Using RCTs to Identify the Impact: Evaluating YouWin!
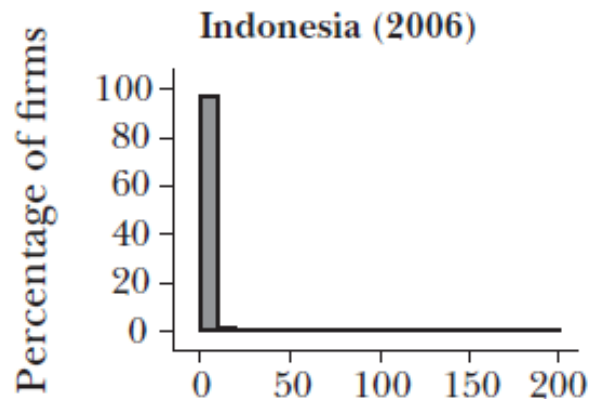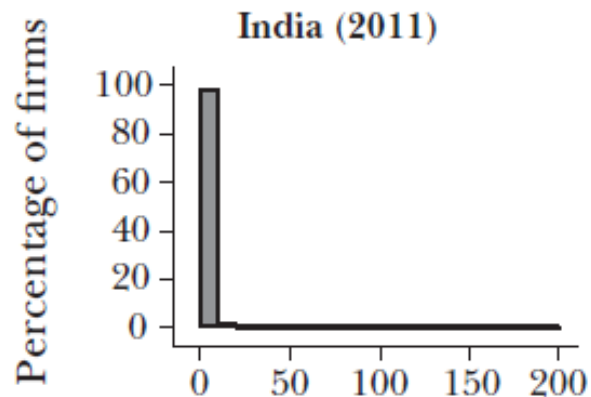
David McKenzie,

World Bank

An Abundance of Tiny Firms in Developing Countries

$$0 < Employment \leq 200$$

India (2011)

Percentage of firms

Indonesia (2006)

Percentage of firms

- Modal firm in most developing countries has one worker (the owner)

- Modal manufacturing firm in the U.S. has 45 workers.

	Madagascar 2005	Tanzania 2008
Total number of manufacturing firms	19334	24979
With <10 employees	18030	24204
With 10 or more employees	1304	775
With 100+ employees	190 with 200+	80
Total number in trade	159594	122622
With <10 employees	157080	121589
With 10 or more employees	2514	1033
With 100+ employees	89 with 200+	0

Source: Hsieh and Olken (2014)

Source: McKenzie (2012)

Three key questions

1) How successful are business plan competitions at identifying which individuals will start firms that will grow rapidly?

2) Does winning lead to more growth and innovation, or merely just subsidize individuals whose firms would grow anyway?
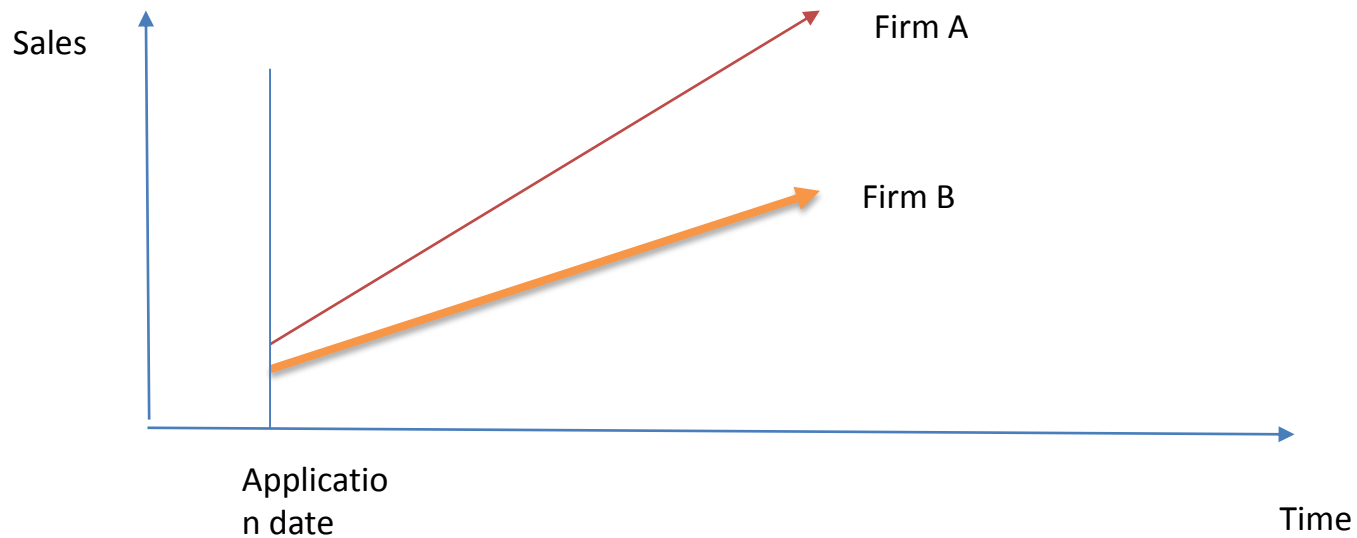
3) Which types of individuals should such programs target?

Why do we want RCTs?
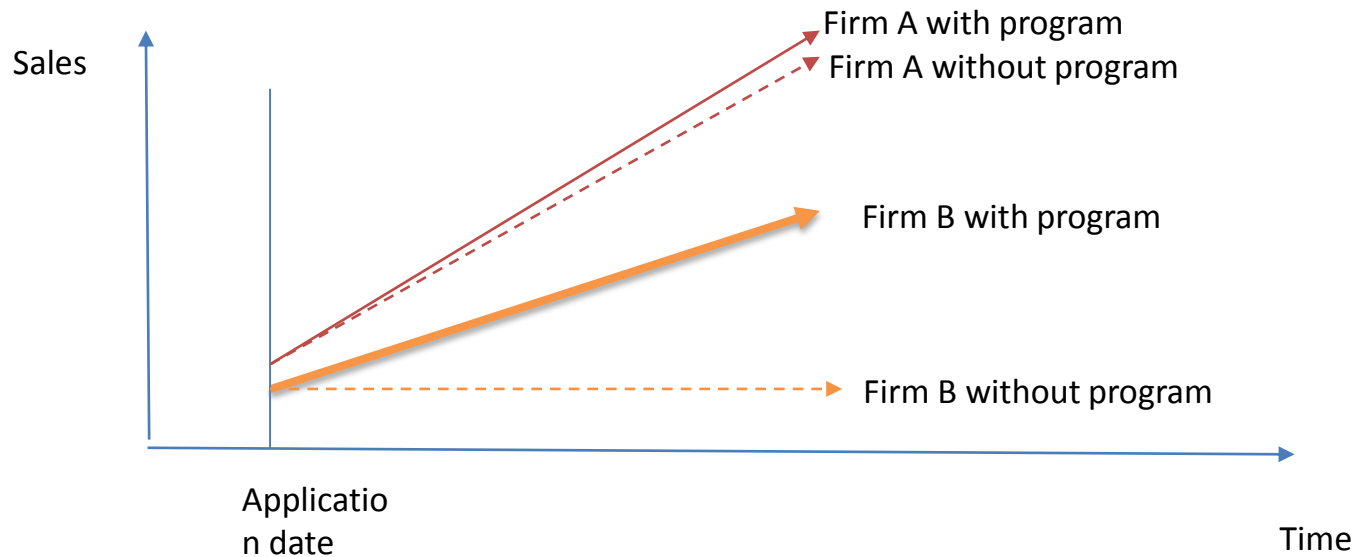
Common approach to targeting programs

- *Policy aim:* encourage entrepreneurship, innovation, exports, and job creation
- *Example instruments:* matching grants, business plan competitions, investment readiness programs, export facilitation
- *Common targeting approach:* try to pick the firms you think have the highest likelihood of success aka "the best" firms.

e.g. score all the applications for your grant program, and then award the program to the highest scoring

Which firm should we pick?

Which firm should we pick?

Sales

Firm A with program
Firm A without program

Firm B with program

Firm B without program

Application date

Time

Why RCTs

- Without knowing what would have happened in the absence of our program
  - We can't measure accurately impact of our program
  - We don't know who to target our program to
- Random assignment ensures the two groups are similar on average before intervention, only difference is our intervention

Outline

- Context: YouWin! business plan competition in Nigeria
- Randomization and Evaluation Procedure
- What is the impact of winning?
  - Business ownership
  - Job creation effects
  - Sales, Profitability, Innovation
  - Intermediate Channels
- Targeting
- Preliminary Conclusions

Contact Us . Discussion Forum . Login . Register   [   ] Go

YouWiN!

YOUTH ENTERPRISE WITH INNOVATION IN NIGERIA

...YouWiN!

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YouWiN!

AGENTS OF **CHANGE**

Mon **07 Nov 2011**

YOUTH **EMPOWERMENT**

Deadline extended until the 18th of November

APPLY HERE

APPLICATION CLOSES IN

11	13	31	37
Days	Hrs	Mins	Secs

Partners

What is YouWiN!

The Youth Enterprise with Innovation in Nigeria (*You WiN!*) Programme is a collaboration of the Ministry of Finance, the Ministry of Communication Technology (CT), and the Ministry of Youth Development that will launch an annual Business Plan Competition (BPC) for aspiring young entrepreneurs in Nigeria, in line with the Federal Government's drive to create more jobs for Nigerians. The programme will be implemented in partnership with Nigeria's private sector, who will be requested to provide funding support.

The competition

- stated objective of encouraging innovation and **job creation** through the <u>creation of new businesses</u> and <u>expansion of existing businesses</u>
- Had to be 40 or younger and Nigerian citizen to be eligible
- Launched in late 2011, launch ceremony on national TV; advertised through media, roadshows.
- 1200 national winners to be chosen, eligible for up to US$64,000 in funding each.

50 million youth

Online application

24,000 apply

4,873

Business

plans

scored

Top
2,400

Top
2,400

National winners

Regional winners

Ordinary winners 720

Control Group 1112

Dropped
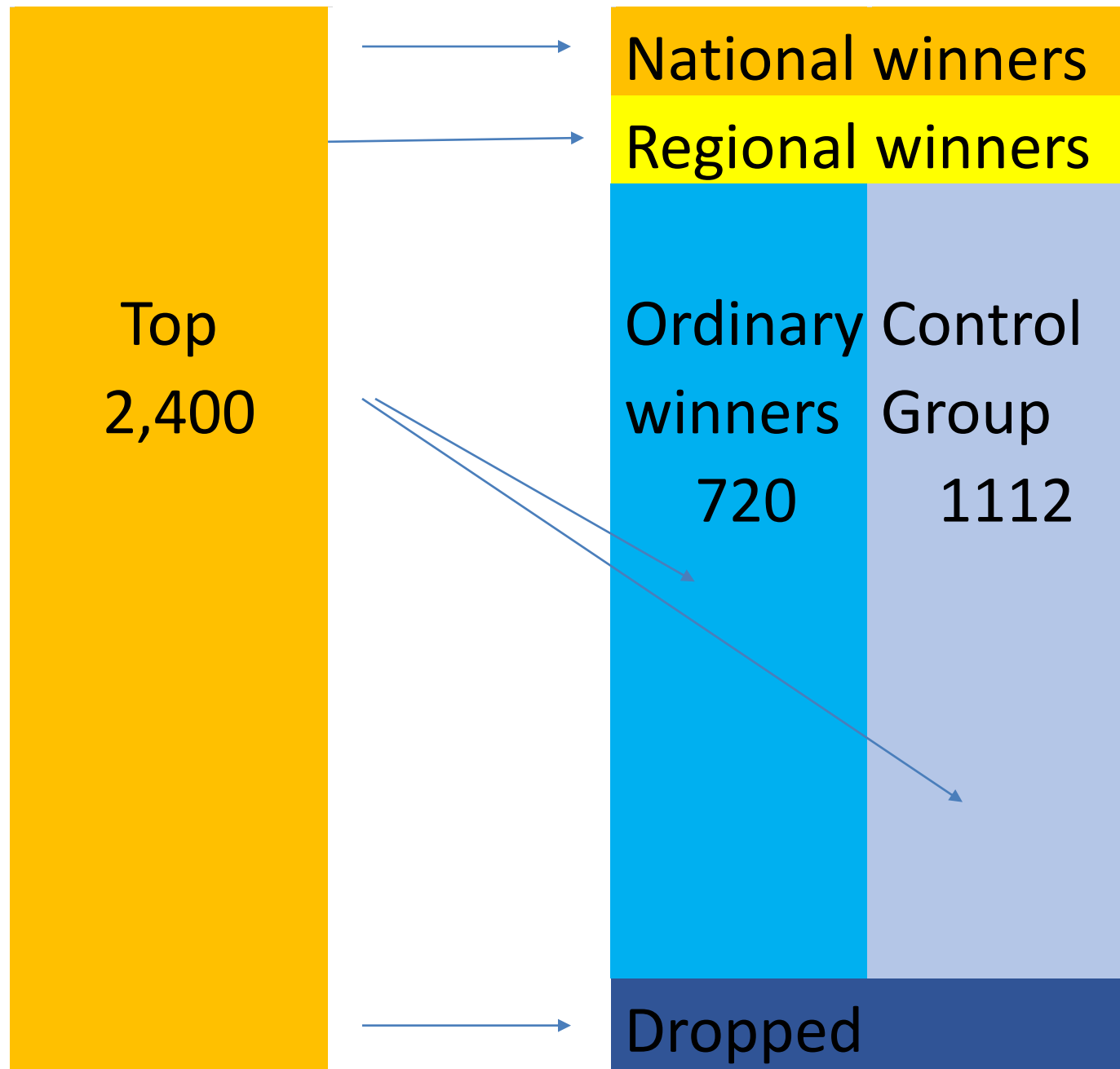
Table 1: Baseline Characteristics and Balance of Experimental Sample

	Existing Firms			New Firms		
	Non-Experimental Winners	Treatment Group	Control Group	Non-Experimental Winners	Treatment Group	Control Group
Applicant Characteristics						
Female	0.17	0.18	0.17	0.19	0.17	0.18
Age	32.5	32.0	31.8	30.1	29.3	29.6
Married	0.60	0.50	0.56	0.42	0.34	0.36
High School or Lower	0.10	0.13	0.12	0.06	0.11	0.10
University education	0.71	0.63	0.67	0.79	0.69	0.71
Postgraduate education	0.12	0.08	0.12	0.13	0.05	0.06
Lived Abroad	0.14	0.10	0.11	0.18	0.06	0.09
Choose Risky Option	0.59	0.56	0.52	0.63	0.57	0.55
Have Internet access at home	0.68	0.57	0.61	0.60	0.47	0.48
Own a Computer	0.94	0.87	0.88	0.92	0.84	0.86
Satelite Dish at home	0.74	0.67	0.71	0.64	0.68	0.64
Freezer at home	0.64	0.57	0.61	0.63	0.51	0.55
Business Characteristics						
Crop and Animal Sector	0.14	0.16	0.16	0.22	0.22	0.22
Manufacturing Sector	0.28	0.28	0.26	0.23	0.28	0.24
Trade Sector	0.05	0.06	0.05	0.06	0.04	0.04
IT Sector	0.14	0.15	0.14	0.04	0.07	0.06
First Round Application Score	59.0	57.2	56.6	59.9	59.9	59.9
Business Plan Score	61.7	45.8	45.4	74.4	53.7	55.5
Number of Workers	9.11	7.35	7.73			
Ever had Formal Loan	0.11	0.06	0.09			
Joint orthogonality test: treatment versus control		0.920			0.884	
Joint orthogonality test: non-experimental vs treatment	0.000			0.000		

Data Collection

- survey targeted a total of 3,139 individuals comprised of four groups who had applied to the competition:
  - National and regional winners - 475
  - Other winners (Treatment group) - 729
  - Control group - 1112
  - RD group – 823 – within 5 points of cutoff
- Three rounds of follow-up surveys:
  - Round 1: 79% of experimental firms completed
  - Round 2: 92% of experimental firms completed
 - Round 3: 85% of experimental firms completed

The impact of winning

How might we expect winning to affect firm growth and job creation?

$$Y = f(A, K, E, L)$$

- Perfect markets, just a grant
  - Then expect it just to make owner richer, not change production decision
- Perfect markets, conditional grant
  - Paid in tranches, causes short-term increase in returns to K and L in firm – short-term effect only.
- Program is more than a grant
  - Training may increase entrepreneurial skills E
  - Mentoring, improvements in confidence & attitudes, reputation effects => may increase A and E.
  => Impact on L depends on whether complement or substitute
- With capital and labor market constraints
  - Allows firm to overcome these, increase K
  - May also encourage owner to take on riskier activities if insurance markets missing.
  => Impact on L depends on whether complement or substitute to capital

Proportion of New Applicants Operating a Business
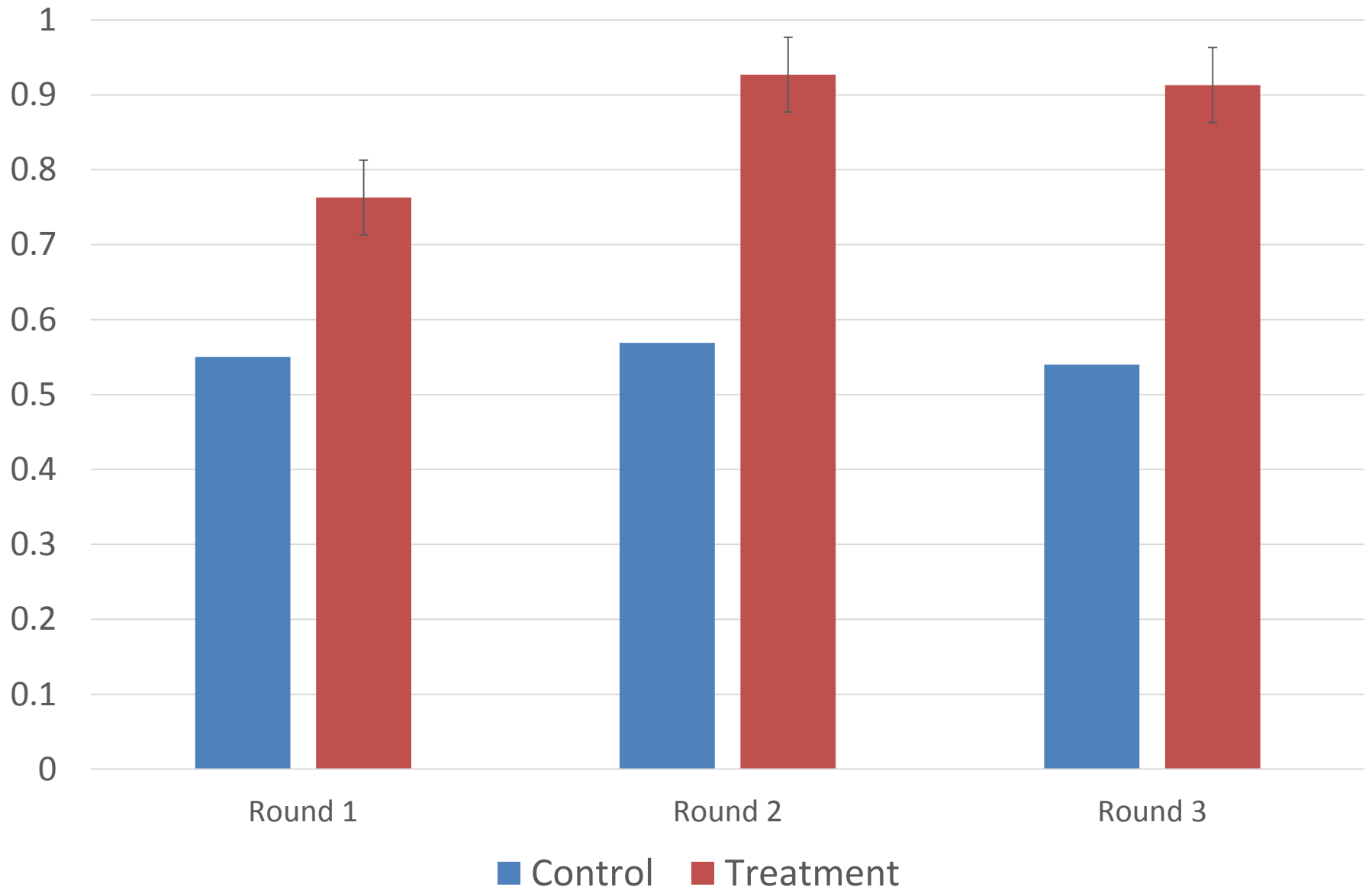
Impact on New Firm Start-up

Impact on Start-up and Survival of New Firms

	Round 1	Round 2	Round 3
Impact for Ordinary Winners	0.213***	0.358***	0.373***
	(0.029)	(0.023)	(0.024)
Lee Bounds	[0.19,0.30]	[0.22, 0.23]	[0.37, 0.43]
Sample Size	1021	1181	1085
Control Mean	0.550	0.569	0.540
PSM Impact for National/Zonal winners	0.250***	0.414***	0.382***
	(0.040)	(0.023)	(0.035)
RD Impact of 4-day Training	0.089	0.039	0.040
	(0.095)	(0.086)	(0.095)

Impact on Survival of Existing Firms
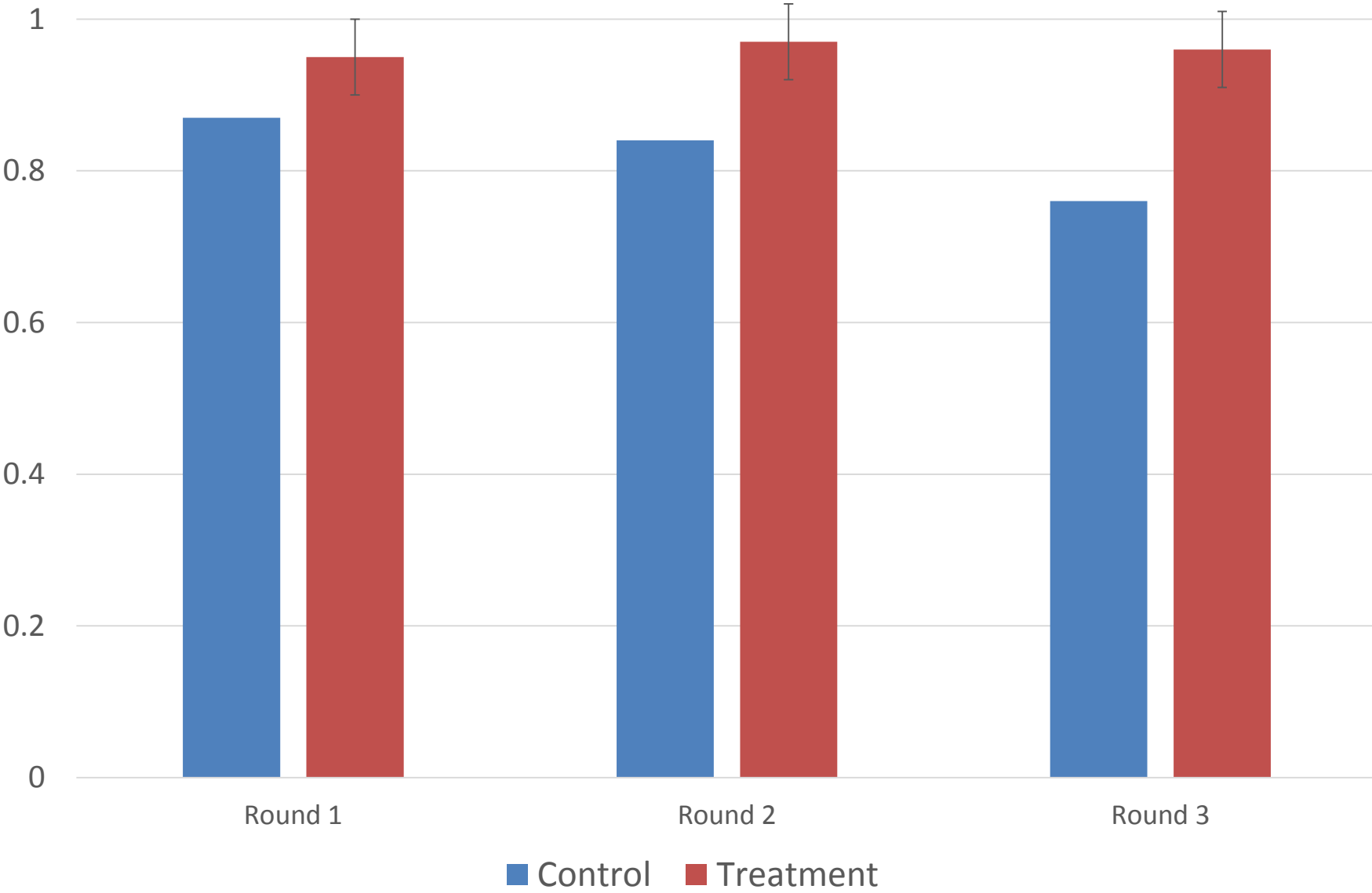
Impact on Survival of Existing Businesses

Impact on Survival of Existing Firms

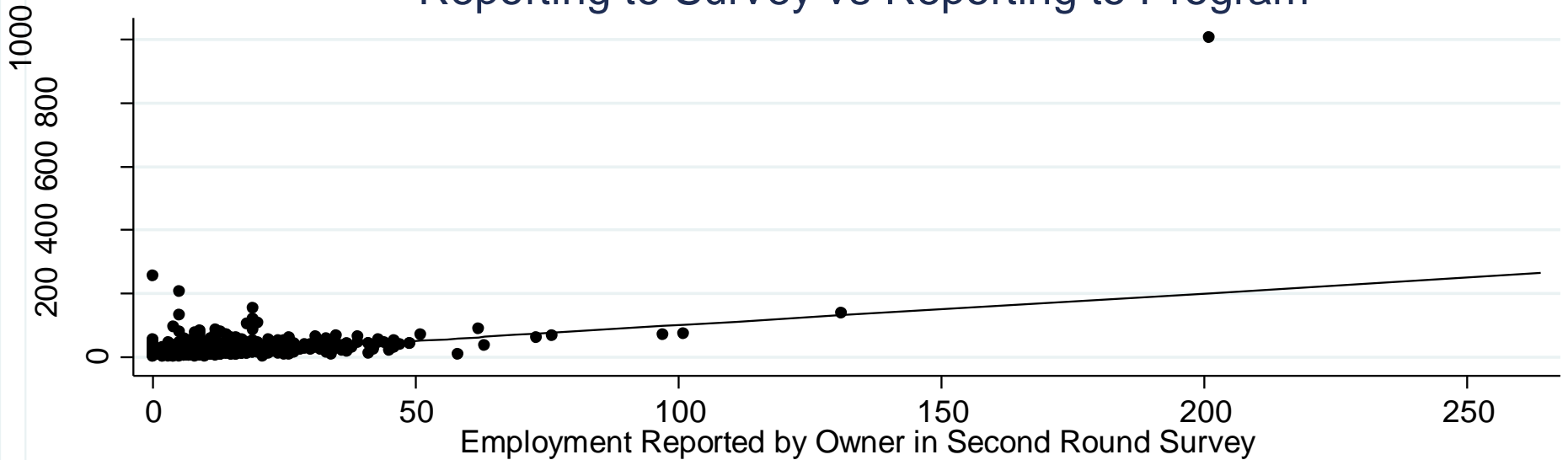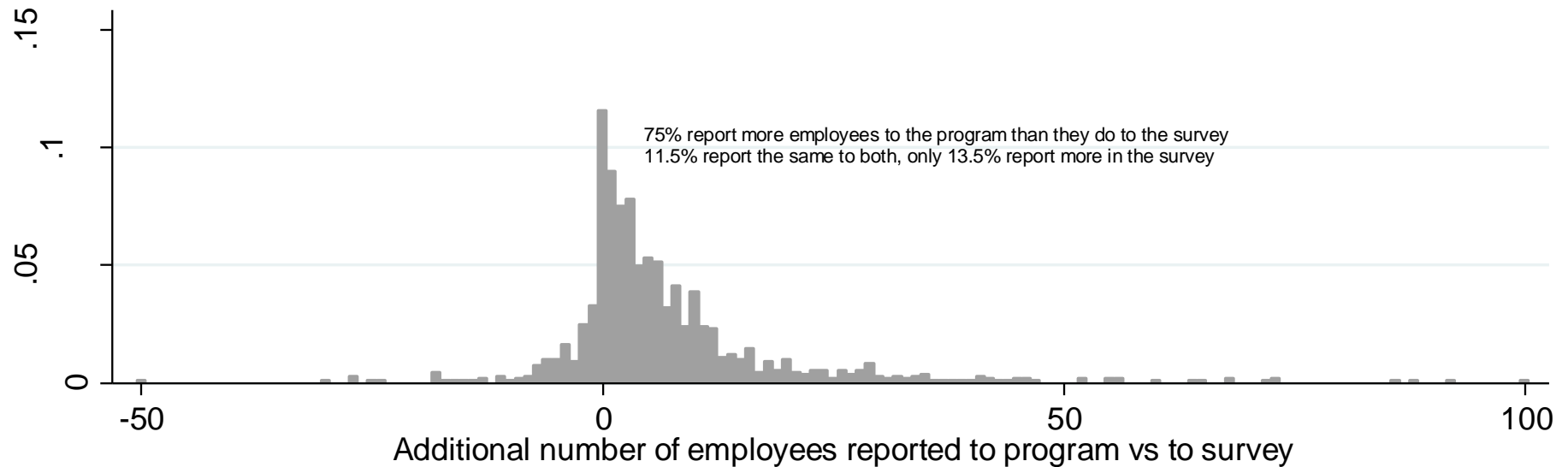|	Round 1	Round 2	Round 3
Impact for Ordinary Winners	0.082***	0.130***	0.196***
	(0.027)	(0.025)	(0.031)
Lee Bounds	[0.07, 0.13]	[0.07, 0.12]	[0.19, 0.24]
Sample Size	432	505	477
Control Mean	0.871	0.844	0.759
PSM Impact for National/Zonal winners	0.097***	0.134***	0.200***
	(0.024)	(0.029)	(0.035)
RD Impact of 4-day Training	-0.007	0.114	0.240**
	(0.100)	(0.101)	(0.112)

Impact on Employment

Measuring Jobs

- Our surveys ask firms about the number of employees they have in different categories
- They report fewer employees to our enumerators than they do to the YouWiN! program

Reporting to Survey vs Reporting to Program

Employment Reported by Owner in Second Round Survey

Distribution of Difference in Reporting of Employees to Program vs Survey

75% report more employees to the program than they do to the survey
11.5% report the same to both, only 13.5% report more in the survey

Additional number of employees reported to program vs to survey

Which should we trust?

- Incentives to over-report employment numbers to program
- Less clear whether there are any misreporting incentives to our survey
- Objective measure: had survey enumerators also physically count employees during survey visits
  - Problem is that this misses employees who are sick, or out of the office, or working in another location
  - Survey data corresponds more closely to observed than reports to program. No differential treatment effect on gap between survey and observed.
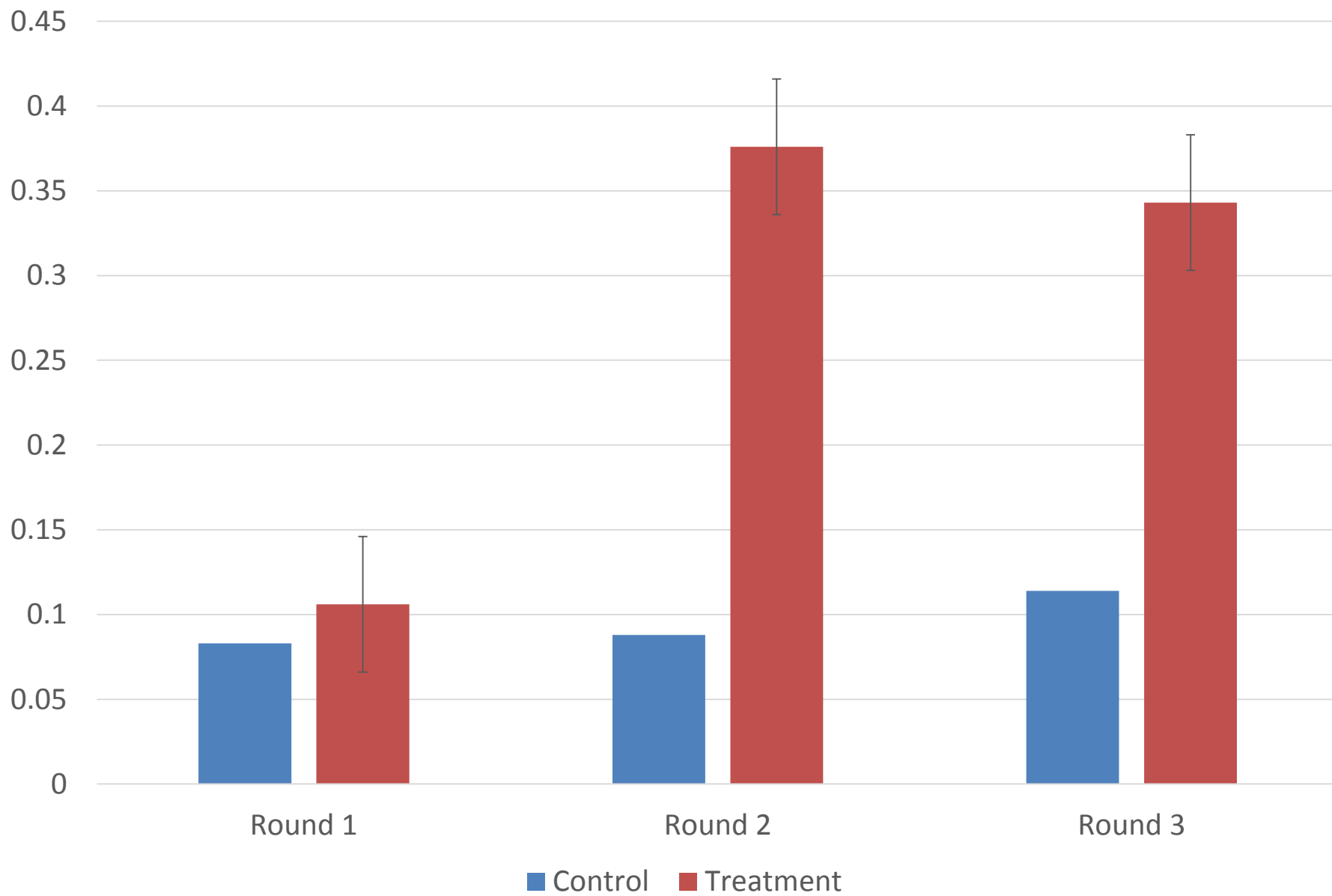
Impact on the Likelihood of an Existing Firm having 10+ Employees
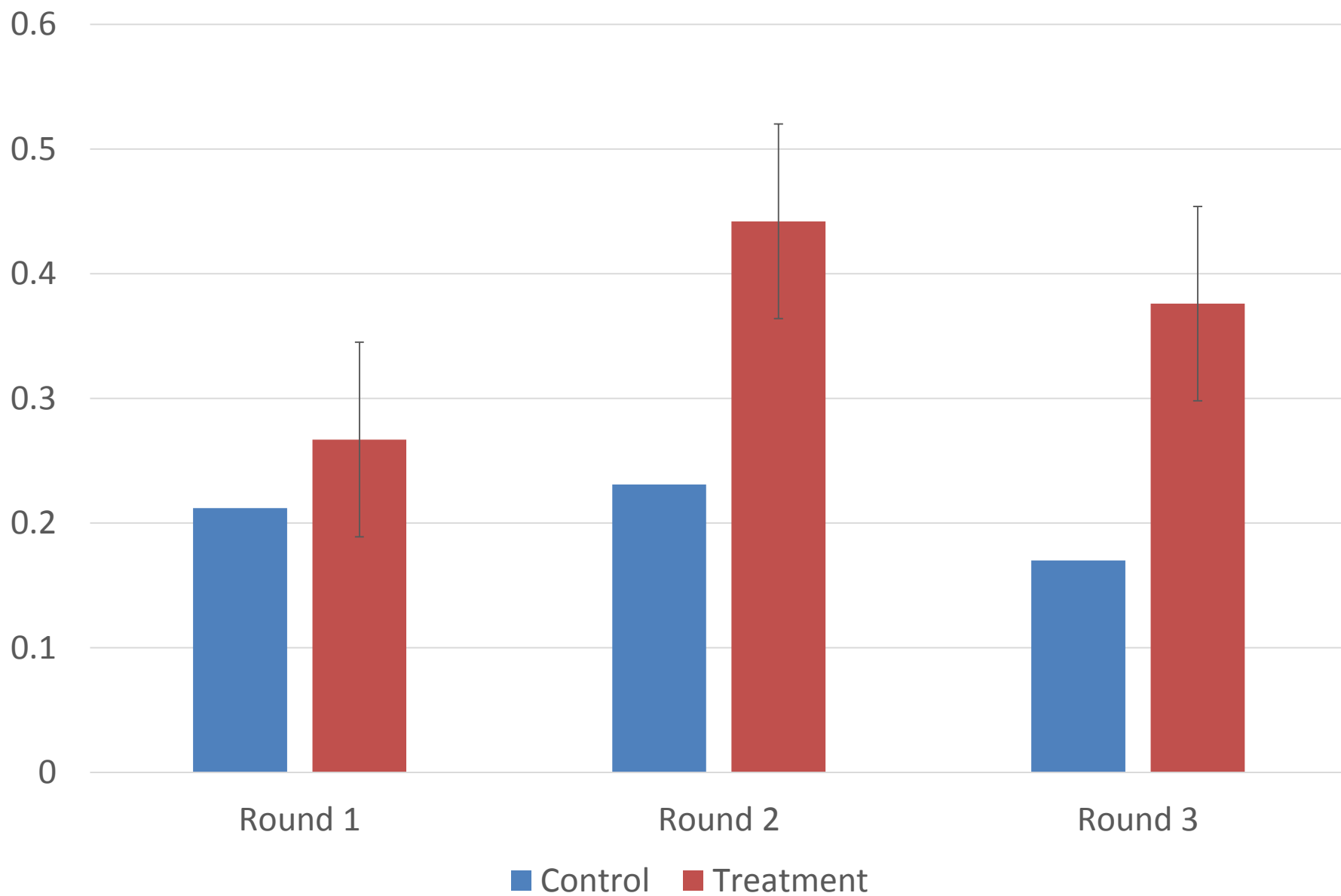
Experimental Impacts on Employment in Existing Firms

	Own Employment	Total Employment	Firm of 10 + workers	Firm of 25+ workers
ITT at:				
First-Follow-up	0.046**	1.461*	0.055	0.007
	(0.019)	(0.808)	(0.041)	(0.019)
Second Follow-up	0.066***	2.521*	0.211***	0.008
	(0.018)	(1.366)	(0.041)	(0.018)
Third Follow-up	0.069***	4.391***	0.206***	0.027*
	(0.021)	(0.674)	(0.040)	(0.015)
Control Mean: First follow-up	0.938	6.852	0.212	0.032
Control Mean: Second follow-up	0.922	8.134	0.231	0.038
Control Mean: Third follow-up	0.906	5.571	0.170	0.014
Obs: First follow-up	432	422	422	422
Obs: Second follow-up	505	500	500	500
Obs: Third follow-up	477	461	461	461

Impact on the Likelihood of a New Applicant having 10+ workers

Legend: Control (blue), Treatment (red)

Experimental Impacts on Employment in New Firms

	Own Employment	Total Employment	Firm of 10 + workers	Firm of 25+ workers
ITT at:				
First-Follow-up	0.073***	1.405*	0.023	0.007
	(0.025)	(0.736)	(0.020)	(0.008)
Second Follow-up	0.127***	6.001***	0.288***	0.022**
	(0.017)	(0.412)	(0.026)	(0.009)
Third Follow-up	0.119***	5.225***	0.229***	0.025**
	(0.018)	(0.471)	(0.028)	(0.011)
Control Mean: First follow-up	0.787	3.618	0.083	0.010
Control Mean: Second follow-up	0.841	3.305	0.088	0.009
Control Mean: Third follow-up	0.831	3.773	0.114	0.014
Obs: First follow-up	1021	987	987	987
Obs: Second follow-up	1181	1159	1159	1159
Obs: Third follow-up	1085	1044	1044	1044

Table 5: Total Employment and Total Employment Impact in Winning Firms

	Number of Firms	Administrative Report of Employment	Total Employment in Winning Firms			Treatment Effect on Total Employment		
			Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Randomly selected winners	729	11940	4588	7183	6858	1051	3411	3579
New Firms	451	7487	2289	4209	4099	645	2711	2359
Existing Firms	278	4453	2299	2974	2759	406	701	1220
National and Zonal winners	475	11780	4439	6762	5870	1444	3366	3448
New Firms	118	3783	744	1712	1273	320	1317	827
Existing Firms	357	8009	3695	5050	4597	1125	2049	2620
All winners	1204	23781	9027	13945	12728	2495	6777	7027

Who are these workers hired?

- Only 5% are related to the owner
- Mean age 28, 33% female
- Only 6% didn't finish high school, 45% have post high school education

(c.f. Nigerian youth: only 11% of females & 16% of males have post high school education)

- Average wage is 22,000 Naira/month (US$140).

Cost effectiveness to date

- US$58 million in grants to create 7,027 jobs

⇒$8,350 per job created.

⇒ wages of those hired are $143/month – so need 58 months employment to make it larger effect than just paying people directly.

⇒Caveats:

    ⇒Employment effects may continue to grow, as may wages.

    ⇒Employment not the only benefit – higher productivity, higher earnings for entrepreneurs, etc.

By way of comparison

Estimates of Job Creation from the American Recovery and
Reinvestment Act of 2009

EXECUTIVE OFFICE OF THE PRESIDENT

COUNCIL OF ECONOMIC ADVISERS

ESTIMATES OF JOB CREATION FROM THE

AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

Table 4
**Estimates of Spending Needed to Create 1 Job-Year
for Different Types of Fiscal Stimulus**

Government spending:	$92,136 per job-year
Tax cuts:	$145,351 per job-year
State fiscal relief:	$116,603 per job-year

Cost per job-year over first 3 years in Nigeria: $3,600, scaling for per-capita GDP differences is equivalent to US$64,000 (upper bound).

Firm creation impact

- Approx. 22% increase in number of firms with 10+ workers

    = 264 more firms of this size

- 3 years of competition => approx. 790 more firms with 10+ workers

- Tanzania has 50 million population and 1800 firms with 10+ workers

- Suggests approx. 6100 firms with 10+ in Nigeria

=> Approx 13% increase in number of firms in country with 10 or more workers.
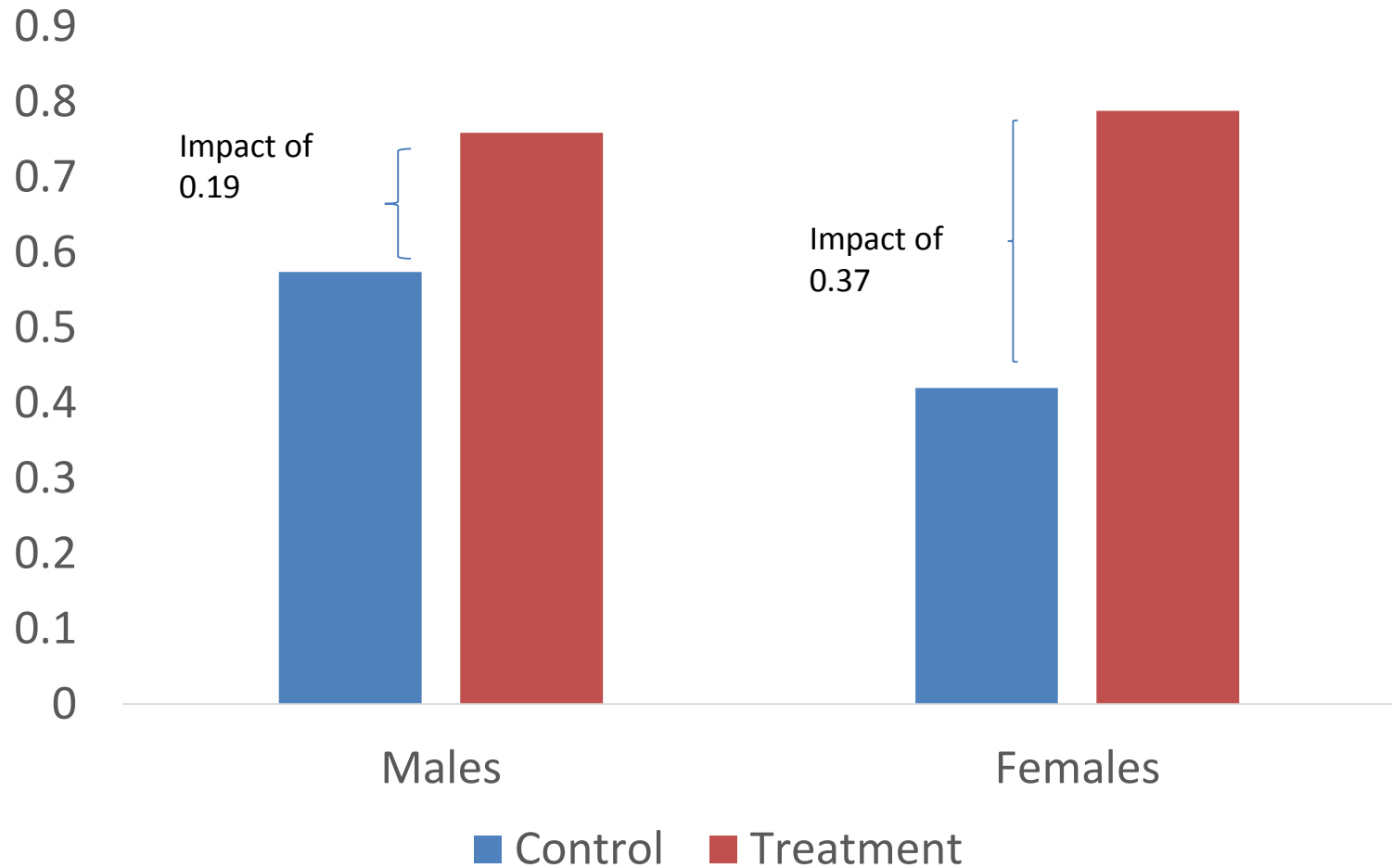
Other impacts

- Firms are innovating more
- Firms are earning approximately 25 percent higher profits
- Firms no more likely to have a mentor, have business networks, loans, or equity partners
- Firm owners working more hours per week in business, have more inventory, and more capital stock
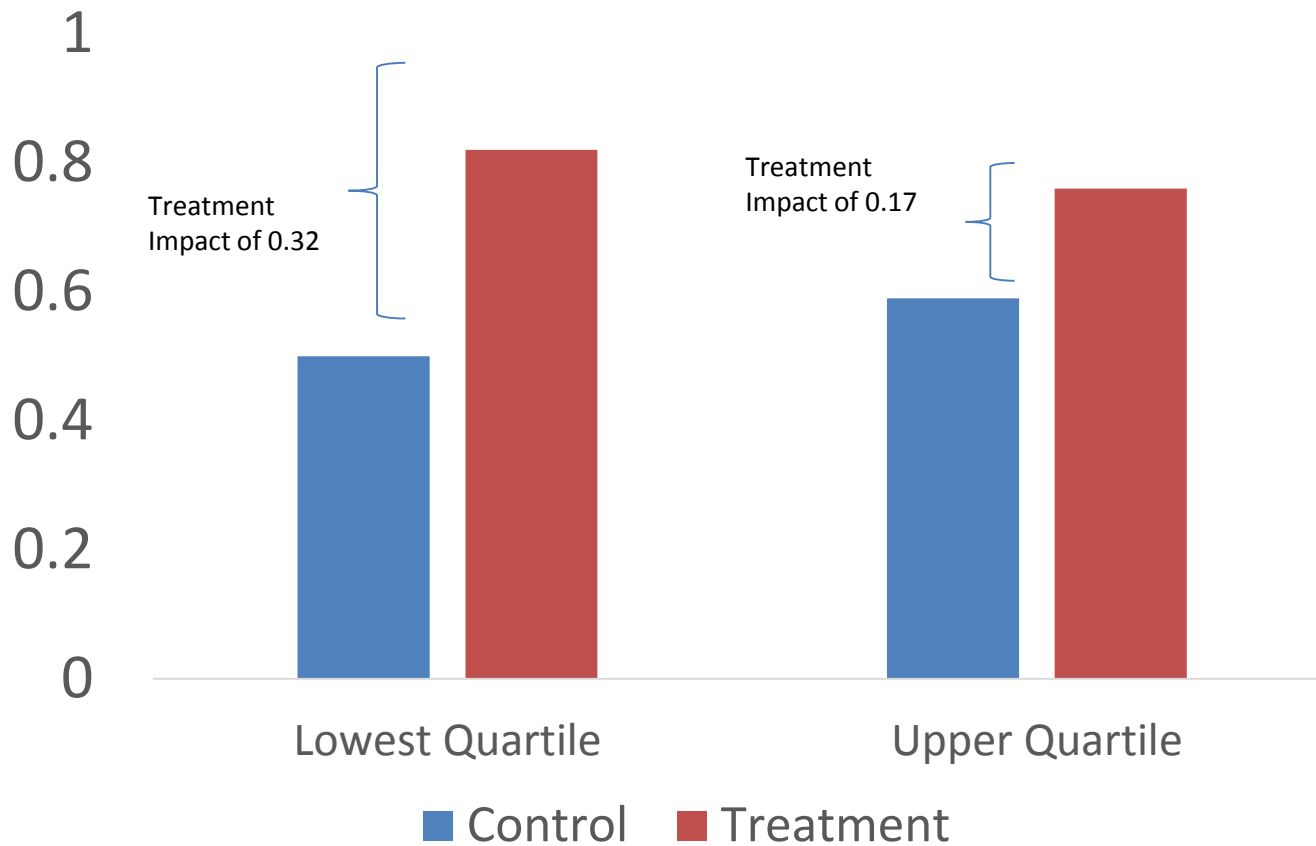
Targeting:
Who benefits most from this assistance?

Treatment impacts

Likelihood of Opening a Firm in the First Year

Likelihood of Start-up by Business Plan Score

Treatment Impact of 0.32

Treatment Impact of 0.17

Lowest Quartile   Upper Quartile

■ Control ■ Treatment

Closing Gender Gaps for New firms?

New Firms and Gender

	Operate a Firm			Total Employment		
	Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Treatment	0.185***	0.340***	0.353***	1.414	6.099***	4.951***
	(0.032)	(0.025)	(0.026)	(0.860)	(0.471)	(0.509)
Treatment*Female	0.183**	0.102	0.123*	0.109	-0.608	1.649
	(0.078)	(0.062)	(0.066)	(0.996)	(0.903)	(1.337)
Sample Size	1021	1181	1085	987	1159	1044
Control Mean Females	0.420	0.481	0.422	1.674	2.165	2.883
Control Mean Males	0.574	0.586	0.562	3.964	3.539	3.937

Existing firms: no gender gap to close

Existing Firm Heterogeneity by Gender

|	Survival			Total Employment		
	Round 1	Round 2	Round 3	Round 1	Round 2	Round 3
Treatment	0.092***	0.138***	0.187***	1.527*	2.163	4.378***
	(0.032)	(0.029)	(0.035)	(0.868)	(1.617)	(0.685)
Treatment*Female	-0.064	-0.051	0.065	-0.471	2.034	0.331
	(0.045)	(0.059)	(0.082)	(2.224)	(2.597)	(2.318)
Sample Size	432	505	477	422	500	461
Control Mean Females	0.967	0.886	0.722	7.862	7.364	6.091
Control Mean Males	0.854	0.834	0.766	6.669	8.309	5.475
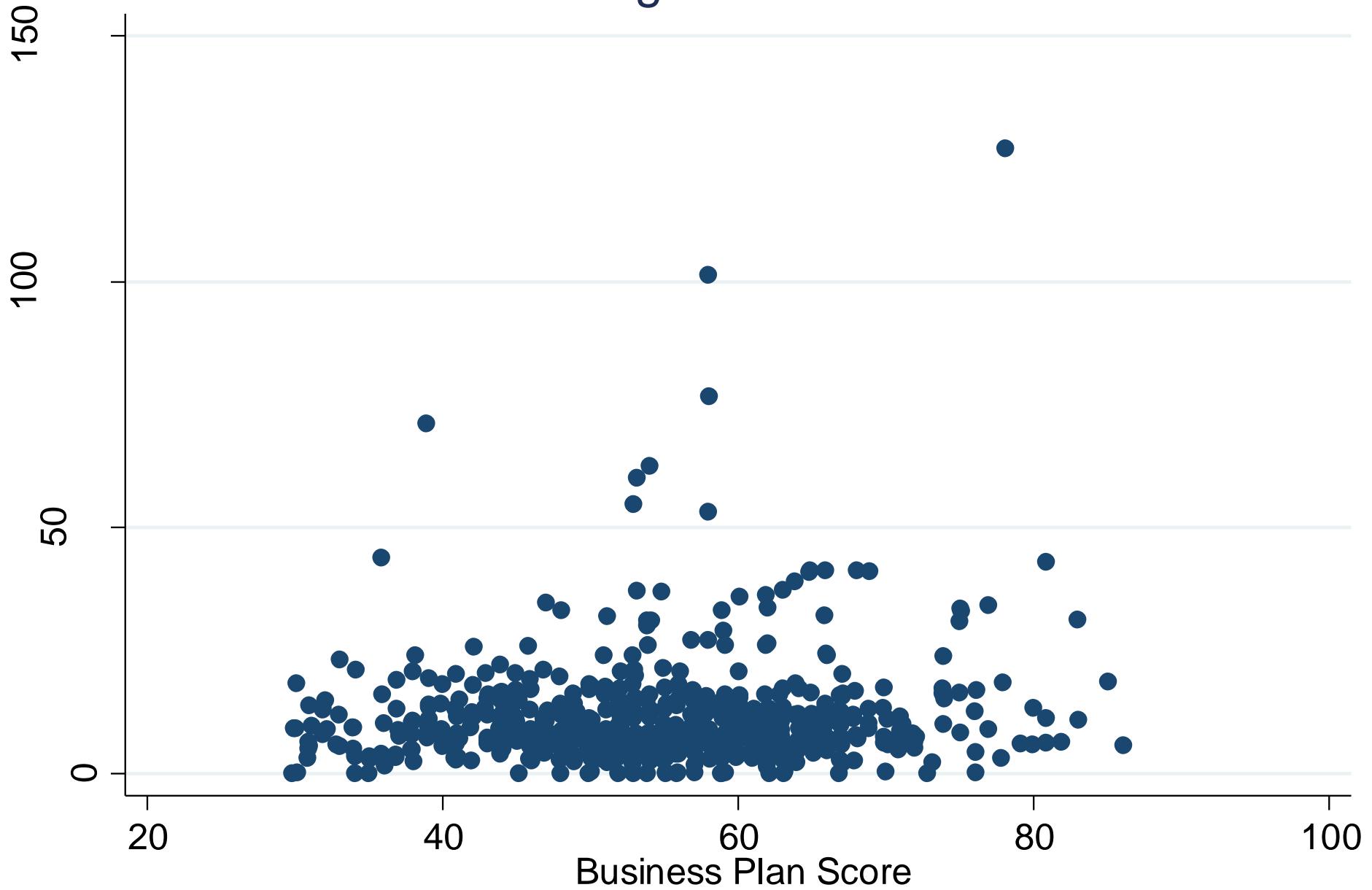
Existing Firm Winners

Business Plan Score
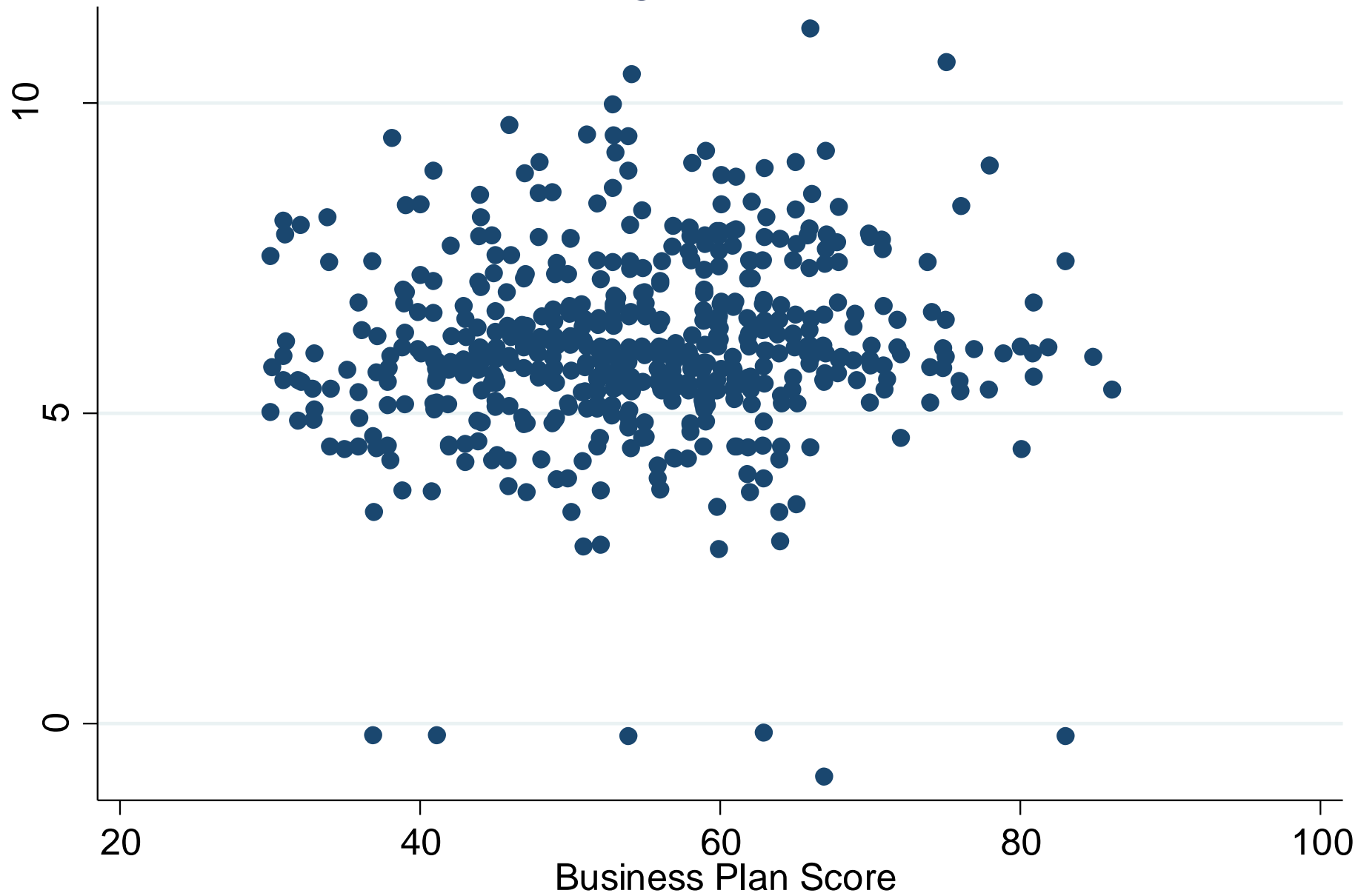
New Firm Winners
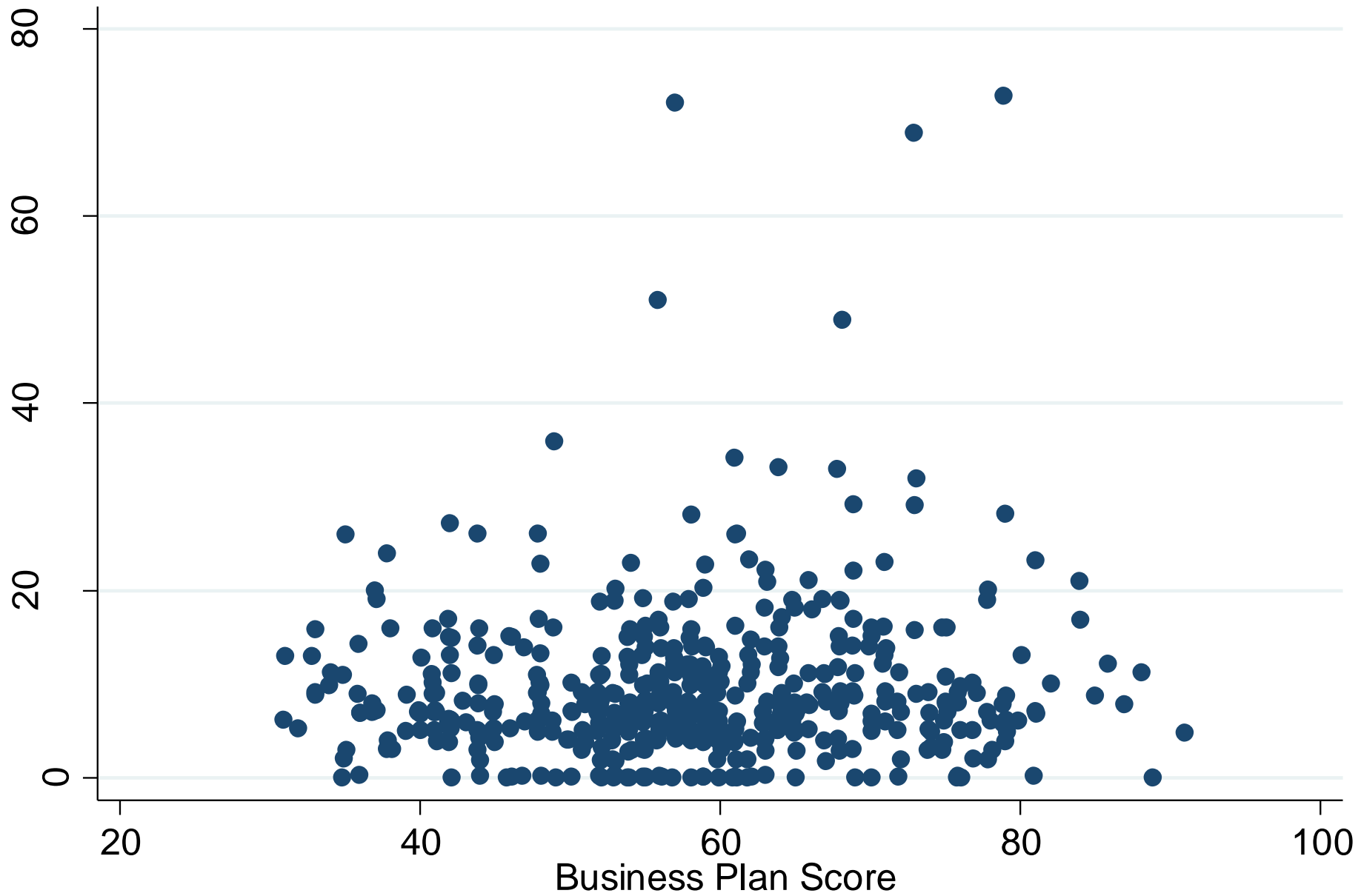
Conclusions

- To date program has created 7000 jobs (first round of program)
- New firms:
  - 37 p.p. increase in start-up; 23 p.p. increase in likelihood of having 10+ workers; profits 18-75% higher
- Existing firms:
  - 20 p.p. increase in survival rate, 21 p.p. increase in likelihood of 10+ workers, 15-55% increase in profits
- First experimental evidence on creation of such firms with 10+ workers
- Examination of the intermediate channels suggests that the main effect of the program is enabling firms to buy more capital and hire more workers, with little impact on business practices, mentoring or networking.

Conclusions

- Evidence also points to the difficulty of identifying high-growth entrepreneurs, and especially of targeting programs to help them.

  – Although business plan scores, gender, and ability do have some predictive power for business growth over the next three years, these variables explain only a fraction of subsequent growth.

- Moreover, it appears that, if anything, firms with lower predicted growth if they don't win the competition are the firms that may benefit most from the program in the short-run.