
Experience (years)	15.92 (8.33)	16.69 (8.37)	15.28 (8.34)	14.35 (7.87)
Education (years)	11.87 (1.33)	12.39 (1.93)	12.02 (1.72)	11.86 (1.36)
Panel B: Incoming worker				
Daily wage in EUR	81.80 (27.83)	72.28 (30.30)	82.53 (33.04)	63.87 (29.54)
Age	33.75 (10.44)	31.90 (10.28)	33.39 (10.28)	32.56 (10.68)
Experience (years)	9.45 (7.21)	7.71 (6.67)	9.09 (7.55)	8.12 (6.79)
Education (years)	11.93 (1.47)	12.37 (2.08)	12.44 (2.00)	12.00 (1.51)
Number of obs.	22,961	3,226	1,049	3,818

# Mean log wage by transition group

Plotting raw group mean by relative event time and associated standard error

 Normalizing Male-Male to 0 at event time 0



Interested in differences in outcomes of female versus male replacement workers:

 $y_{it} = \beta_{0t} + \beta_{1t}$ female\_replacement<sub>i</sub> +  $\gamma_{it} X_{i,-1} + \epsilon_{it}$ 

- *i* is a hiring event associated with a sudden departure
- *t* is time relative to the event
  - $t \leq 0$ : hiring firm / departing worker
  - t > 0: incoming worker
- Same hiring opportunity:  $X_{it}$  controls for deciles of: ex-ante probability of female replacement, departing worker's wage at t = -1, firm size, share of females in the firm, etc.
- + Same pre-hire wage: Additionally control for the incoming worker's pre-hire wage at their previous firm
- Estimating separately for each t

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#### THE GENDER HIRING OPPORTUNITY GAP

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# The gender hiring opportunity gap

- Firms respond to the same hiring shocks:
  - Hiring workers of different levels of productivity based on their gender
  - Compensating workers with similar productivity differently

### Log wage difference by replacement gender



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## Log wage difference by replacement gender



## Earnings difference by replacement gender



## Earnings difference by replacement gender



# The gender hiring opportunity gap

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  - Compensating workers with similar productivity differently
- Role of statistical discrimination:

#### Log wage difference by replacement gender Replacements who stay full-time for 5 years



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# Number of days working full-time

Replacements who stay full-time for 5 years



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# The gender hiring opportunity gap

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  - Hiring workers of different levels of productivity based on their gender
  - Compensating workers with similar productivity differently
- Role of statistical discrimination:
  - *In the year of hire*: Remarkably similar gender gap in 5-year full-time sample compared to overall
  - Over time: Gaps stay the same in the 5-year full-time sample, unlike overall where they widen
    - → initial disparities lead to differential on-the-job training at the same employer or negative signals to new employers

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## THE GENDER HIRING OPPORTUNITY GAP Heterogeneity

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# The gender hiring opportunity gap

Taking stock: log wage difference in the year of hire



Departing worker: Male

#### Changes over the decades

- The gap is the largest in the 1980s and closing in the 2010s
- As large as half of the adjusted gender wage gap



## Reflects prevailing gender dynamics across markets

- Higher in West Germany than East Germany
- Closes for workers in the public sector with same pre-hire wage



## Reflects prevailing gender dynamics within firms



## Reflects prevailing gender dynamics within firms

- By existing gender wage gap
- By family-friendliness of firms (female manager with young child)



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## THE GENDER HIRING OPPORTUNITY GAP Mechanisms

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# The gender hiring opportunity gap

• Do firms shift wages paid to other coworkers?

- Female replacement workers have worse outside options?

- Compensating differentials for job amenities?

#### Coworkers? Total same-occupation male wage bill (EUR)



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#### Coworkers? Total same-occupation female wage bill (EUR)



#### Coworkers? Total same-occupation female wage bill (EUR)



## Outside options? Proxy using previous firm

- Using characteristics of the replacement worker's firm in the year before the hiring event as proxy for the worker's outside option cannot explain the gap
- For replacements that have similar pre-hire wage, females tend to come from better paying firms



#### Amenities? Commuting distance before and after hire

- Women commute less than men
- But changes in commuting distance from the previous job cannot explain the difference



## Amenities? Characteristics of new firms

- Gender wage gap in the years prior to the vacancy is similar between firms that hire a male vs. female replacement
- Also recall: "same hiring opportunity" controls for share of females in the firm at -1



#### Gender wage gap of other workers in the firm

#### Amenities? Characteristics of new firms

- Gender wage gap in the years prior to the vacancy is similar between firms that hire a male vs. female replacement
- Also recall: "same hiring opportunity" controls for share of females in the firm at -1



Characteristics of hiring firm at −2

# The gender hiring opportunity gap

- Do firms shift wages paid to other coworkers?
  - The magnitude of changes in total wage bill for other coworkers is too small
  - Supports that the replacement worker is not "misidentified"
- · Female replacement workers have worse outside options?
  - Proxy for outside options by wages at their previous firm
  - Not in the case when they have the same pre-hire wage
- Compensating differentials for job amenities?
  - Not changes in commuting distance
  - Not that women are moving to firms that offer amenities they are likely to value more

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#### DISCUSSION

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## "Bargaining" channel of the gender wage gap

- The empirical strategy we employ in this paper helps isolate the component that arises from men and women moving to the same hiring opportunities
  - In the language of Card, Cardoso, and Kline (2016), it speaks to the "bargaining" (within-firm) component of the gender gap, instead of the "sorting" (across-firm) component
  - Could reflect firm discrimination and/or worker preferences and negotiation
- Over time, the gender hiring opportunity gap for equally productive workers can translate into differences in individual fixed effects rather than differential firm fixed effects

- 
$$y_{it} = \alpha_i + \psi_{J(i,t)}^{G(i)} + X'_{it}\beta^{G(i)} + r_{it}$$

- Equally productive men and women can be given different opportunities, and women may work in jobs below their productivity levels

## Implications for estimating gender wage gap within firms



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• 
$$y_{it} = \alpha_i + \psi_{J(i,t)}^{G(i)} + X'_{it}\beta^{G(i)} + r_{it}$$

- Firm A pays equally productive M and F 70 and 60, respectively
- Firm B is a lower-paying firm that pays equally and "undoes" more of M's higher wages

# Implications for estimating gender wage gap within firms



• 
$$y_{it} = \alpha_i + \psi^{G(i)}_{J(i,t)} + X'_{it}\beta^{G(i)} + r_{it}$$

- Firm A pays equally productive M and F 70 and 60, respectively
- Firm B is a lower-paying firm that pays equally and "undoes" more of M's higher wages
- Dynamics of the gender gap
  → Male FEs are higher than
  Female FEs
  - → Fails to attribute the full gender gap at firm A to gender-differential firm FEs

#### Comparing replacement workers by gender



#### Comparing replacement workers by gender



#### Comparing replacement workers by gender



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#### CONCLUSION

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## Conclusion

- Firms respond to the same hiring shocks by hiring and paying workers differently based on gender
  - Equally productive men and women can be given different opportunities, and women may systematically work in jobs below their potential productivity levels
  - Not captured in a firm-worker fixed effects framework
- Important to go beyond the static gender wage gap
  - Male and female workers getting paid the same wage within a firm may come from different prior wages
  - Suggests a different emphasis from "equal pay for equal work" policies: current wage is not a sufficient statistic for "equal pay"

#### Industry composition relative to a random sample



# Gender hiring opportunity gap by occupational skill intensity



## Differential firm exit

Same hiring opportunity + Same pre-hire wage



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## Staying at the same firm



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## Gender wage gap of full-time movers



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## Gender wage gap of full-time movers

## Controlling for pre-move wage



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