

# The Experimental Setup in this Study

## Bicycle Messengers in Zurich, Switzerland

- Data: Delivery records of Veloblitz and Flash Delivery Services, 1999 - 2000.
  - Contains large number of details on every package delivered.
  - Observe hours (shifts) and effort (revenues per shift).
  
- Work at the messenger service
  - Messengers are paid a commission rate  $w$  of their revenues  $r_{it}$ . ( $w =$  „wage“). Earnings  $wr_{it}$
  - Messengers can freely choose the number of shifts and whether they want to do a delivery, when offered by the dispatcher.
  - suitable setting to test for intertemporal substitution.
  
- Highly volatile earnings
  - Demand varies strongly between days
  - Familiar with changes in intertemporal incentives.

# Experiment 1

## ■ The Temporary Wage Increase

- Messengers were randomly assigned to one of two treatment groups, A or B.
  - $N=22$  messengers in each group
- Commission rate  $w$  was increased by 25 percent during four weeks
  - Group A: September 2000  
(Control Group: B)
  - Group B: November 2000  
(Control Group: A)

## ■ Intertemporal Substitution

- Wage increase has no (or tiny) income effect.
- Prediction with time-separable preferences,  $t=$  a day:
  - Work more shifts
  - Work harder to obtain higher revenues
- Comparison between TG and CG during the experiment.
  - Comparison of TG over time confuses two effects.

# Results for Hours

- Treatment group works 12 shifts, Control Group works 9 shifts during the four weeks.
- Treatment Group works significantly more shifts ( $\chi^2(1) = 4.57, p < 0.05$ )
- Implied Elasticity: 0.8

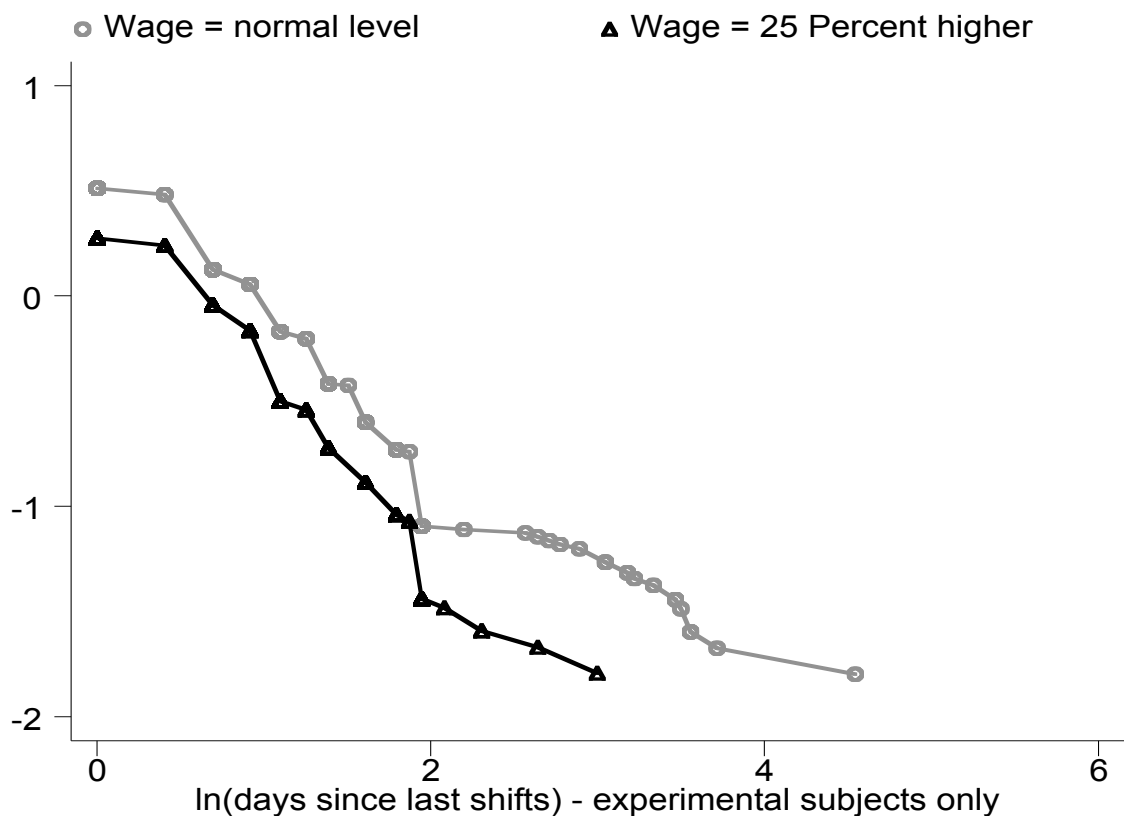
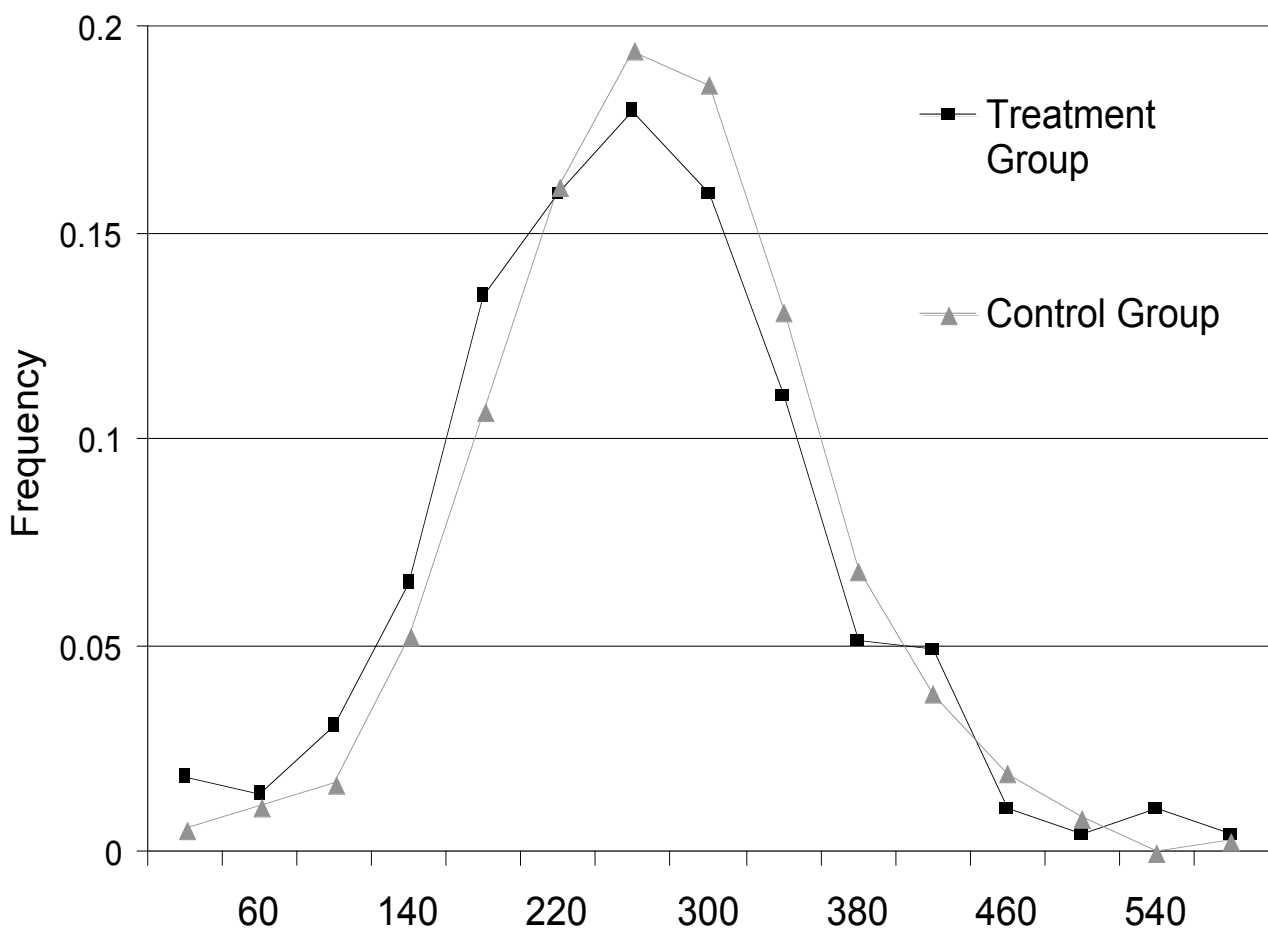


Figure 6: The Working Hazard during the Experiment

# Results for Effort: Revenues per shift

- Treatment Group has lower revenues than Control Group: - 6 percent. ( $t = 2.338, p < 0.05$ )
- Implied *negative* Elasticity: -0.25

## The Distribution of Revenues during the Field Experiment



- Distributions are significantly different (KS test;  $p < 0.05$ );

# Results for Effort, cont.

- **Important caveat**

- Do lower revenues relative to control group reflect lower effort or something else?

- **Potential Problem: Selectivity**

- Example: Experiment induces TG to work on bad days.
- More generally: Experiment induces TG to work on days with unfavorable states
  - If unfavorable states raise marginal disutility of work, TG may have lower revenues during field experiment than CG.

- **Correction for Selectivity**

- Observables that affect marginal disutility of work.
  - Conditioning on experience profile, messenger fixed effects, daily fixed effects, dummies for previous work **leave result unchanged.**
- Unobservables that affect marginal disutility of work?
  - Implies that reduction in revenues only stems from sign-up shifts in addition to fixed shifts.
  - **Significantly lower revenues on fixed shifts, not even different from sign-up shifts.**

# Corrections for Selectivity

- **Comparison TG vs. CG without controls**
  - Revenues 6 % lower (s.e.: 2.5%)
  
- **Controls for daily fixed effects, experience profile, workload during week, gender**
  - Revenues are 7.3 % lower (s.e.: 2 %)
  
- **+ messenger fixed effects**
  - Revenues are 5.8 % lower (s.e.: 2%)
  
- **Distinguishing between fixed and sign-up shifts**
  - Revenues are 6.8 percent lower on fixed shifts (s.e.: 2 %)
  - Revenues are 9.4 percent lower on sign-up shifts (s.e.: 5 %)
  
- **Conclusion: Messengers put in less effort**
  - Not due to selectivity.

# Measuring Loss Aversion

- **A potential explanation for the results**

- Messengers have a daily income target in mind
  - They are loss averse around it
  - Wage increase makes it easier to reach income target
- That's why they put in less effort per shift

- **Experiment 2: Measuring Loss Aversion**

- Lottery A: Win CHF 8, lose CHF 5 with probability 0.5.
  - 46 % accept the lottery
- Lottery C: Win CHF 5, lose zero with probability 0.5; or take CHF 2 for sure
  - 72 % accept the lottery
- Large Literature: Rejection is related to loss aversion.

- **Exploit individual differences in Loss Aversion**

- Behavior in lotteries used as proxy for loss aversion.
- Does the proxy predict reduction in effort during experimental wage increase?

# Measuring Loss Aversion

- **Does measure of Loss Aversion predict reduction in effort?**
  - Strongly loss averse messengers reduce effort substantially: Revenues are 11 % lower (s.e.: 3 %)
  - Weakly loss averse messenger do not reduce effort noticeably: Revenues are 4 % lower (s.e. 8 %).
  - No difference in the number of shifts worked.
- **Strongly loss averse messengers put in less effort while on higher commission rate**
  - Supports model with daily income target
- **Others kept working at normal pace, consistent with standard economic model**
  - Shows that not everybody is prone to this judgment bias (but many are)



# Concluding Remarks

- **Our evidence does not show that intertemporal substitution is unimportant.**
  - Messenger work more shifts during Experiment 1
  - But they also put in less effort during each shift.
  
- **Consistent with two competing explanations**
  - Preferences to spread out workload
    - But fails to explain results in Experiment 2
  
  - Daily income target and Loss Aversion
    - Consistent with Experiment 1 and Experiment 2
  
    - Measure of Loss Aversion from Experiment 2 predicts reduction in effort in Experiment 1
  
    - Weakly loss averse subjects behave consistently with simplest standard economic model.
  
    - Consistent with results from many other studies.