The Impact of Angel Investing

Josh Lerner (co-authored with William Kerr, Antoinette Schoar, Stanislav Sokolinski, and Karen Wilson)

Harvard, MIT, and OECD

Welcome!

May 13, 2015

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- Use chat to submit questions
- Yes, you'll get the slides
- We're recorded, so come back and listen again

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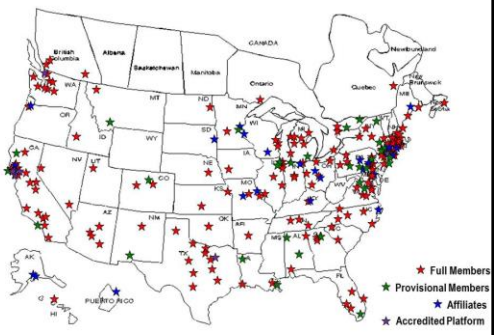
Mission:

Fuel the success of angel groups and accredited individuals active in the early-stage landscape

- World's largest trade group for angel investors
  - **220+ angel groups**
  - **12,000 accredited investors**
  - **Voice of accredited individuals, portals, and family offices**
- 50 US states + Canada
- Research/ education partner

ANGEL RESOURCE INSTITUTE



Member Groups & Accredited Platforms

Golden Seeds

LIFE SCIENCE ANGELS

NASHVILLE CAPITAL NETWORK

FundersClub

band OF ANGELS

AngelList

alliance of angels

LAUNCHPAD VENTURE GROUP

TECH COAST ANGELS

TiE ANGELS

CommonAngels Uncommon Expertise

New York ANGELS

New Dominion Angels

OHIO TechAngels

SIERRA ANGELS

Houston Angel Network

SAND HILL ANGELS

ACA Partners

Our Speaker

Josh Lerner, PhD

Jacob H. Schiff Professor of Investment Banking

Chair, Entrepreneurial Management

HARVARD
BUSINESS SCHOOL

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Topics We'll Explore Today

- Angels vs Venture Capitalists
- Neglected Topic
- Our Empirical Approach
- US Study
- Global Study

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Rapid Growth

- Last decade saw rapid expansion of "personal" entrepreneurial finance:
  - Angel groups, super angels.
  - Crowd funding.
- Angel activity has spread world-wide:
  - One of oldest forms of outside finance.
  - Venture capital concentrated in a few countries/cities.
  - Active involvement, close social ties may address lack of legal protections or formal capital market:
  - Many policy efforts to encourage development of angel groups.

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Angels vs. Venture Capitalists

- Angel share many of the positive features of VCs:
  - Fund early-stage entrepreneurs.
  - Undertake intensive due diligence.
  - Serve as mentors and (sometimes) outside directors for the entrepreneurs.
    - Kaplan and Stromberg, 2003; Wong, Bhatia and Freeman, 2009.
- Since angels invest their own money, less prone to agency problems:
  - Fee-based compensation structures lead to excessive fund raising (Metrick and Yasuda, 2010).
  - Sub-optimal investment and exit decisions (Gompers, 1995).
  - Periods of misvaluation and overfunding:
    - Gompers and Lerner, 1999; Chung, et al., 2012.

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Angels vs. Venture Capitalists (2)

- But challenges associated with angels as well:
  - Angels are not professional investors, so entrepreneurs are exposed to funding risk:
    - Angels subject to liquidity shocks.
    - Angels may change their opinions more frequently about what projects to fund.
  - Angels might not be prepared to invest in truly radical high growth projects:
    - More risk averse due to limited diversification.
    - Lack of expertise to evaluate complex ventures.

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A Neglected Topic

- Several institutions important in funding entrepreneurial ventures:
  - Personal finance.
  - Banks.
  - Venture capital.
  - Public offerings.
  - Angel finance.

    Particular, and growing importance, in software finance.
    - Andy Bechtolsheim's $100,000 investment in Google turns into $1.7 billion.
    - Peter Thiel's $500K investment in Facebook realized >$1 billion.

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A Neglected Topic (2)

- Title/abstract search in SSRN in past three years:
  - IPO or initial public offering: 896
  - Venture capital: 886
  - Bank loan or bank lending: >1000.
  - ***Angel: 100***.
    - Moreover, far fewer of the latter papers are empirical.

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Explaining the Differential

- Gap is readily explained by data issues.
  - Angel financing estimated at 2X-6X > VC investment dollars … but understudied:
    - No data collectors (cf., VX, Venture One).
    - Literature is thus mostly survey based:
      - With clear biases and issues.

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Our Empirical Approach

- Study angel financing *groups*:
  - Detailed documentation of deal flow, deliberations and venture outcomes.
  - Formal votes and expressions of interest in deals.
  - Basic idea: compare ventures that just received funding versus those that just missed.

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Angel Group Selection Process

- Entrepreneurs approach angel groups with their b-plans
- Selection funnel of screening and pitches begins
- Angels express interest in deals throughout
- Examine for regularities and break points

TCA Orange County Screening Overview

Welcome to the #1 Angel network in the US. We are pleased you are attending an Orange County screening session. The screening process is an important part of the TCA process. Typically, we have over 300 companies per year apply over the web for TCA funding. Approximately one third of these companies make it to the screening process which you are about to participate in. Although each year varies, we typically fund between 10 and 20 companies per year. TCA consists of 4 chapters, each facilitating the first three steps of the deal flow process a little differently. The overall deal flow process for TCA consists of 7 steps as follows:

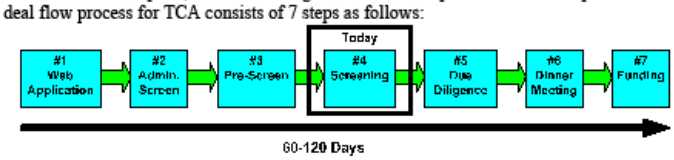

Figure 2

- Centerpiece of monthly angel meetings
- Several venture pitches in a row with individual evaluation by angels
- Sample evaluation with overall scores

Confidential when Completed

[Investor Name]

CommonAngels

Evaluation Sheet
[Date]
[Company Name]

1. Your level of investment interest

Overall Investment Potential:
1 2 3 4 5 6 7 8 9 10

Are you interested in investing? YES NO
POSSIBLY (please comment)

How much? $ _____

Comments and/or key issues for due diligence:

2. Evaluation of the investment opportunity

Positive factors:

Negative factors:

3. Assistance

How I can Help:
☐ Diligence team

☐ Contacts/Introductions

Our Empirical Approach (2)

- Use several econometric approaches:
  - Restriction of sample to deals of similar quality levels.
  - Matched sample approaches.
  - A (fuzzy) regression discontinuity design.
- Several key advantages:
  - By matching to ventures that tried but failed to get funding, we better capture founder motivations.
  - The same investors evaluated the ventures to be comparable at the time of their pitch!

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Data for U.S. Study

- Information from two angel groups, 2001-06:
  - Tech Coast Angels (California, 5 chapters).
  - CommonAngels (Boston).
- Outcome data, 2008 to 2010:
  - Venture success: venture alive in 2010? successful exit (IPO or acquisition)? 75+ employees?
  - Venture operations: employment count? patenting? growth in web site traffic?
  - Venture financing: does the venture receive entrepreneurial finance? traits of financing?

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Table 1: Angel group selection funnel

Angel group interest level	Number of ventures	Cumulative share of ventures	Share funded by angel group
0	1640	64%	0.000
1-4	537	84%	0.007
5-9	135	90%	0.037
10-14	75	93%	0.120
15-19	52	95%	0.173
20-24	42	96%	0.381
25-29	33	97%	0.303
30-34	21	98%	0.286
35+	44	100%	0.409

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35+	44	100%	0.409

Table 2: Comparison of groups above and below border discontinuity

Traits of ventures above and below border discontinuity	Above border ventures	Below border ventures	Two-tailed t-test for equality of means
Basic characteristics			
Financing sought ($ thousands)	1683	1306	0.277
Documents from company	3.0	2.5	0.600
Management team size	5.8	5.4	0.264
Employee count	13.4	11.2	0.609
Primary industry (%)			
Biopharma and healthcare	23.9	29.3	0.579
Computers, electronics, and measurement	15.2	17.1	0.817
Internet and e-commerce	39.1	39.0	0.992
Other industries	21.7	14.6	0.395
Company stage (%)			
Good idea	2.2	2.4	0.936
Initial marketing and product development	34.8	46.3	0.279
Revenue generating	63.0	51.2	0.272
Angel group decisions			
Documents by angel members	10.5	5.1	0.004
Discussion items by angel members	12.0	6.7	0.002
Share funded	63.0	39.0	0.025

Tables 3a, b, and c

- Looks naively at the impact of angel funding:
  - Associated with better performance along many criteria.
  - Sample limited to those near border.
  - But coefficients and significance by be impacted by selection effect.

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Basic Outcome Estimates

- Improved venture success:
  - ✓ Survival 0.246 (0.083).
  - ✓ Successful exit: 0.110 (0.054).
  - ✓ Exit or 75+ employees: 0.163 (0.074).
- Improved venture operations:
  - ✓ Employee count: 19.3 (6.5).
  - ✓ Patent granted: 0.175 (0.084).
  - ✓ Improved web performance: 0.162 (0.107).
  - ✓ 39% improvement in web rank.

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Basic Outcome Estimates (2)

- Improved venture financing:
  - ✓ Receives any financing:0.706 (0.063).
  - ✓ Receives later financing: 0.270 (0.090).
  - ✓ 1.2 additional financing rounds.
  - ✓ Most additional financing involves outsiders.
  - ✓ Syndication is often present.

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Tables 6a,b, and c: More rigorous outcome estimates

- Improved venture success:
  - ✓ Survival 0.247 (0.095)
  - ✓ Successful exit: 0.075 (0.058)
  - ✓ Exit or 75+ employees: 0.088 (0.086)
- Improved venture operations:
  - ✓ Employee count: 12.4 (7.4)
  - ✓ Patent granted: 0.154 (0.089)
  - ✓ Improved web performance: 0.232 (0.120)
  - ✓ 38% improvement in web rank
- No evidence of better financing.

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Table 7

- Might worry that these non-professional investors are using other criteria.
- To address, compare returns of TCA investors with those of VC groups.
- Focus on cash-on-cash multiples—more readily aggregated.
  - Even so, weighting across years poses subtle issues.
- Substantial outperformance across all approaches!

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Table 7: Analysis of angel group portfolio investment returns

	Cumulative US VC vintage year performance				Angel group performance, by year of investment								
Fund year	Sample size	Total VC funds raised in vintage year ($B)	Capital weighted average: D/PI	Capital weighted average: TV/PI	$ Invested	Distributed capital ($s)	Total value ($s)	Estimated fees paid ($s)	Estimated carry paid ($s)	D/PI	TV/PI	Net of fee D/PI	Net of fee TV/PI
1997	64	19.8	2.11	2.37	$1,150,000	$18,630,000	$18,630,000	$178,250	$3,496,000	16.20	16.20	11.39	11.39
1998	78	30.0	1.28	1.72	$6,285,510	$242,342	$3,130,342	$974,254	$0	0.04	0.50	0.03	0.43
1999	107	55.7	0.45	0.74	$16,331,104	$10,386,749	$13,138,226	$2,531,321	$0	0.64	0.80	0.55	0.70
2000	122	104.5	0.48	1.03	$12,819,029	$5,588,458	$13,815,428	$1,986,949	$0	0.44	1.08	0.38	0.93
2001	59	38.9	0.56	1.16	$6,563,700	$4,277,088	$35,390,216	$1,000,964	$0	0.65	5.39	0.57	4.68
2002	20	9.4	0.21	0.97	$3,701,495	$1,218,194	$3,977,907	$545,971	$0	0.33	1.07	0.29	0.94
2003	17	11.6	0.34	1.11	$4,251,519	$914,050	$6,967,163	$596,276	$0	0.21	1.64	0.19	1.44
2004	23	19.8	0.24	1.04	$7,466,829	$615,813	$9,617,376	$970,688	$0	0.08	1.29	0.07	1.14
2005	21	29.0	0.11	1.02	$14,079,569	$350,000	$17,975,928	$1,548,753	$0	0.02	1.28	0.02	1.15
2006	38	22.0	0.11	0.96	$11,567,778	$1,025,000	$16,189,696	$1,041,100	$0	0.09	1.40	0.08	1.28
2007	20	36.1	0.03	0.94	$9,469,772	$0	$7,538,680	$662,884	$0	0.00	0.80	0.00	0.74
2008	12	28.5	0.00	0.85	$6,527,593	$0	$5,421,499	$326,380	$0	0.00	0.83	0.00	0.79
Wtd average, VC funds raised			**0.67**	**1.22**						**2.52**	**3.54**	**1.82**	**2.71**
Wtd average, TCA weights			**0.35**	**1.02**						**0.43**	**1.51**	**0.34**	**1.31**

Notes: Table compares performance of an angel group fund to the venture capital industry as a whole. Weights used in the first weighted industry average returns are based on cumulative VC dollars raised. Weights used in the second weighted industry average employ the same year distribution as the angel group's investments. Net of fee assumes 2% management fee for first seven years and 0.5% for next three years; analysis assumes additional funds raised to cover fees. Net of carry assumes 20% of difference between distributed and invested capital; deducted from distributed capital or total value. Industry data from Thomson Reuters.

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Conclusions from U.S. Study

- Angel investments and entrepreneurial finance are important for venture success.
- Additional analysis shows that one of our groups performs as well as or better than VC industry.
- Limitations of analysis
  - Methodology: inferred RDD discontinuities.
  - Our angel groups are professionally managed:
    - Representative of angels as a whole?

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The Global Study

- 13 angel groups in 11 countries from Europe, Asia Pacific, Latin America and North America, with applicants from 21 nations.
  - Wide differences in legal, tax, and VC environment, as well as experience of angel groups.
- Identified through:
  - Personal connections: e.g., former students.
  - Alumni contacts suggested by liaisons at Harvard and MIT.
  - Associations and informal consortia of angels, such as the Angel Capital Association.

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Requirements for Participation

- Participating angel groups needed to:
  - Have been active investors for at least two years.
  - Have (or be able to compile) records both on applicants that were funded and those that were considered and rejected.
  - Have records about the degree of angel interest in potential transactions.
    - Beyond these, considerable heterogeneity in sponsorship, membership, rules, etc.

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Supplemental Data Collection

- Small, privately held status, incomplete record-keeping by the angel groups, meant need for extensive work:
  - Angel groups: Tracked key information about the firms that they had funded, but unfunded much poorer.
  - Internet searches: Looked at URLs provided at the time the companies sought financing, as well as web searches (language issues!).
  - Corporate and financing databases: CapitalIQ and Bureau van Dijk's Orbis for profiles; Thomson Reuters IPO and acquisition databases.

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Supplemental Data Collection (2)

- VC databases: Thomson Reuters' VentureXpert, CrunchBase, and the Emerging Markets Private Equity Association database.
- News stories: Factiva database.
- Patents: U.S. patent awards via US Patent and Trademark Office, Thompson Innovations database.
- Direct contacts: Email and cellular phone (information from the angel groups).

- Focus on small set of outcomes as of 2014, due to these limitations.

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Table 7

- Impact of angel financing on firm outcomes:
  - Again, use border sample.
  - In Table 6, whether the firm above the funding discontinuity is the key independent variable.
  - In each case, the angel-funded (or more likely to be funded) ventures are more likely to…
    - Survive.
    - Have a successful exit
    - Raise subsequent financing, and
    - (More weakly) hire additional employees.

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Table 7 - Outcomes and discontinuity - Panel A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0,1)Venture is in operation or underwent a successful exit		(0,1)Venture has a minimum of 1.5 years of operations since the financing event		(0,1)Venture underwent IPO or acquisition		Employment count as of today with a maximum of 100 employees	
(0,1)Venture is above the funding cutoff	0.181***	0.194***	0.105***	0.069	0.161***	0.087***	3.755	4.255*
	(0.040)	(0.054)	(0.036)	(0.045)	(0.031)	(0.030)	(2.560)	(2.373)
Observations	568	307	568	307	568	307	307	185
R-squared	0.215	0.279	0.269	0.372	0.260	0.105	0.232	0.535
Angel group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Venture level controls	No	Yes	No	Yes	No	Yes	No	Yes

Table 7 - Outcomes and discontinuity – Panel B

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	Patent count as of today		(0,1) At least one of the founders is still with the venture		(0,1)Venture received any subsequent financing		(0,1)Venture received subsequent VC financing		Total subsequent financing raised (USD, millions)	
(0,1)Venture is above the funding cutoff	-1.564	-0.237	0.014	0.001	0.163***	0.213***	0.089***	0.093**	4.913	1.719
	(1.595)	(0.793)	(0.043)	(0.057)	(0.039)	(0.050)	(0.032)	(0.038)	(7.680)	(4.294)
Observations	568	307	343	196	568	307	568	307	107	45
R-squared	0.118	0.869	0.164	0.135	0.206	0.287	0.187	0.316	0.236	0.987
Angel group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Venture level controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8

- Based on Table 7, but adding independent variables measuring national environment, as well as interaction with discontinuity measure:
  - As before, increased likelihood of angel financing has a strongly positive impact on outcomes.
  - More entrepreneur-friendly environment → greater probability of survival and of subsequent financing.
  - More venture capital activity → greater probability of subsequent financing, but lower chance of survival.
  - *In all but two regressions, the interaction between the environment and being above the cutoff is insignificant*.
    - Suggests the positive impact of angel financing on the firm development remains consistent across the nations under study.

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	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	(0,1)Venture is in operation or underwent a successful exit		(0,1)Venture has a minimum of 1.5 years of operations since the financing event		(0,1)Venture underwent IPO or acquisition		(0,1)Venture received any subsequent financing		(0,1)Venture received subsequent VC financing	
(0,1)Venture is above the funding cutoff	0.198***	0.199*	0.127***	0.170*	0.174***	0.255***	0.189***	0.124	0.109***	0.092
	(0.040)	(0.103)	(0.037)	(0.100)	(0.031)	(0.088)	(0.040)	(0.119)	(0.034)	(0.091)
Steps to open business	-0.156***	-0.156***	-0.102***	-0.092**	0.025	0.044*	-0.152***	-0.168***	-0.062**	-0.066**
	(0.033)	(0.043)	(0.030)	(0.040)	(0.021)	(0.026)	(0.034)	(0.037)	(0.025)	(0.028)
(0,1)Venture is above the funding cutoff * Steps to open business		-0.000		-0.025		-0.048		0.039		0.010
		(0.061)		(0.058)		(0.046)		(0.062)		(0.047)
Observations	562	562	562	562	562	562	562	562	562	562
R-squared	0.127	0.127	0.143	0.143	0.223	0.225	0.127	0.127	0.073	0.073
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Venture level controls	No	No	No	No	No	No	No	No	No	No

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9

- Do the criteria for funding employed by angels vary with the national setting?
  - Examine first all 1682 firms which were considered by the angel groups:
    - In environments that were less entrepreneur friendly or where the venture market was less developed, firms seeking funding…
      - Had more employees.
      - Were less likely to be in the early stages of development.
      - Were seeking a smaller amount of funding.
  - Similar patterns in border sample.

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Table 10

- Similar results in regression analyses:
  - While the companies funded by angels show distinct patterns across nations, this reflects the companies applying to seek angel financing, rather than choices within the applicants.
  - In countries with a less conducive entrepreneurial environment…
    - Applicants larger and already revenue generating, but seek smaller amounts of funding.
      - Firms "self-censor" when they apply to angel groups.

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Conclusions from Global Study

- Angel investors have positive impact on the growth and survival of the firms they fund:
  - Impact regardless of national features.
- Unlike in the U.S., angels globally also matter in the ability to obtain follow-on financing:
  - Suggests play important accreditation function for follow-on funding in thinner VC markets.
- Selection of firms that apply for angel funding is different across countries.

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Audience Resources

Josh Lerner
Unit Head, Entrepreneurial Management
Harvard Business School
Boston, MA 02163 USA
1-617-495-6065

josh@hbs.edu
www.people.hbs.edu/jlerner
@joshlerner

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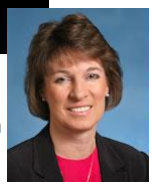
Additional Resources

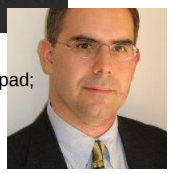
Forbes



Marianne Hudson
Executive Director
Angel Capital Association

http://www.angelcapitalassociation.org/news-forbes/

Inc.
Handbook of the American Entrepreneur



Christopher Mirabile
Managing Director, Launchpad;
Vice Chair, Angel Capital Association

http://www.angelcapitalassociation.org/news-inc/

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Upcoming ACA Events

May 20, 2015 - Veterans & Angels - Washington, DC

June 2-3, 2015 - Northwest Regional Meeting - Vancouver B.C.

October 23, 2015 - Southwest Regional Meeting - Tucson, AZ

November 9 – 10, 2015 – ACA Fall Workshop, New Orleans, LA

http://www.angelcapitalassociation.org/events/

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