"Survival Versus Profit Maximization in a Dynamic Stochastic Experiment" by Ryan Oprea

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EXPEREIMENTAL ECONOMICS

Outline

❶ Introduction of Two Theories

❷ Model and Experimental Design

❸ Implication and Conclusion

Market Selection Hypothesis v.s. Survival Bias Hypothesis

鄭紹鈺 Jheng, Shao Yu

Market Selection Hypothesis

Market Selection Hypothesis:

Market selects profit-makers, kicking out（"eliminate"）those deviate from profit-maximization.

Darwin's "Survival of the fittest"

→ "Survival of the most profitable"

SURVIVAL VERSUS PROFIT MAXIMIZATION

Survival Bias Hypothesis

Survival Bias Hypothesis:

….Maybe sometimes survivors are not not profit-makers?

When there is trade-off between "profit" and "survival," people may choose *survival* rather than profit!

The Logic of Main Ideas

Levels	Ideas	Result
1	Survival Bias	O
2	Market Selection Hypothesis	→ X
3	Profit Maximization Assumption	→X

A Great Debate

A debate about assumptions of economics

❶ Long: 1946 → 2014

❷ Large: 100+ papers from famous economists including many Nobel Prize takers

How to Explain the Life of Forrest Gump

她在电视上看到我…跑步
She saw me on TV... running.

Challenge comes

Ricard.Lester(1946):

"Look! Forrest Gump never follows the assumption of profit maximization!"

Response: Market selects Profit-Makers

Armen.Alchian(1950):

"He is a fool, but market does not kick him out.

Forrest Gump unintentionally becomes an efficient profit-maker!"

Challenge again comes!

Dutta and Radner(1999):

"Survival Bias may distract Forrest Gump to do something good for survival, not profits."

Call for An Experiment!

Ryan Oprea(2014):

"How about let Forrest Gump run a firm in laboratory?"

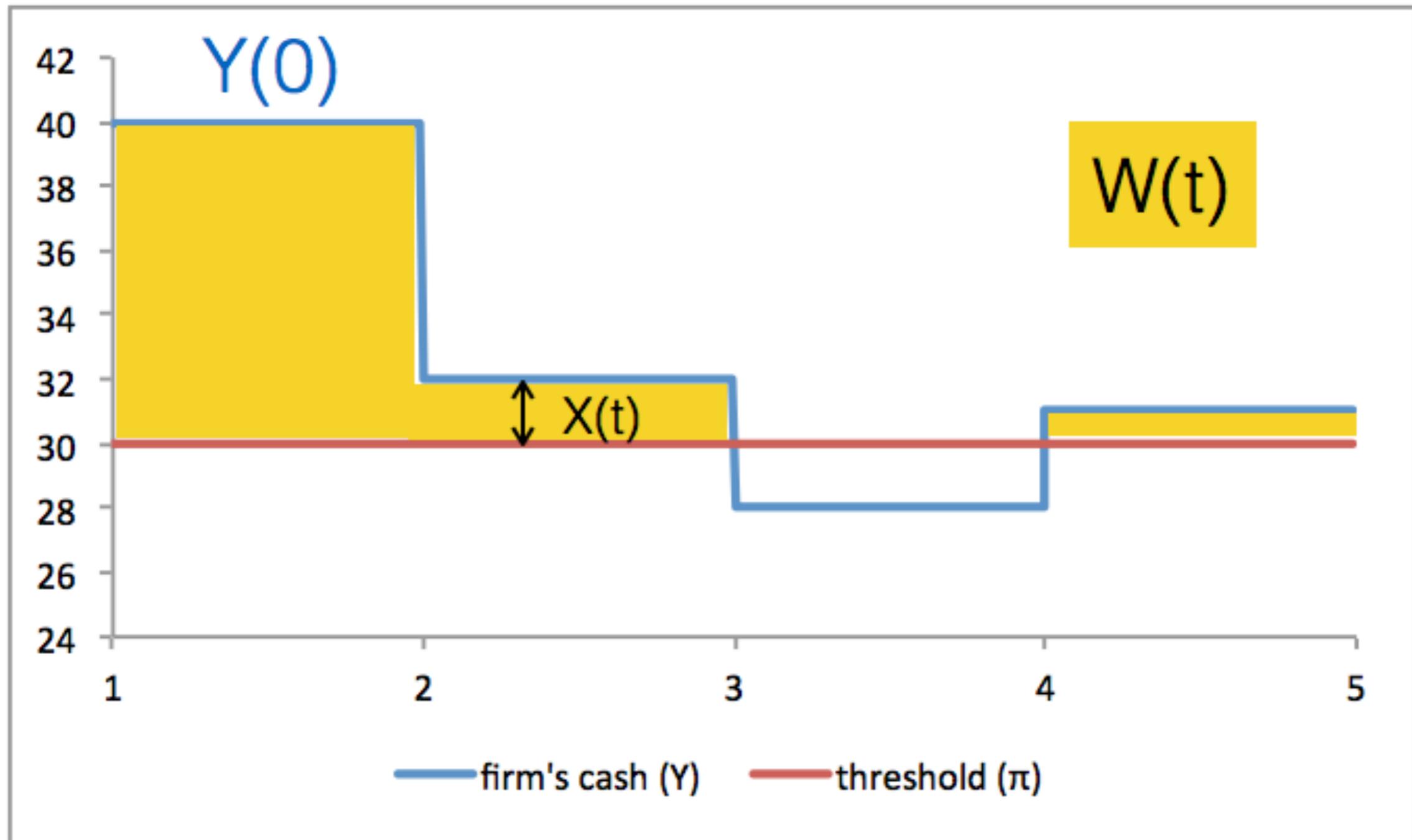- Let's explain the experimental design!

MODEL and RESULTS

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Wealth Function

$$Y(t) = Y(0) + X(t) - W(t)$$

- Y(t): firm's cash at t

- Y(0): firm's initial cash

- X(t): net cash flow at t

- W(t): withdraw at t, what entrepreneur earns

Wealth Function

In Experiment

- Maximizes total withdraw (W)

- Participant sets a threshold, π

- π is adjustable in each period

- Each threshold (π) is corresponding to a survival rate, s

- Higher π, higher s

Experimental Settings

- Different distributions of X(t)

- **High Survival State, HS**

  - $\pi^*=7$, $s^*=96\%$

- **Low Survival State, LS**

  - $\pi^*=7$, $s^*=15\%$

Hypothesis

- People have bias toward survival

- HS: $\pi \rightarrow \pi^* = 7$

- LS: $\pi >> \pi^*$

Results

- HS: 74% near optimal, 26% hoarder

- LS: 20% near optimal, 74% hoarder

- **Cannot** reject hypothesis

More Analysis

- Use a regression model to check survival bias

- Positive and significant in BOTH groups!

Variable	(1)	(2)
(Intercept)	1.696***	1.670***
	(0.512)	(0.504)
$\tau_{it-1} - \tau^*$	0.839***	0.845***
	(0.027)	(0.026)
$bank_{it-1}$	1.848***	1.784***
	(0.515)	(0.511)
t	-0.020 **	-0.022**
	(0.010)	(0.010)
$\tilde{\pi}_{it-1}$		0.007***
		(0.002)

Investment, Conclusion and Discussion
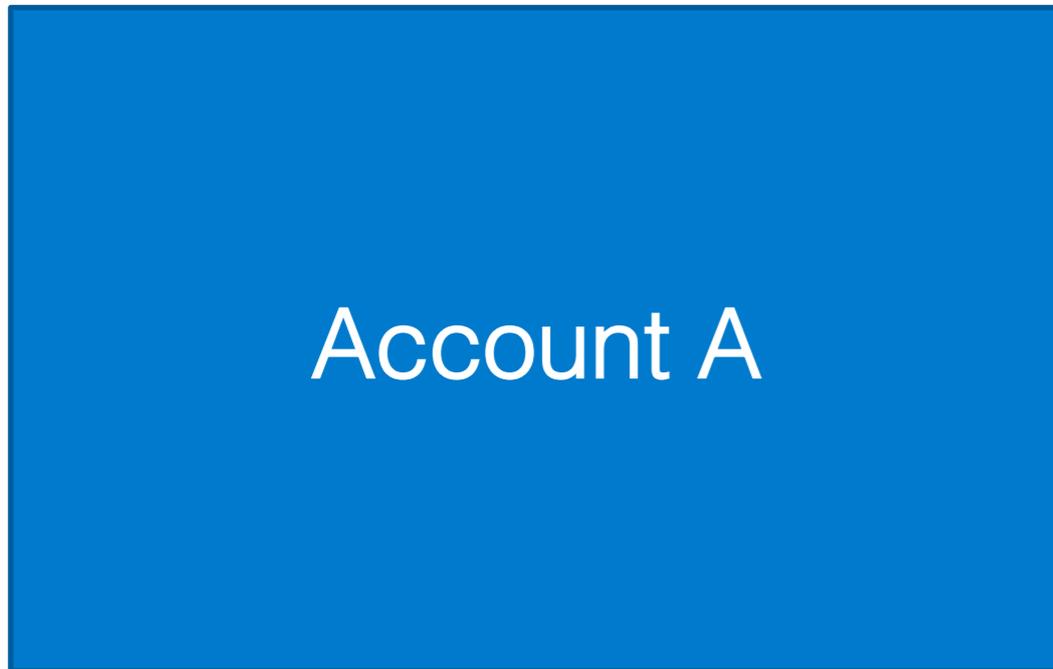
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Investment and Survival Bias

- Question: Are investors going to invest bias firms?

- Market Selection Hypothesis

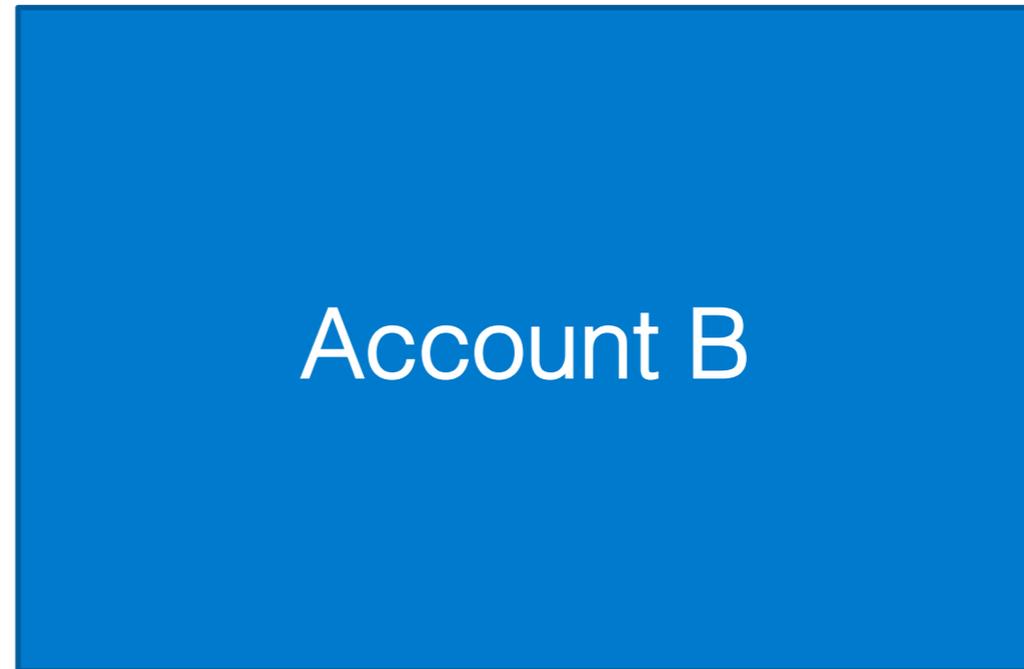- Implicit Assumption: The investors do not have survival bias.

Experiment Design

- **I-LS & I-HS**

τa

τb

Account A

Account B

Result

- The frequency of investment on optimal firms

	Overall	The last half of the session
I-HS	84%	Over 90%
I-LS	55%	58%

- The investors do have survival bias

Psychological Interpretation

- Survival Seeking Heuristics(SSH) & Wealth Seeking Heuristics(WSH)

- Market Selection Bias: SSH & WSH generate same behavior

- Dutta & Radner: SSH is opposite to WSH.

- Experiment Result: Under LS, SSH > WSH

Conclusion

- Survival is of secondary importance to profit-max firms

- Under HS, subjects play optimal behaviors.

- Under LS, subjects hoard cash to improve survival rate.

- The investors themselves have survival bias.

- The Market Selection Hypothesis may fail in LS.

Discussion

- To what extent the salience of survival bias differs between lab and field?

- The background of subject

Thanks for your listening