

“Tigerblood”: Newspapers, Blogs, and the Founding of Information Technology Firms

Online Appendix

Sample Bias

As the VentureXpert dataset only includes entrepreneurs who received venture capital funding, it is possible that the sample is biased in terms of its generalizability to all IT entrepreneurs. In the Kauffman Foundation Firm Survey, for example, only 11% of entrepreneurs surveyed receive venture capital financing (Kauffman 2012). Other estimates suggest that the number may be even lower (Goldfarb et al. 2005). To ensure that our results extend to entrepreneurial activity outside this sample, we replicate our analysis using the County Business Partners (CBP) dataset provided by the US Census Bureau. Although this dataset does not provide data on newly founded firms, and do not allow us to cleanly subdivide the sample by industry subsector due to limited coverage, it allows us to track changes in the number of firms, by county and number of employees, which exist in IT industries (as classified by NAICS). By focusing on the number of very small firms (<50 employees) in an area, we are able to approximate firm founding behavior and thereby provide a comparison to the main analysis presented in the main paper.

To map the available ISCs from VentureXpert of the established NAICS classes we compare the actual text of the industry name in the NAICS classification to each of the ISC names and then calculate the Jaccard Distance to determine the best possible match for each industry. We then discard all matches that are either a) not the best possible match for the industry or b) not above a match threshold of 60%. Robustness checks are conducted on this matching process in two ways. First we manipulate the matching threshold at 70%, 80%, and 90%. We similarly calculate the Levenshtein Distance and JaroWinkler Distance (two commonly used techniques for calculating text disparity) and replicate the analysis this way. In each case the results are consistent. Appendix Table A1 contains a sample mapping. In this table the right hand column contains a sampling of the VentureXpert ISC3 industry names and the left hand column contains the NAICS industry names which are matched to those from the ISC3.

As discussed, the dependent variable in this analysis is the number of firms with fewer than 50 employees (*Under_50*) in industry *i*, county *c*, and time *t* we replicate our QMLE Poisson and time series OLS and analysis with results in Table A2. As with our prior estimations we see a positive and significant

correlation between the Print media, Blogs, and firm founding. Each of these estimations provides further robustness for our main finding – increased discourse on technology sectors in Print media and Blogs are correlated with firm founding.

Media Tenor

Our measures of discourse in traditional print media and blogs are based only on counts of articles that mention the specific technology sector (ISC3 from VentureXpert) but do not account for the tone of the discourse. While prior work in journalism indicates that, in general, discourse in the print media has a positive tone (Pollock and Rindova2003), it is not clear that this positive bias exists in discourse on technology, particularly on blogs where it is possible for discussion to take a negative tone (Aggarwal et al.2012).

Therefore, we examine the tenor of the discourse on technology across both types of media. To ensure that media is generally positive, thereby making information availability and legitimacy more relevant to the firm founding decision than the tone of the discourse, we randomly collect content of 19,286 news articles and 23,174 blog posts from our dataset and analyze the tone of these articles with the extensively used Linguistic Inquiry Word Count tool. This tool provides an index of the positivity and negativity of each article. We then compare the positivity to the negativity within each type of media to determine the overall tone. The results of the two sample T-tests are shown in Table A3 and indicate that the tone in both print and blog discourse is largely positive. This test allows us to rule out any potential effect that the tone of discourse may have on the decision to found a firm.

Effect of Firm Founding on Media

While our estimations show a consistent effect of media on the behavior of entrepreneurs over a wide variety of specifications and datasets, the question of reverse causality, i.e. how entrepreneurial entry in specific technology sectors affects media coverage in that sector, is equally interesting. It is plausible, for example, that the entry of entrepreneurs into the market sparks off spikes in media coverage, thereby leading to the funding of already established ventures (Aggarwal et al.2012). Conversely, it is also plausible there is little effect of new firms entering the market on the general discourse in blogs and print media, because these nascent ventures have not yet brought products to market or begun to systematically influence content creators in traditional and user-generated media. We therefore swap our independent and dependent variables of interest

and investigate how the entry of firms in t_0 influences the change in media coverage from t_0 to t_{+1} , i.e. we lag firm founding and regress media upon this variable¹. Results in Table A4 suggest no significant effect of new firm entry on the behavior of either the *Print* media or the *Blogging* community. This finding also helps establish the validity of our central finding in this work –the direction of influence is from discourse in media to firm founding and not the reverse.

Table A1: Matching of NAICS Industry Names to ISC Industry Names

NAICS Industry Name	ISC Industry Name
Computer Training Services	Computer Training
Radio TV Broadcasting Other Related Equipment	Radio & TV Broadcasting & Wireless Communications Equipment
Fiber Optic Cables	Fiber Optic Cables
Semiconductors	Semiconductor Machinery
Electronics Related Equipment	Electricity Measuring & Testing Equipment
Analytical Scientific Instrumentation	Analytical Laboratory Instruments
Optical computing	Optical Instrument & Lens
Wireless Communications Services	Wireless Telecommunications (except Satellite)
Satellite Communications	Satellite Telecommunications

Table A2: QMLE Estimations of Media on Firm Founding Using County Business Patterns Dataset

DV	(1)	(2)	(3)
	Under 50	Under 50	Under 50
Num Founded _(t-1)	0.00155*** (0.000315)	0.00163*** (0.000318)	0.00155*** (0.000315)
Print	1.518*** (0.159)		1.516*** (0.158)
Blog		0.00268** (0.00112)	0.00265** (0.00113)
Poverty	3.53e-07 (3.42e-07)	3.94e-07 (3.52e-07)	3.54e-07 (3.42e-07)
Median	3.46e-06 (2.85e-06)	3.85e-06 (2.84e-06)	3.45e-06 (2.85e-06)
Employment	-7.14e-06 (1.05e-05)	-8.03e-06 (1.03e-05)	-7.12e-06 (1.05e-05)
VC Capital	-3.93e-09 (3.24e-09)	-4.10e-09 (3.26e-09)	-3.96e-09 (3.24e-09)
Population	1.81e-07 (1.98e-07)	2.04e-07 (1.97e-07)	1.81e-07 (1.98e-07)
VC Investments	0.000616*** (0.000148)	0.000615*** (0.000150)	0.000616*** (0.000148)
Patenting	-0.00409*** (0.00105)	-0.00403*** (0.00106)	-0.00401*** (0.00104)
Wald χ^2	1161.18	1130.25	1167.99
N	13,727	13,727	13,727

Columns 1 – 3 - Estimator: Quasi Maximum Likelihood Poisson. Fixed Effects: Year and Industry-Location. Fixed Effects: Year
Robust Standard Errors in Parentheses - *** p<0.01, ** p<0.05, * p<0.1

¹ Note that the Arellano Bond estimates are consistent but fail the diagnostic tests surrounding AR(2) and Hansen’s J. Therefore, we do not provide them here.

Table A3: Two Sample T-Test of Media Positivity

	Print Media		Blog Discussion	
	Positivity	Negativity	Positivity	Negativity
<i>Mean</i>	2.23	.735	2.32	.848
<i>Std Dev</i>	1.24	.778	1.36	.797
<i>N</i>	19286	19286	23174	23174
<i>T-Value</i>	141.82		142.15	
<i>P-Value</i>	<0.0001		<0.0001	

Table A4: OLS Estimations of Effect of Firm Founding on Media

Dependent Variable	(1)	(2)
	Print	Blog
<i>Num Founded</i>	-0.0304 (0.0689)	0.0303 (0.0231)
<i>Poverty</i>	1.56e-06 (5.70e-06)	2.05e-07 (9.51e-07)
<i>Median</i>	-3.99e-05 (0.000175)	8.25e-06 (1.60e-05)
<i>Employment</i>	0.000159* (9.07e-05)	6.46e-07 (9.70e-06)
<i>Num Firms</i>	0.00404 (0.00299)	-5.02e-06 (0.000456)
<i>Population</i>	3.74e-07 (1.58e-06)	-6.65e-09 (2.07e-07)
<i>VC Capital</i>	-1.27e-09** (5.33e-10)	1.24e-09*** (4.48e-10)
<i>VC Investments</i>	2.27e-05 (6.21e-05)	-0.000181*** (3.09e-05)
<i>Patenting</i>	0.000345 (0.000535)	0.000198 (0.000127)
<i>Constant</i>	-0.738 (4.104)	2.147*** (0.659)
<i>Industry - Zone Fixed Effects</i>	Yes	Yes
<i>Period Fixed Effects</i>	Yes	Yes
<i>N</i>	54,720	54,720
<i>Overall R²</i>	0.005	0.073

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A5: Overview of Studies and Findings on *Firm Founding*

Phenomenon	Paper	Finding
Entrepreneurial Demographic Traits	Braguinsky et al. (2012)	Young, higher earning, workers with significant market knowledge are more likely to become entrepreneurs
	DeMartino and Barbato (2003)	Men are more likely to become entrepreneurs than women and are motivated by different factors (e.g. women – flexibility, men – wealth creation)
	Dunn and Holtz-Eakin (2000)	Family wealth and connection strongly predict the selection to become an entrepreneur.
	Saxenian (2002)	Immigrant entrepreneurs are able to leverage transnational social ties
	Sorensen (2007)	Employees from highly bureaucratic firms are less likely to transition to self-employment.
Individual Experience	Aldrich and Zimmer (1986)	The decision to self-employ is facilitated and incentivized by the diversity and density entrepreneur's social network
	Shane (2001)	Effectiveness of IP protections and possession of complementary assets in distribution and marketing incentivize market entry.
	Shane (2001)	The more radical and broad new an inventor's creation is the more likely it is to result in firm formation.
	Shane and Khurana (2003)	Inventors with specific and deep industry knowledge are more likely to found a firm in that industry
	Sorenson and Stuart (2001)	Co-location and possession of overlapping social networks with financiers increases the likelihood of VC investment
	Stuart and Sorenson (2005)	Social networks facilitate the identification of nascent opportunities and the ability to mobilize resources to exploit them
Entrepreneurial Cognition	Carnahan (2013)	Market entry is more likely when incumbent firms fail and release resources into the environment
	Douglas and Shepherd (2000)	Entrepreneurs, on the margin, are less risk averse and will enter the market pending the accrual of adequate resources.
	Gompers et al. (2005)	The culture of undiversified, venture backed, firms is more likely to spin-off peripherally related startup firms.
	Grégoire et al. (2010)	Entrepreneurs are more skilled at identifying market opportunities because they draw atypical mental market connections
	Iyigun and Owen (1998)	Agents are more likely to devote resources away from entrepreneurial endeavors when less risky options exist
	McMullen and Shepherd (2006)	Entrepreneurial knowledge and motivation allow her to identify opportunities which are subsequently evaluated and acted / not acted upon
	Sarasvathy et al. (1998)	Entrepreneurs are less risk averse and accept more personal responsibility in business dealings than other actors
Economic Conditions	Armington and Acs (2002)	Firm birth rates are correlated with firm density, income, and population
	Bresnahan et al. (2001)	Local skilled management, labor, and connection to buyers/ suppliers are correlated with firm founding rates
	Delacroix et al. (1989)	Prior firm foundings and failings are correlated with the emergence of new firms
	Dubini (1989)	Munificent environments: characterized by efficient infrastructures, access to capital markets, and lacking strong competition are more likely to spawn new ventures
	Hannan and Freeman (1987)	There is a curvilinear relationship between firm founding and subsequent firm founding in a local area
	Klepper and Graddy (1990)	The growth rate of incumbents and ability of new entrants to imitate them is correlated with local market entry
	Saxenian (1994)	Highly dense agglomerated economies allow the emergence of social networks which facilitate firm birth and growth
	Sorenson and Audia (2000)	The ability to leverage existing social networks and acquire tacit knowledge leads to the geographic concentration of industries.

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