Do Workers Work More if Wages Are High? Evidence from a Randomized Field Experiment

by Ernst Fehr and Lorenz Goette (AER, 2007)

Presentation by Renke Schmacker
Experimental and Behavioral Economics (TU Berlin)
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Motivation

→ Do workers work more if wages are high?

- Intertemporal labor supply (Card 1994):
  - \( \log h_{it} = a_{it} + \eta \log w_{it} + \delta \log \lambda_{it} \)
  - \( h_{it} \): working hours
  - \( a_{it} \): individual preferences
  - \( \eta \): intertemporal substitution elasticity
  - \( w_{it} \): real wage per hour
  - \( \delta \): „income elasticity“
  - \( \lambda_{it} \): marginal utility of wealth
Motivation

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- Model predicts intertemporal substitution when the wage change is
  - transitory
  - anticipated

Size of \( \eta \) has major implications for
- propagation of shocks across periods in RBC
- policy advice, e.g. "Kurzarbeitergeld"
Literature

- Camerer et al. (1997): New York City cab drivers’ labor supply
  - workers work fewer hours (\(\triangleq\) less effort) on high-wage days
  \(\Rightarrow\) negative effort elasticity
Experimental setup

Data:
- delivery records of a bicycle messenger service in Zurich (between 50 and 60 participating employees)
Experimental setup

Data:
- delivery records of a bicycle messenger service in Zurich (between 50 and 60 participating employees)

Independent Variable:
- increase in the commission rate by roughly 25% for the treatment group
Aug. 2000
Announcement

Randomization

Sept. 2000
Group A
- Treatment

Group B
- Control group

Nov. 2000
- 4 weeks
- 4 weeks

Dec. 2000
Payout

Group A
- Control group

Group B
- Treatment
Experimental setup

Data:
- delivery records of a bicycle messenger service in Zurich
  (between 50 and 60 participating employees)

Independent Variable:
- increase in the commission rate by roughly 25% for the treatment group

Dependent Variable:
- number of shifts per messenger
- generated revenues per messenger (deliveries*price) → effort

Controls:
- time effects (demand variations) controlled for by taking into account delivery records of a second messenger service
Aug. 2000

Announcement

Randomization

Group A

Sept. 2000
Treatement

Control group

Group B

Nov. 2000
Control group

Treatment

Dec. 2000
Payout

Compare

4 weeks

Compare

4 weeks
## Results

### Table 3—Main Experimental Results

*(OLS regressions)*

<table>
<thead>
<tr>
<th></th>
<th>Dependent variable:</th>
<th></th>
<th>Dependent variable:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Revenues per four-week period</td>
<td></td>
<td>Shifts per four-week period</td>
</tr>
<tr>
<td><strong>Observations are restricted to</strong></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td><strong>Treatment dummy</strong></td>
<td>Messengers participating in experiment</td>
<td>All messengers at Veloblitz</td>
<td>All messengers at Flash and Veloblitz</td>
</tr>
<tr>
<td></td>
<td>1,033.6***</td>
<td>1,094.5***</td>
<td>1,035.8**</td>
</tr>
<tr>
<td></td>
<td>(326.9)</td>
<td>(297.8)</td>
<td>(444.7)</td>
</tr>
<tr>
<td><strong>Dummy for nontreated at Veloblitz</strong></td>
<td></td>
<td>-211</td>
<td>-370.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(497.3)</td>
<td>(334.1)</td>
</tr>
<tr>
<td><strong>Treatment period 1</strong></td>
<td></td>
<td>-574.7</td>
<td>-656.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(545.7)</td>
<td>(357.9)</td>
</tr>
<tr>
<td><strong>Treatment period 2</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Individual fixed effects</strong></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>R squared</strong></td>
<td>0.74</td>
<td>0.786</td>
<td>0.753</td>
</tr>
<tr>
<td><strong>N</strong></td>
<td>124</td>
<td>190</td>
<td>386</td>
</tr>
</tbody>
</table>

*Note:* Robust standard errors, adjusted for clustering on messengers, are in parentheses.

*** Indicates significance at the 1-percent level.

** Indicates significance at the 5-percent level.

* Indicates significance at the 10-percent level.

Source: Fehr, Goette (2007)
Results

• Compute substitution elasticities:
  • Revenues:
    • Treatment period 1: \( \frac{1.000}{3.568} = 1.12 \)
    • Treatment period 2: \( \frac{1.000}{3.205} = 1.25 \)
  • Shifts:
    • Treatment period 1: \( \frac{4}{11.925} = 1.34 \)
    • Treatment period 2: \( \frac{4}{10.64} = 1.50 \)

→ By definition: \( \varepsilon_{revenues} = \varepsilon_{shifts} + \varepsilon_{revenues \ per \ shifts} \)
  • Treatment period 1: 1.12 = 1.34 + (-0.22)
  • Treatment period 2: 1.25 = 1.50 + (-0.25)

Revenues per shift (=effort) decrease in reaction to a wage increase!
Discussion

→ Do workers work more if wages increase?
  → workers work more hours (average elasticity of shifts is 1.42)
  → workers spend less effort during their work time (average elasticity of effort per shift is -0.24)

→ How can this results be explained theoretically?
  → Not consistent:
    → Standard neoclassical model
  → Consistent:
    → Modified neoclassical model with preference spillovers
    → Reference dependency (target income with loss aversion)
Test of the reference-dependency explanation

- Do the loss averse workers drive the effect?

Experiment:
- choose
  - Lottery A: (-5, p=.5; 8, p=.5)
  - Lottery B: six repetitions of lottery A
  - reject both: (0, p=1)

and/or

or
Test of the reference-dependency explanation

Source: Fehr, Goette (2007)
Summary and Critique

• Workers at a bicycle messenger service work more shifts if wages are higher...
  • ...but spend less effort
  • Overall the intertemporal substitution elasticity is positive ($\approx 1.19$)
• The findings can be good explained by a reference-dependency model with loss-averse individuals

Caveats:
• The “test“ of loss aversion is no falsification (Popper)
  $\rightarrow$ thereby discrimination between theories not possible
• Are the findings really applicable to workers in other domains?
  $\rightarrow$ necessary condition for drawing policy conclusions
Quellen