Why Work Hard?
The Reserve Army and the Protestant Ethic

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Why do workers work hard?

- Two classical theses:

"The industrial reserve army, during the periods of stagnation and average prosperity, weighs down the active labour army; during the periods of over-production and paroxysm, it holds its pretensions in check."

—Karl Marx, Capital, Vol. I (1867)

vs.

"The rosy blush of its laughing heir, the Enlightenment, seems also to be irretrievably fading, and the idea of duty in one's calling prowls about in our lives like the ghost of dead religious beliefs."

—Max Weber, The Protestant Ethic (1905)

Classic theses in modern labor-economics language

- **The Reserve Army** (external pressure)

  Workers exert effort because labor-market slack lowers their outside options.

  Efficiency wages / worker-discipline device (Shapiro & Stiglitz 1984; Cappelli & Chauvin 1991)

- **The Protestant Ethic** (internalized values)

  Workers exert effort because they internalize a norm valuing diligence in utility.

  Intrinsic motivation / work identity (Bénabou & Tirole 2003; Gneezy & Rustichini 2000)

- This paper: do workers work hard out of **discipline** or **duty**?

The reserve army as worker discipline

- A simple efficiency-wage logic: workers exert effort to avoid losing a valuable job
- Exerting effort yields $u(w) - h(e)$; shirking is detected with probability q, and dismissal delivers outside option z. Dismissal delivers outside option z.
- Incentive compatibility requires

$$\underbrace{u(w) - h(e)}_{\text{exert effort}} \;\geq\; \underbrace{(1-q)\,u(w) + q\,z}_{\text{shirk}} \qquad \Longrightarrow \qquad h(e) \;\leq\; q\big[u(w) - z\big].$$

- A weaker labor market lowers the outside option $z \Rightarrow$ raises enforceable effort.
- The worker-discipline logic of efficiency wages (Shapiro & Stiglitz, 1984).

The Protestant ethic as intrinsic motivation

- A simple intrinsic-motivation logic: workers may attach moral value to effort itself
- The worker choose effort e to maximize

$$u(w(e)) - h(e) + \eta v(e),$$

where $v(e)$ is the moral value of effort and η its strength.

- Optimal effort satisfies

$$\underbrace{u'\big(w(e^*)\big)\, w'(e^*)}_{\text{monetary return}} + \underbrace{\eta\, v'(e^*)}_{\text{intrinsic return}} = \underbrace{h'(e^*)}_{\text{disutility}}$$

- A stronger work ethic η raises the intrinsic return to effort $\Rightarrow$ raises optimal effort.

This paper

- Studying this question is difficult:
  - Measurement: the two forces rarely exist in the data
  - Identification: the two forces rarely vary exogenously
- Our approach: a randomized field experiment shifting each force
  - **Labor-market information** $\Rightarrow$ shifts external labor-market pressure (*Reserve-army* channel)
  - **Work-ethic message** $\Rightarrow$ shifts internalized motivation to work (*Protestant-ethic* channel)
- Conducted in a large Chinese manufacturer, with administrative records of worker effort and performance before and after treatment

What does it mean to "work hard"?

$$\text{Output} = \underbrace{\text{Hours}}_{\text{time margin}} \times \underbrace{\text{Output per hour}}_{\text{productivity margin}}$$

- **Hours**: working hard in terms of how long the worker works

  Relatively easy to observe

- **Output per hour**: working hard in terms of how much each hour produces

  Pace, attention, care; not easily observed

- Distinct margins of "working hard": workers can work longer with lower output per hour

- We measure both margins in the administrative data

Preview of results

	Hours	Output/hr	Errors	
Market Info (Marxian discipline)	$+7.7\%$	-13.9%	$\uparrow$	*sweat more, produce less*
Work Values (Weberian ethics)	≈ 0	$+7.1\%$	$\downarrow$	*work better, not longer*

- Pressure expands the hours worked but degrades quality of work — Discipline raises exertion, but exertion need not translate into productive effort.
- Internalized values raise the quality of each hour, without more hours or more stress.
- Combined treatment $\approx$ sum of the two effects

What's new: discipline versus work values

- **Worker discipline / efficiency wages** Shapiro & Stiglitz (1984); Cappelli & Chauvin (1991); Ichino & Riphahn (2005); Lazear, Shaw & Stanton (2016)
  - Prior work studies wage premia, employment protection, or realized labor-market conditions
  - This paper: randomly shift incumbent workers' **perceived outside option**
- **Intrinsic motivation and work values** Bénabou & Tirole (2003); Gneezy & Rustichini (2000); Gneezy & List (2006); DellaVigna & Pope (2018); DellaVigna et al. (2022)
  - Prior experiments vary incentives, reciprocity, meaning, or social preferences
  - This paper: randomly shift the **moral value attached to diligent work**
- A clean comparison of external discipline and internalized motivation

What's new: the margins of "hard work"

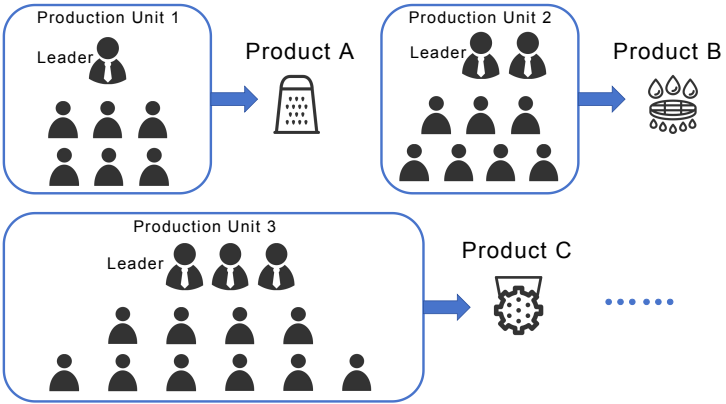
- **Work ethic and economic behavior** Becker & Woessmann (2009); Cantoni (2015); Spenkuch (2017); Bryan, Choi & Karlan (2021)
  - Prior work uses religious or historical variation to study consequences of Protestantism
  - This paper: directly manipulate a **work-ethic norm** inside the workplace
- **Hours versus effort per hour** Fehr & Goette (2007)
  - This paper: The source of motivation determines which margin responds
- **Labor-market information** Altmann et al. (2018); Belot, Kircher & Muller (2019); Card et al. (2012)
  - Prior interventions primarily target job seekers or provide information about coworkers' pay
  - This paper: change incumbent workers' beliefs about **outside labor-market conditions** and observe their subsequent workplace behavior

Experimental Design

Setting

- Chemical manufacturer producing industrial filtration materials, with two factories in Liaoning and Zhejiang
- Target population: frontline production workers
  - Gender ratio $\approx$ 1:1; average age 43; most completed 9 years of schooling; half migrant workers
  - Compensation is mostly production-based: individual or team piece rates, no fixed base salary, monthly bonuses (e.g. referrals), and penalties (attendance and quality issues)
  - Repetitive tasks, strict production targets, frequent lateness/early leave, quality-control penalties

Production organization



- 22 production units; production is organized independently across units
- Within each unit, workers may either collaborate or work independently
- Team leaders perform regular production tasks while also coordinating the unit

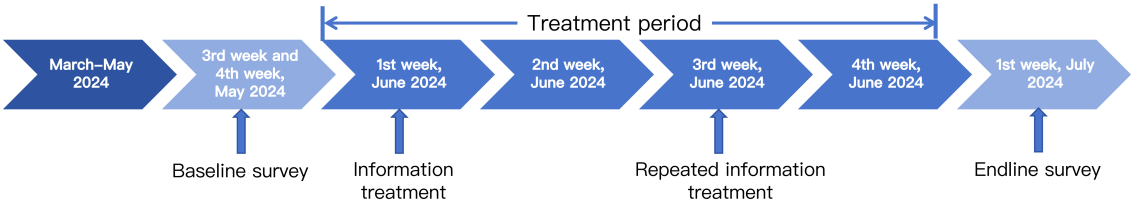
Data

- **Administrative records**:
  - monthly wage records (earnings, bonuses, and penalties)
  - monthly attendance records (working hours)
  - human resources data (job positions and demographic characteristics)
- **Worker surveys**:
  - before and after the intervention, to measure beliefs, attitudes, and other self-reported outcomes

Randomization and interventions

506 subjects, randomized at the individual level

1. **Labor-market information**: expert forecast of a weakening labor market $(n = 134)$
2. **Work-ethic message**: diligence, frugality, and hard work as a moral virtue $(n = 134)$
3. Combined treatment: receives both interventions $(n = 134)$
4. Control group: no intervention $(n = 104)$



Contents of interventions

Info	English Content	Chinese Content
Panel A. Labor Market Information Intervention		
Info 1	Greeting and question: Will the labor market worsen in June?	亲爱的工友您好！已经进入六月份了。现在的劳动市场是否会变得更差呢？
Info 2	Experts predict a weaker labor market in June than in May.	近日，北京大学经济政策研究所的教授们根据研究分析提出：与五月份相比，本月的劳动市场将变得更差。
Info 3	Forecast: unemployment to rise 5%, 2.2 million nationwide, 5 000 in Quzhou.	专家预测，在六月份，想找但找不到工作的人将比上个月增多 5%，这意味着全国将增加约 220 万人失业，仅衢州市就将增加 5000 人以上。
Info 4	Fewer vacancies (–5%), tougher job competition; reflection encouraged.	专家认为，由于劳动力市场环境变差，正在招工的岗位相比上个月将有所减少，每个正在找工作的人对应的岗位将减少 5%。相信读到这里，您会有自己的看法。
Panel B. Work Ethics Information Intervention		
Info 1	Greeting and theme: "No pain, no gain."	亲爱的工友您好！已经进入六月份了。一分耕耘，一分收获！
Info 2	Emphasizes diligence and frugality as core virtues.	勤俭节约是中华民族的传统美德。古话说，“成由勤俭败由奢”。
Info 3	Ancient quote: *Shang Shu* —"Be diligent and frugal."	我国最古老的文集《尚书》提到：“克勤于邦，克俭于家。”
Info 4	Western view: Weber's "Protestant Ethic" links hard work and self-discipline to success.	同样，在西方，思想家马克斯·韦伯认为，“新教伦理”中勤劳节俭、自律克制的精神，是现代资本主义发展的重要道德基础。相信读到这里，您会有自己的看法。

Summary statistics and balance tests

Variable	Total	Group 1	Group 2	Group 3	Control	*F*-statistic
Demographic Characteristics						
Age	43.01	42.53	42.68	43.10	44.00	0.75
	(7.60)	(7.56)	(7.39)	(7.19)	(8.46)	
Female	0.50	0.50	0.51	0.54	0.43	0.92
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	
Married	0.84	0.85	0.88	0.81	0.79	1.29
	(0.37)	(0.36)	(0.33)	(0.39)	(0.41)	
Localcity	0.48	0.48	0.48	0.49	0.47	0.03
	(0.50)	(0.50)	(0.50)	(0.50)	(0.50)	
Rural	0.74	0.78	0.76	0.73	0.70	0.64
	(0.44)	(0.42)	(0.43)	(0.45)	(0.46)	
Education						
Educ_PrimaryJunior	0.73	0.73	0.74	0.72	0.71	0.12
	(0.45)	(0.44)	(0.44)	(0.45)	(0.46)	
Educ_HighSchoolVoc	0.21	0.22	0.20	0.20	0.24	0.15
	(0.41)	(0.41)	(0.40)	(0.40)	(0.43)	
Educ_CollegePlus	0.06	0.05	0.06	0.08	0.06	0.27
	(0.24)	(0.22)	(0.23)	(0.27)	(0.23)	
Job Characteristics						
Team piece rate	0.64	0.66	0.60	0.64	0.66	0.35
	(0.48)	(0.48)	(0.49)	(0.48)	(0.48)	
Quzhou	0.43	0.46	0.45	0.37	0.45	0.77
	(0.50)	(0.50)	(0.50)	(0.49)	(0.50)	
Team leader	0.10	0.09	0.11	0.08	0.12	0.54
	(0.30)	(0.29)	(0.32)	(0.27)	(0.33)	
Tenure	3.69	3.73	3.43	3.66	4.01	0.50
	(3.47)	(3.22)	(2.93)	(3.86)	(3.93)	
Observations	451	120	124	118	89	

Summary statistics and balance tests

Variable	Total	Group 1	Group 2	Group 3	Control	*F*-statistic
Beliefs and Attitudes						
Urate belief	0.35	0.33	0.38	0.32	0.38	0.46
	(0.48)	(0.47)	(0.49)	(0.47)	(0.49)	
Ideal effort	9.14	9.20	9.04	9.19	9.15	0.30
	(1.46)	(1.52)	(1.47)	(1.54)	(1.26)	
Pressure	6.28	6.43	5.91	6.57	6.22	1.08
	(3.01)	(3.03)	(3.03)	(2.98)	(2.99)	
Perceived effort	8.95	8.95	8.96	8.86	9.04	0.27
	(1.50)	(1.33)	(1.32)	(1.88)	(1.38)	
Happiness	7.85	7.78	8.08	7.69	7.82	0.59
	(2.38)	(2.45)	(2.28)	(2.53)	(2.21)	
Pre-treatment Work Outcomes						
Hours	276.86	276.41	271.38	291.21	266.07	2.51
	(71.76)	(71.48)	(73.48)	(75.16)	(62.68)	
Production wage	6594.13	6853.11	6487.74	6610.19	6371.89	1.32
	(1874.41)	(1890.15)	(1945.25)	(1789.38)	(1852.37)	
Hourly production efficiency	24.90	26.04	25.21	23.49	24.81	1.93
	(8.39)	(9.11)	(8.99)	(6.80)	(8.30)	
Bonus	200.32	170.74	220.48	203.89	207.38	1.29
	(204.11)	(198.30)	(210.37)	(207.12)	(197.81)	
Operation penalty	13.25	9.67	12.37	17.02	14.30	0.31
	(60.66)	(57.73)	(36.11)	(81.23)	(60.63)	
Attendance penalty	15.43	11.34	15.51	22.47	11.48	1.08
	(53.47)	(33.77)	(39.93)	(84.31)	(35.97)	
Observations	451	120	124	118	89	

No significant differences across arms; randomization succeeded.

Empirical Results

Empirical specification

- Estimate treatment effects using a difference-in-differences specification:

$$Y_{it} = \alpha + \sum_{g=1}^{3} \beta_g \left(\mathbb{1}[G_i = g] \times Post_t \right) + \sum_{g=1}^{3} \gamma_g \mathbb{1}[G_i = g] + \Gamma' X_i + \lambda_t + \delta_{s(i)} + \varepsilon_{it}.$$

  - Group 1, 2, 3: labor-market information; work-ethic message; combined treatment
  - X_i: pre-treatment worker and job characteristics
  - λ_t: time fixed effects;
  - $\delta_{s(i)}$: production-unit fixed effects
  - Standard errors clustered at the worker level

- Coefficient of interest: β_g measures the treatment effect of Group g

Treatment effects on perceived unemployment and ideal effort

	(1) Urate belief	(2) Ideal effort
Group1 × Post	0.274***	0.039
	(0.094)	(0.311)
Group2 × Post	0.047	0.673**
	(0.087)	(0.305)
Group3 × Post	0.221**	0.353
	(0.091)	(0.320)
Group1	-0.058	-0.061
	(0.070)	(0.205)
Group2	-0.009	-0.131
	(0.070)	(0.196)
Group3	-0.050	-0.064
	(0.070)	(0.207)
Controls	Yes	Yes
Production unit FE	Yes	Yes
Month FE	Yes	Yes
Control group mean	0.351	8.877
Observations	844	844
Adjusted R-squared	0.016	0.047

- **LM Info** raises the probability of expecting rising unemployment
- **Ethic message** raises intended effort.
- The manipulations took, and did not cross-contaminate.

Treatment effects on administrative performance

	(1) Log hours	(2) Log production wage	(3) Log hourly production efficiency
Group1 × Post	0.077**	-0.062**	-0.139***
	(0.032)	(0.030)	(0.035)
Group2 × Post	0.007	0.077**	0.071**
	(0.032)	(0.031)	(0.027)
Group3 × Post	0.032	-0.037	-0.069**
	(0.030)	(0.027)	(0.027)
Group1	0.008	0.031	0.023
	(0.030)	(0.031)	(0.028)
Group2	-0.008	0.007	0.016
	(0.032)	(0.031)	(0.029)
Group3	0.052*	0.039	-0.014
	(0.029)	(0.031)	(0.029)
Controls	Yes	Yes	Yes
Production unit FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Control group mean	5.544	8.703	3.159
Observations	844	844	844
Adjusted R-squared	0.298	0.402	0.557

Treatment effects on bonuses and penalties

	(1) Log bonus	(2) Log operation penalty	(3) Log attendance penalty
Group1 × Post	0.411*	0.604**	-0.088
	(0.216)	(0.286)	(0.258)
Group2 × Post	0.023	-0.912***	-0.544**
	(0.178)	(0.239)	(0.247)
Group3 × Post	0.197	0.159	-0.613**
	(0.209)	(0.285)	(0.246)
Group1	-0.403**	-0.301*	0.005
	(0.187)	(0.165)	(0.208)
Group2	-0.197	0.060	0.187
	(0.188)	(0.188)	(0.219)
Group3	-0.149	-0.096	0.187
	(0.207)	(0.180)	(0.226)
Controls	Yes	Yes	Yes
Production unit FE	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Control group mean	4.065	0.626	0.602
Observations	844	844	844
Adjusted R-squared	0.696	0.169	0.080

Ethic reduces operational and attendance penalties; LM info increases operational penalties.

Why each channel hits a different margin

- The estimates line up with the two channels acting on *different* margins:
  - External pressure $\Rightarrow$ the hours margin
  - Internalized values $\Rightarrow$ the intensity margin
- One reason is an **observability asymmetry**:
  - Discipline (Shapiro & Stiglitz) works only on effort the firm can monitor
  - Intrinsic values reward diligence the worker feels, whether or not anyone observes it
- This points to a model with both forces and both margins

A simple framework

- The worker chooses hours h and intensity e.
- Output per hour is $e \cdot g(\pi)$, with $g'(\pi) < 0$: stress degrades the productivity of effort.

$$U(h, e) = \underbrace{w\, h\, e\, g(\pi)}_{\text{piece-rate pay}} - \underbrace{c(h, e)}_{\text{disutility}} + \underbrace{\eta\, v(e)}_{\text{work ethic}} - \underbrace{\pi\, \kappa(h)}_{\text{job-loss risk}}$$

- **Pressure acts on hours.** Discipline works through what the firm observes.
- **The ethic acts on intensity.** Moral value of diligence attaches to how carefully one works.
- **Stress is the wedge.** $g(\pi)$ makes each unit of effort less productive under pressure.

First-order conditions and comparative statics

- First-order conditions:

$$w\, e\, g(\pi) - \pi\, \kappa'(h) = c_h(h, e), \qquad w\, h\, g(\pi) + \eta\, v'(e) = c_e(h, e).$$

- $\uparrow \pi$: $-\pi\kappa'(h) > 0$ raises the return to hours ($h \uparrow$ if discipline dominates the stress effect on pay); $g(\pi) \downarrow$ lowers effective output per hour.
- $\uparrow \eta$: $+\eta v'(e)$ raises intensity ($e \uparrow$); effect on h through cross-terms (ambiguous and small)

	Hours h		**Output/hr** $e\,g(\pi)$	
	Model	Data	Model	Data
Pressure $\uparrow \pi$	$+$	$+7.7\%$	$-$	-13.9%
Ethic $\uparrow \eta$	≈ 0	≈ 0	$+$	$+7.1\%$

Potential threat: spillover

	(1) Log hours	(2) Log production wage	(3) Log hourly production efficiency
F_Group1 × Post	1.034	0.391	-0.643
	(0.647)	(0.772)	(0.766)
F_Group2 × Post	0.381	0.191	-0.191
	(0.502)	(0.522)	(0.491)
F_Group3 × Post	0.655	0.269	-0.386
	(0.496)	(0.444)	(0.507)
F_Group1	1.960***	2.448***	0.488
	(0.491)	(0.570)	(0.437)
F_Group2	0.758*	0.370	-0.388
	(0.400)	(0.449)	(0.394)
F_Group3	0.475	0.558	0.084
	(0.361)	(0.373)	(0.330)
Controls	Yes	Yes	Yes
Month FE	Yes	Yes	Yes
Control group mean	5.547	8.693	3.147
Observations	158	158	158
Adjusted R-squared	0.359	0.552	0.592

We find no detectable spillovers onto control workers.

Potential threat: survey response and attrition

	Reached	Baseline respondents	Baseline response rate	Follow-up respondents	Follow-up attrition rate
Total	506	451	89.13%	393	13.53%
Group 1	134	120	89.55%	102	15.00%
Group 2	134	124	92.54%	106	14.52%
Group 3	134	118	88.06%	103	12.71%
Control	104	89	85.58%	82	11.24%
F-statistic			1.05		0.26
p-value			0.372		0.853

No differential survey response or attrition across arms.

Additional result on turnover

	(1) Quitting decision	(2) Quitting decision	(3) Quitting decision	(4) Quitting decision
Group1	0.021	0.026	0.023	0.029*
	(0.018)	(0.017)	(0.018)	(0.017)
Group2	0.005	0.012	0.010	0.019
	(0.014)	(0.013)	(0.015)	(0.014)
Group3	0.020	0.021	0.025	0.027*
	(0.018)	(0.018)	(0.016)	(0.016)
Controls		Yes		Yes
Production Unit FE			Yes	Yes
Control group mean	0.010	0.010	0.010	0.010
Observations	503	503	501	501
Adjusted R-squared	-0.002	0.075	0.075	0.129

No impact on worker turnover.

Additional results on subjective measures

	(1) Pressure	(2) Perceived effort	(3) Work ethics index	(4) Happiness
Group1 × Post	1.087***	0.660**	0.178	-0.292
	(0.417)	(0.274)	(0.121)	(0.442)
Group2 × Post	-0.098	0.438	0.195*	0.277
	(0.464)	(0.277)	(0.111)	(0.374)
Group3 × Post	0.081	0.569*	0.144	-0.023
	(0.449)	(0.317)	(0.112)	(0.452)
Group1	0.130	-0.149	-0.001	-0.192
	(0.431)	(0.193)	(0.097)	(0.328)
Group2	-0.363	-0.113	0.080	0.067
	(0.438)	(0.190)	(0.094)	(0.310)
Group3	0.262	-0.291	0.123	-0.248
	(0.433)	(0.229)	(0.098)	(0.330)
Controls	Yes	Yes	Yes	Yes
Production unit FE	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes
Control group mean	6.637	8.895	-0.082	7.398
Observations	844	844	844	844
Adjusted R-squared	0.094	0.051	0.067	0.068

LM Info raises pressure and self-assessed effort, yet output per hour falls — effortful but ineffective work.

Components of the work ethics index

	(1) Stability belief	(2) Blurred work–life	(3) Vacation sacrifice	(4) Training	(5) Mentorship
Group1 × After	0.000	0.228	0.534**	0.018	0.211
	(0.215)	(0.171)	(0.217)	(0.224)	(0.193)
Group2 × After	-0.045	0.198	0.691***	0.152	0.142
	(0.197)	(0.162)	(0.207)	(0.212)	(0.180)
Group3 × After	0.041	0.339**	0.487**	-0.307	0.192
	(0.199)	(0.167)	(0.211)	(0.220)	(0.185)
Group1	-0.017	-0.170	0.132	0.145	-0.036
	(0.161)	(0.138)	(0.182)	(0.172)	(0.140)
Group2	0.238	-0.086	0.056	0.066	0.150
	(0.149)	(0.134)	(0.183)	(0.168)	(0.131)
Group3	0.223	-0.100	0.175	0.330*	0.089
	(0.153)	(0.139)	(0.187)	(0.175)	(0.146)
Controls	Yes	Yes	Yes	Yes	Yes
Production unit FE	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes
Control group mean	4.094	4.398	3.556	3.333	4.146
Observations	844	844	844	844	844
Adjusted R-squared	0.076	0.021	0.095	0.041	0.049

Attitude shift concentrates in willingness to sacrifice leisure.

Heterogeneity by gender

	Log hours		Log production wage		Log hourly production efficiency	
	(1) Female	(2) Male	(3) Female	(4) Male	(5) Female	(6) Male
Group1 × Post	0.123***	0.062	-0.064	-0.053	-0.187***	-0.115**
	(0.047)	(0.043)	(0.044)	(0.043)	(0.043)	(0.046)
Group2 × Post	0.012	0.018	0.051	0.092**	0.039	0.074**
	(0.049)	(0.040)	(0.049)	(0.039)	(0.035)	(0.036)
Group3 × Post	0.030	0.067*	-0.090**	-0.015	-0.119***	-0.082**
	(0.044)	(0.040)	(0.044)	(0.032)	(0.038)	(0.036)
Group1	0.023	-0.009	0.037	0.024	0.014	0.033
	(0.041)	(0.043)	(0.046)	(0.041)	(0.036)	(0.042)
Group2	-0.015	-0.017	0.028	-0.014	0.043	0.003
	(0.046)	(0.043)	(0.047)	(0.039)	(0.032)	(0.048)
Group3	0.080**	0.013	0.068	0.019	-0.012	0.006
	(0.039)	(0.044)	(0.043)	(0.039)	(0.032)	(0.043)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Production Unit FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Control group mean	5.506	5.545	8.724	8.691	3.218	3.146
Observations	460	456	460	456	460	456
Adjusted R-squared	0.418	0.234	0.336	0.527	0.639	0.578

Women respond to LM Info more, men to Ethic more.

Heterogeneity by age

	Log hours		Log production wage		Log hourly production efficiency	
	(1) Young	(2) Senior	(3) Young	(4) Senior	(5) Young	(6) Senior
Group1 × Post	-0.007	0.123***	-0.107	-0.036	-0.100	-0.158***
	(0.068)	(0.036)	(0.071)	(0.033)	(0.072)	(0.035)
Group2 × Post	-0.076	0.042	0.074	0.077**	0.150**	0.035
	(0.059)	(0.037)	(0.056)	(0.037)	(0.062)	(0.027)
Group3 × Post	-0.032	0.068**	-0.095	-0.036	-0.063	-0.104***
	(0.074)	(0.032)	(0.059)	(0.030)	(0.059)	(0.029)
Group1	0.043	-0.009	0.100	0.004	0.056	0.013
	(0.060)	(0.034)	(0.074)	(0.036)	(0.066)	(0.031)
Group2	0.069	-0.037	0.061	-0.016	-0.009	0.021
	(0.055)	(0.037)	(0.067)	(0.036)	(0.057)	(0.034)
Group3	0.124*	0.042	0.035	0.040	-0.089	-0.002
	(0.066)	(0.032)	(0.070)	(0.036)	(0.066)	(0.031)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Production Unit FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Control group mean	5.572	5.518	8.803	8.685	3.232	3.167
Observations	206	710	206	710	206	710
Adjusted R-squared	0.326	0.321	0.498	0.386	0.550	0.586

Senior workers respond to LM Info more, young workers to Ethic more.

Heterogeneity by piece-rate arrangement

	Log hours		Log production wage		Log hourly production efficiency	
	(1) Team	(2) Individual	(3) Team	(4) Individual	(5) Team	(6) Individual
Group1 × Post	0.133***	0.018	-0.048	-0.069	-0.180***	-0.088**
	(0.038)	(0.056)	(0.037)	(0.055)	(0.042)	(0.037)
Group2 × Post	0.061	-0.051	0.087**	0.053	0.027	0.104**
	(0.041)	(0.052)	(0.039)	(0.054)	(0.030)	(0.040)
Group3 × Post	0.070**	0.011	-0.038	-0.070	-0.108***	-0.080**
	(0.034)	(0.058)	(0.032)	(0.052)	(0.036)	(0.034)
Group1	0.022	-0.016	-0.002	0.081	-0.024	0.097*
	(0.033)	(0.062)	(0.036)	(0.056)	(0.033)	(0.050)
Group2	-0.035	0.021	-0.049	0.085	-0.014	0.064
	(0.038)	(0.060)	(0.039)	(0.051)	(0.036)	(0.046)
Group3	0.093***	-0.019	0.007	0.087*	-0.087**	0.107***
	(0.031)	(0.056)	(0.037)	(0.049)	(0.036)	(0.039)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Production Unit FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Control group mean	5.499	5.582	8.817	8.493	3.318	2.911
Observations	586	330	586	330	586	330
Adjusted R-squared	0.413	0.174	0.227	0.546	0.498	0.611

Team workers respond to LM Info more, individual workers to Ethic more.

Heterogeneity by baseline unemployment beliefs

	Log hours		Log production wage		Log hourly production efficiency	
	(1) Pessimistic	(2) Optimistic	(3) Pessimistic	(4) Optimistic	(5) Pessimistic	(6) Optimistic
Group1 × Post	0.080*	0.135**	-0.046	-0.040	-0.126***	-0.175***
	(0.041)	(0.052)	(0.034)	(0.058)	(0.039)	(0.057)
Group2 × Post	0.012	0.041	0.096**	0.071	0.084**	0.030
	(0.042)	(0.048)	(0.040)	(0.047)	(0.036)	(0.033)
Group3 × Post	0.059	0.039	-0.032	-0.050	-0.091**	-0.089**
	(0.037)	(0.052)	(0.031)	(0.050)	(0.037)	(0.035)
Group1	0.020	0.013	0.020	0.073	0.000	0.060
	(0.037)	(0.053)	(0.042)	(0.054)	(0.041)	(0.042)
Group2	-0.001	-0.010	-0.008	0.046	-0.007	0.056
	(0.044)	(0.056)	(0.043)	(0.056)	(0.043)	(0.045)
Group3	0.057	0.040	-0.000	0.141***	-0.058	0.100**
	(0.037)	(0.051)	(0.044)	(0.045)	(0.041)	(0.042)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Production Unit FE	Yes	Yes	Yes	Yes	Yes	Yes
Month FE	Yes	Yes	Yes	Yes	Yes	Yes
Control group mean	5.518	5.563	8.712	8.667	3.194	3.104
Observations	584	318	584	318	584	318
Adjusted R-squared	0.326	0.285	0.382	0.478	0.539	0.665

Optimists respond to LM Info more, pessimists Ethic more.

Conclusion: Why do workers work hard?

- **External labor-market pressure**:

  Workers feel more pressure, report greater effort, and work longer

  Yet output per hour falls: workers try harder, but perform worse.

- **Internalized work values**:

  Workers report a stronger desire to exert effort, while hours remain unchanged

  Output per hour rises: workers work better, not longer.

- External discipline and internalized motivation operate through different margins of hard work