Internet Appendix

for

"Seed-Stage Success and Growth of Angel Networks"

This Internet Appendix contains the following details which are not reported in the paper due to space constraints: (1) description of start-up financing stages; (2) description of network measures; and (3) results of additional robustness tests that we conduct to rule out possible alternative explanations for our main findings.

IA-1. Description of Start-up Financing Stages

Start-ups raise funds at various stages of their life cycle. Industry participants classify these financing stages as *Seed*, *Series A*, *Series B*, *Series C*, and so on. The academic literature (e.g., see Gompers 1995) sometimes refers to series A as "early stage," series B as "expansion stage," and series C and beyond as "late stage." The informal definitions of the these stages are as follows:¹

- Seed stage: The purpose of the series seed is for the startup to figure out the product it is building, the market it is in, and the user base. Typically, a seed round helps the company scale to a few employees past the founders and to build and launch an early product.
- Series A: Startups that get to this stage have figured out their product and user base, and are trying to establish a viable business model and scale up their operations.
- Series B: This stage is all about scaling. Startups that get to this stage have an established product and business model, and are trying to scale up their business model and user base.
- Series C: This stage is used by startups to accelerate their growth beyond the Series B stage; e.g., by going international or by making acquisitions. Firms requiring more funds raise them in stages Series D, E, etc.

The startups disclose the financing stage when they raise funds, and this information is reported by CrunchBase and AngelList. Each financing stage may itself involve multiple funding rounds.

¹See http://blog.eladgil.com/2011/03/how-funding-rounds-differ-seed-series.html for a more detailed description of these funding stages.

IA-2. Description of Network Measures

Co-investment networks may be viewed as a set of nodes and edges. For example, in the network of 6 investors shown below, the nodes are investors and the edges represent co-investment connections between investors. In order to compute centrality measures, networks are represented in the form of $N \times N$ "adjacency" matrices, where N is the total number of investors in the network. The adjacency matrix below represents the co-investment network, where a '1' denotes the presence of a co-investment connection between the two investors (e.g., investors I_1 and I_2), whereas a '0' denotes the lack of a connection (e.g., between investors I_1 and I_3).



Investor	I_1	I_2	I_3	I_4	I_5	I_6
I_1	-	1	0	0	0	0
I_2	1	-	1	1	0	1
I_3	0	1	-	0	0	1
I_4	0	1	0	-	1	0
I_5	0	1	0	1	-	0
I_6	0	1	1	0	0	-

The network measures are defined as follows:

- Degree Centrality_{i,t} denotes the total number of co-investment connections that an investor has as of year t. It is obtained by summing the investor's row (or column) vector in the adjacency matrix. For example, in the network above, investor I_1 has a degree centrality of 1 ('d' in the network figure shows degree centrality of each investor).
- Eigenvector Centrality_{i,t} measures the relative importance of each investor in the network. It is a recursive degree measure where each investor's eigenvector centrality is the sum of his ties to others weighted by their respective degree centrality. It is the positive eigenvector of the network's undirected adjacency matrix. Mathematically, eigenvector of investor 'i' (ev_i) is given by $ev_i = \sum_j p_{ij} ev_j$, where p_{ij} takes a value 1 if there is a relationship between investors i and j. We use power iteration method (100 iterations) recommended by Bonacich (1987) to calculate eigenvector centrality of each investor.
- Eigenvector Centrality Decile_{i,t} represents the decile of Eigenvector Centrality to which the individual angel belongs in year t. $\Delta(Eigenvector Centrality Decile)_{i,t}$ represents change in Eigenvector Centrality Decile of angel i from year t - 1 to t.
- New $Connections_{i,t}$ is the number of new co-investment connections formed by an investor in year t excluding the new-co-investment connections that arise from any existing portfolio firm that progressed from seed stage to series A stage.

• New Outside Connections_{i,t} is the number of new out-of-state co-investment connections formed by an investor in year t.

IA-3. Additional Tests

Effect of Other Forms of Success: All our analysis so far has relied on seed-stage success as the measure of angels' successful performance. In Table IA.2, we replicate our main results with Other Stage Success (Panel A) and Successful Exit (Panel B) as alternative measures of success. As it can be seen, our qualitative results are similar with these alternative measures of success. However, some of the $PreSuccess_{-\tau}$ are also positive and significant in some regressions, which suggests that the parallel trends assumption may not always be met for these alternative measures of success. This may be because only the more established angels are likely to deliver successful exits and success at later stages.

Falsification test: One concern may be that our results are driven by macro trends, such as large inflow of funds into the angel investor market, that lead to both successful performance of existing seed-stage startups as well as increase in future deal flow for the angel investors. We note that our empirical specification should ameliorate such concerns because such a macro trend should affect both the successful angel and the control group of unsuccessful angels, and hence, cannot drive the γ_{τ} coefficient which captures the *difference* in the change in the *y*-variable between the two groups. Nonetheless, to further address this concern, we implement a falsification test by creating a variable called *PlaceboSuccess* as follows. For each angel that actually experiences a seed success, we randomly assign *PlaceboSuccess*= 1 to one of the angels in its control group. We then repeat our estimation of the difference-in-differences specification (3) with *PlaceboSuccess* instead of *Seed Success* as the treatment variable, the results of which are presented in Table IA.3. As can be seen, the γ_{τ} coefficients on the *PostPlaceboSuccess*_{τ} terms are all insignificant, which shows that our results in Section 5 of the paper are capturing the causal effect of successful performance.

Dealing with multiple successes: Another concern with the difference-in-differences specification (3) is that if an investor experiences multiple successes within a gap of a few years, then it complicates the identification of the causal effect of success on y, because a *PostSuccess* term corresponding to the first success may overlap with a *PreSuccess* term on account of the second success. We note that this is not a serious concern in our setting because only a few investors experience more than one seed success during the 2005–2014 time period. Nonetheless, to alleviate this concern, we estimate specification (3) using only the first *Seed Success* of every angel investor. As can be seen from Table IA.4, our results are mostly unchanged.

Other tests: Recall that we conducted our analysis only on angels that invested in at least 3 portfolio companies during the period 2005–2014. The idea behind this restriction was to eliminate angel investors that make one-off investments in startups founded by their family members or friends. We now ease this restriction, and repeat all our tests with *Seed Success* as the measure of success after including all individual angels in the analysis. The results are presented in Table IA.5, and show all our main results hold even without the restriction.

Our propensity score matching methodology did not control for the past seed successes or exit performance of angels. This is because seed success and exit via IPO and M&A are rare for individual angels in our sample. As a robustness check, we re-do our analysis after controlling the matching procedure for angels' past seed successes, IPOs and M&A exits. Table IA.6 reports the results of these analyses. Panel A of Table IA.6 summarizes the characteristics of the matched angels and Panel B reports the multivariate results, which shows that the results are broadly similar to those described in the paper.

We are measuring *within angel* change in network outcomes after an angel experiences success (specification (3)). However, there could be a concern that the results are driven by pre-existing social capital of angels who are entrepreneurs or VC partners. In the paper we address this by estimating the effect of success on high and low network capital angels separately and show that the impact of success is higher for low network capital angels. Alternatively, in table IA.7 we exclude angels who are also entrepreneurs and VC partners from our sample and show that the results are qualitatively similar to those in the paper.

References

- Bonacich, P. 1987. Power and Centrality: A Family of Measures. American Journal of Sociology 92:1170–1182.
- Gompers, P. A. 1995. Optimal Investment, Monitoring, and the Staging of Venture Capital. Journal of Finance 50:1461–1489.

Table IA.1 Determinants of Seed-stage Success of Startups

In this table, we investigate the determinants of seed-stage success for startups in our sample. The dependent variable is *Seed Success*, a binary variable that identifies seed-stage startups that successfully progressed to series A stage. The independent variable *Serial Entrepreneur* identifies startups that were founded by a serial entrepreneur. The binary variable *Hot Market* is assigned a value '1' if startup *i* is in a industry and state where above-average number of seed-stage startups progressed to series A stage in the year before its seed round; '0' otherwise. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

	ç	Seed Succes	s
	(1)	(2)	(3)
Serial Entrepreneur.	$\begin{array}{c} 0.040^{***} \\ (0.010) \end{array}$	$\begin{array}{c} 0.043^{***} \\ (0.012) \end{array}$	0.025^{*} (0.013)
Hot Market	0.006^{***} (0.002)	0.006^{***} (0.002)	0.005^{***} (0.002)
Startup Age		$0.003 \\ (0.002)$	$0.003 \\ (0.003)$
Observations $Adj. R^2$ State, Industry & Year F.E.	12805 0.027 No	12805 0.030 No	12805 0.091 Yes

Table IA.2 Effect of Other-stage Success and Successful Exits on Angel Outcomes

In this table, we estimate regression (3) with alternative measures of success to examine the effect of successful performance on angel investor network capital growth and deal flow outcomes. The measure of success is *Other-stage Success* in panel A and *Successful Exit* in panel B. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

	$ \begin{array}{c} Ln(1 + New \\ Connections_{i,t}) \\ (1) \end{array} $	$\begin{array}{c} \Delta(Eigenvector\\ Centrality \ Decile)_{i,t}\\ (2) \end{array}$	$ \begin{array}{c} Ln(1 + New \ Outside \\ Connection_{i,t}) \\ (3) \end{array} $	$ \begin{array}{c} Ln(1 + New \\ Investments_{i,t}) \\ (4) \end{array} $	$ \begin{array}{c} Ln(1 + New \ Lead\\ Investments_{i,t})\\(5)\end{array} $	$ \begin{array}{c} Ln(1 + New \ Outside \\ Investments_{i,t}) \\ (6) \end{array} $	$\begin{array}{c} Other \ Seed\\ Success_{i,t}\\ (7) \end{array}$	$VC \\ Financing_{i,t} \\ (8)$
Other stage Success	-0.009 (0.011)	$0.022 \\ (0.019)$	0.030 (0.023)	$0.016 \\ (0.010)$	-0.011 (0.008)	$0.029 \\ (0.019)$	-0.021^{*} (0.012)	$0.000 \\ (0.013)$
$PreSuccess_{-3}$	-0.017 (0.018)	-0.052 (0.032)	-0.035^{*} (0.021)	-0.016 (0.019)	-0.022^{*} (0.013)	-0.032 (0.020)	-0.014 (0.013)	-0.017 (0.015)
$PreSuccess_{-2}$	-0.003 (0.016)	-0.045 (0.029)	-0.028 (0.023)	-0.014 (0.016)	-0.011 (0.012)	-0.024 (0.018)	-0.010 (0.013)	-0.004 (0.014)
$PreSuccess_{-1}$	0.013 (0.015)	-0.016 (0.026)	-0.012 (0.025)	-0.011 (0.015)	$0.010 \\ (0.011)$	$0.007 \\ (0.019)$	0.023^{*} (0.013)	0.029^{**} (0.014)
$PostSuccess_{+1}$	0.099^{***} (0.020)	$\begin{array}{c} 0.178^{***} \\ (0.053) \end{array}$	$\begin{array}{c} 0.101^{***} \\ (0.024) \end{array}$	0.140^{***} (0.016)	$\begin{array}{c} 0.118^{***} \\ (0.012) \end{array}$	$\begin{array}{c} 0.186^{***} \\ (0.020) \end{array}$	$\begin{array}{c} 0.129^{***} \\ (0.015) \end{array}$	$\begin{array}{c} 0.144^{***} \\ (0.019) \end{array}$
$PostSuccess_{+2}$	$\begin{array}{c} 0.084^{***} \\ (0.022) \end{array}$	$\begin{array}{c} 0.204^{***} \\ (0.052) \end{array}$	$\begin{array}{c} 0.186^{***} \\ (0.025) \end{array}$	$\begin{array}{c} 0.161^{***} \\ (0.016) \end{array}$	0.021^{*} (0.012)	0.100^{***} (0.021)	$\begin{array}{c} 0.118^{***} \\ (0.015) \end{array}$	$\begin{array}{c} 0.132^{***} \\ (0.020) \end{array}$
$PostSuccess_{+3}$	$\begin{array}{c} 0.067^{***} \\ (0.024) \end{array}$	$\begin{array}{c} 0.091 \\ (0.056) \end{array}$	0.050^{*} (0.026)	0.176^{***} (0.018)	$0.013 \\ (0.013)$	0.041^{*} (0.022)	0.024 (0.016)	$\begin{array}{c} 0.129^{***} \\ (0.020) \end{array}$
Obs.	30342	18767	30342	30342	30342	30342	30342	30342
Adj. R ² Investor & Year F.E.	0.491 Yes	0.177 Yes	0.458 Yes	0.554 Yes	0.603 Yes	0.579 Yes	0.297 Yes	0.468 Yes

Panel A: Effect of Other-stage Success on Angel Outcomes

		Panel 1	B: Effect of Success	ful Exits on An	gel Outcomes			
	$ \begin{array}{c} Ln(1 + New \\ Connections_{i,t}) \\ (1) \end{array} $	$\begin{array}{c} \Delta(Eigenvector\\ Centrality Decile)_{i,t}\\ (2) \end{array}$	$ \begin{array}{c} Ln(1 + New Outside \\ Connection_{i,t}) \\ (3) \end{array} $	$ \begin{array}{c} Ln(1 + New \\ Investments_{i,t}) \\ (4) \end{array} $	$ \begin{array}{c} Ln(1 + New \ Lead\\ Investments_{i,t})\\(5)\end{array} $	$ \begin{array}{c} Ln(1 + New \ Outside \\ Investments_{i,t}) \\ (6) \end{array} $	$\begin{array}{c} Other \ Seed\\ Success_{i,t}\\ (7) \end{array}$	$ \frac{VC}{Financing_{i,t}} $ (8)
Successful Exit	$0.020 \\ (0.015)$	$0.035 \\ (0.026)$	$\begin{array}{c} 0.043^{**} \\ (0.021) \end{array}$	0.011 (0.016)	0.021 (0.013)	0.039^{*} (0.021)	0.003 (0.013)	$0.008 \\ (0.014)$
$PreSuccess_{-3}$	-0.022 (0.018)	-0.013 (0.031)	-0.015 (0.020)	$0.033 \\ (0.021)$	$0.019 \\ (0.017)$	-0.022 (0.022)	$0.015 \\ (0.014)$	$\begin{array}{c} 0.004 \\ (0.015) \end{array}$
$PreSuccess_{-2}$	-0.026 (0.017)	-0.029 (0.027)	$0.029 \\ (0.021)$	$0.032 \\ (0.020)$	0.021 (0.016)	0.024 (0.020)	$0.018 \\ (0.013)$	$0.000 \\ (0.015)$
$PreSuccess_{-1}$	-0.020 (0.016)	-0.039 (0.024)	0.042^{*} (0.023)	$0.008 \\ (0.019)$	0.024 (0.015)	0.047^{**} (0.023)	0.033^{**} (0.013)	$\begin{array}{c} 0.084^{***} \\ (0.015) \end{array}$
$PostSuccess_{+1}$	0.065^{***} (0.024)	$\begin{array}{c} 0.325^{***} \\ (0.056) \end{array}$	$\begin{array}{c} 0.163^{***} \\ (0.022) \end{array}$	0.116^{***} (0.022)	0.095^{***} (0.017)	$\begin{array}{c} 0.179^{***} \\ (0.022) \end{array}$	$\begin{array}{c} 0.138^{***} \\ (0.016) \end{array}$	0.202^{***} (0.020)
$PostSuccess_{+2}$	$\begin{array}{c} 0.110^{***} \\ (0.026) \end{array}$	0.269^{***} (0.057)	$\begin{array}{c} 0.154^{***} \\ (0.024) \end{array}$	0.158^{***} (0.023)	$\begin{array}{c} 0.102^{***} \\ (0.019) \end{array}$	$\begin{array}{c} 0.187^{***} \\ (0.023) \end{array}$	$\begin{array}{c} 0.112^{***} \\ (0.016) \end{array}$	$\begin{array}{c} 0.212^{***} \\ (0.020) \end{array}$
$PostSuccess_{+3}$	$\begin{array}{c} 0.115^{***} \\ (0.028) \end{array}$	0.116^{*} (0.060)	0.115^{***} (0.026)	0.164^{***} (0.025)	0.088^{***} (0.020)	0.083^{***} (0.022)	0.090^{***} (0.016)	$\begin{array}{c} 0.113^{***} \\ (0.021) \end{array}$
Obs. $Adj. R^2$ Investor & Year F.E.	16533 0.565 Yes	10230 0.265 Yes	16533 0.391 Yes	16533 0.569 Yes	16533 0.577 Yes	16533 0.438 Yes	16533 0.347 Yes	16533 0.489 Yes

Table IA.3 Falsification Test

This table reports results of falsification tests that investigate the effect of placebo success on future network capital and deal flow of angels. For each angel that experienced a seed success, we randomly assign PlaceboSuccess = 1 for one of the angels in the control group and set PlaceboSuccess = 0 for the successful angel and all other angels in the control group. For each angel-year observation, the dummy variables $Post-PlaceboSuccess_{\tau}$ identify the year $\tau \in \{1, 2, 3\}$ after the placebo success year, whereas the dummy variables $Pre-PlaceboSuccess_{\tau}$ identify the year $\tau \in \{-3, -2, -1\}$ before the placebo success year. We then estimate the following difference-in-differences regression:

$$y_{i,t} = \alpha + \sum_{\tau=-3}^{\tau=-1} \beta_{\tau} \times \text{Pre-PlaceboSuccess}_{\tau} + \sum_{\tau=1}^{\tau=3} \gamma_{\tau} \times \text{Post-PlaceboSuccess}_{\tau} + \delta \times \text{PlaceboSuccess} + \sum_{\tau=-3}^{\tau=-1} \zeta_{\tau} \times Pre_{\tau} + \sum_{\tau=1}^{\tau=3} \eta_{\tau} \times \text{Post}_{\tau} + \mu_{i} + \mu_{t} + \epsilon_{i,t}$$

	Ln(1 + New	$\Delta(Eigenvector$	$Ln(1 + New \ Outside$	Ln(1 + New	$Ln(1 + New \ Lead$	$Ln(1 + New \ Outside$	$Other\ Seed$	VC
	$Connections_{i,t}$)	Centrality $Decile$) _{<i>i</i>,t}	$Connection_{i,t})$	$Investments_{i,t}$)	$Investments_{i,t}$)	$Investments_{i,t}$)	$Success_{i,t}$	$Financing_{i,t}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PlaceboSuccess	0.019	0.022	0.040*	0.026	0.021^{*}	0.019	0.020	0.041^{*}
	(0.013)	(0.016)	(0.022)	(0.020)	(0.012)	(0.017)	(0.014)	(0.023)
$PrePlaceboSuccess_{-3}$	0.051***	0.011	-0.015	0.044^{**}	0.012	-0.021	0.011	0.031
0	(0.017)	(0.012)	(0.020)	(0.021)	(0.011)	(0.014)	(0.012)	(0.020)
$PrePlaceboSuccess_{-2}$	0.030	-0.018	-0.005	0.015	0.021	-0.011	0.019^{*}	0.023
	(0.019)	(0.012)	(0.022)	(0.019)	(0.015)	(0.010)	(0.011)	(0.018)
$PrePlaceboSuccess_{-1}$	0.028	-0.021*	0.031	-0.020	-0.010	-0.022	0.016	0.035^{*}
	(0.020)	(0.011)	(0.026)	(0.018)	(0.012)	(0.018)	(0.010)	(0.019)
$PostPlaceboSuccess_{\pm 1}$	0.012	-0.024	-0.013	0.023	-0.018	-0.031*	-0.014	-0.042**
	(0.019)	(0.017)	(0.028)	(0.017)	(0.014)	(0.016)	(0.009)	(0.021)
$PostPlaceboSuccess_{+2}$	-0.003	-0.001	-0.022	-0.031	-0.014	-0.019	-0.024	0.018
	(0.023)	(0.020)	(0.019)	(0.021)	(0.013)	(0.015)	(0.015)	(0.020)
$PostPlaceboSuccess_{+3}$	-0.031	-0.011	0.003	-0.019	-0.023	-0.031*	0.010	0.010
	(0.022)	(0.019)	(0.025)	(0.020)	(0.017)	(0.018)	(0.014)	(0.023)
Obs.	54138	48874	54138	54138	54138	54138	54138	54138
$Adj. R^2$	0.091	0.052	0.135	0.101	0.111	0.128	0.099	0.091
Investor & Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.4 Effect of First Seed Success on Angel's Network Growth and Deal Outcomes

In this table, we estimate regression (3) with *Seed Success* as the measure for success to examine the effect of successful performance on the angel investor's network capital growth and deal flow. For this analysis, we consider only the first success of each successful angel and generate a control group using propensity score matching method. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

	$ Ln(1 + New \\ Connections_{i,t}) $ (1)	$\begin{array}{c} \Delta(Eigenvector\\ Centrality Decile)_{i,t} \end{array}$	$ Ln(1 + New Outside Connection_{i,t}) (2) $	$ Ln(1 + New \\ Investments_{i,t}) (4) $	$ Ln(1 + New Lead \\ Investments_{i,t}) (5) $	$Ln(1 + New Outside \\ Investments_{i,t})$	Other Seed Success _{i,t} (7)	VC Financing _{i,t}
	(1)	(2)	(3)	(4)	(5)	(0)	(7)	(8)
Seed Success	-0.007	-0.021	-0.010	-0.017	-0.012	-0.001	0.021	-0.026^{*}
	(0.017)	(0.013)	(0.024)	(0.012)	(0.010)	(0.011)	(0.014)	(0.014)
$PreSuccess_{-3}$	-0.025	-0.026*	-0.021	-0.035*	-0.016	-0.017	-0.023*	-0.021
	(0.019)	(0.014)	(0.027)	(0.019)	(0.021)	(0.022)	(0.012)	(0.013)
$PreSuccess_{-2}$	-0.031	-0.016	-0.029	-0.027	-0.022	-0.011	-0.011	0.016
	(0.021)	(0.016)	(0.023)	(0.017)	(0.022)	(0.023)	(0.013)	(0.014)
$PreSuccess_{-1}$	0.010	0.011	0.030	0.010	0.030	0.007	0.011	0.034**
	(0.020)	(0.012)	(0.025)	(0.015)	(0.020)	(0.020)	(0.012)	(0.014)
$PostSuccess_{+1}$	0.099***	0.106^{***}	0.109^{***}	0.145^{***}	0.078***	0.165^{***}	0.077***	0.111^{***}
	(0.021)	(0.018)	(0.023)	(0.018)	(0.021)	(0.020)	(0.018)	(0.015)
$PostSuccess_{+2}$	0.051^{**}	0.147^{***}	0.199^{***}	0.077***	0.099***	0.097***	0.092***	0.076***
	(0.024)	(0.021)	(0.020)	(0.016)	(0.023)	(0.023)	(0.017)	(0.018)
$PostSuccess_{+3}$	0.052**	0.040^{*}	0.063^{**}	0.026	0.038	0.046^{*}	0.033^{*}	0.070***
	(0.024)	(0.023)	(0.027)	(0.018)	(0.027)	(0.025)	(0.019)	(0.019)
Obs.	49516	43187	49516	49516	49516	49516	49516	49516
$Adj. R^2$	0.369	0.102	0.351	0.448	0.453	0.384	0.201	0.267
Investor & Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.5 Effect of Seed Success on Outcomes: Including angels who have invested in fewer than 3 startups

In this table, we estimate regression (3) with *Seed Success* as the measure for success to examine the effect of successful performance on the angel investor's network capital growth and deal flow. For these tests we relax the sample selection criterion that an angel should have invested in at least 3 startups. Thus the sample used here is an unbalanced panel of 12,147 angels. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

	Ln(1 + New)	$\Delta(Eigenvector$	Ln(1 + New Outside	Ln(1 + New)	$Ln(1 + New \ Lead$	Ln(1 + New Outside	Other Seed	VC
	$Connections_{i,t}$	Centrality $Decile$) _{<i>i</i>,t}	$Connection_{i,t}$	Investments _{<i>i</i>,t})	$Investments_{i,t}$	$Investments_{i,t}$)	$Success_{i,t}$ (7)	$Financing_{i,t}$
	(1)	(2)	(3)	(4)	(0)	(0)	(1)	(8)
Seed Success	-0.027	-0.024	-0.030	-0.026	-0.021	-0.019	-0.023	-0.026
	(0.023)	(0.016)	(0.028)	(0.020)	(0.020)	(0.017)	(0.019)	(0.020)
$PreSuccess_{-3}$	-0.041	-0.031	-0.044*	-0.025	-0.011	-0.033*	-0.039**	-0.022
	(0.033)	(0.020)	(0.025)	(0.020)	(0.016)	(0.019)	(0.017)	(0.016)
$PreSuccess_{-2}$	-0.033	0.023	-0.028	-0.011	-0.009	-0.016	-0.019	-0.004
	(0.034)	(0.019)	(0.026)	(0.010)	(0.018)	(0.017)	(0.018)	(0.014)
$PreSuccess_{-1}$	-0.007	0.016	0.002	-0.001	0.011	0.007	-0.006	0.028
	(0.032)	(0.017)	(0.023)	(0.020)	(0.019)	(0.016)	(0.018)	(0.019)
$PostSuccess_{+1}$	0.088***	0.057^{***}	0.034^{*}	0.091***	0.032	0.102***	0.029^{*}	0.077***
	(0.033)	(0.019)	(0.020)	(0.021)	(0.020)	(0.017)	(0.016)	(0.019)
$PostSuccess_{+2}$	0.041	0.089***	0.102***	0.050**	0.051**	0.057***	0.088***	0.030**
	(0.031)	(0.022)	(0.021)	(0.023)	(0.021)	(0.018)	(0.019)	(0.014)
$PostSuccess_{+3}$	0.058^{*}	0.041	0.043^{*}	0.012	0.022	0.041**	0.068***	0.024
	(0.031)	(0.026)	(0.025)	(0.024)	(0.019)	(0.017)	(0.020)	(0.019)
Obs.	126374	117925	126374	126374	126374	126374	126374	126374
$Adj. R^2$	0.213	0.122	0.237	0.300	0.256	0.266	0.173	0.192
Investor & Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.6 Effect of Success on Angel Investor Outcomes: Controlling for Angels' Past Successes

Panel A of this table reports a univariate comparison of the treatment (Successful angels) and control (Unsuccessful angels) groups obtained through the propensity score matching method in the year of *Seed Success*. The last column reports the *t-statistic* of the tests for difference between treatment and control samples.

In Panel B, we estimate regression (3) with Seed Success as the measure of success to examine the effect of successful performance on the angel investor's network capital growth and deal flow. For these tests we include angel investor's past successes as control variables in addition to the controls presented in the paper. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

Panel A: Summary of Matched Angel Investor Characteristics									
	Successful Angels (A: Treatment Group)			Unsuc (B: Ce	Unsuccessful Angels (B: Control Group)				
Variable	Mean	Stdev.	Ν	Mean	Stdev.	Ν	t-stat		
Angel Characteristics									
Start-ups invested	2.095	4.547	1879	2.110	5.468	5802	-0.118		
Rounds Invested	2.901	6.471	1879	3.012	7.843	5802	-0.612		
Experience	3.047	4.063	1879	3.151	4.766	5802	-0.923		
Entrepreneurship Experience	0.136	0.343	1879	0.141	0.348	5802	-0.547		
Degree Centrality	11.723	22.091	1879	12.229	24.315	5802	-0.841		
Eigenvector Centrality	6.068	8.914	1747	6.362	12.431	5644	-1.090		
No. of IPOs	0.013	0.171	1879	0.017	0.198	5802	-0.847		
No. of M&As	0.028	0.174	1879	0.031	0.197	5802	-0.628		
No. of Seed Successes	0.031	0.178	1879	0.035	0.189	5802	-0.721		

		Panel B: E	ffect of Success on An	gel Investor Out	comes		
	$ \begin{array}{c} Ln(1 + New \\ Connections_{i,t}) \\ (1) \end{array} $	$\begin{array}{c} \Delta(Eigenvector\\ Centrality \ Decile)_{i,t}\\ (2) \end{array}$	$ \begin{array}{c} Ln(1 + New \ Outside \\ Connection_{i,t}) \\ (3) \end{array} $	$ \begin{array}{c} Ln(1 + New \\ Investments_{i,t}) \\ (4) \end{array} $	$ \begin{array}{c} Ln(1 + New \ Outside \\ Investments_{i,t}) \\ (5) \end{array} $	$\begin{array}{c} Other \ Seed\\ Success_{i,t}\\ (6) \end{array}$	$VC \\ Financing_{i,i} \\ (7)$
Seed Success	$0.025 \\ (0.026)$	$0.041 \\ (0.068)$	$0.021 \\ (0.019)$	-0.015 (0.010)	0.020^{*} (0.012)	0.010 (0.009)	-0.018^{**} (0.008)
$PreSuccess_{-3}$	-0.031 (0.030)	-0.038 (0.057)	-0.049^{*} (0.025)	-0.020 (0.021)	-0.017 (0.017)	-0.021^{**} (0.011)	$0.020 \\ (0.016)$
$PreSuccess_{-2}$	-0.020 (0.028)	-0.033 (0.036)	-0.010 (0.026)	-0.014 (0.019)	-0.015 (0.019)	-0.008 (0.012)	$0.012 \\ (0.018)$
$PreSuccess_{-1}$	-0.033 (0.027)	$\begin{array}{c} 0.003 \ (0.035) \end{array}$	-0.020 (0.025)	$0.019 \\ (0.018)$	-0.009 (0.017)	0.003 (0.012)	0.011 (0.017)
$PostSuccess_{+1}$	$\begin{array}{c} 0.148^{***} \\ (0.026) \end{array}$	$\begin{array}{c} 0.143^{***} \\ (0.039) \end{array}$	0.128^{***} (0.024)	0.171^{***} (0.018)	$\begin{array}{c} 0.111^{***} \\ (0.019) \end{array}$	0.081^{***} (0.011)	0.011 (0.012)
$PostSuccess_{+2}$	0.093^{***} (0.028)	0.181^{***} (0.041)	0.223^{***} (0.026)	0.100^{***} (0.019)	$\begin{array}{c} 0.153^{***} \\ (0.018) \end{array}$	$\begin{array}{c} 0.132^{***} \\ (0.012) \end{array}$	$\begin{array}{c} 0.127^{***} \\ (0.018) \end{array}$
$PostSuccess_{+3}$	0.087^{***} (0.028)	0.076^{*} (0.040)	0.098^{***} (0.028)	0.018 (0.019)	0.185^{***} (0.020)	0.089^{***} (0.012)	$\begin{array}{c} 0.102^{***} \\ (0.017) \end{array}$
Obs. $Adj. R^2$ Investor F.E.	44062 0.409 Yes	39188 0.210 Yes	44062 0.413 Yes	44062 0.428 Yes	44062 0.470 Yes	44062 0.337 Yes	44062 0.436 Yes
Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.7 Effect of Success on Angel Investor Outcomes: Excluding Entrepreneurs and VC Partners

In this table, we estimate regression (3) with Seed Success as the measure of success to examine the effect of successful performance on the angel investor's network capital growth and deal flow. For these tests we exclude from our sample angels who are also Entrepreneurs and VC Partners. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

	Ln(1 + New $Connections_{i+1})$	$\Delta(Eigenvector$ Centrality Decile):	$Ln(1 + New Outside Connection; _)$	Ln(1 + New Investments:)	Ln(1 + New Outside Investments: +)	Other Seed	VC Financina: 4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Seed Success	-0.020	-0.021	-0.018	-0.017	-0.023	-0.018	-0.024
	(0.025)	(0.019)	(0.025)	(0.018)	(0.024)	(0.019)	(0.022)
$PreSuccess_{-3}$	-0.034	-0.020	-0.028	-0.036^{*}	-0.042^{*}	-0.025	-0.027
	(0.027)	(0.020)	(0.024)	(0.020)	(0.023)	(0.019)	(0.026)
$PreSuccess_{-2}$	-0.019	-0.010	-0.017	-0.020	-0.029	-0.017	-0.020
	(0.028)	(0.024)	(0.025)	(0.021)	(0.024)	(0.020)	(0.024)
$PreSuccess_{-1}$	0.010	0.001	-0.006	-0.011	0.017	-0.001	-0.005
	(0.026)	(0.021)	(0.023)	(0.019)	(0.021)	(0.021)	(0.026)
$PostSuccess_{+1}$	0.153^{***}	0.192***	0.105^{***}	0.140^{***}	0.048**	0.149***	0.082***
	(0.028)	(0.022)	(0.026)	(0.026)	(0.022)	(0.023)	(0.024)
$PostSuccess_{+2}$	0.081***	0.133^{***}	0.189***	0.101***	0.199***	0.192***	0.168***
	(0.029)	(0.021)	(0.027)	(0.022)	(0.025)	(0.020)	(0.025)
$PostSuccess_{+3}$	0.039	0.075^{***}	0.031	0.048^{*}	0.030	0.081***	0.092***
	(0.027)	(0.024)	(0.024)	(0.025)	(0.023)	(0.022)	(0.025)
Obs.	33694	30100	33694	33694	33694	33694	33694
$Adj. R^2$	0.401	0.152	0.471	0.557	0.478	0.326	0.409
Investor & Year F.E.	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table IA.8 Effect of Success on New Co-investment Connections: Origin of New Connections

This table is equivalent to the analysis performed in Panel A of Table 7 in the paper. We divide the number of new connections generated by angels each year into (i) New Co-investment connections from new startup investments and (ii) New Co-investment connections from existing investments excluding startups that moved from seed to series A stage in the current year. Panel A summarizes these variables in our angel-year panel that was used to create Table 4 in the paper.

Panels B and C we use the aforementioned two variables as dependent variables and estimate regressions (2) and (3) to examine the effect of Seed Success on the ability of an angel to generate new connections. We estimate the regressions on the entire sample in columns (1) and (2); separately for low-network-capital angels and high-network-capital angels in columns (3) and (4), respectively; and separately for more-likely successes and less-likely successes in columns (5) and (6), respectively. For the sample splits in columns (3) versus (4), and for columns (5) versus (6), we also report p-values of χ^2 tests to examine whether the total post-period effect of success is the same across the two groups. All variables are defined in the Appendix. Standard errors reported in parentheses are robust to heteroskedasticity and are clustered by angels. We use ***, **, and * to denote statistical significance at 1%, 5% and 10% levels, respectively.

Panel A: Summary Statistics									
Percentile Distribution									
Variable	Mean	Stdev.	10^{th}	50^{th}	90^{th}	Ν			
New connections	8.013	17.429	0.000	5.000	20.000	25868			
New Connections: New firm investments	4.193	15.196	0.000	4.000	16.000	25868			
New Connections: Existing Investments	3.819	13.897	0.000	3.000	13.000	25868			

Panel B: Effect of	f Success of	n New Co-i	nvestment Conn	ections from Nev	v Investments	only
		Ln(1 +	$New\ Connection$	ns from New In	$vestments_{i,t})$	
	All a	ngels	Low network capital angels	High network capital angels	More likely success	Less likely success
	(1)	(2)	(3)	(4)	(5)	(6)
Seed Success	$0.010 \\ (0.011)$	0.011 (0.012)	0.015 (0.018)	$0.015 \\ (0.025)$	0.014 (0.022)	0.018 (0.017)
Post	$\begin{array}{c} 0.010 \\ (0.010) \end{array}$					
$Seed \ Success \times Post$	0.062^{***} (0.016)					
$PreSuccess_{-3}$		-0.024 (0.018)	-0.022 (0.021)	-0.031 (0.049)	-0.029 (0.021)	-0.027 (0.023)
$PreSuccess_{-2}$		-0.019 (0.020)	-0.012 (0.018)	-0.020 (0.036)	-0.012 (0.019)	-0.025 (0.022)
$PreSuccess_{-1}$		-0.014 (0.018)	-0.009 (0.019)	$\begin{array}{c} 0.011 \\ (0.031) \end{array}$	-0.001 (0.016)	-0.010 (0.017)
$PostSuccess_{+1}$		$\begin{array}{c} 0.110^{***} \\ (0.020) \end{array}$	$\begin{array}{c} 0.126^{***} \\ (0.020) \end{array}$	0.072^{**} (0.034)	0.055^{**} (0.024)	$\begin{array}{c} 0.142^{***} \\ (0.020) \end{array}$
$PostSuccess_{+2}$		0.069^{***} (0.019)	$\begin{array}{c} 0.072^{***} \\ (0.022) \end{array}$	0.051^{**} (0.025)	$\begin{array}{c} 0.037 \\ (0.024) \end{array}$	$\begin{array}{c} 0.066^{***} \\ (0.021) \end{array}$
$PostSuccess_{+3}$		$\begin{array}{c} 0.035^{*} \\ (0.020) \end{array}$	$\begin{array}{c} 0.083^{***} \\ (0.021) \end{array}$	$0.026 \\ (0.027)$	$0.022 \\ (0.025)$	0.050^{*} (0.026)
Obs.	17198	49335	26355	22980	22103	27232
$Adj. R^2$	0.320	0.344	0.351	0.339	0.409	0.378
Investor F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Year F.E. <i>p-value of difference</i>	No	Yes	Yes 0.011	Yes	Yes 0.000	Yes

Panel C: Effect of Success on New Co-investment Connections from Existing Investments						
	$Ln(1 + New \ Connections \ from \ Existing \ Investments_{i,t})$					
	All angels		Low network capital angels	High network capital angels	More likely success	Less likely success
	(1)	(2)	(3)	(4)	(5)	(6)
Seed Success	$0.005 \\ (0.010)$	$0.010 \\ (0.013)$	$0.016 \\ (0.020)$	$0.016 \\ (0.021)$	0.018 (0.021)	$0.016 \\ (0.018)$
Post	$\begin{array}{c} 0.012 \\ (0.011) \end{array}$					
$Seed \ Success \times Post$	0.032^{**} (0.015)					
$PreSuccess_{-3}$		-0.020 (0.017)	-0.021 (0.020)	-0.027 (0.045)	-0.020 (0.022)	-0.023 (0.024)
$PreSuccess_{-2}$		-0.011 (0.021)	-0.009 (0.019)	-0.011 (0.035)	-0.010 (0.020)	-0.019 (0.021)
$PreSuccess_{-1}$		-0.013 (0.019)	-0.010 (0.020)	$0.009 \\ (0.030)$	$0.010 \\ (0.020)$	-0.011 (0.020)
$PostSuccess_{+1}$		0.080^{***} (0.021)	$\begin{array}{c} 0.109^{***} \\ (0.023) \end{array}$	0.063^{**} (0.031)	0.049^{*} (0.025)	$\begin{array}{c} 0.101^{***} \\ (0.023) \end{array}$
$PostSuccess_{+2}$		0.040^{**} (0.021)	0.051^{**} (0.022)	$0.031 \\ (0.026)$	0.047^{*} (0.022)	0.036^{*} (0.021)
$PostSuccess_{+3}$		$\begin{array}{c} 0.021 \\ (0.020) \end{array}$	0.042^{**} (0.021)	$0.020 \\ (0.030)$	$0.038 \\ (0.024)$	0.042^{*} (0.023)
Obs.	17198	49335	26355	22980	22103	27232
$Adj. R^2$	0.311	0.310	0.314	0.301	0.388	0.357
Investor F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Year F.E. <i>p-value of difference</i>	No	Yes	Yes 0.010	Yes	Yes 0.059	Yes
p-value of difference			0.010		0.059	