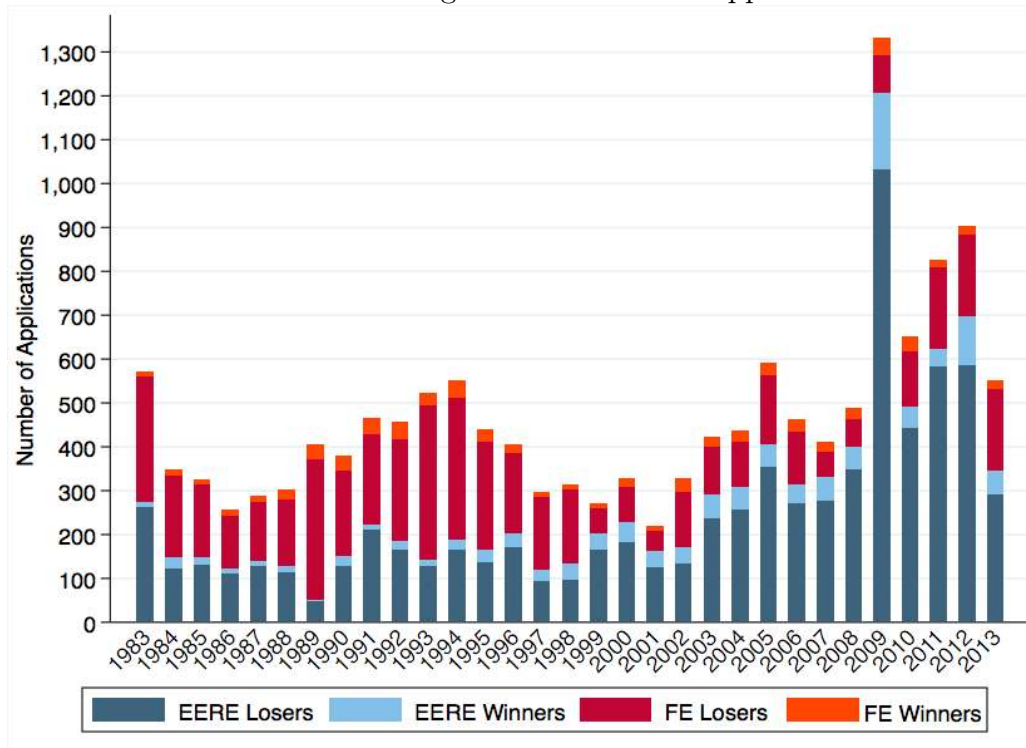


Financing Innovation: Evidence from R&D Grants

Sabrina T. Howell

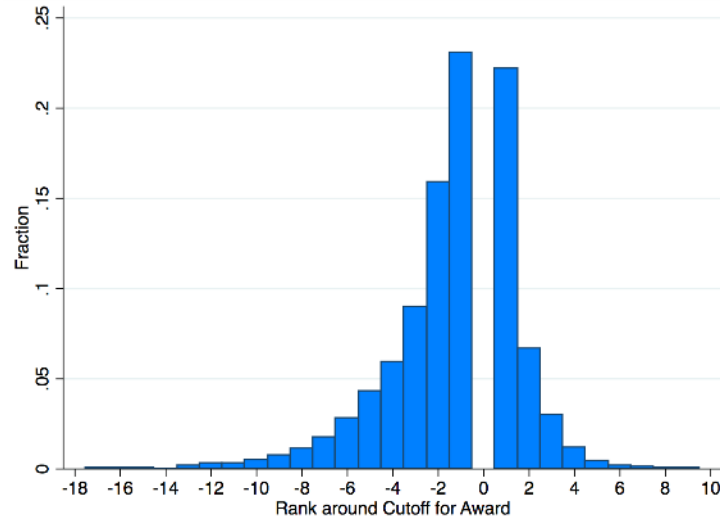
Online Appendix

Figure 1: Number of Applicants



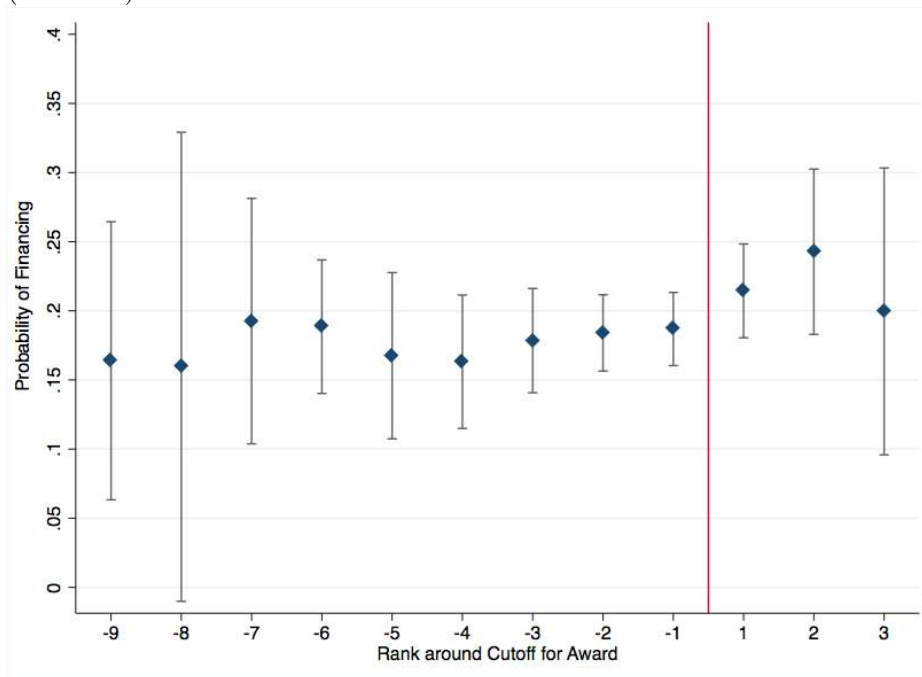
Note: This figure shows the number of losing and winning Phase 1 grant applicants over time by office (Energy Efficiency & Renewable Energy and Fossil Energy). Note that firms may appear more than once.

Figure 2: Density of Applicants by Normalized Rank



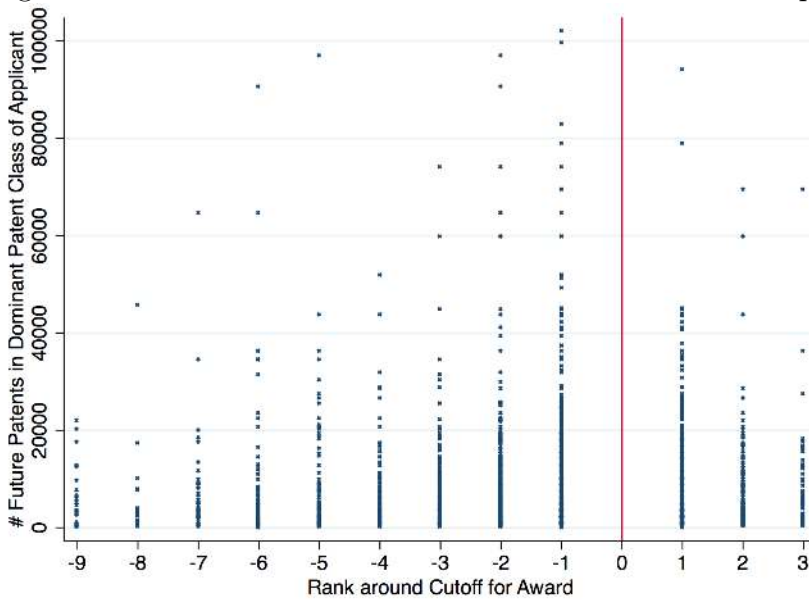
Note: This figure shows applicant density by normalized rank.

Figure 3: Baseline Covariate Predicted Probability of VC Financing after Grant by Rank (Phase 1)



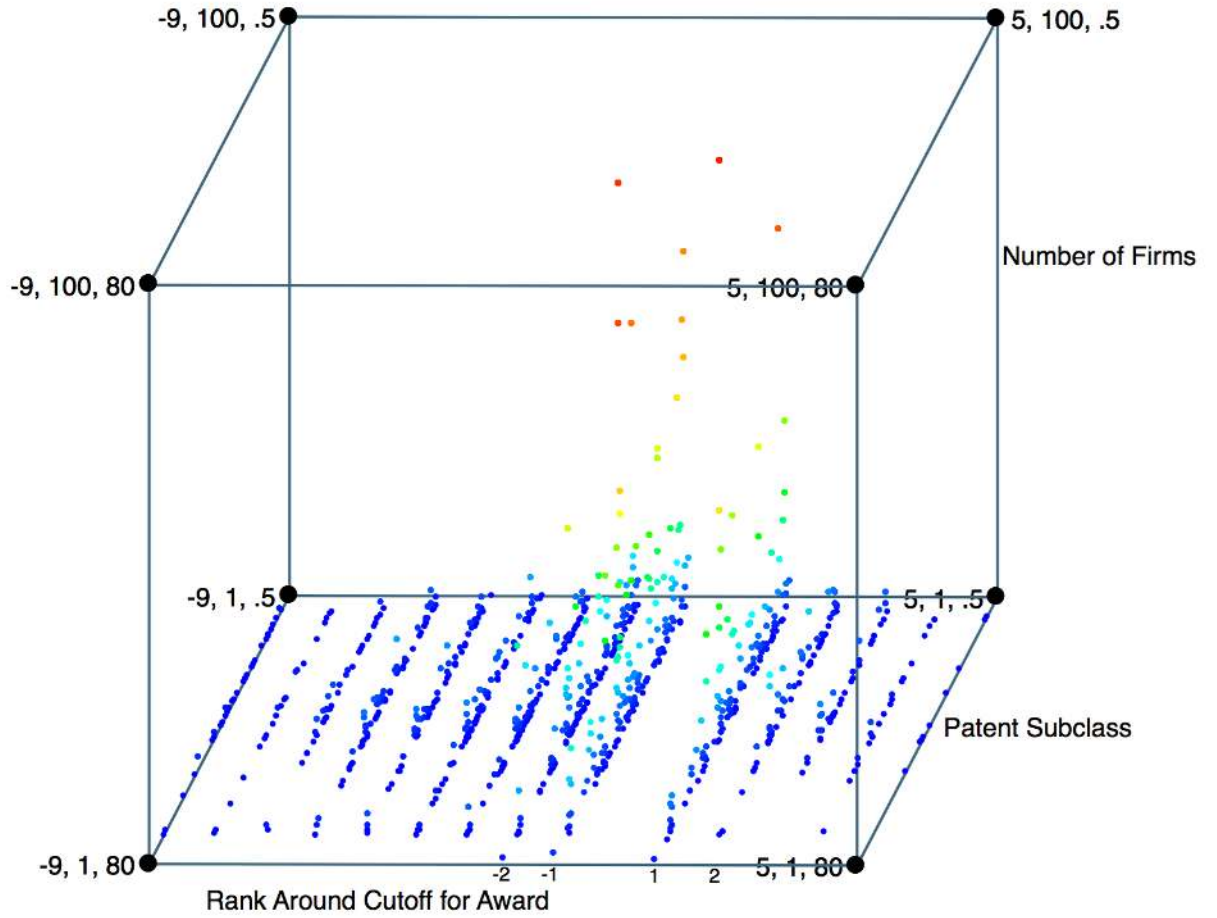
Note: Ranks higher than 0 awarded a grant. Data for phase 1 awards (1st time winners) after 1994. 95% confidence intervals shown. Covariates include VC^{Prev} , MSA , Age , $Minority_owned$, $Woman_owned$, $Exit^{Prev}$, $\#SBIR^{Prev}$, $Patents^{Prev}$, $Citations^{Prev}$.

Figure 4: Future Patents in Dominant Patent Subclass of Applicants around Phase 1 Cutoff



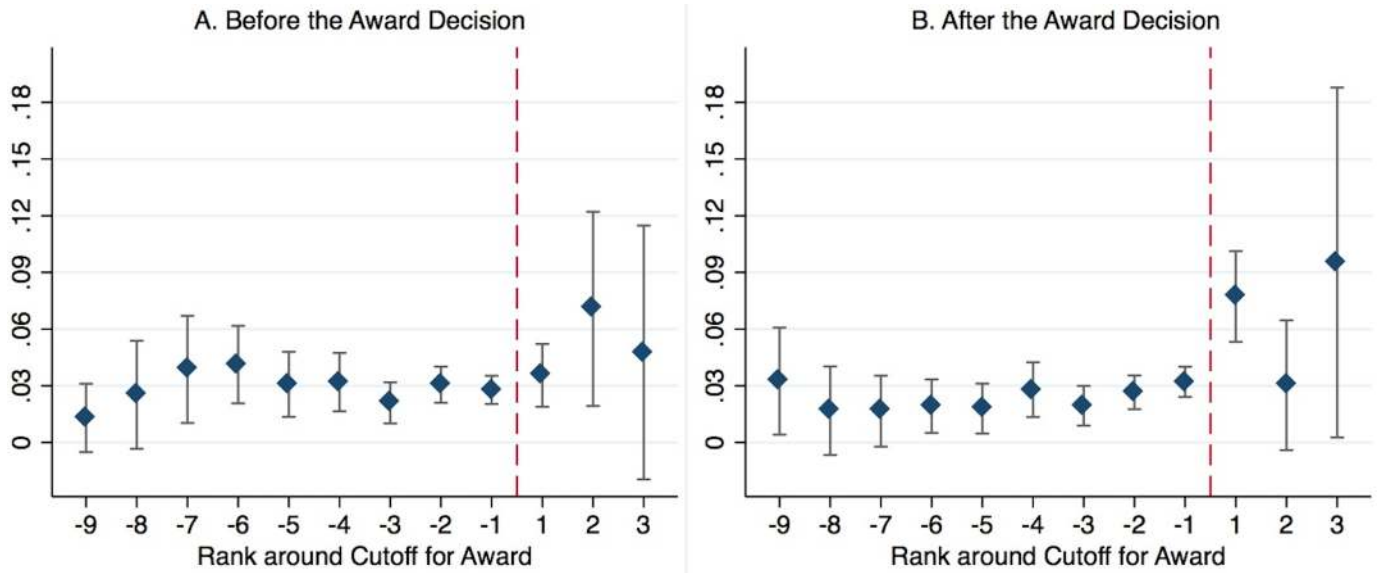
Note: This figure shows the distribution of firms by the number of future patents in the firm's dominant patent subclass, grouped by rank around the cutoff. Each dot is the dominant subclass for an applicant at a particular rank.

Figure 5: Dominant Patent Subclass of Applicants around Phase 1 Cutoff



Note: This figure shows the distribution of patent subclasses around the cutoff. Each dot's x-coordinate is its rank around the cutoff, the z-coordinate is the firm's dominant patent subclass (the subclass in which it most frequently patents), and the y-coordinate is the number of firms that occupy that x-z bin (the number of firms in a certain rank with a certain dominant subclass). The graph shows that the same subclasses in similar concentrations are present on both sides of the cutoff.

Figure 6: Probability of Exit (IPO or Acquisition) Before and After Grant Decision by Rank



Note: This figure shows the fraction of applicants who ever experienced an exit (IPO or acquisition) ever prior to (5A) and ever after (5B) the Phase 1 grant award decision. The applicants are binned by their DOE assigned rank, which I have centered so that Rank > 0 indicates a firm won an award. Capped lines indicate 95% confidence intervals. N=4,816.

Figure 7: Probability of VC After Phase 1 Grant by Rank and Number of Awards in Competition

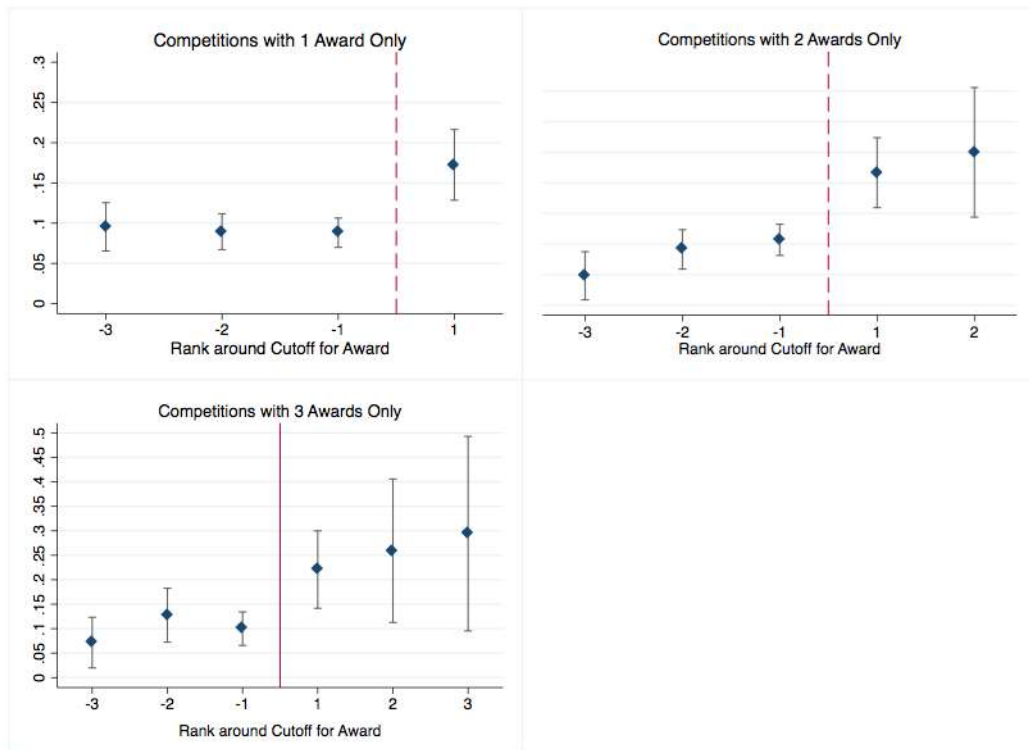


Table 1: Summary Statistics for Private Financing Matches (Number of Deals or Firms)

| | |
|---|-------|
| Applicant firms matched to ≥ 1 PF deal | 838 |
| Applicant firms matched to ≥ 1 VC deal | 683 |
| PF deals matched to applicant firms (Some companies have multiple funding events) | 3,751 |
| VC deals | 2,638 |
| Seed/Angel | 178 |
| Series A | 1,313 |
| Series B | 561 |
| Series C+ | 587 |
| Acquisitions | 221 |
| IPOs | 27 |
| Debt deals | 196 |
| PE Buyout deals | 59 |
| Project Finance | 61 |
| PF deals with data on deal size (amount) | 2,141 |
| VC deals with data on deal size (amount) | 1,728 |
| Unique applicants with ≥ 1 PF deal & 0 grant wins | 565 |
| Unique applicants with ≥ 1 VC deal & 0 grant wins | 451 |
| Unique applicants with ≥ 1 PF deal & ≥ 1 grant wins | 273 |
| Unique applicants with ≥ 1 VC deal & ≥ 1 grant wins | 232 |
| Note: PF= all private finance; VC=venture capital (subset of PF). Sources: ThompsonOne VentureSource, Preqin, Cleantech Group's i3 Platform, CrunchBase, and CapitalIQ | |

Table 2: Rank Production Function

| <i>Dependent Variable: R_i</i> | | |
|---|-------------------------|--------------------------|
| | I. All Covs | II. Select Covs |
| VC_i^{Prev} | 0.0498 (0.0321) | 0.0717** (0.0304) |
| $\#SBIR_i^{\text{Prev}}$ | 0.00212** (0.000950) | 0.00256*** (0.000827) |
| MSA_i | 0.165 (0.137) | 0.121 (0.0971) |
| Age_i | -0.00141 (0.00345) | |
| $Exit_i^{\text{Prev}}$ | 0.124 (0.211) | |
| $Patent_i^{\text{Prev}}$ | 0.0368 (0.117) | 0.0895 (0.0797) |
| $Citation_i^{\text{Prev}}$ | 0.0730 (0.102) | 0.0438 (0.0715) |
| Competition f.e. | Y | Y |
| N | 3871 | 5848 |
| R^2 | 0.606 | 0.629 |

Note: This table reports regression estimates of the effect of the baseline covariates on the Phase 1 rank. Column I includes all observables while column II uses only variables available for the full dataset. Standard errors are robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995

Table 3: T-tests for difference of means immediately around cutoff

| <i>Covariate</i> | N | \bar{X}_1 | \bar{X}_{-1} | t-statistic | H_1 p-value | H_2 p-value |
|----------------------------|------|-------------|----------------|-------------|---------------|---------------|
| MSA_i | 1872 | 0.333 | 0.304 | -1.68 | 0.243 | 0.122 |
| Age_i | 1272 | 9.42 | 10.4 | -1.26 | 0.208 | 0.896 |
| $Minority_i$ | 919 | 0.0749 | 0.103 | -1.50 | 0.134 | 0.933 |
| $Woman_i$ | 919 | 0.070 | 0.087 | -0.962 | 0.337 | 0.832 |
| $Exit_i^{\text{Prev}}$ | 1872 | 0.0411 | 0.0289 | 1.220 | 0.223 | 0.112 |
| $\#SBIR_i^{\text{Prev}}$ | 1872 | 15.2 | 14.2 | 0.439 | 0.661 | 0.330 |
| PF_i^{Prev} | 1872 | 0.111 | 0.103 | 0.48 | 0.630 | 0.315 |
| VC_i^{Prev} | 1872 | 0.0905 | 0.0837 | 0.46 | 0.648 | 0.324 |
| $Patent_i^{\text{Prev}}$ | 1872 | 0.475 | 0.469 | 0.153 | 0.879 | 0.439 |
| $Citation_i^{\text{Prev}}$ | 1872 | 0.483 | 0.412 | 1.42 | 0.156 | 0.078 |

Note: This table tests for continuity of all baseline covariates immediately around the cutoff for the Phase 1 award, comparing centered ranks $R_i = 1$ and $R_i = -1$. First-time winners only; test performed without assuming equal variance. Year ≥ 1995

Table 4: Patent Class Growth

| <i>Panel 1: T-tests of Future Patents in Firm's Dominant Patent Class Around Award Cutoff</i> | | | | | |
|---|--------------|-----|--------------|-------|---------|
| | Grantees | | Losers | | p-value |
| | Mean (s.e.) | N | Mean (s.e.) | N | |
| Phase 1; Bandwidth=1 | 10,118 (741) | 231 | 11,462 (521) | 514 | 0.15 |
| Phase 1; Bandwidth=all | 9,926 (677) | 297 | 9,616 (303) | 1,498 | 0.68 |
| Phase 2 | 8,019 (566) | 276 | 8,790 (707) | 266 | 0.39 |

| <i>Panel 2: Regressions of Award Status on Future Patents in Applicant Dominant Patent Subclass</i> | | | | | |
|---|----------------|------------------|-------------------|-----------------|----------------|
| <i>Dependent variable: Award</i> | | | | | |
| <i>Phase:</i> | Phase 1 | | | | Phase 2 |
| <i>Bandwidth:</i> | All | | | | All |
| | I. | II. | III. | IV. | V. |
| Future Patents in Class/10,000 | -.014 (.01) | -.012 (.0074) | -.0063 (.0066) | -.024 (.015) | -.018 (.02) |
| Normalized rank | | .12*** (.026) | .09*** (.015) | | |
| N | 2861 | 2861 | 2861 | 1778 | 542 |
| R^2 | 0.273 | 0.584 | 0.363 | 0.359 | 0.001 |

Note: This table uses the classes in which firms patent and all future patents in that class (from whole USPTO database) to test whether awardees disproportionately patent in technological growth areas. I assign each firm with ≥ 1 patent its modal class. Panel 1: t-tests for differences around the cutoff in average future patents for firm's dominant class. Panel 2: OLS regressions in which award is regressed on the future patents in dominant class variable, to assess whether future patents can predict awards. *** $p < .01$. Year ≥ 1995 .

Table 5: Impact of Grant Interacted with Firm's Previous SBIR Awards

| <i>Dependent variable:</i> | I. | II. | III. | IV. | V. |
|-------------------------------|---------------|---------------------------|-------------|-------------------|-----------------|
| | VC_i^{post} | $\ln(1 + Cites_i^{post})$ | $Revenue_i$ | $In Bus_i^{Post}$ | $Exit_i^{post}$ |
| Award · Norm. $SBIR_i^{prev}$ | -.041* | -.19* | -.3 | -.044* | -.03** |
| | (.023) | (.097) | (1) | (.023) | (.013) |
| Award | .12*** | .54*** | .27 | .18*** | .035*** |
| | (.019) | (.075) | (.2) | (.028) | (.011) |
| Norm. $SBIR_i^{prev}$ | .063*** | .79*** | 1.6*** | .089*** | .032*** |
| | (.018) | (.085) | (.26) | (.02) | (.011) |
| Competition f.e. | Y | Y | Y | Y | Y |
| N | 3368 | 3915 | 1780 | 2357 | 3368 |
| R^2 | 0.285 | 0.433 | 0.12 | 0.362 | 0.237 |

Note: This table is an RD estimating via OLS the impact of the Phase 1 grant ($1 | R_i > 0$) interacted with the number of previous non-DOE SBIR awards (from other government agencies, e.g. DOD, NSF), normalized by demeaning and dividing by 100. All models use bandwidth 2. The full ZINB model is shown for revenue (column III). Standard errors robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995

Table 6: Impact of Grant on Subsequent Private Finance with Linear and Quadratic Control Functions

| Dependent Variable: PF_i^{Post} | | | | | | | |
|-----------------------------------|---------|---------|----------|---------|----------|---------|-----------|
| Bandwidth: | 1 | 2 | 3 | All | | | |
| | I. | II. | III. | IV. | V. | VI. | VII. |
| Award | 0.12*** | 0.12*** | 0.23*** | 0.13*** | 0.29*** | 0.12*** | 0.11*** |
| | (0.037) | (0.028) | (0.0623) | (0.027) | (0.051) | (0.023) | (0.037) |
| Norm. rank | | | -0.045** | | -0.12*** | | 0.0051 |
| | | | (0.022) | | (0.029) | | (0.0081) |
| Norm. rank ² | | | | | 0.034*** | | 0.000072 |
| | | | | | (0.0085) | | (0.00059) |
| Controls [†] | Y | Y | Y | Y | Y | Y | Y |
| Competition f.e. | Y | Y | Y | Y | Y | Y | Y |
| N | 1872 | 2836 | 2836 | 3368 | 3368 | 5021 | 5021 |
| R^2 | 0.47 | 0.39 | 0.4 | 0.35 | 0.36 | 0.28 | 0.29 |

Note: This table reports regression estimates of the effect of the Phase 1 grant ($1 | R_i > 0$) on all private finance. The specifications are variants of the model in Equation 1. The dependent variable PF_i^{Post} is 1 if the company ever received PF after the award decision, and 0 if not. [†]Controls: previous VC, previous all-gov't SBIR awards. Standard errors robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995

Table 7: Estimating Spillovers with the Number of Awards in a Competition

| Dependent Variable: VC_i^{post} | | | | | | | |
|--|---|-----------------|--|----------------|-----------------|-------------------|-------------------|
| | Comparing effect on VC, among losers, of competitions with 1 award vs. > 1 award | | Comparing effect on VC, among losers, of competitions with ≤ 2 award vs. > 2 awards | | Same MSA | Different MSAs | V & VI |
| | I. | II. | III. | IV. | V. | VI. | VII. |
| (1 # Awards > 1) | .0017 (.01) | .0081 (.011) | | | | | |
| (1 # Awards > 2) | | | .014 (.011) | .019 (.011) | | | |
| Award | | | | | .11** (.052) | .078*** (.025) | .078*** (.025) |
| Award · (1 Same MSA _i ^{Prev}) | | | | | | | .029 (.056) |
| 1 Same MSA _i ^{Prev} | | | | | | | -.11*** (.013) |
| Normalized rank, Normalized rank ² | N | Y | N | Y | Y | Y | Y |
| Controls [†] | Y | Y | Y | Y | Y | Y | Y |
| Year f.e. | Y | Y | Y | Y | N | N | N |
| Competition f.e. | N | N | N | N | Y | Y | Y |
| N | 4374 | 4374 | 4374 | 4374 | 1214 | 3807 | 5021 |
| R ² | .12 | .12 | .12 | .12 | 0.13 | 0.11 | 0.11 |

Note: This table reports regression estimates of the effect of having multiple awards in the competition for losers, using a bandwidth of all the data. The sample only includes losing firms. I control for rank in columns II and IV, and do not in columns I and III. I expect that negative spillovers will cause the indicators for more winners to have positive coefficients. [†]Controls are normalized rank, normalized rank squared, previous VC investment and previous SBIR awards from all gov't agencies, which are the only covariates with predictive power over the outcome and rank, respectively. V & VI include firms from the same and different cities (MSAs), respectively, within a topic. In the MSA analysis, I use a bandwidth of all and control for rank and its interaction with the same MSA indicator. Standard errors are robust and clustered at the topic-year level. *** $p < .01$. Year ≥ 1995

Table 8: Correlation of Characteristics Used in Heterogeneity Analysis

| | $\mathbf{1} \mid Age_i \leq 2$ | $\mathbf{1} \mid No\ Cites_i^{Prev}$ | $\mathbf{1} \mid Emerging\ Sector_i$ | $\mathbf{1} \mid Hardware_i$ |
|--------------------------------------|--------------------------------|--------------------------------------|--------------------------------------|------------------------------|
| $\mathbf{1} \mid Age_i \leq 2$ | - | | | |
| $\mathbf{1} \mid No\ Cites_i^{Prev}$ | 0.19 | - | | |
| $\mathbf{1} \mid Emerging\ Sector_i$ | 0.01 | 0.07 | - | |
| $\mathbf{1} \mid Hardware_i$ | 0.05 | -0.004 | -0.001 | - |

Note: This table shows correlation coefficients between variables used in the heterogeneity analysis.

Table 9: Impact of Phase 1 Grant Amount on Subsequent Venture Capital (VC) Investment

| Dependent Variable: VC_i^{Post} | | | | |
|---|-------------------------------------|--------------------------------------|-------------------|--|
| | I. 2008-09 (Grant= \$100,000) | II. 2010-11 (Grant= \$150,000) | III. I vs. II | IV. Interaction w/ grant amount (whole sample) |
| Award | .086*** (.033) | .18*** (.045) | .086*** (.028) | -.15 (.13) |
| Award· $\mathbf{1} \mid Year \in [2010, 2011]$ | | | .093** (.045) | |
| $\mathbf{1} \mid Year \in [2010, 2011]$ | | | -.038 (.059) | |
| Norm. Rank | .0032 (.0029) | .0051 (.0036) | .0032 (.0028) | .011 (.015) |
| Norm. Rank· $\mathbf{1} \mid Year \in [2010, 2011]$ | | | .0019 (.0046) | |
| Award·Grant Amt [†] | | | | .2** (.099) |
| Grant Amt [†] | | | | -.058 (.036) |
| Norm. Rank·Grant Amt | | | | -.0066 (.011) |
| Sector f.e. | Y | Y | Y | N |
| Year-sector f.e. | N | N | N | Y |
| N | 991 | 1352 | 2343 | 5021 |
| R^2 | 0.201 | 0.176 | 0.187 | 0.033 |

Note: This table reports regression estimates of the effect of the Phase 1 grant ($\mathbf{1} \mid R_i > 0$) on VC. Specifications are variants of Equation 1, using BW=all. In columns I-III I also control for previous VC, and in column III also interact it with the dummy for 2010-11. In column III, sector f.e. are interacted w/ $\mathbf{1} \mid Year \in [2010, 2011]$, and in column IV year-sector f.e. are interacted with the grant amount. Note that here the Award coefficient is the effect of treatment when the grant amount is zero, which obviously does not occur in the data. In columns I-III, standard errors robust; in subsequent columns clustered by topic-year.[†]Grant amount is divided by 100,000 to make the coefficients of reasonable size. *** $p < .01$.

Table 10: Grant Use Survey Response Sample Selection Tests

| <i>Panel 1: Surveyed Firms</i> | | | | | | |
|--------------------------------|----------------|-----|----------------|----|---------------------------|---------------------------|
| | Non-responders | | Responders | | 2-tailed t-test | 1-tailed t-test |
| | Mean (std dev) | N | Mean (std dev) | N | p-value for diff of means | p-value for diff of means |
| First year won Phase 1 | 2008.0 (3.7) | 253 | 2008.9 (3.4) | 94 | .036** | .018** |
| Last year won Phase 1 | 2009.8 (2.27) | 253 | 2010.3 (2.25) | 94 | .041** | .020** |
| Number Phase 1 awards | 1.9 (2.5) | 253 | 1.97 (3.0) | 94 | .90 | .45 |
| Number Phase 2 awards | .56 (1.0) | 253 | .61 (1.3) | 94 | .78 | .39 |
| $LnCites_i^{post}$ | .41 (1.1) | 253 | .25 (.79) | 94 | .13 | .067 |
| $Cites_i^{post}$ | 6.6 (35) | 253 | 2.4 (16) | 94 | .12 | .061* |
| VC_i^{post} | .27 (.44) | 253 | .32 (.47) | 94 | .27 | .14 |

| <i>Panel 2: All Grantees</i> | | | | | | |
|------------------------------|----------------|-----|----------------|-----|--|--|
| | Surveyed | | Non-surveyed | | Two-tailed | One-tailed |
| | Mean (std dev) | N | Mean (std dev) | N | t-test p-value for difference of means | t-test p-value for difference of means |
| First year won Phase 1 | 2008. 9 (3.6) | 347 | 2005.03 (5.6) | 184 | .00*** | .00*** |
| Last year won Phase 1 | 2009.9 (2.3) | 347 | 2009.4 (2.5) | 184 | .019** | .001*** |
| Number Phase 1 awards | 3.07 (3.4) | 347 | 1.9 (2.7) | 184 | .00*** | .00*** |
| Number Phase 2 awards | .58 (1.1) | 347 | .79 (1.3) | 184 | .0049** | .025** |
| $LnCites_i^{post}$ | .36 (1.0) | 347 | 1.07 (1.7) | 184 | .00*** | .00*** |
| $Cites_i^{post}$ | 5.5 (31) | 347 | 25 (84) | 184 | .0033*** | .0017*** |
| VC_i^{post} | .29 (.45) | 347 | .20 (.40) | 184 | .019*** | .010*** |

Note: This table tests whether the responders to the grant use survey were systematically different from the non-responders. All 347 firms that received a Phase 1 grant in 2005 or later and are still in business ($In Bus_i^{post}=1$) were contacted. Responses were obtained for 94 firms. I report the smaller one-tailed p-value.

Table 11: Impact of Grant on Subsequent VC by Cutoff Point (by Number of Awards in Competition)

| <i>Dependent Variable: VC_i^{Post}</i> | | | | | |
|--|-------|---------|---------|----------|----------|
| <i>Bandwidth:</i> | 1 | | All | | |
| <i># Awards:</i> | I. 1 | II. > 1 | III. 2 | IV. 3 | V. > 3 |
| $\mathbf{1} \mid R_i > 0$ | .11** | .088** | .14** | .18** | .13 |
| | (.05) | (.041) | (.054) | (.089) | (.086) |
| Normalized rank | | | -.012 | -.034 | .0044 |
| | | | (.014) | (.027) | (.017) |
| Normalized rank ² | | | .0018 | .0061*** | -.00033 |
| | | | (.0012) | (.0021) | (.00072) |
| Controls [†] | Y | Y | Y | Y | Y |
| Comp. f.e. | Y | Y | Y | Y | Y |
| N | 860 | 1012 | 1386 | 720 | 680 |
| R^2 | 0.52 | 0.44 | 0.30 | 0.30 | 0.23 |

Note: This table reports regression estimates of the effect of the Phase 1 grant ($\mathbf{1} \mid R_i > 0$) on VC, where each column includes only competitions with the designated number of awards. The specifications are variants of the model in Equation 1. [†] Controls are previous VC investment and previous all-gov't SBIR awards. Standard errors are robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995

Table 12: Impact on VC with Absolute Rank (Non-Centered) Dummies

| <i>Dependent Variable: VC_i^{Post}</i> | | | |
|--|-----------------------|-----------------------------------|--|
| | I. Rank Dummies | II. Award Dummy & Rank Dummies | III. Award Dummy, Controls & Rank Dummies |
| $1 \mid R_i > 0$ | | 0.143*** (0.0402) | 0.139*** (0.0406) |
| VC_i^{Prev} | | | 0.323*** (0.0295) |
| $\#SBI R_i^{\text{Prev}}$ | | | 0.000939*** (0.000204) |
| $R_i = 1$ | 0.0825*** (0.0274) | -0.0560 (0.0466) | -0.0834* (0.0472) |
| $R_i = 2$ | 0.0237 (0.0188) | 0.0100 (0.0176) | -0.0131 (0.0178) |
| $R_i = 3$ | -0.0154 (0.0239) | -0.0123 (0.0226) | -0.0289 (0.0217) |
| $R_i = 4$ | -0.0406 (0.0291) | -0.0243 (0.0283) | -0.0287 (0.0264) |
| $R_i = 5$ | -0.0738** (0.0354) | -0.0505 (0.0344) | -0.0568* (0.0300) |
| $R_i = 6$ | -0.0885** (0.0399) | -0.0595 (0.0375) | -0.0541* (0.0313) |
| $R_i = 7$ | -0.117** (0.0472) | -0.0852* (0.0450) | -0.0769* (0.0400) |
| $R_i = 8$ | -0.140** (0.0568) | -0.100* (0.0560) | -0.0854 (0.0532) |
| $R_i = 9$ | -0.193*** (0.0662) | -0.145** (0.0650) | -0.150*** (0.0555) |
| $R_i = 10$ | -0.139 (0.101) | -0.0949 (0.0960) | -0.0679 (0.0841) |
| $R_i = 11$ | -0.137 (0.0976) | -0.0850 (0.0928) | -0.0542 (0.0782) |
| $R_i = 12$ | -0.179*** (0.0603) | -0.145** (0.0565) | -0.0791 (0.0480) |
| $R_i = 13$ | -0.0907 (0.244) | -0.0452 (0.234) | 0.00922 (0.229) |
| $R_i = 14$ | 0.300 (0.485) | 0.345 (0.473) | 0.346 (0.485) |
| N | 5671 | 5671 | 5671 |
| R^2 | 0.176 | 0.181 | 0.261 |

Note: This table reports regression estimates using absolute rank dummies rather than centered/percentile continuous rank variables. Column I projects VC finance on only the rank dummies, and subsequent columns include Phase 1 treatment ($1 \mid R_i > 0$) Standard errors are robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995

Table 13: Impact of Grant on VC with Logit Model

| <i>Dependent Variable: VC_i^{post}</i> | | | | | | | | |
|---|----------------------|-----------------------|----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| <i>Bandwidth:</i> | 1 | | 2 | | 3 | | All | |
| | I. | II. | III. | IV. | V. | VI. | VII. | VIII. |
| $\mathbf{1} \mid R_i > 0$ | 1.35*** (0.35) | 1.11*** (0.245) | 1.18*** (0.25) | 1.04*** (0.19) | 1.25*** (0.23) | 1.12*** (0.17) | 1.16*** (0.18) | 1.04*** (0.16) |
| VC_i^{Prev} | 2.633*** (0.4) | 2.3*** (0.3) | 2.76*** (0.29) | 2.41*** (0.21) | 2.54*** (0.26) | 2.25*** (0.19) | 2.44*** (0.18) | 2.29*** (0.15) |
| $\#SBIR_i^{Prev}$ | 0.013*** (0.0027) | 0.0095*** (0.0025) | 0.009*** (0.0023) | 0.0075*** (0.0018) | 0.0096*** (0.0021) | 0.0076*** (0.0017) | 0.0075*** (0.0014) | 0.0073*** (0.0013) |
| Competition f.e. | Y | N | Y | N | Y | N | Y | N |
| Topic f.e. | N | Y | N | Y | N | Y | N | Y |
| N | 700 | 1194 | 1250 | 2054 | 1614 | 2528 | 3450 | 4672 |
| Pseudo- R^2 | 0.25 | 0.232 | 0.241 | 0.21 | 0.23 | 0.19 | 0.21 | 0.18 |
| <i>Note:</i> This table reports logit regression estimates of the effect of the Phase 1 grant ($\mathbf{1} \mid R_i > 0$) on VC. The specifications are variants of the model in Equation 1. Standard errors are robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995 | | | | | | | | |

Table 14: Impact of Grant on All Outcomes with Alternative Fixed Effects

| Panel 1 | | | | | | | | | |
|---|-------------------|-------------------|------------------|-------------------|-------------------|-------------------|---------------|-----------------|----------------------|
| Dep. Variable: | I. | II. | III. | IV. | V. | VI. | VII. | VIII. | Revenue _i |
| Award | .099*** (.021) | .094*** (.021) | .1*** (.021) | .34*** (.09) | .34*** (.091) | .28*** (.1) | .97* (.50) | 1.02** (.49) | 1.2** (.47) |
| Sector f.e. | N | Y | Y | N | Y | Y | N | Y | Y |
| Year f.e. | Y | Y | N | Y | Y | N | Y | Y | N |
| N | 1872 | 1872 | 1872 | 1872 | 1872 | 1872 | 1108 | 1108 | 1108 |
| R ² | 0.036 | 0.062 | 0.043 | 0.165 | 0.183 | 0.027 | 0.028 | 0.049 | 0.023 |
| Panel 2 | | | | | | | | | |
| Dep. Variable: | I. | II. | III. | IV. | V. | VI. | | | |
| Award | .12*** (.033) | .12*** (.033) | .11*** (.032) | .044*** (.014) | .044*** (.014) | .044*** (.013) | | | |
| Sector f.e. | N | Y | Y | N | Y | Y | | | |
| Year f.e. | Y | Y | N | Y | Y | N | | | |
| N | 1212 | 1212 | 1212 | 1872 | 1872 | 1872 | | | |
| R ² | 0.067 | 0.078 | 0.025 | 0.027 | 0.038 | 0.016 | | | |
| Note: This table reports regression estimates of the effect of the Phase 1 grant (1 $R_i > 0$) on all outcomes using bandwidth 1. The specifications are variants of the model in Equation 1, with alternative fixed effects. Standard errors are robust and clustered at topic-year level. *** $p < .01$. Year ≥ 1995 | | | | | | | | | |

Table 15: Impact of Grant on All Outcomes with Alternative Standard Errors

| Panel 1 | | | | | | | | | | | |
|--|--------------------|-------------------|------------------|---------------------------|-------------------|-----------------|----------------|-----------------|----------------|---|--|
| Dependent Variable: | VC_i^{post} | | | $\ln(1 + Cites_i^{post})$ | | | $Revenue_i$ | | | | |
| Bandwidth: | 1 | All | 1 | 1 | All | 1 | 1 | All | 1 | 1 | |
| Std error clustering: | I. | II. | III. | IV. | V. | VI. | VII. | VIII. | IX. | | |
| Award | .1*** (.0034) | .061*** (.028) | .1*** (.034) | .33*** (.027) | .2* (.11) | .33*** (.15) | 1.7* (0.17) | 0.67* (0.38) | 1.7* (0.93) | | |
| Norm. rank, Norm. rank ² | N | Y | N | N | Y | N | N | Y | N | | |
| Competition f.e. | Y | Y | Y | Y | Y | Y | Y | Y | Y | | |
| N | 1872 | 5021 | 1872 | 1872 | 5021 | 1872 | 1108 | 3583 | 1108 | | |
| R ² | 0.42 | 0.19 | 0.42 | 0.46 | 0.350 | 0.46 | 0.402 | 0.15 | 0.40 | | |
| Panel 2 | | | | | | | | | | | |
| Dependent Variable: | $In\ Bus_i^{post}$ | | | $Exit_i^{post}$ | | | | | | | |
| Bandwidth: | 1 | All | 1 | 1 | All | 1 | 1 | All | 1 | 1 | |
| Std error clustering: | I. | II. | III. | IV. | V. | VI. | | | | | |
| Award | .15* (.02) | .14*** (.025) | .15*** (.058) | .046 (.016) | .046*** (.019) | .046* (.025) | | | | | |
| Norm. rank, Norm. rank ² | N | Y | N | N | Y | N | | | | | |
| Competition f.e. | Y | Y | Y | Y | Y | Y | | | | | |
| N | 1212 | 3880 | 1212 | 1872 | 5021 | 1872 | | | | | |
| R ² | 0.46 | 0.25 | 0.46 | 0.38 | 0.17 | 0.38 | | | | | |
| <i>Note:</i> This table reports regression estimates of the effect of the Phase 1 grant ($\mathbf{1} R_i > 0$) on all outcomes using bandwidth 1 or all. The specifications are variants of the model in Equation 1. Standard errors are robust and clustered as specified. *** $p < .01$. Year ≥ 1995 | | | | | | | | | | | |

Table 16: Variation in Covariates, Rank Control, and Dependent Variable

| Dependent Variable: | VC_i^{post} | | | | $\ln(1 + VC \text{ Amt}_i^{post})$ | $VC \text{ Deals}_i^{post}$ |
|------------------------------------|-----------------------|------------------|----------------------|-----------------|------------------------------------|-----------------------------|
| | I. | II. | III. | IV. | V. | VI. |
| Award | .11** (.045) | .083** (.042) | .089*** (.023) | .064* (.036) | 1.8** (.89) | .8*** (.29) |
| Age | -.0017 (.0022) | | | | | |
| $Hardware_i$ | -.0017 (.032) | | | | | |
| In Major MSA | -.0012 (.059) | | | | | |
| Prev. non-DOE SBIRs | -.0013*** (.00048) | | | | | |
| VC_i^{prev} | .44*** (.06) | | | | | |
| $Cites_i^{prev}$ | .00039 (.0004) | | | | | |
| MSA VC investment | .000027* (.000015) | | | | | |
| MSA median income | -.0029* (.0015) | | | | | |
| Minority-owned | | .012 (.068) | | | | |
| Woman-owned | | -.069 (.082) | | | | |
| $\ln(1 + VC \text{ Amt}_i^{prev})$ | | | -.0077*** (.0016) | | | |
| Norm. rank lose | | | | .021 (.016) | -.56 (.5) | -.051 (.14) |
| Norm. rank win | | | | .043 (.042) | .21 (.14) | .11** (.043) |
| Competition f.e. | Y | Y | Y | Y | Y | Y |
| N | 1147 | 1365 | 3174 | 3368 | 3368 | 3368 |
| R^2 | 0.604 | 0.45 | 0.30 | 0.28 | 0.36 | 0.038 (Pseudo- R^2) |

Note: This table reports regression estimates of the effect of the Phase 1 grant ($1 | R_i > 0$) using variants of the model in Equation 1 with a bandwidth of 3. Standard errors are robust and clustered at the sector-year level. *** $p < .01$. Year ≥ 1995