High-Pressure, High-Paying Jobs?

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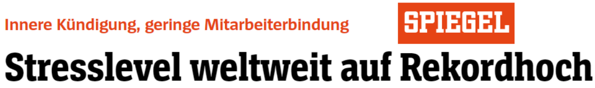
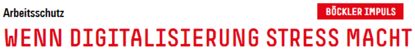
Stress at work is at record high



Innere Kündigung, geringe Mitarbeiterbindung

SPIEGEL

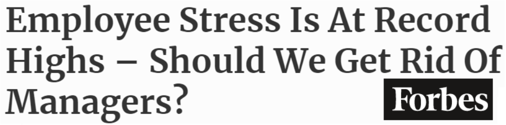
Stresslevel weltweit auf Rekordhoch



Arbeitsschutz

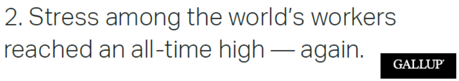
BÖCKLER IMPULS

WENN DIGITALISIERUNG STRESS MACHT



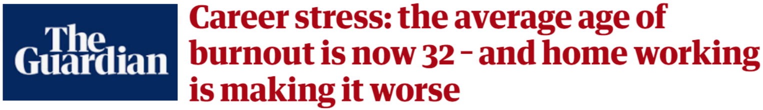
Employee Stress Is At Record Highs – Should We Get Rid Of Managers?

Forbes



2. Stress among the world's workers reached an all-time high — again.

GALLUP



The Guardian

Career stress: the average age of burnout is now 32 – and home working is making it worse

This paper: work pressure, wages, and inequality

Work pressure (here)

Frequent tight deadlines and pressure to perform, frequent multitasking, frequent interruptions, minimum performance requirements

Key questions:

- Is there a compensating wage premium for work pressure? (Rosen 1986)
- Do differences in (valuation of) work pressure help explain existing wage inequalities?

Preview of main findings

Part 1: In observational data, work pressure...

- ...is associated with adverse health and family outcomes
- ...is associated with an earnings premium, even within occupations

Part 2: Using a stated-preference experiment, we show that...

- ...willingness-to-pay to avoid pressure is sizable
- ...workers sort into high-pressure jobs based on preferences
- ...accounting for pressure partly explains wage inequality

Part 1: BIBB/BAuA Employment Surveys

Summary Stats

- Survey of detailed workplace characteristics
- Waves: 1979, 1985/86, 1991/92, 1998/99, 2005/06, 2011/12, 2018
- Full-time employees in dependent employment in the private sector

Pressure variables

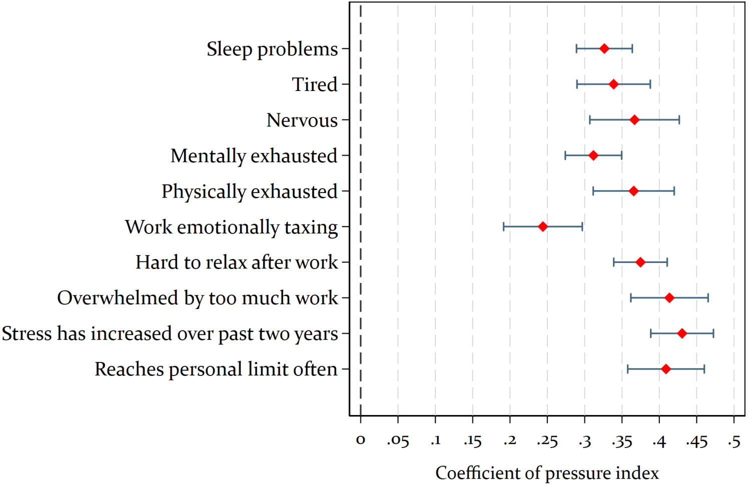
Survey questions to define high-pressure job

1. **Tight deadlines:** In your work, how often do you have tight deadlines and pressure to perform?
2. **Multitasking:** In your work, how often are you forced to carry out several tasks at the same time?
3. **Interruptions:** How often are you being interrupted, for example by colleagues, telephone calls, bad material, or machine malfunctions?
4. **Minimum requirements:** How often do you face a minimum/maximum requirement, in terms of quantity or in terms of the time needed to carry out a task?

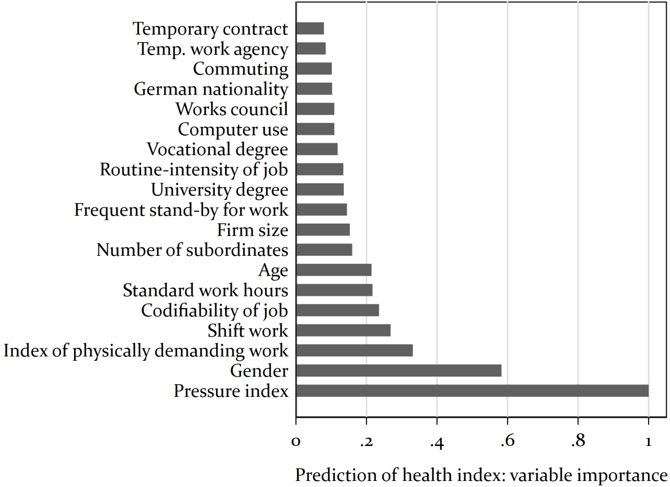
$$HighPressure_i = \frac{\sum_j answer = often}{4}$$

Validation: Pressure associated with adverse health outcomes even within occupations

Characteristics



Validation: Pressure most important predictor of health problems



High-pressure jobs better paid even within occupations and industries..

	Dep. Var.: 100 x Ln(monthly earnings)				
	(1)	(2)	(3)	(4)	(5)
High pressure	16.68***	13.98***	12.46***	9.37***	12.21***
	(3.33)	(2.10)	(1.92)	(2.07)	(1.86)
Adj. R2	0.01	0.33	0.43	0.49	0.52
Obs.	7825	7825	7825	7825	7825
Extended mincer controls		√	√	√	√
Occupation & industry dummies			√	√	√
Firm & job controls				√	√
Task controls					√

..partially because of higher hours, but also in terms of hourly wages

Specification · Hours and Wages · Heterogeneity · Placebo and Bounding

Further evidence favoring compensating differentials

1. **Placebo** Details

   No connection between work pressure and earnings for civil servants

2. **Bounding** Details

   Use worker FE in IAB Linked Personnel Panel to provide lower bound

But: still challenging to estimate compensating differentials in observational data

Part 2: estimate worker's willingness-to-pay (WTP) to avoid work pressure with choice experiment

- Representative sample of German employees (N=3'305) in July 2022
- Choose between hypothetical jobs that differ in terms of wages, work pressure & other job attributes (Maestas et al. 2018)
- 10 choices + 2 attention checks

Details

Modelling job choices

Hedonic Wage Reg

$$V_{ijt} = \alpha + X'_{ijt}\beta + H'_{ijt}\theta + \delta ln\ w_{ijt} + \epsilon_{ijt}$$

where

- V_{ijt}: Indirect utility
- X'_{ijt}: Job amenities
- H'_{ijt}: Hours
- w_{ijt}: Earnings

Assume logistic distribution to arrive at:

$$P(V_{ijt} > V_{ikt}) = \frac{\exp[(X'_{ijt} - X'_{ikt})\beta + (H'_{ijt} - H'_{ikt})\theta + \delta(\ln w_{ijt} - \ln w_{ikt})]}{1 + \exp[(X'_{ijt} - X'_{ikt})\beta + (H'_{ijt} - H'_{ikt})\theta + \delta(\ln w_{ijt} - \ln w_{ikt})]}$$

Willingness-to-pay estimate

Indifference condition:

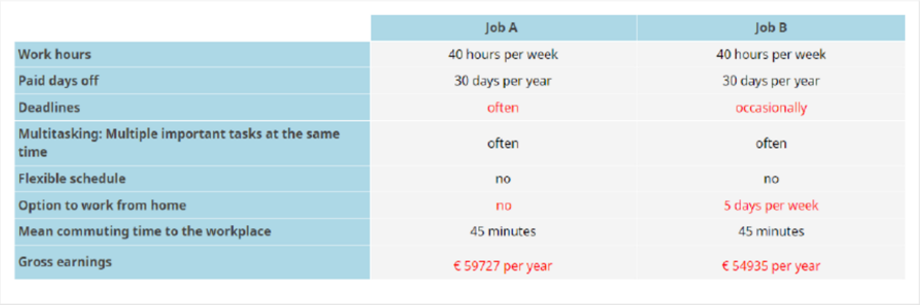
$$\delta \ln w = \beta^r + \delta \ln(w - WTP^r)$$

And thus,

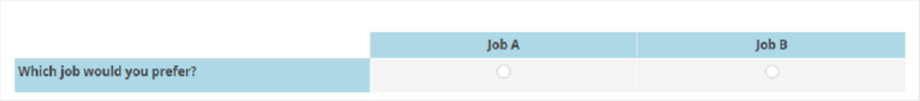
$$WTP^r = \left[1 - e^{\left(-\frac{\beta^r}{\delta}\right)}\right]$$

$\Rightarrow$ WTP for job amenity in percent of wage

Choosing wisely



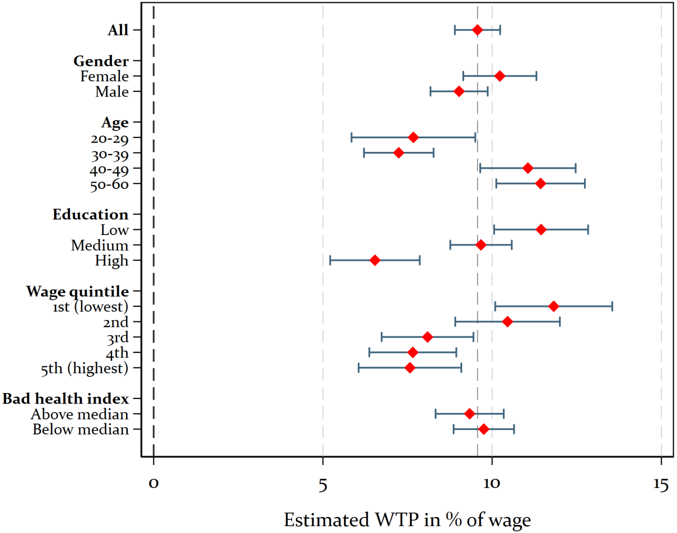
	Job A	Job B
Work hours	40 hours per week	40 hours per week
Paid days off	30 days per year	30 days per year
Deadlines	often	occasionally
Multitasking: Multiple important tasks at the same time	often	often
Flexible schedule	no	no
Option to work from home	no	5 days per week
Mean commuting time to the workplace	45 minutes	45 minutes
Gross earnings	€ 59727 per year	€ 54935 per year



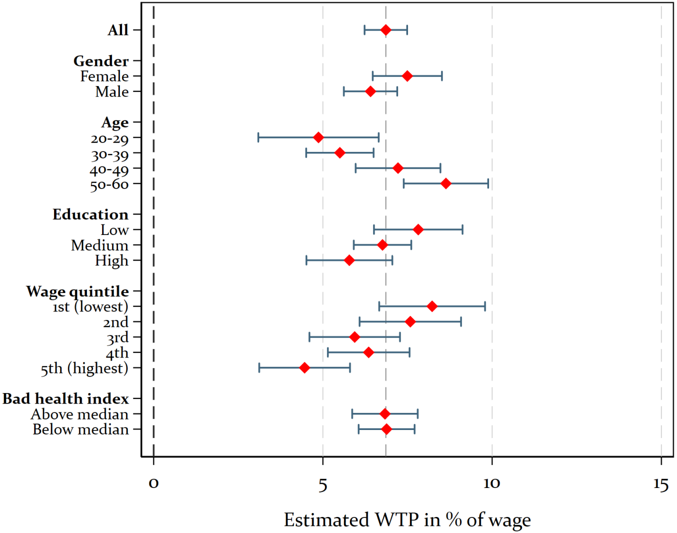
	Job A	Job B
Which job would you prefer?	○	○

Sizeable WTP to avoid frequent tight deadlines

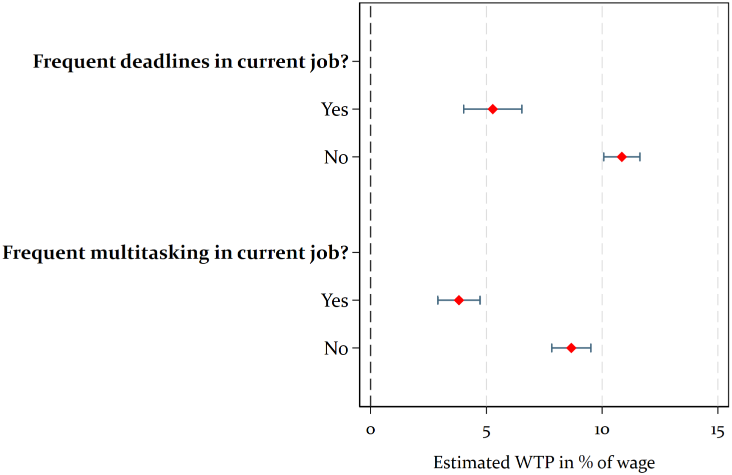
Multitasking



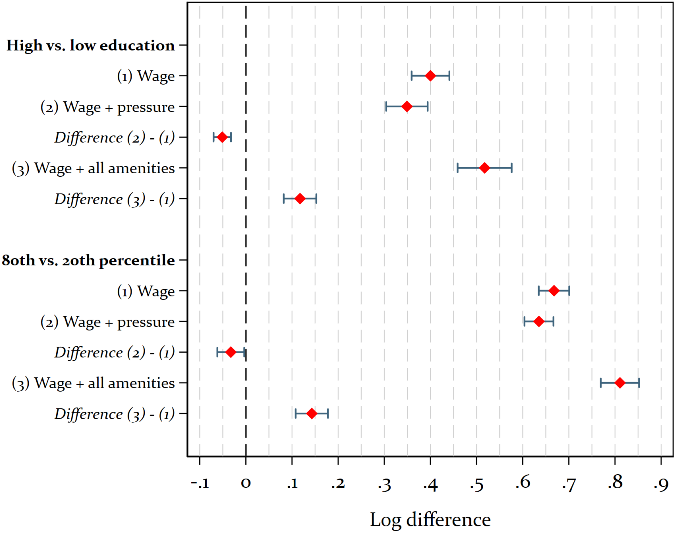
..also for multitasking Back



Strong sorting on WTP



Work pressure partly explains existing inequalities



Conclusion

- Several pieces of evidence of compensating wage differential for work-related stress
- Quantitatively important trade-off between wages and work-related stress
- Implications for wage inequality

What are your comments?

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Appendix

Summary stats by wave

Back

Wave	1979	1986	1999	2006	2012	2018
	(1)	(2)	(3)	(4)	(5)	(6)
	mean/sd	mean/sd	mean/sd	mean/sd	mean/sd	mean/sd
Deadlines	0.42	0.47	0.54	0.58	0.55	0.51
	(0.49)	(0.50)	(0.50)	(0.49)	(0.50)	(0.50)
Multitasking	0.48	0.41	0.43	0.61	0.60	0.62
	(0.50)	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)
Interruptions	.	0.24	0.37	0.52	0.48	0.50
	(.)	(0.43)	(0.48)	(0.50)	(0.50)	(0.50)
Minimum requirements	0.21	0.25	0.29	0.34	0.32	0.32
	(0.41)	(0.43)	(0.46)	(0.47)	(0.47)	(0.46)
High pressure index	.	0.34	0.41	0.51	0.49	0.49
	(.)	(0.28)	(0.31)	(0.31)	(0.31)	(0.31)
High education	0.05	0.06	0.10	0.18	0.19	0.23
	(0.22)	(0.23)	(0.30)	(0.39)	(0.39)	(0.42)
Medium education	0.82	0.71	0.76	0.73	0.73	0.67
	(0.38)	(0.45)	(0.43)	(0.44)	(0.44)	(0.47)
Low education	0.15	0.23	0.14	0.09	0.08	0.09
	(0.36)	(0.42)	(0.35)	(0.28)	(0.28)	(0.29)
Age	37.89	38.52	39.02	39.95	41.28	41.78
	(11.44)	(11.46)	(10.62)	(10.04)	(10.76)	(11.11)
Female	0.31	0.32	0.29	0.29	0.32	0.32
	(0.46)	(0.47)	(0.45)	(0.46)	(0.47)	(0.47)
Temporary contract	.	0.05	0.08	0.09	0.10	0.11
	(.)	(0.22)	(0.27)	(0.28)	(0.31)	(0.31)
Shift work	0.16	0.14	0.21	0.28	0.15	0.19
	(0.36)	(0.34)	(0.41)	(0.45)	(0.35)	(0.39)
Computer use	0.05	0.03	0.50	0.64	0.67	0.69
	(0.23)	(0.17)	(0.50)	(0.48)	(0.47)	(0.46)
Routine job	0.47	0.49	0.46	0.50	0.47	0.45
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)

Survey questions to define high-pressure job

1. **Tight deadlines:** In your work, how often do you have tight deadlines and pressure to perform?
2. **Multitasking:** In your work, how often are you forced to carry out several tasks at the same time?
3. **Interruptions:** How often are you being interrupted, for example by colleagues, telephone calls, bad material, or machine malfunctions?
4. **Minimum requirements:** How often do you face a minimum requirement, in terms of quantity or in terms of the time needed to carry out a task?

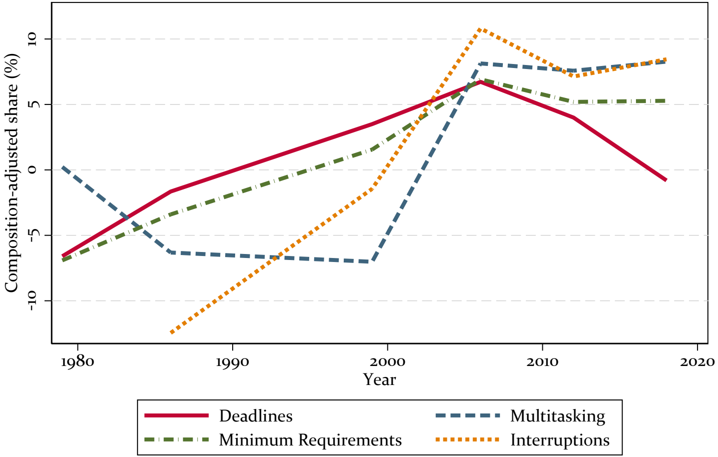
Back

High- vs. low-pressure jobs Back

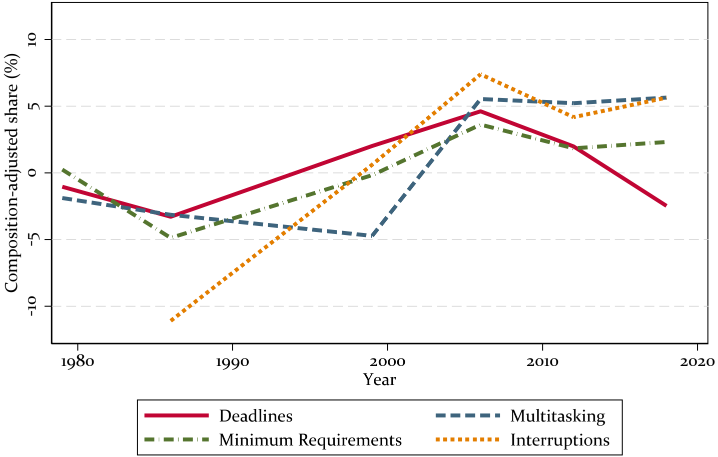
Panel A: Occupations with highest average pressure index	
Drivers of vehicles in railway traffic	.744
Occupations in geriatric care	.694
Occupations in editorial work and journalism	.662
Occupations in human medicine and dentistry	.658
Occupations in nursing, emergency medical services and obstetrics	.642

Panel B: Occupations with lowest average pressure index	
Painters and varnishers, plasterers, occupations in the waterproofing of buildings, preservation of structures and wooden building components	.329
Occupations in physical security, personal protection, fire protection and workplace safety	.346
Occupations in gardening	.346
Occupations in theology and church community work	.352
Occupations in wood-working and -processing	.37

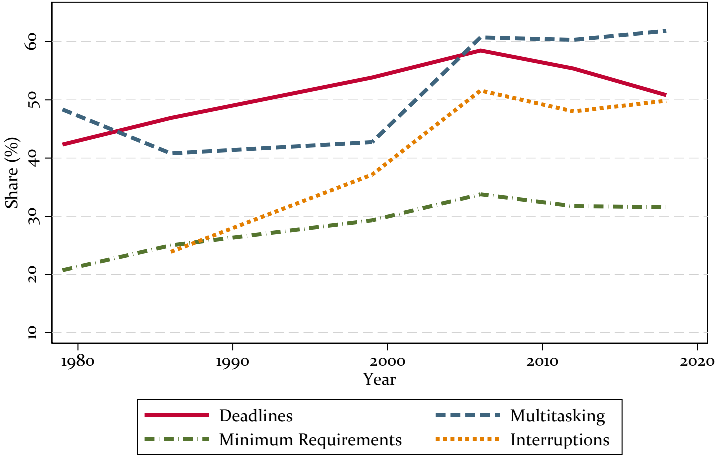
Trend not due to shifts in worker composition Back



Trend not due to shifts in occupation composition Back



Trends for all components of our index Back



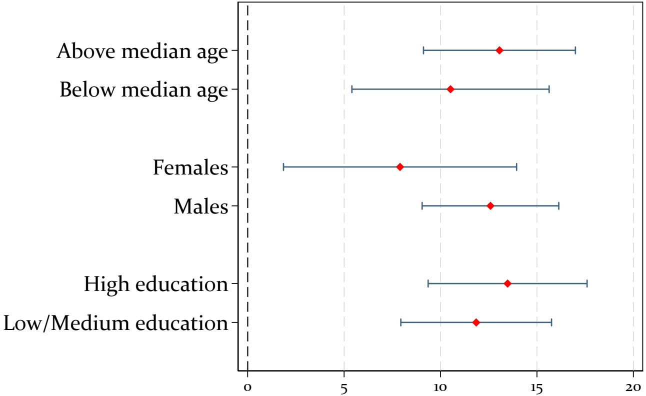
..partially because of higher hours.. Back

Dep. Var.:	100 x Ln(work hours)				
	(1)	(2)	(3)	(4)	(5)
High pressure	6.20***	6.43***	6.47***	6.58***	6.07***
	(0.79)	(0.75)	(0.74)	(0.68)	(0.73)
Adj. R2	0.02	0.08	0.14	0.17	0.17
Obs.	7825	7825	7825	7825	7825
Extended Mincer controls	No	Yes	Yes	Yes	Yes
Occupation and industry dummies	No	No	Yes	Yes	Yes
Firm and employment char.	No	No	No	Yes	Yes
Task characteristics	No	No	No	No	Yes

..but also due to higher wages per hour Back

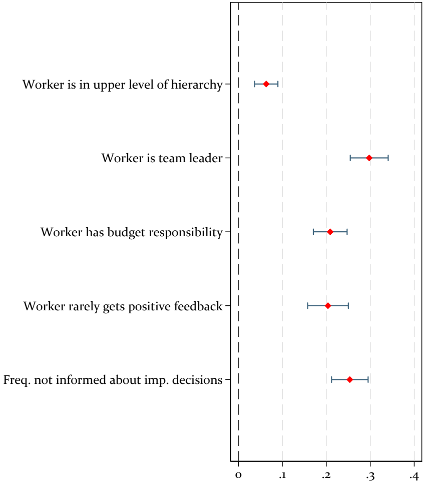
Dep. Var.:	100 x Ln(hourly wages)				
	(1)	(2)	(3)	(4)	(5)
High pressure	10.48***	7.55***	5.99***	2.79	6.13***
	(3.23)	(2.27)	(2.01)	(2.13)	(1.83)
Adj. R2	0.01	0.28	0.41	0.48	0.50
Obs.	7825	7825	7825	7825	7825
Extended Mincer controls	No	Yes	Yes	Yes	Yes
Occupation and industry dummies	No	No	Yes	Yes	Yes
Firm and employment char.	No	No	No	Yes	Yes
Task characteristics	No	No	No	No	Yes

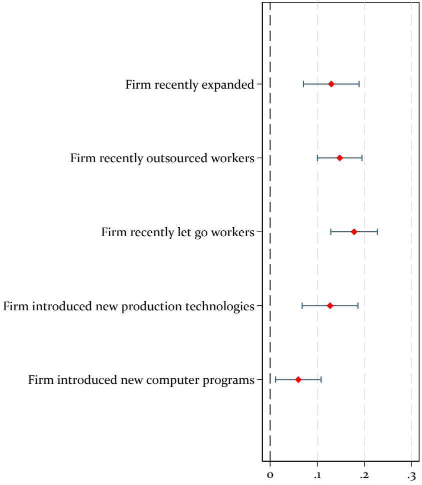
Heterogeneity of earnings premium Back



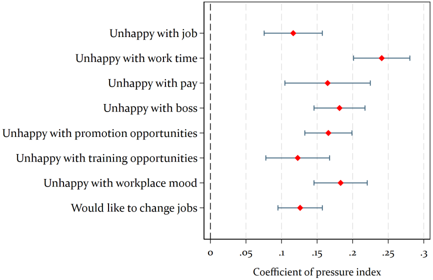
Characteristics of high-pressure jobs

Back





Are workers fully compensated? Back



Possible interpretation:

- Not fully compensated due to frictions
  (e.g., Bonhomme and Jolivet, 2009)
- Workers do not interpret question as ceteris paribus
- Issues with estimation

Choice model

$$V_{ijt} = \alpha + X'_{ijt}\beta + H'_{ijt}\theta + \delta ln\ w_{ijt} + \epsilon_{ijt},$$

where

- X'_{ijt}: Job amenities
- H'_{ijt}: Hours
- w_{ijt}: Earnings

Assume logistic distribution to arrive at:

$$P(V_{ijt} > V_{ikt}) = \frac{\exp[(X'_{ijt} - X'_{ikt})\beta + (H'_{ijt} - H'_{ikt})\theta + \delta(\ln w_{ijt} - \ln w_{ikt})]}{1 + \exp[(X'_{ijt} - X'_{ikt})\beta + (H'_{ijt} - H'_{ikt})\theta + \delta(\ln w_{ijt} - \ln w_{ikt})]}.$$

Back

Willingness-to-pay estimate

Indifference condition:

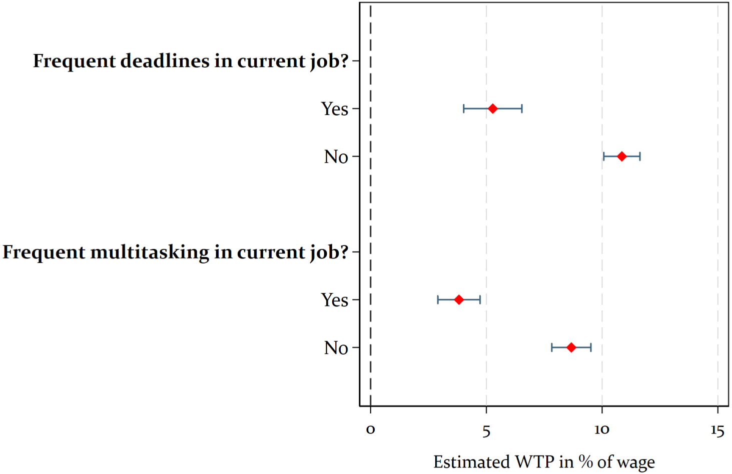
$$\delta \ln w = \beta^r + \delta \ln(w - WTP^r),$$

And thus,

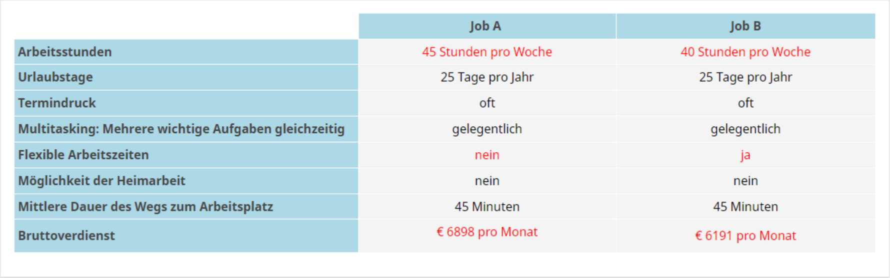
$$WTP^r = \left[1 - e^{\left(-\frac{\beta^r}{\delta}\right)}\right].$$

$\Rightarrow$ WTP for job amenity in percent of wage

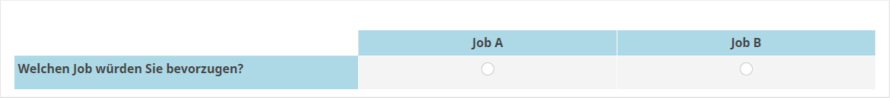
Strong sorting on WTP



Choosing wisely



	Job A	Job B
Arbeitsstunden	45 Stunden pro Woche	40 Stunden pro Woche
Urlaubstage	25 Tage pro Jahr	25 Tage pro Jahr
Termindruck	oft	oft
Multitasking: Mehrere wichtige Aufgaben gleichzeitig	gelegentlich	gelegentlich
Flexible Arbeitszeiten	nein	ja
Möglichkeit der Heimarbeit	nein	nein
Mittlere Dauer des Wegs zum Arbeitsplatz	45 Minuten	45 Minuten
Bruttoverdienst	€ 6898 pro Monat	€ 6191 pro Monat



	Job A	Job B
Welchen Job würden Sie bevorzugen?	○	○

Implications for earnings inequality Back

1. Mobility along the earnings distribution

   Preferred estimate (13 log points):

   - 0→ 1 pressure: 50th → 61th percentile in the aggregate earnings distribution among full-time employees in 2018
   - 25th → 75th pct.: 50th → 55th percentile

2. Earnings inequality

   If all jobs had average level of work pressure in 2018, this would have reduced variance of log earnings by around 1.3%

   Key reason: work pressure does not differ strongly between the upper and the lower part of the earnings distribution

High-pressure jobs, anyone? Details

Dep. Var.:	Bad health		Unhappy with job		Family outcomes	
	Index	Sick days	Index	Change job	Married	No time for family
	(1)	(2)	(3)	(4)	(5)	(6)
High pressure	1.27***	3.29***	0.70***	0.13***	0.03	0.22***
	(0.06)	(0.92)	(0.06)	(0.02)	(0.02)	(0.03)
Mean dep.	-0.01	14.88	-0.01	0.19	0.51	0.18
Adj. R2	0.21	0.11	0.09	0.06	0.18	0.09
Obs.	7793	5110	7585	7694	7846	7823
Ext. Mincer	Yes	Yes	Yes	Yes	Yes	Yes
Occ. and ind. FE	Yes	Yes	Yes	Yes	Yes	Yes

Placebo: “compensating differentials” for civil servants?

For civil servants, compensating differentials should arguably not play a role:

1. Largely fixed pay schedules
2. Stronger labor market frictions

Example: Teacher or police officer in high-pressure environment paid $\sim$ same as in low-pressure environment

Civil servants do not earn more in high pressure jobs..

Dep. Var.:	Ln(monthly earnings)				
	(1)	(2)	(3)	(4)	(5)
High pressure	2.64	2.32	0.24	0.75	2.50
	(6.40)	(4.28)	(4.13)	(3.84)	(3.74)
Adj. R2	-0.00	0.43	0.46	0.48	0.49
Obs.	995	996	996	995	995
Extended Mincer controls	No	Yes	Yes	Yes	Yes
Occupation and industry dummies	No	No	Yes	Yes	Yes
Firm and employment char.	No	No	No	Yes	Yes
Task characteristics	No	No	No	No	Yes

Back

..but still need to work more hours..

Dep. Var.:	Ln(work hours)				
	(1)	(2)	(3)	(4)	(5)
High pressure	7.61***	7.96***	7.70***	7.26***	6.76***
	(2.13)	(1.62)	(1.59)	(1.64)	(1.72)
Adj. R2	0.02	0.11	0.17	0.18	0.19
Obs.	995	996	996	995	995
Extended Mincer controls	No	Yes	Yes	Yes	Yes
Occupation and industry dummies	No	No	Yes	Yes	Yes
Firm and employment char.	No	No	No	Yes	Yes
Task characteristics	No	No	No	No	Yes

..so they earn lower hourly wages in these jobs Back

Dep. Var.:	Ln(hourly wages)				
	(1)	(2)	(3)	(4)	(5)
High pressure	-4.97	-5.64	-7.45**	-6.51*	-4.26
	(5.84)	(3.59)	(3.44)	(3.34)	(2.98)
Adj. R2	0.00	0.41	0.44	0.46	0.48
Obs.	995	996	996	995	995
Extended Mincer controls	No	Yes	Yes	Yes	Yes
Occupation and industry dummies	No	No	Yes	Yes	Yes
Firm and employment char.	No	No	No	Yes	Yes
Task characteristics	No	No	No	No	Yes

Additional data: Linked Personnel Panel Back

- Worker- and establishment-level survey carried out by IAB
- Link to administrative IAB data on worker careers
- Waves 2012/13, 2014/15, 2016/17, 2018/19
- Panel dimension for parts of the sample

Survey question to define work pressure Back

"I often have deadline pressure over a longer period of time or have to manage several important tasks at the same time."

High pressure = 1 if answer = "applies fully" or "applies mostly"

$\Rightarrow$ Similar, but not exactly identical to first data set

Worker FE: lower bound on comp. differential! Back

1. **Worker mobility between firms is endogenous (Lavetti/Schmutte 2018)**
   - Workers move to "better" jobs (higher wages and better amenities) since both consumption and amenities are normal goods
   - Negative correlation between wages and pressure within person across jobs
   - Coefficient severely downward-biased Details

2. **Within-person changes in pressure might reflect measurement error (attenuation bias)**

Issue: imputed wage changes Back

For workers with imputed wages, wage changes over time reflect pure noise

Two solutions:

1. Drop workers with imputed wages
2. Replace imputed wage with self-reported wage from survey

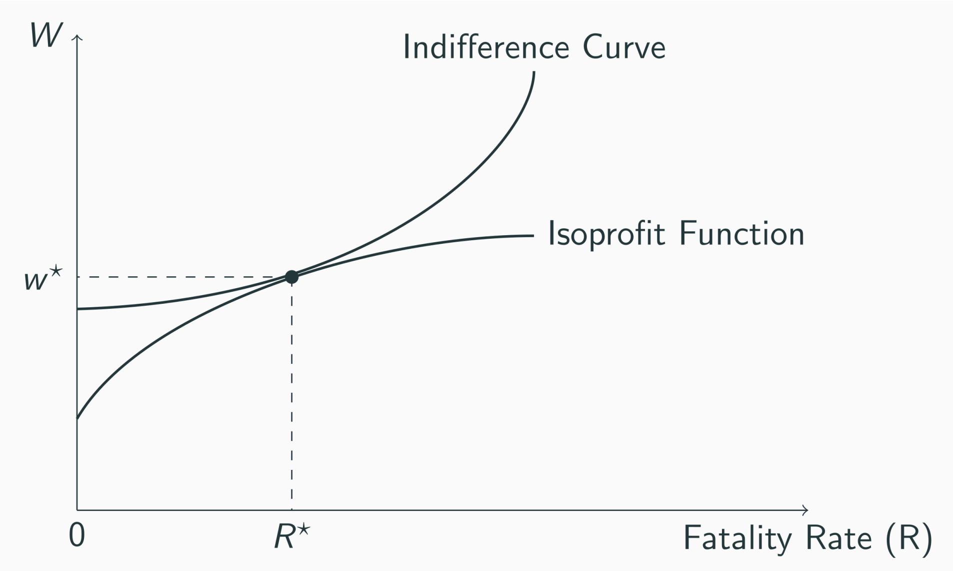
Worker FE analysis: positive lower bound

Back

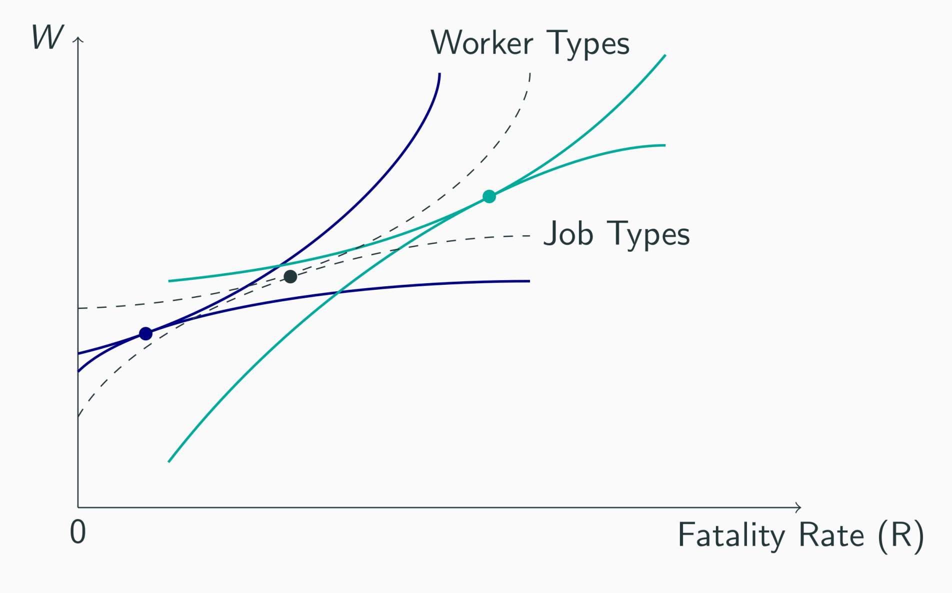
Dep. Var.:	100 x Ln(monthly earnings)				
		Drop censored		Self-reported wage	
	(1)	(2)	(3)	(4)	(5)
High pressure	6.32***	0.60**	0.85**	0.62	0.87***
	(1.25)	(0.25)	(0.36)	(0.39)	(0.38)
Obs.	17,180	13,819	4,165	16,726	5,151
Worker FE	No	Yes	Yes	Yes	Yes
Restrict on $>=$ 3 panel obs.	No	No	Yes	No	Yes

Controls: education, cubic age, firm tenure, gender, occupation and industry dummies, year dummies

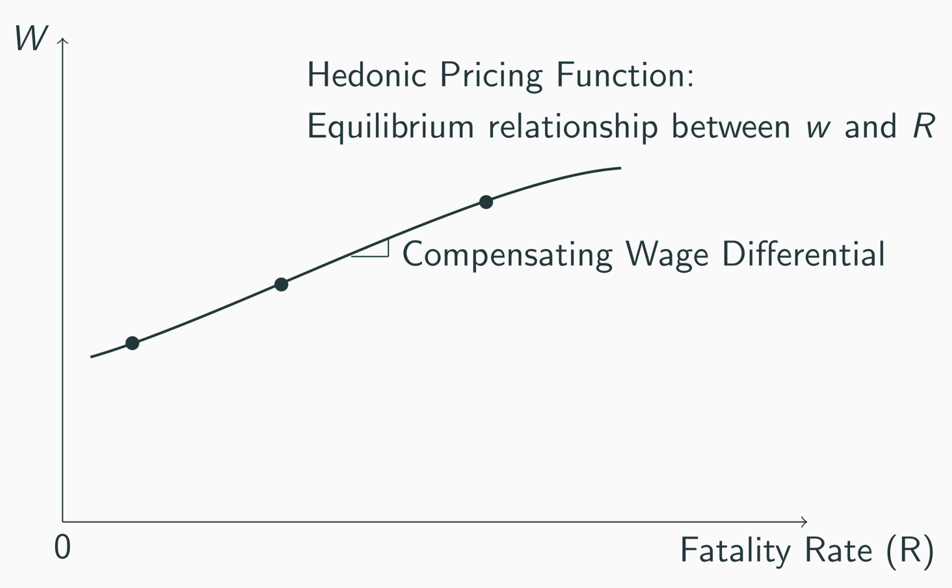
Endogenous mobility (Lavetti/Schmutte 2018) Back


W
Indifference Curve
Isoprofit Function
$w^\star$
0
$R^\star$
Fatality Rate (R)

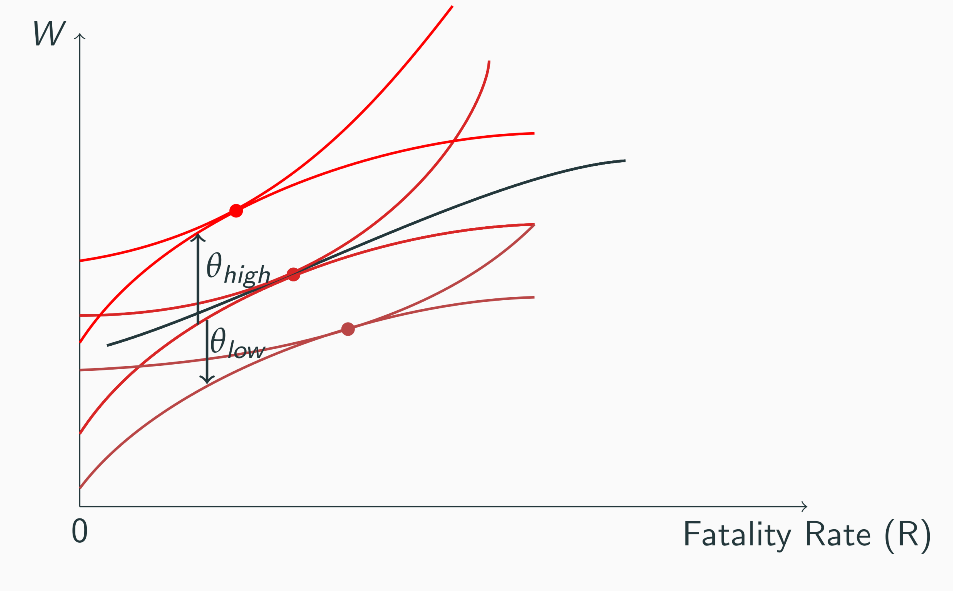
Endogenous mobility (Lavetti/Schmutte 2018) Back


W
Worker Types
Job Types
0
Fatality Rate (R)

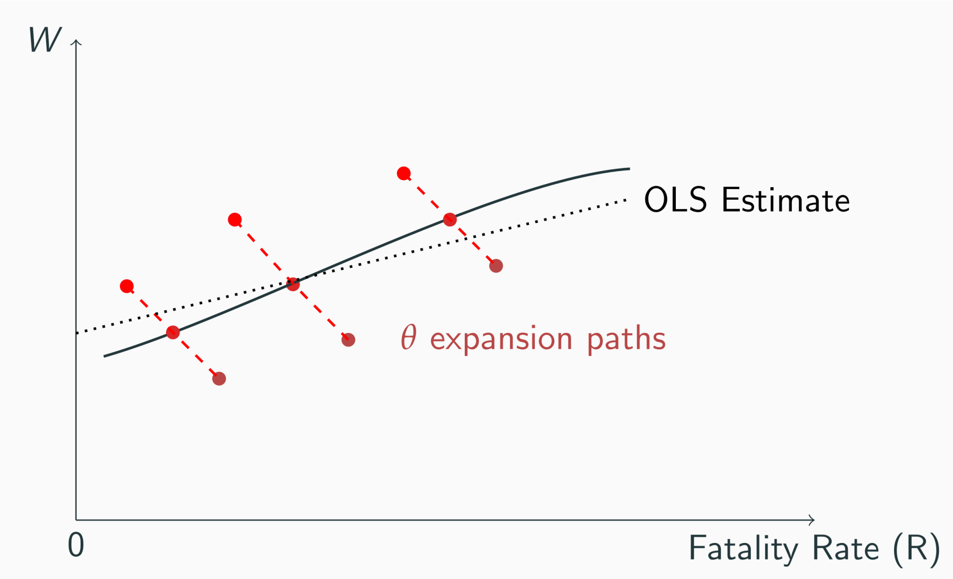
Endogenous mobility (Lavetti/Schmutte 2018) Back


W
Hedonic Pricing Function:
Equilibrium relationship between w and R
Compensating Wage Differential
0
Fatality Rate (R)

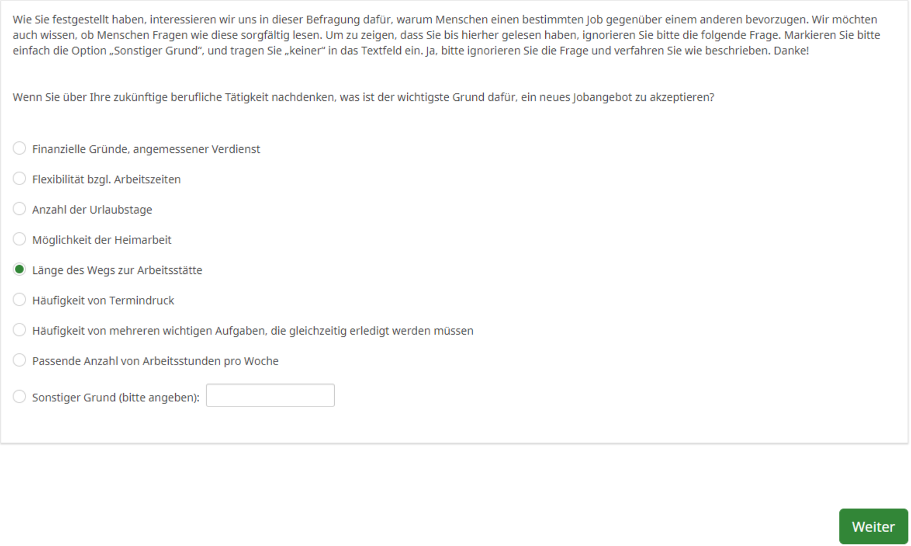
Endogenous mobility (Lavetti/Schmutte 2018) Back


W
θ_{high}
θ_{low}
0
Fatality Rate (R)

Endogenous mobility (Lavetti/Schmutte 2018) Back


W
OLS Estimate
θ expansion paths
0
Fatality Rate (R)

Attention, please



Wie Sie festgestellt haben, interessieren wir uns in dieser Befragung dafür, warum Menschen einen bestimmten Job gegenüber einem anderen bevorzugen. Wir möchten auch wissen, ob Menschen Fragen wie diese sorgfältig lesen. Um zu zeigen, dass Sie bis hierher gelesen haben, ignorieren Sie bitte die folgende Frage. Markieren Sie bitte einfach die Option „Sonstiger Grund", und tragen Sie „keiner" in das Textfeld ein. Ja, bitte ignorieren Sie die Frage und verfahren Sie wie beschrieben. Danke!

Wenn Sie über Ihre zukünftige berufliche Tätigkeit nachdenken, was ist der wichtigste Grund dafür, ein neues Jobangebot zu akzeptieren?

○ Finanzielle Gründe, angemessener Verdienst

○ Flexibilität bzgl. Arbeitszeiten

○ Anzahl der Urlaubstage

○ Möglichkeit der Heimarbeit

● Länge des Wegs zur Arbeitsstätte

○ Häufigkeit von Termindruck

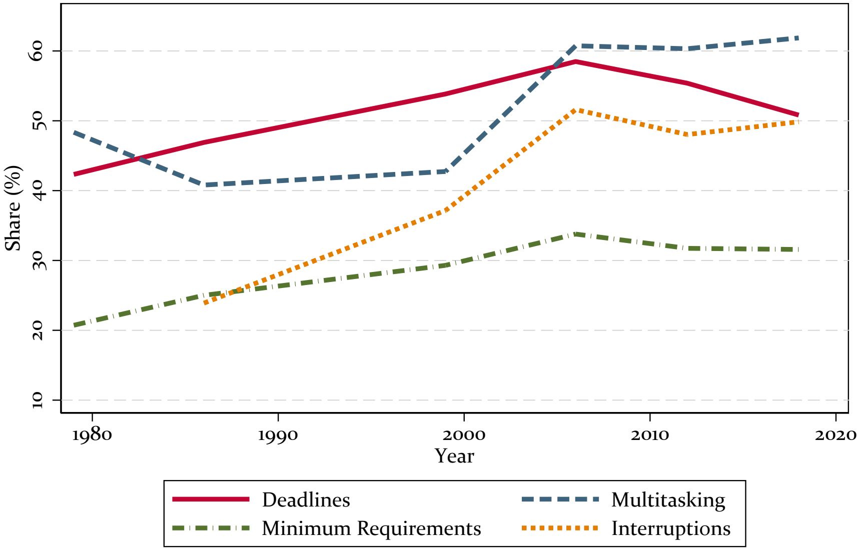
○ Häufigkeit von mehreren wichtigen Aufgaben, die gleichzeitig erledigt werden müssen

○ Passende Anzahl von Arbeitsstunden pro Woche

○ Sonstiger Grund (bitte angeben): ☐

Work pressure has increased

Composition Occupation Components

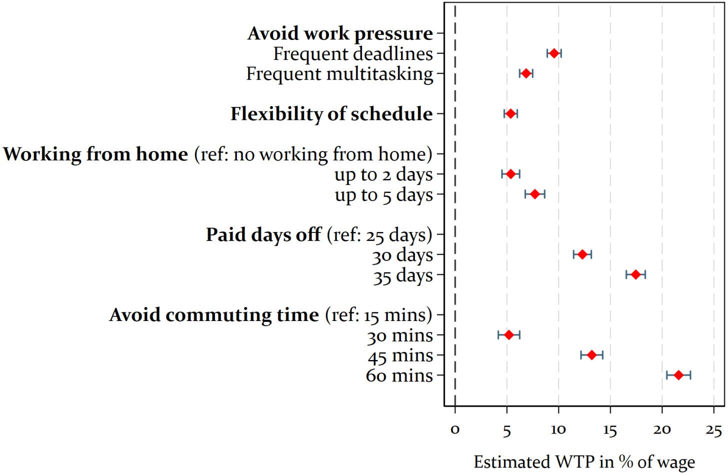


Pressure, health and wages: evidence from 2018 wave

$$y_i = \beta HighPressure_i + M_i'\gamma + Occ_i + Ind_i + F_i'\delta + T_i'\omega + \epsilon_i$$

- y: outcome, e.g. health/log wage/log earnings
- M_i': Extended Mincer controls (educ, gender, age, german, NUTS2, pop. density)
- Occ_i and Ind_i: occupation and industry FE (2-digit KldB2010/ 2-digit WZ2008)
- + F_i': firm and job characteristics (works council, temp. empl. agency, hierarchy level, firm size bins, commuting, temp. contract, normal work hours, stand-by)
- + T_i': task characteristics (routine, codifiable, computer use, phys. req.)
- ϵ_i allows for clustering within occupation

Comparison to other job attributes


Avoid work pressure
Frequent deadlines
Frequent multitasking
Flexibility of schedule
Working from home (ref: no working from home)
up to 2 days
up to 5 days
Paid days off (ref: 25 days)
30 days
35 days
Avoid commuting time (ref: 15 mins)
30 mins
45 mins
60 mins
0
5
10
15
20
25
Estimated WTP in % of wage