Inequality of Opportunity and Investment Choices

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What is inequality of opportunity (IOp)?

- IOp > 0 means that some portion of total income inequality is due to circumstances out of the individual's control, such as gender or place of birth.
- Based on the idea that:
  - Total income inequality can be decomposed based on its source.
  - Income inequality = f(choices, exogenous circumstances) (Roemer, 1998)

Research questions

We use a laboratory experiment to address two primary research questions:

1. What is the marginal impact of IOp on individual investment in a risky asset?
2. How does earnings rank interact with the source of inequality in the income generating process to impact investment decisions?

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Why IOp and investment?

- Investing in physical, financial or human capital ⇒ income, wealth growth for households and small businesses (Klette and Griliches, 2000)
- Propensity to make risky investments may depend on exogenous factors:
  - correlated with socio-economic status (Seto and Bogan, 2013; Kuhnen and Miu, 2017)
  - impacted by experience of exogenous shocks to income (Bucciol and Zarri, 2013; Malmendier and Nagel, 2011; Bernile et al., 2017)
- Policies may have different effects if IOp impacts risk taking, independent of other consequences of disadvantaged circumstances (i.e. relative income insecurity, differential access)

Canonical models suggest that IOp would reduce investments.

- The decision to take financial risk is a function of expected returns and risk aversion.
- People in excluded groups may have less risk tolerance, due to previous negative shocks (Knüpfer et al., 2017; Chakraborty, 2004).
- Subjective expected returns: People who experience a lower income due to circumstances beyond their control may form pessimistic beliefs about the outcome of risky lotteries (Kuhnen and Miu, 2017).

IOp could also increase risky investments, through consumption externalities ("keeping up with the Joneses").

- People exhibit preferences over relative outcomes and over fairness of the income generating process (Cappelen et al., 2013, 2007; Brock et al., 2013).
- A low rank position in the income distribution can motivate people to take more risk (Bursztyn et al., 2014; Mollerstrom et al., 2015; Fliessbach et al., 2007).
- Consumption externalities: documented in both laboratory and non-laboratory settings (Bursztyn et al., 2014; Fafchamps et al., 2015; Luttmer, 2005; Hopkins and Kornienko, 2004; Kirchler et al., 2018; Brown et al., 1996, 2001).

Contribution

- We use the lab to disentangle these two possible mechanisms.
- Existing empirical lit. focuses on stock market participation and is correlational.
  - lower among women and minorities (Choudhury, 2002)
  - increasing in income and education (Seto and Bogan, 2013)
- Choices may be influenced by differential access $\rightarrow$ lab allows holding access and interest rates equal.
- Studies link inequality in small groups to financial risk taking, but not inequality of opportunity.

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Main outcome of interest

- We vary the presence or absence of IOp – holding the access to the investment opportunity constant.
- The outcome of interest: how subjects respond to a standard Gneezy and Potters (1997) investment choice
- Stylized version of the choice to allocate savings to an activity that may or may not yield returns in real life.
  - a firm considering whether to increase its capital stock to expand its production activity
  - a household considering whether to invest in a child's university education or save for retirement

Experiment

Treatment	Source of income inequality	Income rank feedback
Control	effort only	no
IOp only	effort + circumstances	no
Control w/ info	effort only	yes
IOp w/ info	effort + circumstances	yes

IOp treatment is composed of two nested treatments: high value zip code and low value zipcode

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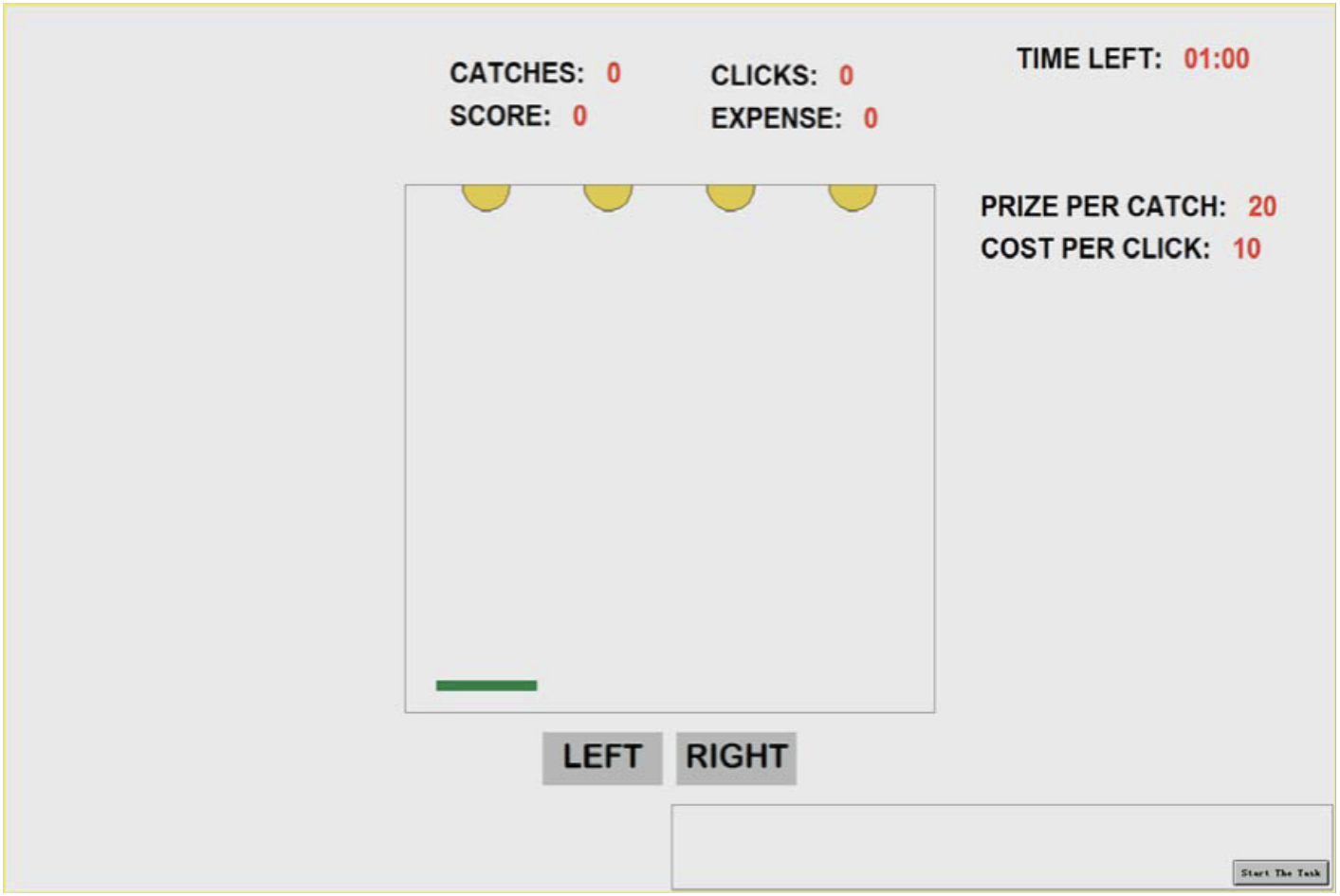
Experiment flow

- Real effort task round
  - ball-catching task, equal wages and quasi-equal effort

Effort in a ball catching task



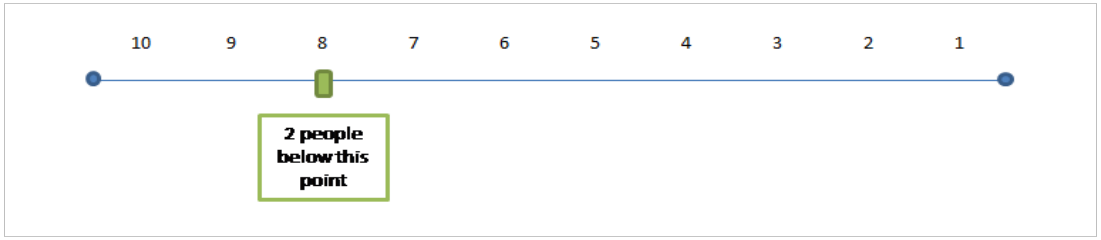
Subjects banked earnings from this effort at 20 tokens per catch.

Experiment flow

- Real effort task round
  - ball-catching task, equal wages and quasi-equal effort
  - income rank perception elicitation (10 point scale)

Rank perception elicitation

"There are XX people in your group. Of those XX people, how many do you think have accrued less EARNINGS, compared to you? Please move the slider to where you think your EARNINGS rank is for the ball-catching task."



Experiment flow

- Real effort task round
  - ball-catching task, equal wages and quasi-equal effort
  - income rank perception elicitation (10 point scale)
  - demographics: year of birth, major and childhood zip code
  - end of round

Experiment flow

- Real effort task round
- Investment task round
  - T1: IOp wages (high vs low) applied to catches from task

IOp treatment

In life, sometimes things outside of your control impact your income. For example, research has shown that the place where you were born can play a role in determining your life trajectory.

Rates for earning tokens to start off in this round will depend on the ZIP CODE where you lived as a child. There are two possible pay rates:

HIGHER: 27 tokens per ball caught
LOWER: 22 tokens per ball caught

Your ZIP CODE has been randomly assigned to the LOWER pay group. Cost per click does not change and is the same for everyone.

Experiment flow

- Real effort task round
- Investment task round
  - T1: IOp wages (high vs low) applied to catches from task
  - income rank perception elicitation (new earnings)
  - T2: randomize receipt of rank information

Rank information treatment

Rank information messages:

A) In fact, there are more people than you thought who have a lower rank than you.

B) You are right about how many people have a lower rank than you.

C) In fact, there are fewer people than you thought who have a lower rank than you.

Your actual place on the distribution is shown on the slider below.

Experiment flow

- Real effort task round
- Investment task round
  - T1: IOp wages (high vs low) applied to catches from task
  - income rank perception elicitation (new earnings)
  - T2: randomize receipt of rank information
  - investment task

You must decide if you want to put part of your initial Round 3 earnings in an investment. You have a chance of 2/3 (67%) to lose the amount you invest and a chance of 1/3 (33%) to win two and a half times the amount you invest.

i. 67% chance to lose the amount invested
ii. 33% chance to earn 2.5x the amount invested

Sample

- February 2020 to July 2021
- 499 subjects
  - 11 in-person sessions, 240 subjects
  - Due to the COVID-19 pandemic: 11 online sessions, 259 subjects
- University of Maryland Department of Agricultural and Resource Economics - Symons Hall Experimental Laboratory (SHEL)
- Subjects earned tokens, converted to US dollars in the ratio 50 tokens to $1 USD.

Online introduction

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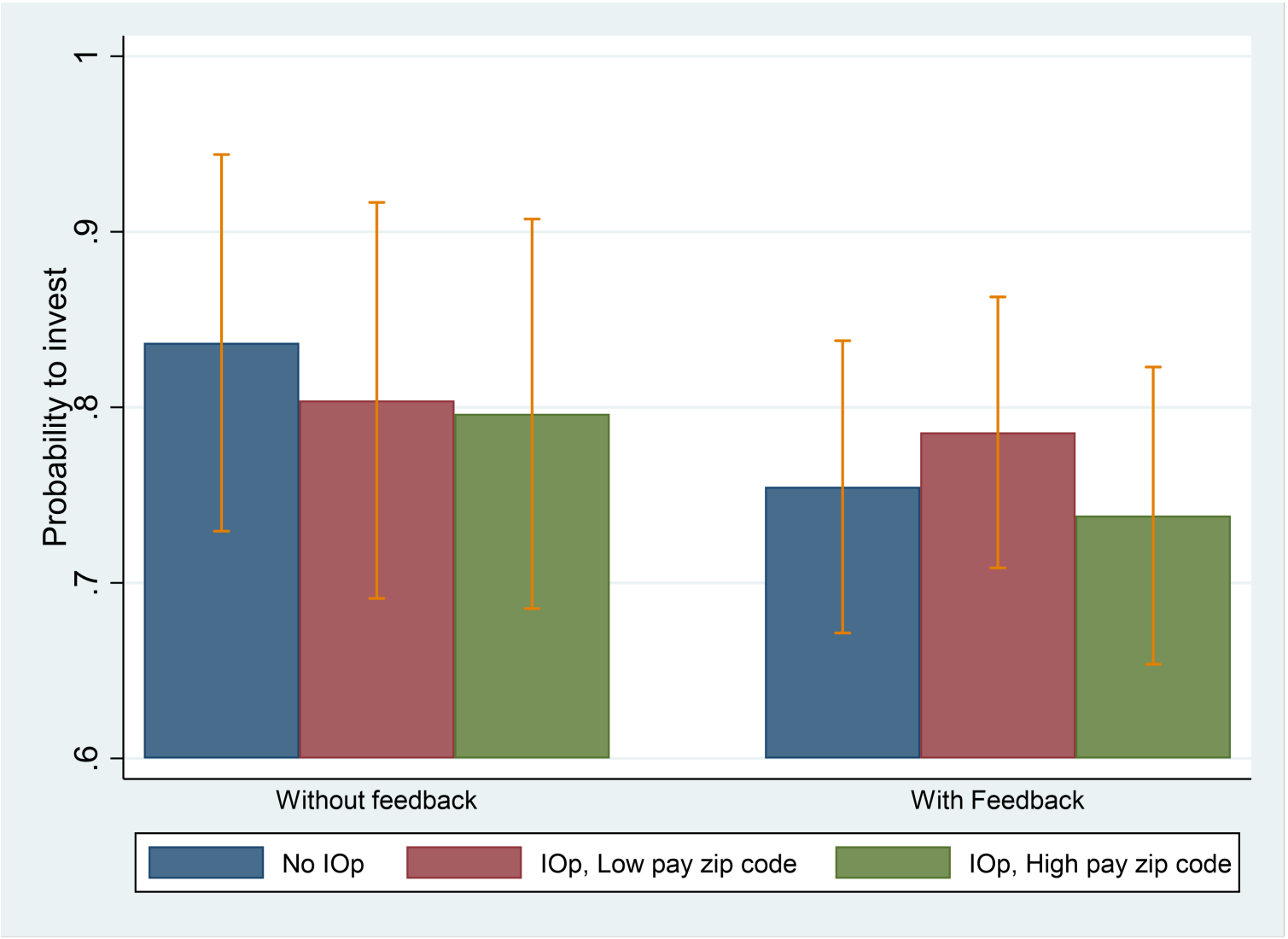
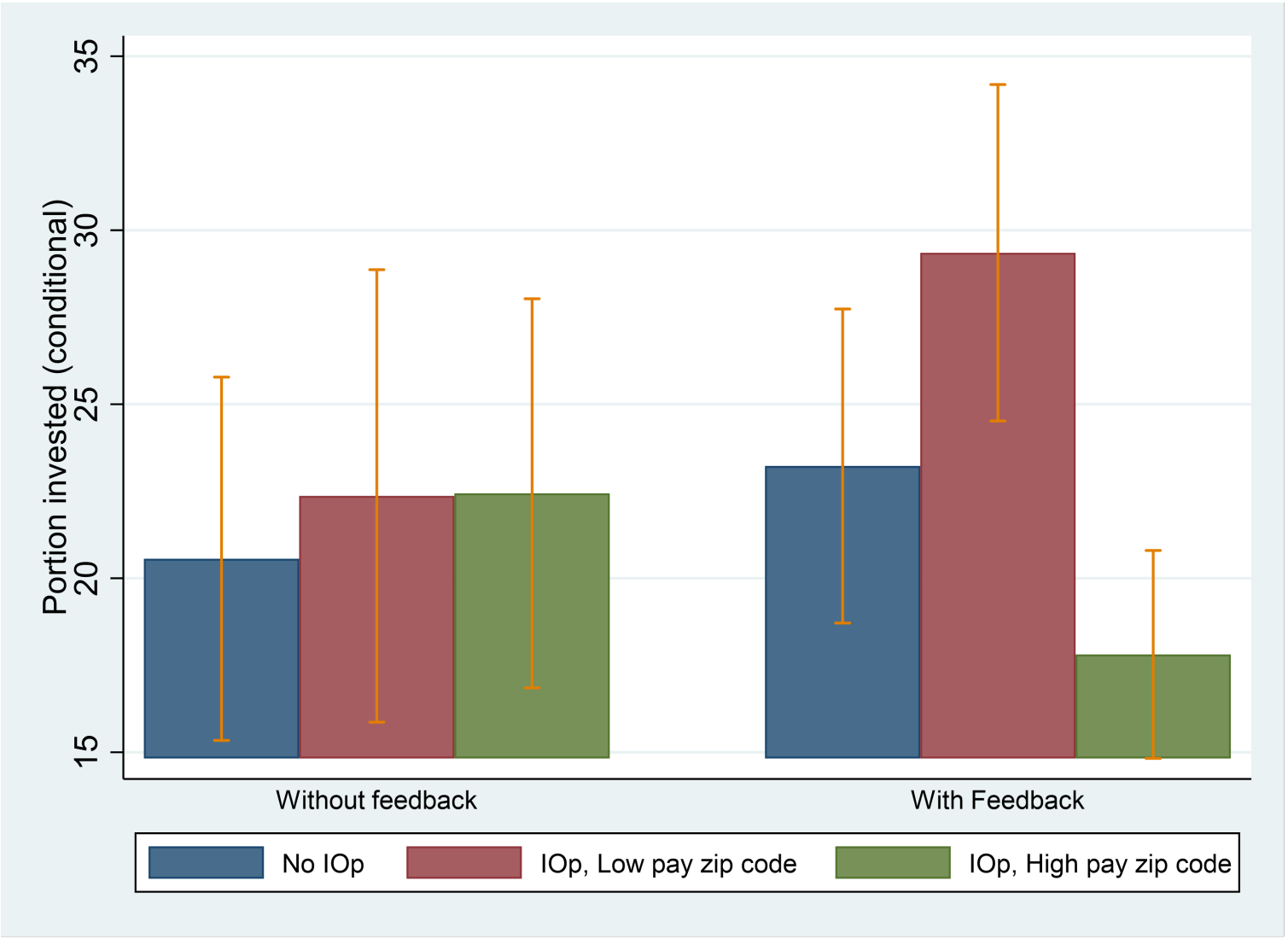
Mean propensity to invest

Results table



Mean amount invested

Results table



Results vary by income rank

Dep var: Portion of earnings invested, conditional on being > 0

	All	w/o rank feedback	w/ rank feedback
	(1)	(2)	(3)
Pre-investment earnings rank	0.512	0.838	0.361
	[0.345]	[0.471]	[0.550]
IOp treatment	9.419**	4.188	11.00**
	[0.018]	[0.612]	[0.017]
IOp X Pre-investment rank	-1.384**	-0.307	-1.771**
	[0.045]	[0.841]	[0.020]
Constant	19.19***	16.23***	20.71***
	[0.000]	[0.006]	[0.000]
Observations	385	130	255
R-squared	0.019	0.014	0.043

Note: OLS regressions. Columns 2 and 3 are partitioned by whether subjects receive feedback on their actual investment rank (prior to investment). Pre-investment rank is subjects' actual earnings rank based on the total value of the Round 3 investment funds (10 point scale, higher values indicate higher earnings). Robust p-values are in brackets. *** p<0.01, ** p<0.05, * p<0.1

No role for perceived rank

Dep var: Portion of earnings invested, conditional on being > 0

	All	w/o rank feedback	w/ rank feedback
	(1)	(2)	(3)
Perceived pre-invest rank	0.333	0.917	0.000
	[0.743]	[0.612]	[1.00]
IOp treatment	7.468	7.938	6.268
	[0.377]	[0.578]	[0.559]
IOp X Perceived rank	-0.917	-0.776	-0.850
	[0.495]	[0.742]	[0.610]
Constant	19.78***	14.64	22.69***
	[0.002]	[0.157]	[0.009]
Observations	385	130	255
R-squared	0.004	0.007	0.005

Note: OLS regressions. Columns 2 and 3 are partitioned by whether subjects receive feedback on their actual investment rank (prior to investment). Perceived pre-invest rank is on a scale of 1-10, where higher values indicate higher perceived rank. Robust p-values are in brackets, and indicted with stars: *** p<0.01, ** p<0.05, * p<0.1

In summary:

- IOp itself is unimportant for investment choices when income rank is unknown...
- but it does impact investment when income rank is known.
- In particular, receiving this information spurs people in the low wage group to take more risk than the comparison groups.
- This is most likely a "catching up" effect, and not a reflection of differences in risk attitudes or pessimistic beliefs.

Next step: determine the impact when investment opportunities are unequal, budget constraints are more binding and or income is more volatile.

Policy implications

- Continue efforts to reduce inequality of opportunity, such as access to education and healthcare, to reduce the rank-IOp combined impact.
- Financial literacy can help people avoid excessive risk taking, especially in low wage groups.
- Improve access to prudent investment opportunities to help low wage groups equalize wealth inequalities.
  - federally backed credit guarantees can improve access to better lending terms (consumer and business loans)
  - subsidized tertiary education facilitate human capital investment

Thank you!

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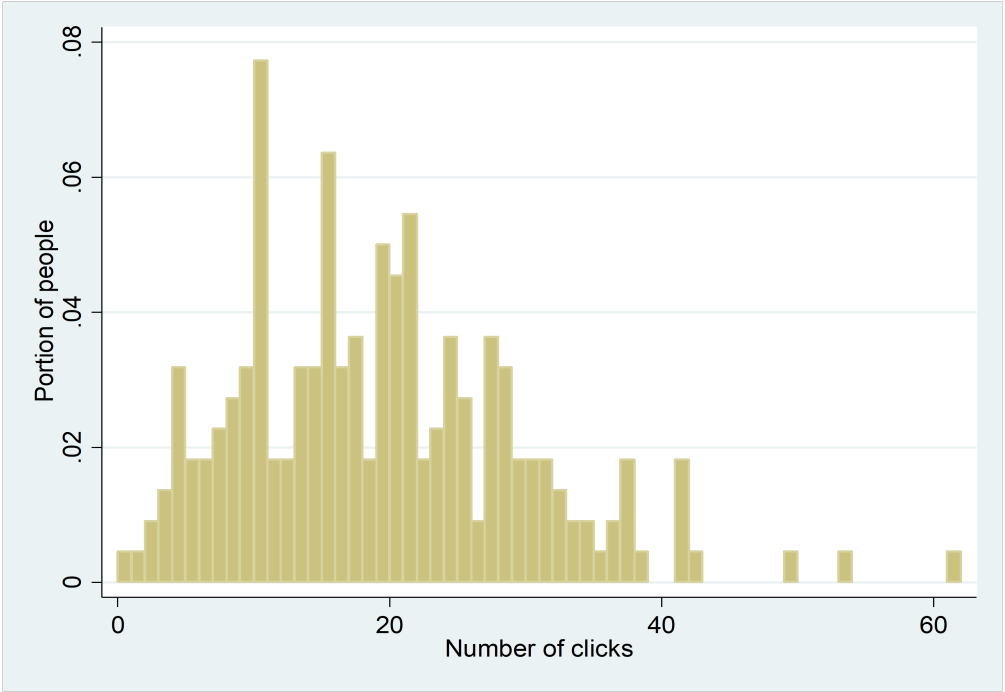
post-COVID introduction text

This study was initiated during the spring 2020 semester and took place in the lab in sessions of 20 individuals. We have adapted the experiment so that it may be completed online from home in order to adhere to current UMD social distancing guidelines and practices. As part of these changes, you will be randomly assigned to be partnered with the data from 19 other individuals who participated in one of these in-person sessions. This means that anytime during the experiment that 'your group' or their decisions are mentioned, this refers to the actual decisions and outcomes of those individuals. Your experience will essentially be the same as if you were participating in a computer lab at the same time with other individuals. The choices of 'your group' members may impact your outcomes, the same as if you were all in the lab at the same time. ◂ Back

"Considering how you did in the periods you played, where on this chart do you think you fall, on average? Select one position that you think best reflects your work."



Average: 18.8 clicks

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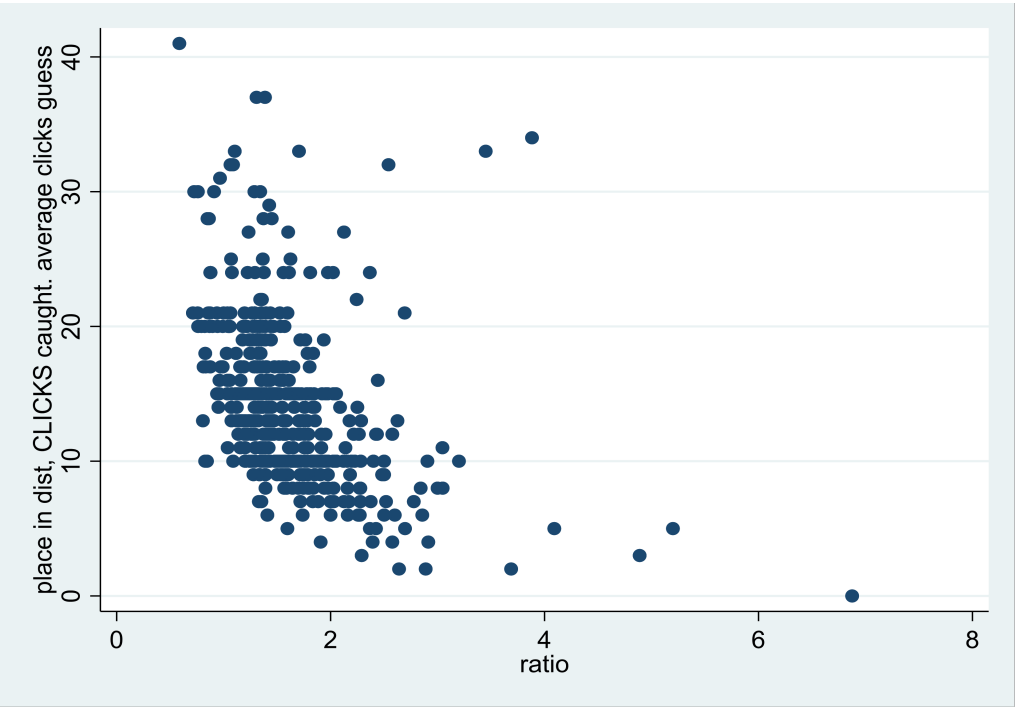
Subjects generally understood their catch/click skill

The scatter shows people's self report of their clicks against their catches/click ratio. Those with higher ratios reported a lower number of clicks.



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Mean outcomes by treatment group

Treatment group	N	Propensity to invest	Portion invested	Tokens invested	Total take home amount
Control	54	0.81	0.20	117.38	676.69
IOp, high value zip code	56	0.77	0.22	160.67	875.64
IOp, low value zip code	54	0.80	0.24	125.93	643.05
Control w/ info	111	0.76	0.23	121.12	680.48
IOp w/ info, high value zip code	110	0.75	0.18	119.64	866.35
IOp w/ info, low value zip code	114	0.78	0.29	156.79	655.26

Note: Each zip code was randomized to high or low earnings per click, within the IOp treatment group. In the control group, there was no randomization of zip codes.

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References I

Bernile, G., Bhagwat, V., Rau, P.R., 2017. What doesn't kill you will only make you more risk-loving: Early-life disasters and ceo behavior. The Journal of Finance 72, 167–206.

Brock, J.M., Lange, A., Ozbay, E.Y., 2013. Dictating the risk: Experimental evidence on giving in risky environments. American Economic Review 103, 415–37.

Brown, K.C., Harlow, W.V., Starks, L.T., 1996. Of tournaments and temptations: An analysis of managerial incentives in the mutual fund industry. The Journal of Finance 51, 85–110.

Brown, S.J., Goetzmann, W.N., Park, J., 2001. Careers and survival: Competition and risk in the hedge fund and cta industry. The Journal of Finance 56, 1869–1886.

References II

Bucciol, A., Zarri, L., 2013. Financial risk aversion and personal life history .

Bursztyn, L., Ederer, F., Ferman, B., Yuchtman, N., 2014. Understanding mechanisms underlying peer effects: Evidence from a field experiment on financial decisions. Econometrica 82, 1273–1301.

Cappelen, A.W., Hole, A.D., Sørensen, E.Ø., Tungodden, B., 2007. The pluralism of fairness ideals: An experimental approach. The American Economic Review 97, 818–827.

Cappelen, A.W., Konow, J., Sørensen, E.Ø., Tungodden, B., 2013. Just luck: An experimental study of risk-taking and fairness. American Economic Review 103, 1398–1413.

References III

Chakraborty, S., 2004. Endogenous lifetime and economic growth. Journal of Economic Theory 116, 119–137.

Choudhury, S., 2002. Racial and ethnic differences in wealth holdings and portfolio choices. 95, Social Security Administration, Office of Research, Evaluation, and Statistics.

Fafchamps, M., Kebede, B., Zizzo, D.J., 2015. Keep up with the winners: Experimental evidence on risk taking, asset integration, and peer effects. European Economic Review 79, 59–79.

Fliessbach, K., Weber, B., Trautner, P., Dohmen, T., Sunde, U., Elger, C.E., Falk, A., 2007. Social comparison affects reward-related brain activity in the human ventral striatum. science 318, 1305–1308.

References IV

Gneezy, U., Potters, J., 1997. An experiment on risk taking and evaluation periods. The Quarterly Journal of Economics 112, 631–645.

Hopkins, E., Kornienko, T., 2004. Running to keep in the same place: Consumer choice as a game of status. American Economic Review 94, 1085–1107.

Kirchler, M., Lindner, F., Weitzel, U., 2018. Rankings and risk-taking in the finance industry. The Journal of Finance 73, 2271–2302.

Klette, T.J., Griliches, Z., 2000. Empirical patterns of firm growth and r&d investment: a quality ladder model interpretation. The Economic Journal 110, 363–387.

References V

Knüpfer, S., Rantapuska, E., Sarvimäki, M., 2017. Formative experiences and portfolio choice: Evidence from the finnish great depression. The Journal of Finance 72, 133–166.

Kuhnen, C.M., Miu, A.C., 2017. Socioeconomic status and learning from financial information. Journal of Financial Economics 124, 349–372.

Luttmer, E.F., 2005. Neighbors as negatives: Relative earnings and well-being. The Quarterly journal of economics 120, 963–1002.

Malmendier, U., Nagel, S., 2011. Depression babies: Do macroeconomic experiences affect risk taking? The quarterly journal of economics 126, 373–416.

References VI

Mollerstrom, J., Reme, B.A., Sørensen, E.Ø., 2015. Luck, choice and responsibility—an experimental study of fairness views. Journal of Public Economics 131, 33–40.

Roemer, J.E., 1998. Theories of Distributive Justice. Harvard University Press, Boston, MA.

Seto, S., Bogan, V.L., 2013. Immigrant household investment behavior and country of origin: a study of immigrants to the united states. International Journal of Finance & Economics 18, 128–158.