Very Early Venture Finance:

An Evaluation of Accelerators, Business Plan Competitions, and their Judges

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- Now core part of entrepreneurial financing landscape
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- This paper: **Winning increases firm chance of subsequent investment**
  - Programs provide useful screening; accelerator component perhaps not important
- **Surprising Finding 1:** Judge scores highly predictive of subsequent financing
- **Surprising Finding 2:** Winning money and pitching helps to get angel/VC; in-kind resources helps to get partners/licensees/debt

Agenda

Introduction

Context

Data

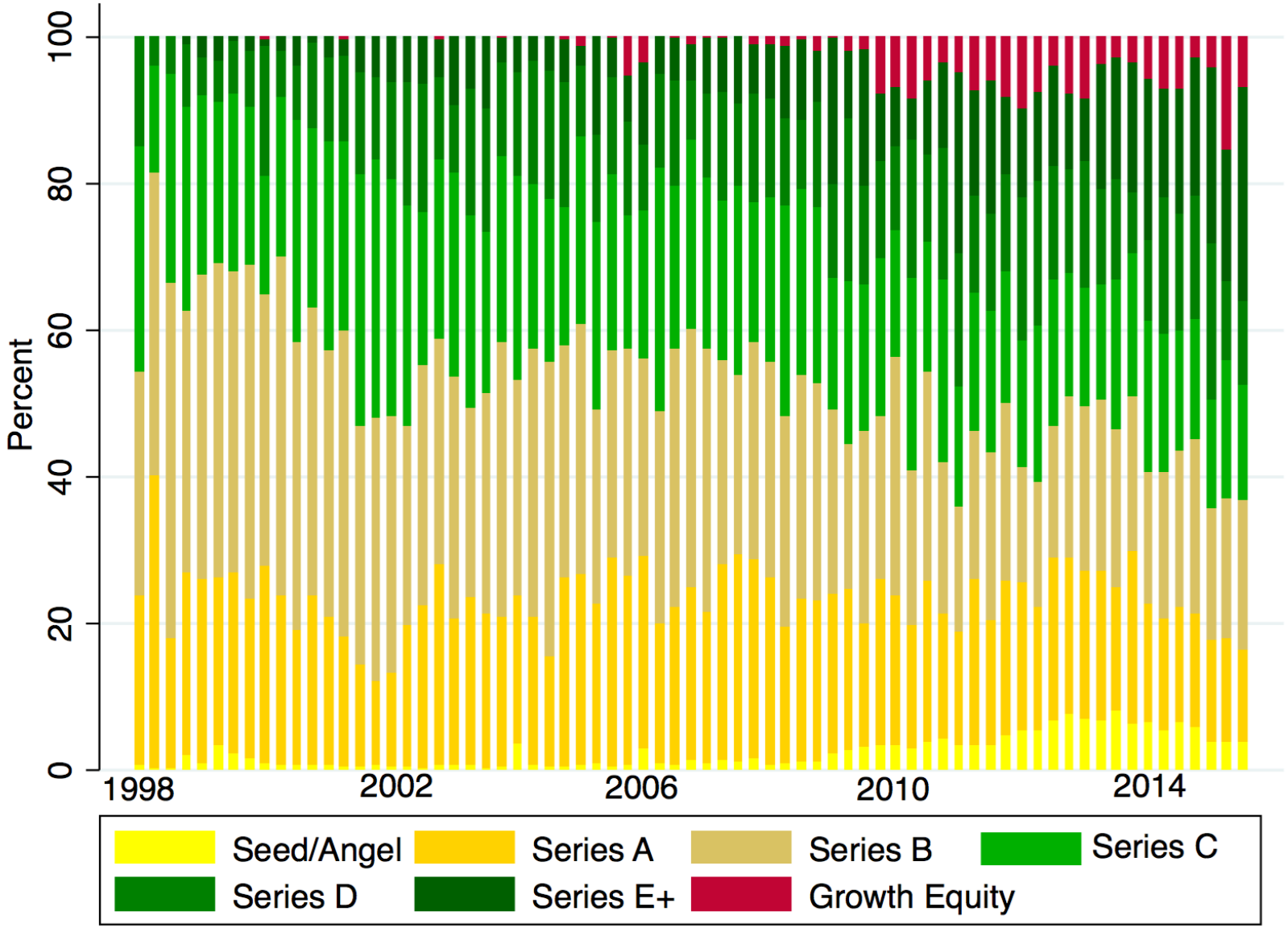
Research Design

Results

Conclusion

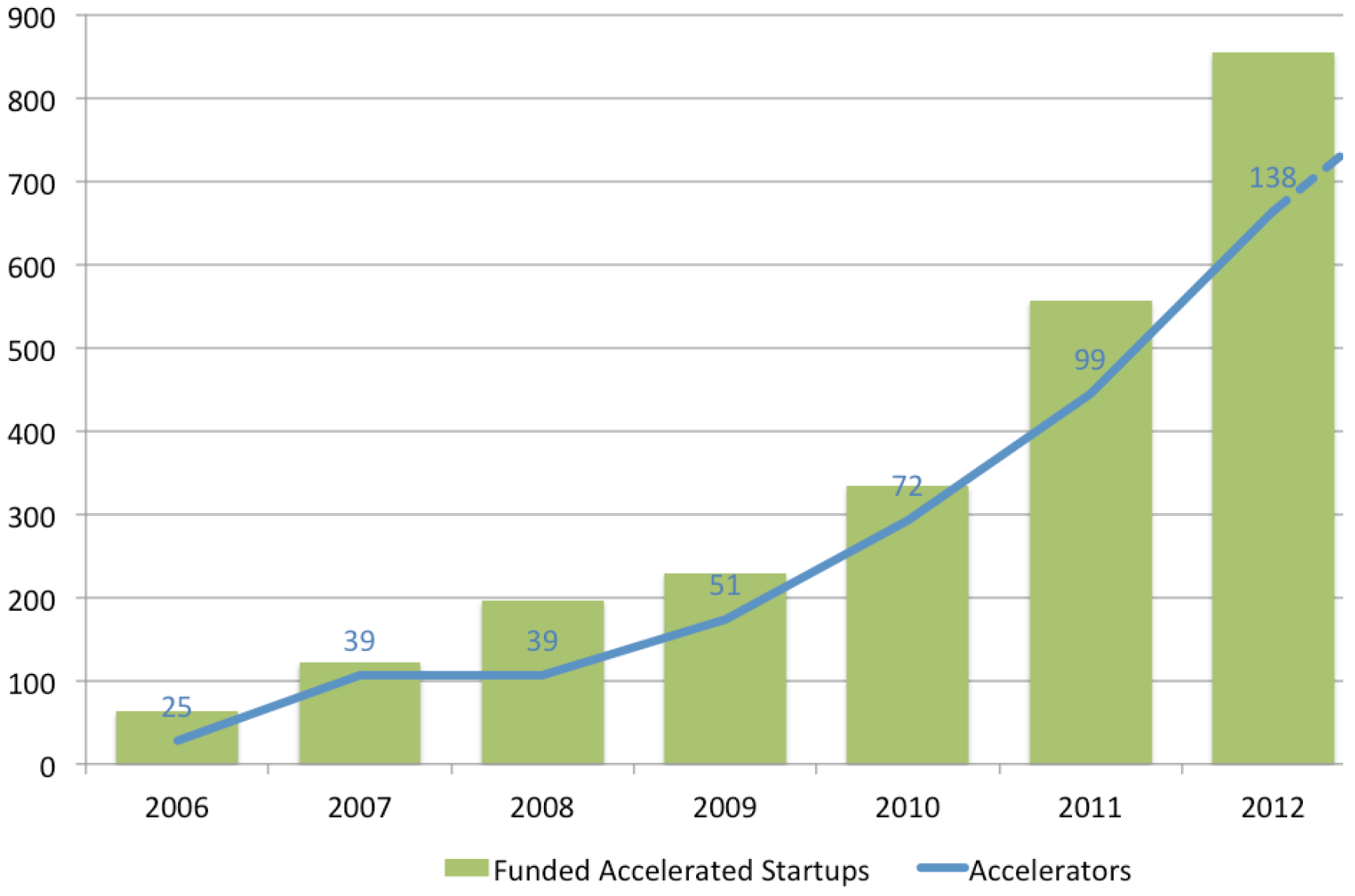
Outline

% U.S. angel/VC investment by stage, 1998 Q1-2015 Q2



Source: CB Insights; author's analysis

accelerators and funded accelerated startups, 2006-2012



Source: Crunchbase

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- Startups face financing constraints: Is information asymmetry about search costs or technology uncertainty?
  - If programs helpful $\rightarrow$ variation in program structure helps identify mechanism and thus source of constraints
  - Mechanisms:
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  - Mechanisms:
    - A: Might reduce investor-entrepreneur search costs
    - B: Resources provided to winners and participants may be helpful
- Whether experts can predict startup success is open question

Specific Research Questions

- Do startups that select into competitions benefit from participating? From winning?
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  - Criteria scores (e.g. team, technology)
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- Are successful startups associated with high variance or consensus in expert predictions?
- Do startups benefit from receiving structured feedback?
  - Can startups benefit from negative feedback by failing faster?

Limitations

- Very early stage project; not all data compiled yet
  - Conclusions may change later!
- Evaluation is limited to participating firms
- Rely on financing as an outcome measure
  - But this is generally orientation of programs
  - Observe several hundred partner/license deals, which have a sales interpretation

Literature 1/2

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- Literature evaluating accelerators compares participating and non-participating ventures
  - Yu (WP 2014): Accelerated firms fail faster, raise less money than matched counterparts
  - Hallen, Bingham and Cohen (2013): Firms from prestigious accelerators raise money and exit faster
  - Winston-Smith and Hannigan (2013): Accelerated ventures raise funding faster and are either acquired or fail faster

Literature 2/2

- Little empirical work on prizes and competitions to procure innovation (Khan 2015)
- Pavel (Harvard JMP 2015): Ideation contests
  - Number of prizes in competition has no effect
  - Increasing prize money increases idea quality but not total number of entrants

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  - Increasing prize money increases idea quality but not total number of entrants
- Kerr, Nanda, and Rhodes-Kropf (2014): Prominent VCs unable to tell ex-ante which firms will be successful
  - Multi-stage financing mitigates this problem by permitting experiments that reveal information before additional money committed

Outline

Business plan competitions

- 1-2 day programs in which new ventures pitch in either written or presentation format to judge panel
  - Sponsored by federal/state/local gov'ts, angel investor groups, universities, foundations, large corporations

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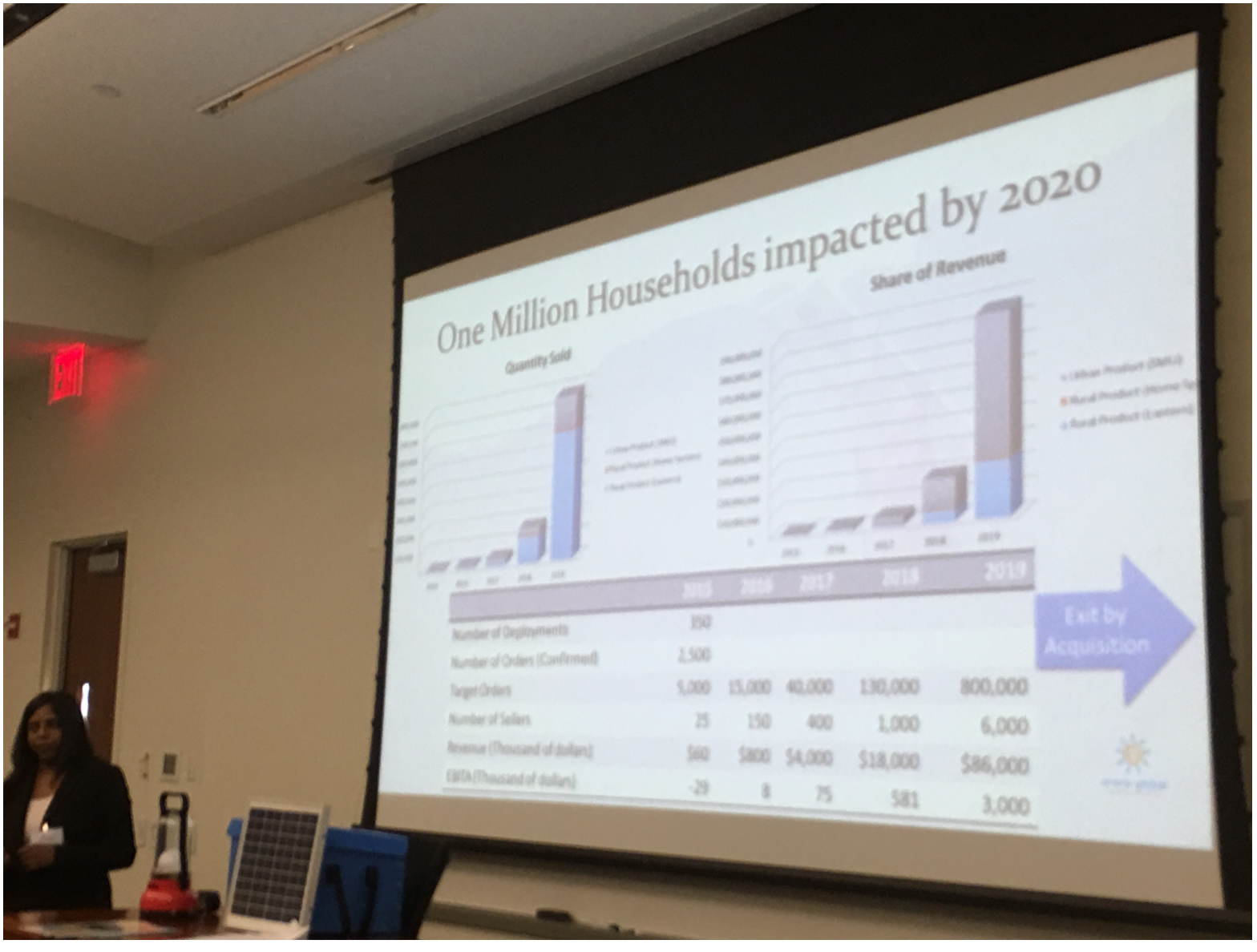
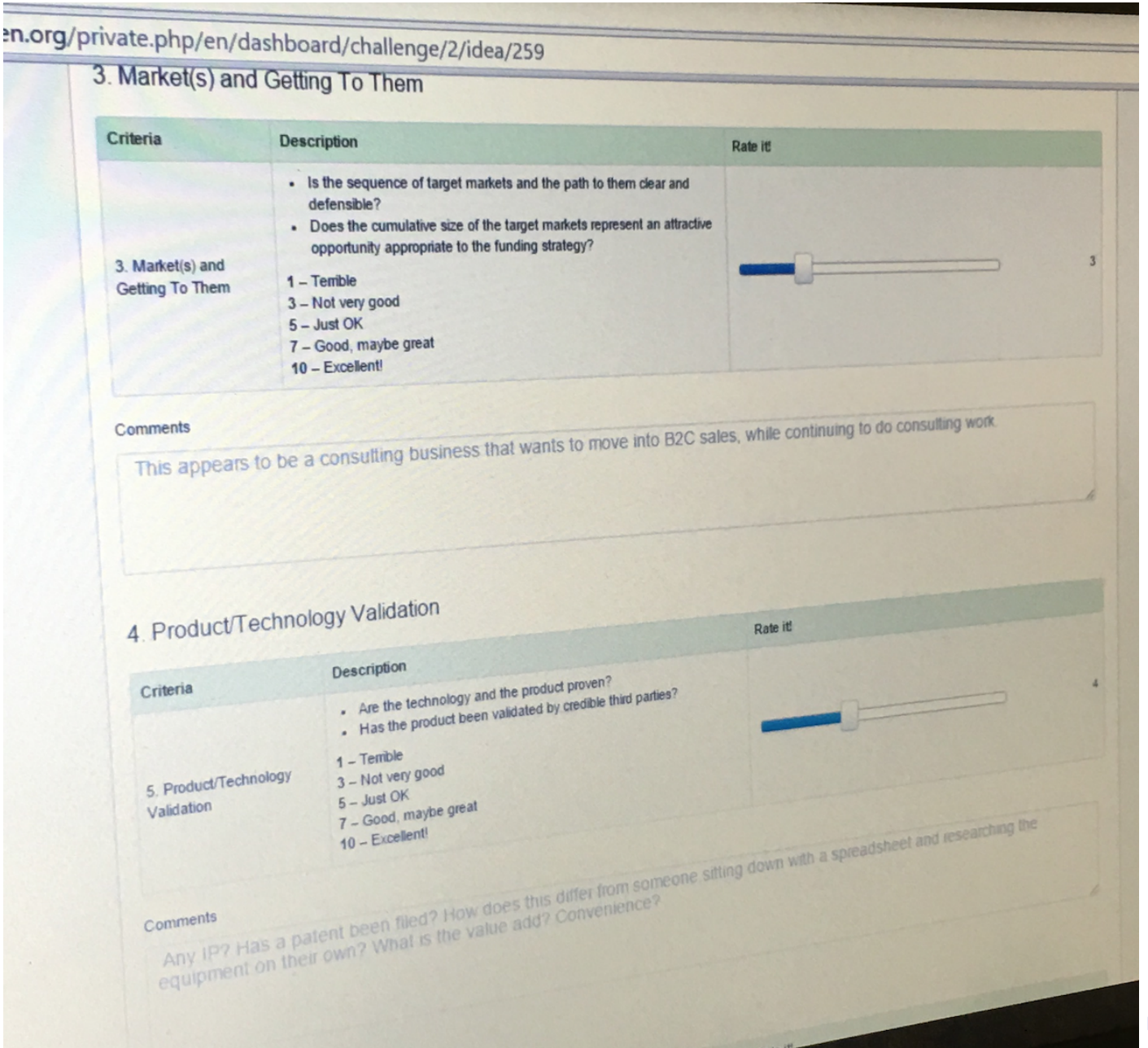
- No official count, but www.bizplancompetitions.com: 260 in 50 states with $23 million in prize money in 2015
  - Just at Berkeley...
    - LAUNCH, the UC Berkeley Startup Competition
    - Intel Global Challenge at UC Berkeley
    - Global Social Venture Comptition

Making the Pitch

Making the Pitch



Scoring


n.org/private.php/en/dashboard/challenge/2/idea/259
3. Market(s) and Getting To Them
Criteria
Description
Rate it!
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• Is the sequence of target markets and the path to them clear and defensible?
• Does the cumulative size of the target markets represent an attractive opportunity appropriate to the funding strategy?
1 – Terrible
3 – Not very good
5 – Just OK
7 – Good, maybe great
10 – Excellent!
3
Comments
This appears to be a consulting business that wants to move into B2C sales, while continuing to do consulting work
4. Product/Technology Validation
Criteria
Description
Rate it!
5. Product/Technology Validation
• Are the technology and the product proven?
• Has the product been validated by credible third parties?
1 – Terrible
3 – Not very good
5 – Just OK
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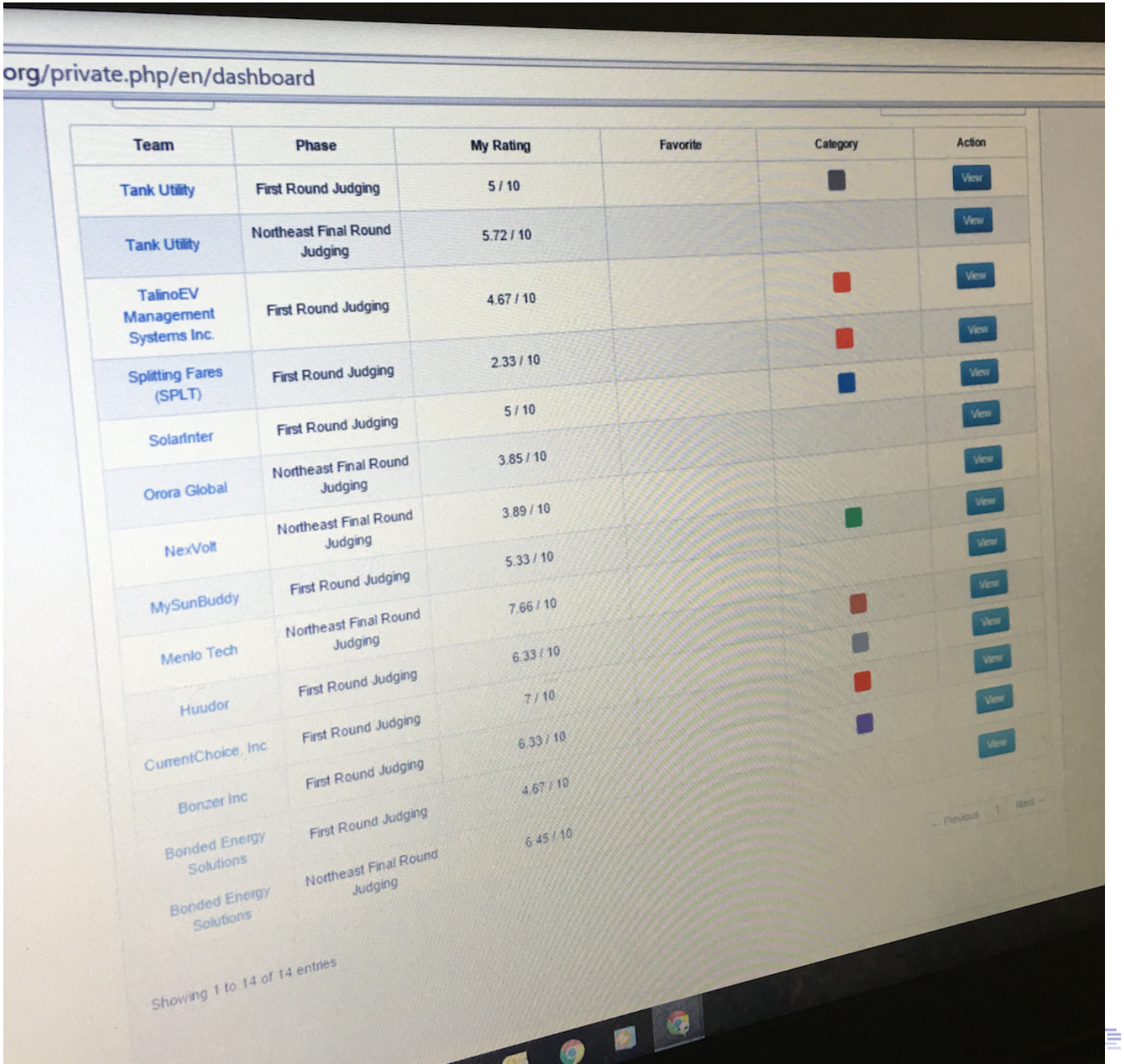
4
Comments
Any IP? Has a patent been filed? How does this differ from someone sitting down with a spreadsheet and researching the equipment on their own? What is the value add? Convenience?

Scoring


org/private.php/en/dashboard
Team
Phase
My Rating
Favorite
Category
Action
Tank Utility
First Round Judging
5 / 10
Tank Utility
Northeast Final Round Judging
5.72 / 10
TalinoEV Management Systems Inc.
First Round Judging
4.67 / 10
Splitting Fares (SPLT)
First Round Judging
2.33 / 10
SolarInter
First Round Judging
5 / 10
Orora Global
Northeast Final Round Judging
3.85 / 10
NexVolt
Northeast Final Round Judging
3.89 / 10
MySunBuddy
First Round Judging
5.33 / 10
Menlo Tech
Northeast Final Round Judging
7.66 / 10
Huudor
First Round Judging
6.33 / 10
CurrentChoice, Inc
First Round Judging
7 / 10
Bonzer Inc
First Round Judging
6.33 / 10
Bonded Energy Solutions
First Round Judging
4.67 / 10
Bonded Energy Solutions
Northeast Final Round Judging
6.45 / 10
View
Showing 1 to 14 of 14 entries

Who are the judges?

- Judges are usually
  - angel or VC investors
  - entrepreneurs
  - corporate executives
  - service professionals (lawyers, consultants, and accountants)
- Judges participate in order to source deals, clients, job opportunities, or to "give back" to the entrepreneurial ecosystem

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  - "help ventures define and build their initial products, identify promising customer segments, and secure resources, including capital and employees...end with a grand event, a "demo day" where ventures pitch to a large audience of qualified investors."
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- "Pitch" days sometimes have winners/prizes
- AngelList: 601 self-described accelerators as of 10/2015
- Hochberg (2015): 180 active accelerators in 2013 up from ~0 in 2006.

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- Sometimes take a small equity stake (e.g. Y Combinator)
  - These should be evaluated alongside counterpart investors: angel and early stage VC
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- Publicly funded programs do not, in general
- Programs in this study treat subsequent investment as primary metric of success
  - Orient their activities towards preparing firms to engage with venture investors
  - All prizes and in-kind resources non-dilutive

Competitions and Spillovers

- "The Federal Government should...use high-risk, high-reward policy tools such as prizes and challenges to solve tough problems" (White House, 2009)
- Do competitions promote innovation?
    - Contribute by evaluating effect on participants/winners relative to rejected applicants/losers

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  - Losing $\rightarrow$ negative signal + potential loss of intellectual property + 0 benefit
    - Adverse selection in participation decision

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- Firms may focus more on winning than selling
  - Stuck serially applying to competitions, grants, etc

Outline

Core data on competitions from 2 sources

- 88 programs (so far) ▸ List
  - Basic applicant info
    - Firm name, CEO/leader name, address, tech description/sector
  - Overall scores, judge scores, criteria scores

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- 2) ValidEval: Competition and judging software platform (67 events)
- In both cases, data on applicants, judges, and scores strictly proprietary

Match to other data sources

- Judge professions (web searching, 1/3 gathered so far)
  - Investor (includes angel, VC)
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- Next Steps
  - Incorporate rest of programs/judge professions
  - Failure data (major undertaking)
  - AngelList match (anybody have contacts?)

Variation in Competition Type

- Format
  - Some include or are culmination of an accelerator (e.g. Cleantech Open)
  - Some are pitch competitions (e.g. Angel Capital Summit)
  - Some are one-day business plan competitions aimed at students (e.g. Illinois Clean Energy Student Challenge)

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- Focus
  - Some are vertically oriented towards biotech, water, or clean energy (e.g. Imagine H2O Infrastructure challenge)
  - Some are regionally oriented (e.g. Arizona Innovation Challenge)

Skewed towards clean energy and Colorado

- Clean energy: challenging to fund privately
  - Capital-intensive at early stages
  - Long lead times
  - Social benefits > private benefits
    1. Entrepreneur supply > Capital supply
    2. Public funding common for prizes/accelerators
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  - ValidEval HQ
- Energy and non-hyper cluster region important targets of innovation subsidy/support
- Marginal group of firms
  - Programs more likely to be helpful
  - Care more about understanding effectiveness here

Summary Statistics

Events		*Firms*		*Judges*	
# competitions	88; (today 35)	# Unique firms	3,502; (today 2,098)	# Unique judges	1,135
# rounds	146	# Firms in >1 competition	580	# Judges participating in >1 competition	146
# competitors per event	38 (sd=51)	# Company-phase observations	3,804		
States of competitions		*Firm Sectors (thus far)*		*Judge professions (thus far)*	
California, Colorado, Texas		# Energy firms	669	Investor	68
Massachusetts, New York, Utah, Florida, Virginia		# Software firms	767	Entrepreneur (founder/startup CEO)	39
Arizona, Illinois, Missouri, Minnesota		# Biotech/health firms	229	Corporate executive	36
Ohio, Wisconsin, Indiana, DC, Louisiana		# Water/waste/ag firms	84	Service (lawyer, consultant, accountant)	90

Summary Statistics

Number of Deals		*Firms by Deal Status*	
Angel/Seed	461	# Firms matched to financing	647
Venture capital series A-B	352	# Firms received angel/VC	391
Venture capital series C+	93	# Firms angel/VC post-event	150
Acquisition	102	# Firms first angel/VC post-event	104
Partner/license	223	# Firms received other investment	465
IPO	8	# Firms other investment post-event	136
Post IPO finance	17	# Firms first other investment post-event	105
Debt	206		
Grant	114		
Other	230		
Total	1,808		

Summary Statistics

Program Characteristics

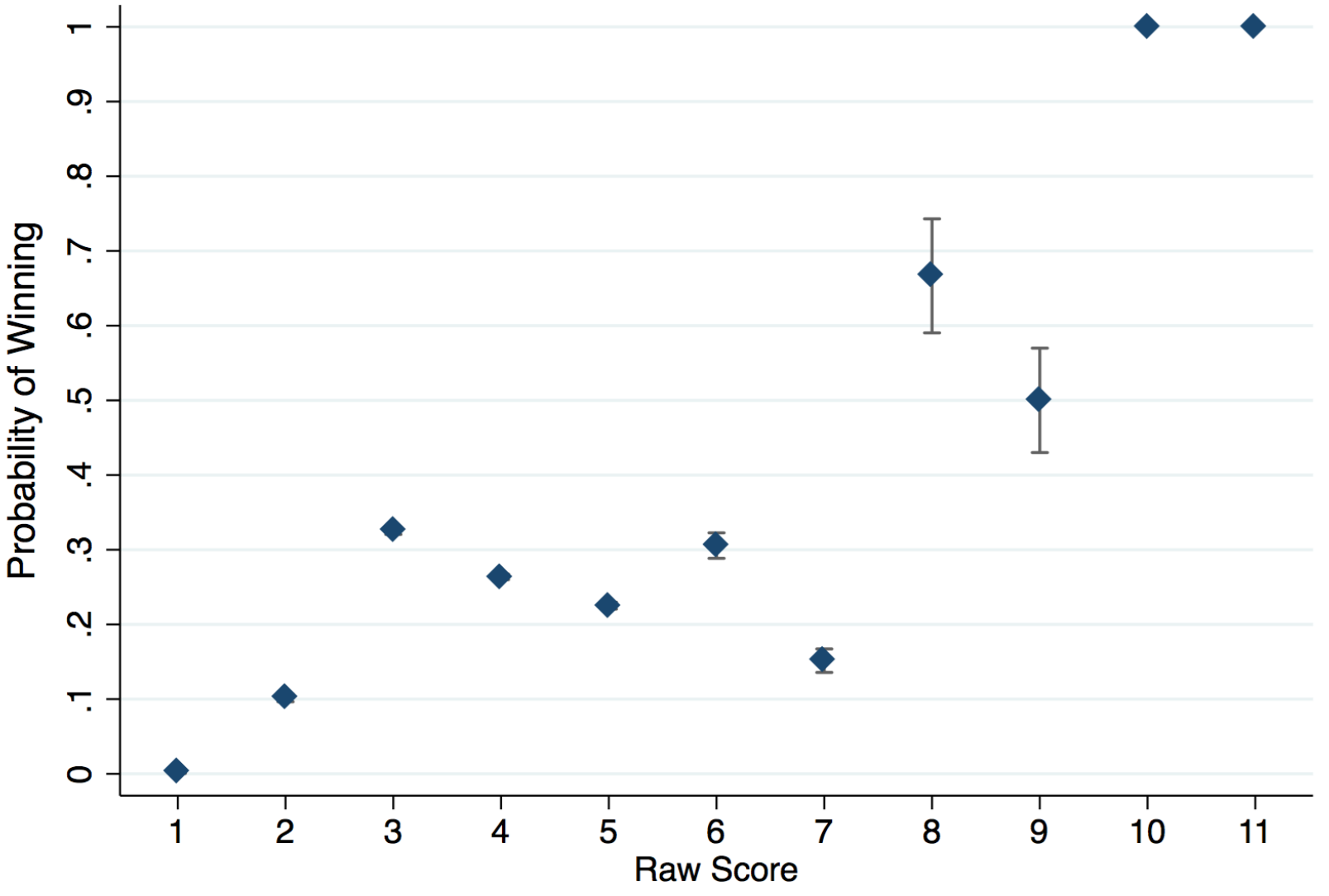
# events with winners who receive cash prizes	34
# events with winners who receive in-kind prizes	22
# firms pitched (i.e. reached pitch stage, or all applicants pitch)	1,115
# firms in accelerator as part of program	872

Quintile Scaled Scores

	Mean (sd)	N	Min	Max
Overall program score	2.94 (1.41)	3,647	1	5
Judge score	2.84 (1.44)	13,681	1	5
Judge criteria scores	2.86 (1.44)	70,577	1	5
Judge business model criterion score	2.88 (1.44)	10,939	1	5
Judge financial criterion score	2.84 (1.45)	6,896	1	5
Judge market attractiveness criterion score	2.88 (1.44)	11,570	1	5
Judge team criterion score	2.88 (1.44)	10,721	1	5
Judge technology/product criterion score	2.88 (1.44)	11,356	1	5
Judge validation/traction criterion score	2.95 (1.42	2,695	1	5

Outline

Probability of Winning by Overall Score



Note: N=3,647. 95% confidence intervals shown

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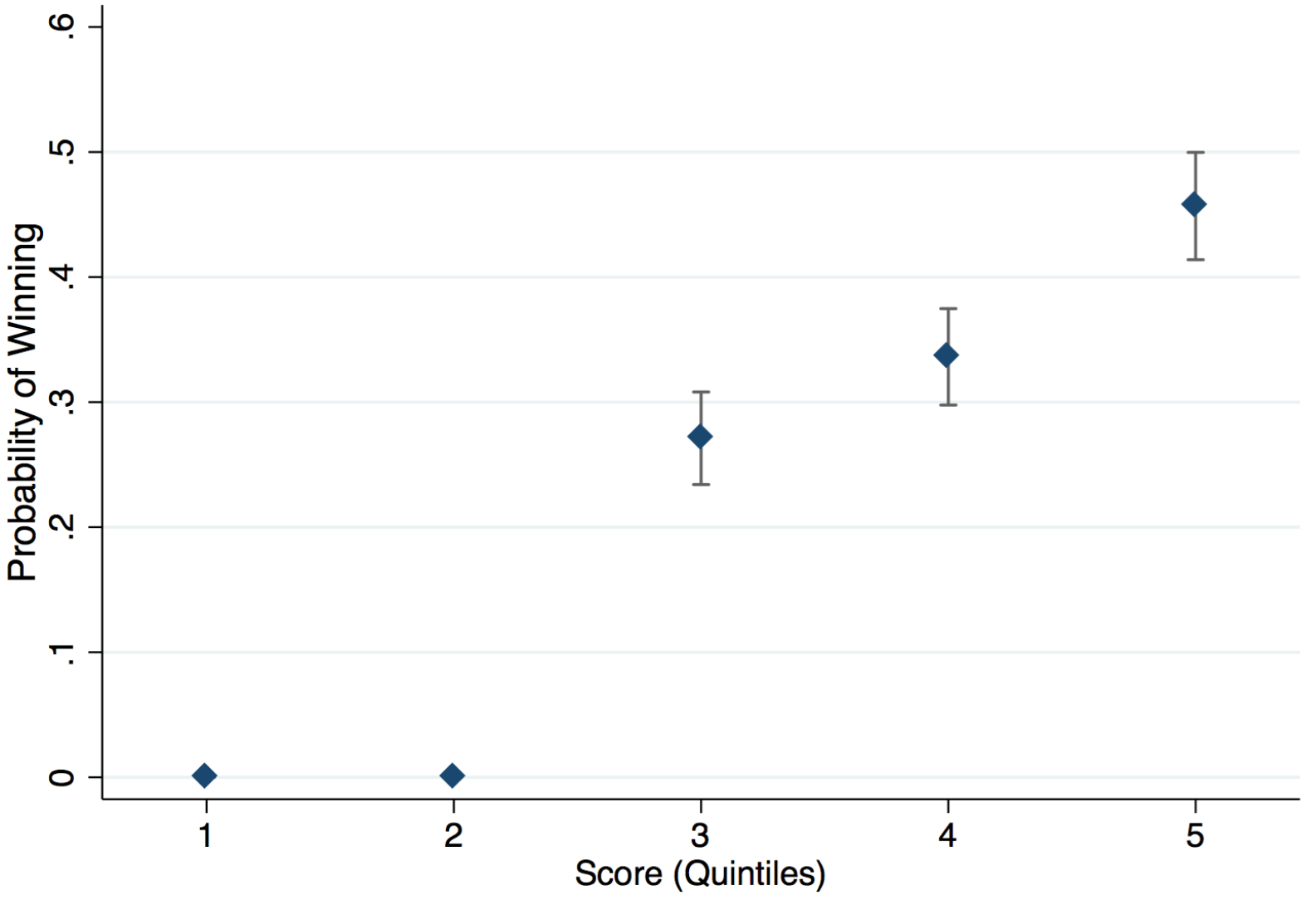

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General Approach

- Control for score and winning to examine program impact/score predictive power (regression discontinuity approach)
- Random effects logistic model
  - Use all data; similar results with OLS/f.e.

$$\begin{aligned} logit\left(Pr\left(Finance_i^{Post}=1 \mid X_{i,j},\varepsilon_{ij}\right)\right) &= \alpha+\beta_1 Overall\ score_{i,j}+\beta_2\left(\mathbf{1} \mid Win_{i,j}\right) \\ &\quad +\beta_3\left(\mathbf{1} \mid Finance_i^{Prev}\right)+\gamma'\left(\mathbf{1} \mid Program_{j\in J}\right)+\varepsilon_{i,j} \end{aligned}$$

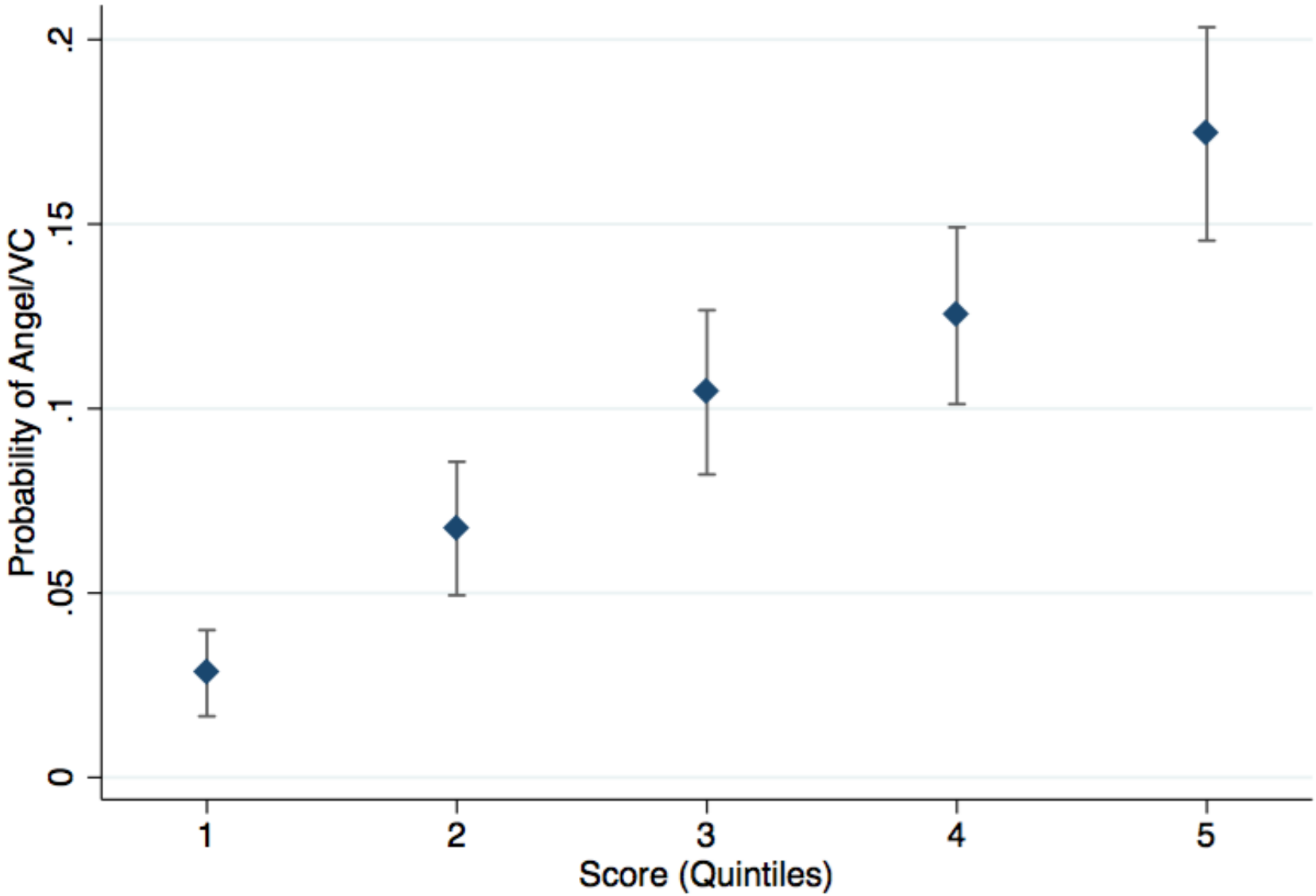
▸ Odds Ratios

Random Effects Logistic Model: Judge Scores

$$
\begin{aligned}
logit\left(Pr\left(Finance_i^{Post}=1 \mid X_{i,j},\varepsilon_{ij}\right)\right) = \; & \alpha+\beta_1 Judge\ score_{ijk}\cdot \mathbf{1} \mid Investor\ Judge_k \\
& +\beta_2 Judge\ score_{ijk}\cdot \mathbf{1} \mid Entrepreneur\ Judge_k \\
& +\beta_3 Judge\ score_{ijk}\cdot \mathbf{1} \mid Executive\ Judge_k \\
& +\beta_4 Judge\ score_{ijk}\cdot \mathbf{1} \mid Service\ Prof\ Judge_k \\
& +\beta_5 Overall\ score_{i,j}+\beta_6\left(\mathbf{1} \mid Win_{i,j}\right) \\
& +\beta_7\left(\mathbf{1} \mid Finance_i^{Prev}\right)+\gamma'\left(\mathbf{1} \mid Program_{j\in J}\right)+\varepsilon_{i,j}
\end{aligned}
$$

Outline

Probability of Subsequent Angel/VC Investment by Overall Score



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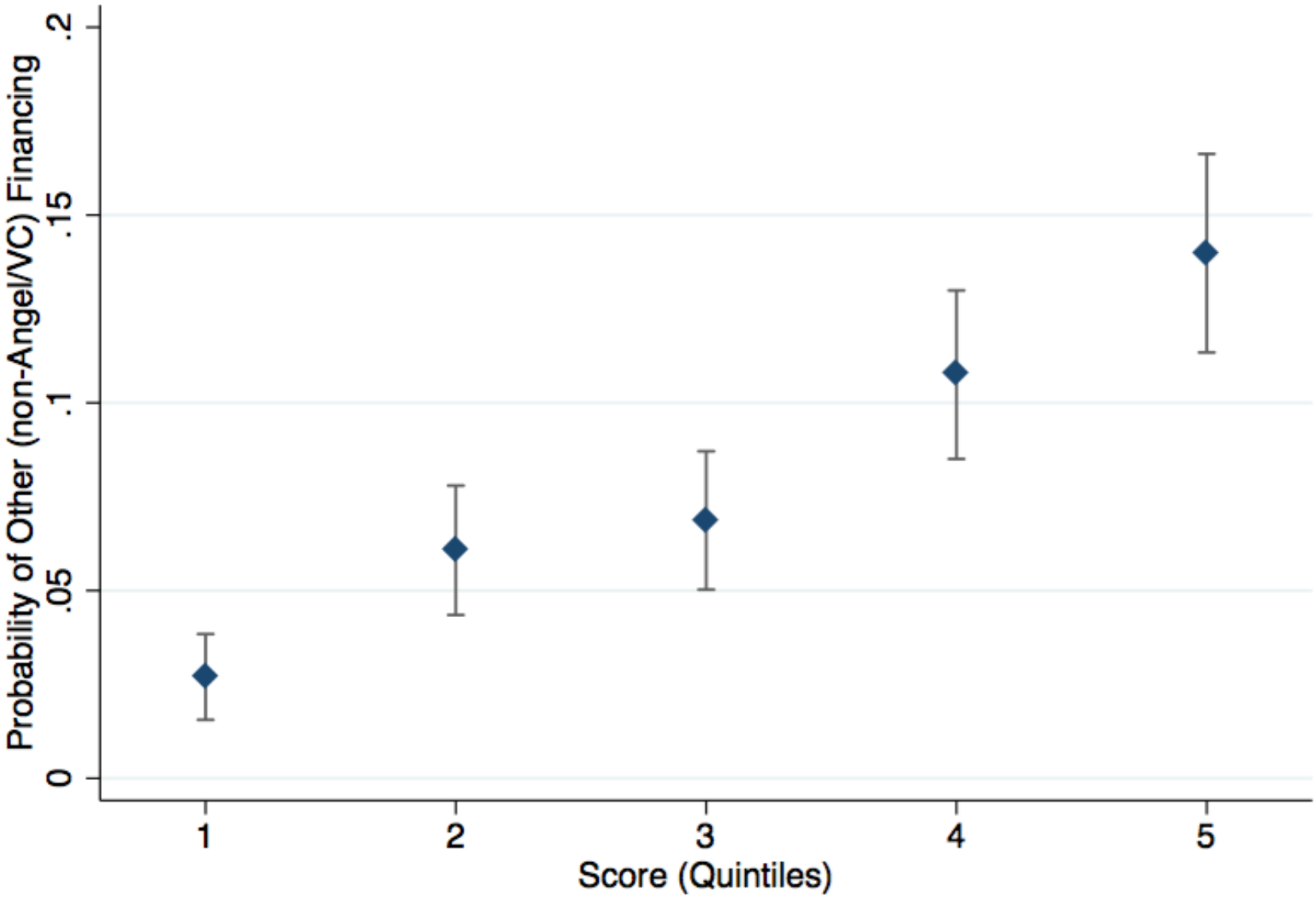
Probability of Other (non-Angel/VC) Investment by Overall Score



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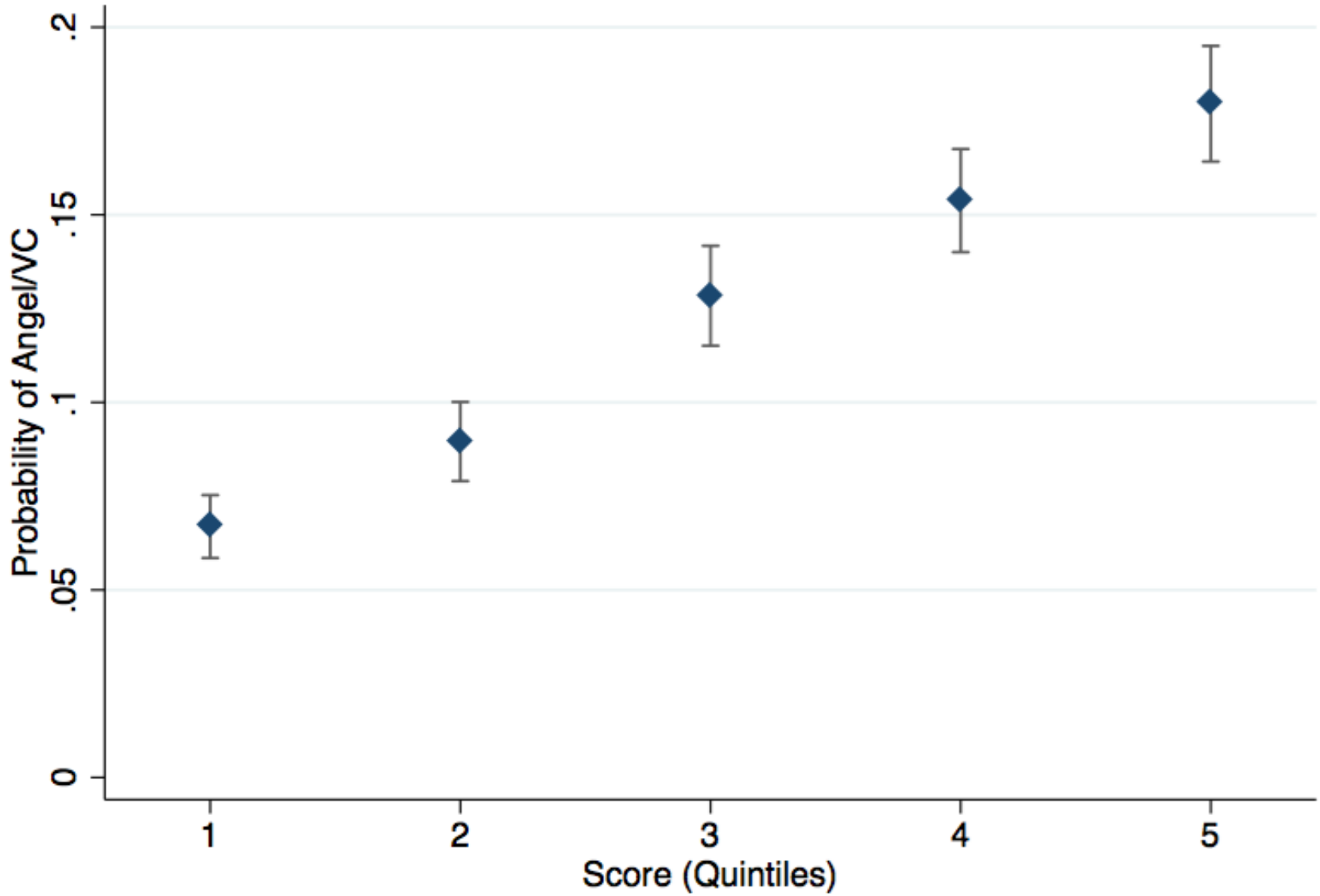

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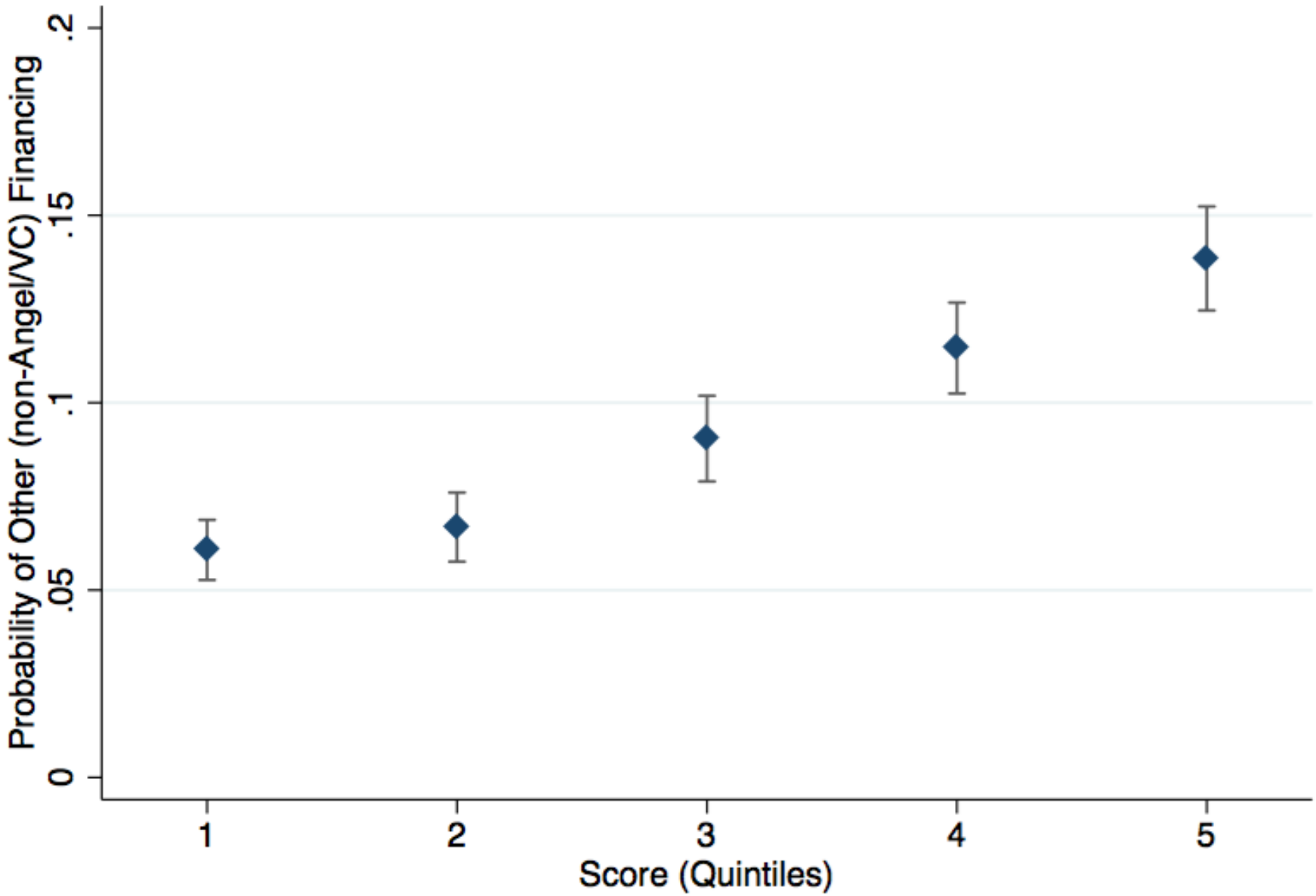
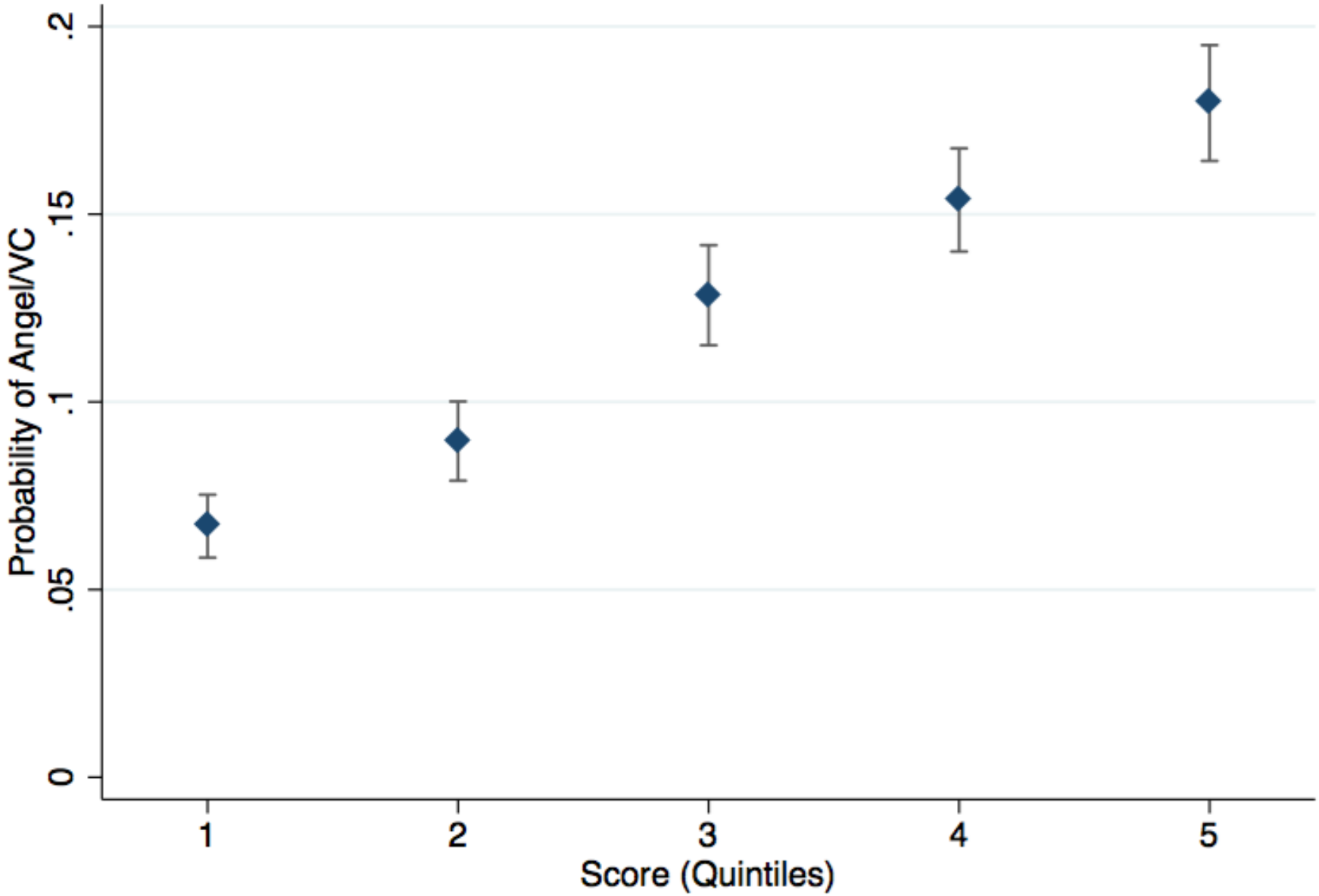


Note: N=13,681. 95% confidence intervals shown

Probability in Non-Winner Subset of Subsequent Angel/VC Investment by Judge Score



Effect of Winning on Firm Financing

Dependent Variable:	Angel/VC investment				Other financing	
	I.	II.	III.	IV. (OLS)	V.	VI. (OLS)
$\mathbf{1} \mid Win_{i,j}$	**2.23*** **	**1.51** **	**1.68*** **	**.0481*** **	**3.18*** **	**.118*** **
	(.3)	(.28)	(.33)	(.017)	(.72)	(.027)
$Overall\ score_{i,j}$		**1.49*** **	**1.32*** **	**.0208*** **	**1.28*** **	**.0138*** **
		(.078)	(.078)	(.0048)	(.085)	(.0047)
$\mathbf{1} \mid Angel/VC_i^{Prev}$			11.2***	.397***		
			(1.5)	(.029)		
$\mathbf{1} \mid Other\ finance_i^{Prev}$					8.98***	.311***
					(1.8)	(.046)
Program r.e.	Y	Y	Y	Y (f.e.)		Y (f.e.)
N	2829	2829	2829	2829	2829	2829
[Pseudo-]R^2	0.047	0.11	0.25	0.181	0.192	0.134

RD Effect of Winning on Firm Financing

	Only quintiles 2-3		Only quintile 3	
Dependent Variable:	I. Angel/VC investment	II. Other financing	III. Angel/VC investment	IV. Other financing
$\mathbf{1} \mid Win_{i,j}$	**1.94****	**3*****	**1.89***	**3.56*****
	(.63)	(.71)	(.64)	(1.2)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	10.6***		8.29***	
	(2.7)		(3.1)	
$\mathbf{1} \mid Other\ finance_i^{Prev}$		10.6***		8.7***
		(3.2)		(4.2)
Program r.e.	Y	Y	Y	Y
N	1138	1138	557	557
Pseudo-R^2	0.205	0.152	0.125	0.152

Effect of Program Type

Dependent Variable:	I. Angel/VC investment	II. Other financing	III. Angel/VC investment	IV. Other financing
$\mathbf{1} \mid Firm\ pitched_{i,j}$	**1.5***	**1.43**		
	(.36)	(.45)		
$\mathbf{1} \mid Firm\ joined\ accelerator_{i,j}$	**1.38**	**.576**		
	(.31)	(.23)		
$\mathbf{1} \mid Event\ has\ cash\ prize_{i,j}$			**3.34*** **	**1.24**
			(.95)	(.68)
$\mathbf{1} \mid Event\ has\ in-kind\ prize_{i,j}$			**1.08**	**.468*** **
			(.23)	(.13)
$\mathbf{1} \mid Win_{i,j}$	**1.04**	**3.61*** **	**1.85*** **	**4.61*** **
	(.21)	(1.5)	(.36)	(1.4)
$Overall\ score_{i,j}$	1.27***	1.26***	1.29***	1.22***
	(.079)	(.089)	(.078)	(.085)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	10.9***		10.9***	
	(1.4)		(1.5)	
$\mathbf{1} \mid Other\ finance_i^{Prev}$		8.94***		8.73***
		(1.9)		(1.8)
Program r.e.	Y	Y	N	N
N	2829	2829	2829	2829
Pseudo-R^2	0.2	0.191	0.168	0.146

Summary So Far

- Winning makes a firm 70-90% more likely to raise angel/VC
- Winning makes a firm 3 times as likely to raise other financing (licenses, partnerships, debt) than losing
- An extra quintile of score increases chance of angel/VC by 32%; other financing by 28%
- Pitching and participating in competition with cash prizes more helpful for angel/VC
- In-kind resources (mentoring, training, free legal services) if anything have a negative effect on subsequent funding

Judge and Criteria Scores

Dependent Variable:	I. All financing	II. OLS All financing	III. Angel/VC investment	IV. Other financing	V. Angel/VC investment OLS	VI. Other financing OLS
$\mathbf{1} \mid Win_{i,j}$	**2.43*** **	**.12*** **	**1.47** **	**5.52*** **	**.0468*** **	**.136*** **
	(.63)	(.011)	(.23)	(1.8)	(.0022)	(.0022)
$Judge\ score_{i,j,k}$	**1.23*** **	**.0213*** **	**1.24*** **	**1.23*** **		
	(.028)	(.0025)	(.04)	(.05)		
$Judge\ criteria\ scores_{i,j,k}$:						
Business model					**.00454*** **	**.00559*** **
					(.00096)	(.00093)
Financials					**.00363*** **	**.0048*** **
					(.0012)	(.0012)
Market					**.00419*** **	**.00536*** **
					(.00095)	(.00091)
Team					**.00432*** **	**.0055*** **
					(.00095)	(.00092)
Tech/product					**.00422*** **	**.00528*** **
					(.00095)	(.00092)
Traction/valid.					**.00524** **	**.000713**
					(.0023)	(.0023)
$\mathbf{1} \mid Finance_i^{Prev}$	15.4***	.478***				
	(2.9)	(.0088)				
$\mathbf{1} \mid Angel/VC_i^{Prev}$			16***		.455***	
			(2.7)		(.0025)	
$\mathbf{1} \mid Other\ finance_i^{Prev}$				10.1***		.293***
				(2.8)		(.0028)
Program r.e.	Y	Y (f.e.)	Y	Y	Y (f.e.)	Y (f.e.)
Judge f.e.	N	Y	N	N	N	N
N	10958	10958	10958	10958	143022	143022
[Pseudo-]R^2	0.26	0.323	0.192	0.193	0.265	0.175

Judge Professions

Dependent Variable:	I. Angel/VC investment	II. Other financing	Angel/VC investment	
			III.	IV.
$Judge\ score_{ijk} \cdot \mathbf{1} \mid Investor\ Judge_k$	**1.11*** **	**1.02**	**1.1*** **	**1.07** **
	(.037)	(.038)	(.038)	(.037)
$Judge\ score_{ijk} \cdot \mathbf{1} \mid Entrepreneur\ Judge_k$	**1**	**.927**	**1.02**	**.97**
	(.05)	(.052)	(.055)	(.05)
$Judge\ score_{ijk} \cdot \mathbf{1} \mid Executive\ Judge_k$	**1.05**	**.907**	**1.04**	**1.01**
	(.055)	(.057)	(.056)	(.052)
$Judge\ score_{ijk} \cdot \mathbf{1} \mid Service\ Prof\ Judge_k$	**1.01**	**1**	**1**	**.967**
	(.034)	(.037)	(.035)	(.033)
$\mathbf{1} \mid Win_{i,j}$	3.3***	4.59***	4.52***	2.94***
	(.37)	(.55)	(.6)	(.34)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	13.9***		11.2***	11.6***
	(1.6)		(1.4)	(1.4)
$\mathbf{1} \mid Other\ finance_i^{Prev}$		6.85***		
		(.98)		
$\mathbf{1} \mid Software_i$			3.95***	
			(.5)	
$\mathbf{1} \mid Energy_i$			.899	
			(.13)	
$\mathbf{1} \mid Biotech/health_i$			1.01	
			(.17)	
$\mathbf{1} \mid Water/waste/ag_i$			4.08**	
			(2.5)	
$Overall\ score_{i,j}$				1.29***
				(.054)
Program r.e.	Y	Y	Y	Y
N	3928	3928	3928	3928
Pseudo-R^2	0.201	0.121	0.247	0.213

Summary of Score Findings

- Judge-specific scores slightly less informative than overall scores
- All criteria scores slightly informative
  - Traction/Validation more relevant for angel/VC
  - Technology/Product more relevant for other financing
- Investors better at predicting angel/VC

Program mechanism - relationship to private finance

- Option (A): Substitute for conventional early stage financing and mentoring from angel and VC investors,
- Option (B): Fill a funding gap between founding and a stage at which conventional investors will consider the new venture

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- If substitutes, should be most effective for capital-light ventures (software)
- If filling gap, particularly allowing ventures to prototype their idea, then may also be helpful (or more helpful) for capital-intensive companies
- Partially address by examining whether winning impacts subsequent investment more in certain sectors
    - If most useful for capital-intensive sectors $\rightarrow$ springboard
    - Ongoing work will examine the effect of the programs on commercialization, which will help with (A)

Is winning more helpful for software firms?

Dependent Variable:	Angel/VC investment		Other financing	
	I.	II.	III.	IV.
$\mathbf{1} \mid Software_i \cdot \mathbf{1} \mid Win_{i,j}$		1.15		2.91***
		(.29)		(1.1)
$\mathbf{1} \mid Software_i$	**3.94*** **	3.73***	**4.29*** **	2.64***
	(.62)	(.75)	(.89)	(.61)
$\mathbf{1} \mid Win_{i,j}$	2.08***		4.48***	
	(.48)		(1.1)	
$Overall\ score_{i,j}$	1.31***	1.39***	1.24***	1.36***
	(.084)	(.08)	(.09)	(.083)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	8.77***	8.91***		
	(1.2)	(1.2)		
$\mathbf{1} \mid Other\ finance_i^{Prev}$			8.53***	7.84***
			(2)	(2)
Program r.e.	Y	Y	Y	Y
N	2829	2829	2829	2829
Pseudo-R^2	0.256	0.245	0.271	0.196

Is winning more helpful for certain hardware sectors?

	Angel/VC investment		Other financing	
	I.	II.	III.	IV.
$\mathbf{1} \mid Energy_i \cdot \mathbf{1} \mid Win_{i,j}$		**1.99*** **		**3.41*** **
		(.51)		(1.1)
$\mathbf{1} \mid Biotech/health_i \cdot \mathbf{1} \mid Win_{i,j}$		**.995**		**3.09**
		(.58)		(2.2)
$\mathbf{1} \mid Water/waste/ag_i \cdot \mathbf{1} \mid Win_{i,j}$		**.892**		**19.3*** **
		(.92)		(20)
$\mathbf{1} \mid Energy_i$	**1.27**	1.06	**1.08**	.709
	(.24)	(.24)	(.23)	(.24)
$\mathbf{1} \mid Biotech/health_i$	**.679** **	.637**	**1.75*** **	1.26
	(.12)	(.13)	(.27)	(.26)
$\mathbf{1} \mid Water/waste/ag_i$	**2.95** **	2.98	**3.91*** **	1.13
	(1.4)	(2)	(1.6)	(.68)
$\mathbf{1} \mid Win_{i,j}$	1.58**		3.3***	
	(.31)		(.8)	
$Overall\ score_{i,j}$	1.32***	1.33***	1.27***	1.3***
	(.078)	(.072)	(.085)	(.079)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	12.1***	10.9***		
	(1.6)	(1.5)		
$\mathbf{1} \mid Other\ finance_i^{Prev}$			8.39***	7.69***
			(1.8)	(1.6)
Program r.e.	Y	Y	Y	Y
N	2829	2829	2829	2829
Pseudo-R^2	0.195	0.163	0.2	0.140

Sector Summary

- Winning has a larger impact on subsequent investment for hardware and energy firms. Winning helps water/waste/agriculture-related firms with non-VC/angel financing
- Evidence supports "springboard" hypothesis

▸ Raw Scores

Structured Feedback

- Cleantech Open roughly same every year
  - Same competition and accelerator format
  - Same scoring criteria
  - Similar set of entrants/judges
- In 2011 used ValidEval judging platform, provided extensive structured feedback
  - Including position relative to peers
- In other years signal is losing; receive verbal, informal feedback from judges

Structured Feedback

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- In 2011 used ValidEval judging platform, provided extensive structured feedback
  - Including position relative to peers
- In other years signal is losing; receive verbal, informal feedback from judges
- Research design: Compare effect of participating in 2011 with surrounding years (2010, 2012)
  - Assumption: Economic environment for funding clean energy same or trending

Structured Feedback: Angel/VC

Dependent Variable: Angel/VC Investment

	2010 and 2012		2011 (structured feedback)	
	I. Overall scores	II. Judge scores	III. Overall scores	IV. Judge scores
$\mathbf{1} \mid Win_{i,j}$	**1.45**	**.21****	**8.85*****	**8.9*****
	(.79)	(.13)	(5.2)	(2.5)
$\mathbf{1} \mid Reach\ semifinals_{i,j}$	**1.66**	**1.77***	**2.49***	**2.9*****
	(.59)	(.56)	(1.3)	(.72)
$Overall\ score_{i,j}$	1.02		1.3**	
	(.12)		(.16)	
$Judge\ score_{i,j,k}$		1.22**		1.13**
		(.12)		(.062)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	13.9***	54.2***	2.97*	10.5***
	(5.4)	(21)	(1.8)	(3.5)
Program r.e.	Y	Y	Y	Y
N	627	811	300	1259
Pseudo-R^2	0.124	0.296	0.140	0.149

Structured Feedback: Other Financing

Dependent Variable: Other financing

	2010 and 2012		2011 (structured feedback)	
	I. Overall scores	II. Judge scores	III. Overall scores	IV. Judge scores
$\mathbf{1} \mid Win_{i,j}$	**5.34*** **	**.514**	**10.1*** **	**5.25*** **
	(3.2)	(.32)	(8.2)	(1.7)
$\mathbf{1} \mid Reach\ semifinals_{i,j}$	**3.88*** **	**1.78**	**5.66** **	**3.47*** **
	(1.7)	(.8)	(4.3)	(1)
$Overall\ score_{i,j}$	.746**		1.33**	
	(.1)		(.18)	
$Judge\ score_{i,j,k}$		.873		1.15**
		(.13)		(.068)
$\mathbf{1} \mid Other\ finance_i^{Prev}$	20.8***	164***	5.67***	7.51***
	(8.3)	(69)	(3.4)	(1.9)
Program r.e.	Y	Y	Y	Y
N	627	811	300	1259
Pseudo-R^2	0.204	0.540	0.141	0.113

Other Findings

- Do not find that variance in judge scores for a firm is relevant
- Do not find that the number of competitions a firm competes in is relevant
- Do not find that award amount is relevant
- Do not find that number of winners in a competition is relevant (consistent with Pavel 2015)

▸ Raw Scores

Outline

Conclusion

- Mechanism part 1: Substitute or complement?
  - Possibly substitute for software, filling gap for hardware

Conclusion

- Mechanism part 1: Substitute or complement?
  - Possibly substitute for software, filling gap for hardware
- Mechanism part 2: Alleviate information asymmetry by certification or "prototyping"?
  - For raising angel/VC, certification mechanism seems possible
  - Scores informative
    - Judges themselves may invest
    - Consensus, not variance, most powerful predictor
  - Winning and/or pitching most useful
  - Accelerator and in-kind resources not helpful
  - $\rightarrow$ Certification(?)

APPENDIX

Raw Scores

Panel 1: Logistic

Dependent Variable:	Angel/VC investment		Other financing	
$\mathbf{1} \mid Win_{i,j}$	1.1***	1.36***	4.28***	7.26***
	(.033)	(.048)	(.14)	(.25)
$Overall\ score_{i,j}$	1.77***		1.65***	
	(.026)		(.026)	
$Judge\ score_{i,j,k}$		1.3***		1.29***
		(.014)		(.014)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	14.2***	15.7***		
	(.32)	(.39)		
$\mathbf{1} \mid Other\ finance_i^{Prev}$			8.6***	8.45***
			(.22)	(.25)
Program f.e.	Y	Y	Y	Y
N	2829	10958	2829	10958
R^2	0.165	0.179	0.127	0.14

Panel 2: OLS

Dependent Variable:	Angel/VC investment		Other financing	
	III.	IV.	V.	VI.
$\mathbf{1} \mid Win_{i,j}$	.0442**	.0649***	.113***	.157***
	(.017)	(.017)	(.027)	(.038)
$Overall\ score_{i,j}$	.0288***		.0212***	
	(.0089)		(.0068)	
$Judge\ score_{i,j,k}$		.0231***		.0166***
		(.0045)		(.0032)
$\mathbf{1} \mid Angel/VC_i^{Prev}$	.399***	.446***		
	(.029)	(.036)		
$\mathbf{1} \mid Other\ finance_i^{Prev}$			.311***	.326***
			(.046)	(.059)
Program f.e.	Y	Y	Y	Y
N	2829	10958	2829	10958
R^2	0.180	0.235	0.135	0.163

Back

Odds Ratios

- Odds of angel or VC investment are 0.13; odds of other types of private funding are 0.15; odds of any private funding 0.23. (Firms ~5 times more likely not to have funding match than to have it)
- Odds are the probability of an event relative to its complement: $Odds = \frac{\pi}{1-\pi}$, or the number of successes per failure, so that when the event has a probability of 0.5, the odds are 1 ("even"), and if an event is twice as likely to happen as not to happen, the odds are 2:1, or $\frac{2/3}{1/3}$.
- Adding 1 to independent variable x increases the log odds of a positive outcome (i.e. subsequent investment) by β_x
- Increasing the log odds by β_x is equivalent to multiplying the odds by e^{β_x}. This is odds ratio, or multiplicative increase in the odds of a positive outcome for a unit increase in x.

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Pitch: The Business Plan

Name	*Years*	*State*
1M Cups Denver	2014	Colorado
Arizona Innovation Challenge Fall	2012-2014	Arizona
Arizona Innovation Challenge Spring	2012-2014	Arizona
Angel Capital Summit	2014-2015	DC
Biomedical Research Foundation Entrepreneur Accelerator Program	2014	Louisiana
Boulder Fall LEADING EDGE	2014	Colorado
CU CleanTech New Venture Challenge	2012-2013	Colorado
Clean Energy Challenge	2013	Illinois
Cleantech Open: California Region	2009-2014	California
Cleantech Open: North Central Region	2010-2013	Minnesota
Cleantech Open: Northeast Region	2009-2013	Massachusetts
Cleantech Open: Pacific Northwest Region	2009-2013	Oregon
Cleantech Open: Rocky Mountain Region	2009-2013	Colorado
Cleantech Open: South Atlantic Region	2011	Georgia
Cleantech Open: South Central Region	2011-2013	Texas
Cleantech Open: Southeast Region	2011-2013	Georgia
Colorado Capital Conference	2013	Colorado
Colorado Digital Health Challenge	2014	Colorado
LEADING EDGE: Colorado Springs	2014	Colorado
LEADING EDGE: Cortez	2014	Colorado
LEADING EDGE: Denver	2014	Colorado
LEADING EDGE: Grand Junction Fall	2014-2015,	Colorado
LEADING EDGE: Grand Junction Spring	2014	Colorado
LEADING EDGE: San Luis Valley	2014	Colorado
LEADING EDGE: Southern Colorado	2014	Colorado
DOE Cleantech Business Plan Competition	2013	DC
Durango NxLeveL Strategic Planning Series	2014	Colorado
Energize	2013	Utah
Energy Security Prize, ATA and EIA Tracks	2013	DC
Food and Agriculture Competition	2013-2014	California
Galvanize Pitches and Pitchers	2013	California
IGEM Commercialization Grant	2013-2014	Idaho
Illinois Clean Energy Student Challenge	2013	Illinois
Imagine H2O Infrastructure Challenge	2014-2015	California
Indiana Clean Energy Student Challenge	2013	Indiana
Innosphere Admissions	2013-2015 (quarterly in 2014)	Colorado
MSU MTRAC for the BioEconomy	2014-2015	Michigan
Missouri Clean Energy Student Challenge	2013	Missouri
OEDIT Advanced Industries Accelerator Energy and Natural Resources	2015	Colorado